



April 1, 2022

NYSEG and RG&E Five-Year Capital Investment Plan (2022-2026)



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Chapter 1 Executive Summary

This document presents a comprehensive five-year Capital Investment Plan for the electric transmission, distribution, generation, and natural gas businesses of AVANGRID Networks’ New York operating companies, New York State Electric & Gas Corporation (“NYSEG”) and Rochester Gas and Electric Corporation (“RG&E”), for the period 2022 through 2026 (the “Plan”). This Plan reflects the full needs of the Companies’ systems over the next five years in order for NYSEG and RG&E (the “Companies”) to continue to provide safe, secure, reliable and resilient service to customers and help New York State reach its environmental and clean energy goals. The Companies plan reflects needed investments of \$11.1 billion in the electric delivery and generation systems and \$1.1 billion in the gas delivery system over the five-year period 2022-2026. . These investments will put the Companies on the right track towards improving their overall service to customers. They will also mitigate the potential for continued future negative reliability impacts. Finally, they will help achieve the State’s clean energy goals; especially, the 70% renewable generation by 2030 through the Companies Phase 1 CLCPA proposed projects.

	2022 Forecast	2023 Forecast	2024 Forecast	2025 Forecast	2026 Forecast	Total 2022-2026
NYSEG Electric	806.2	1,541.1	1,942.6	2,077.1	2,250.5	8,617.4
NYSEG Gas	115.0	128.9	153.5	119.6	117.4	634.4
Subtotal NYSEG	921.2	1,670.0	2,096.1	2,196.7	2,367.9	9,251.9
RG&E Electric	285.1	492.4	595.1	613.5	493.3	2,479.5
RG&E Gas	85.4	92.6	114.6	99.4	95.6	487.6
Subtotal RG&E	370.6	585.0	709.6	713.0	588.9	2,967.1
Total	1,291.8	2,254.9	2,805.8	2,909.7	2,956.8	12,219.0

The Companies use a rigorous and structured investment planning process to determine the overall level of need and govern the eventual plan to implement. This includes a capital investment planning and approval process that assesses the system needs and introduces projects and programs to address those needs in relation to the strategic objectives of the Companies. The result is a comprehensive capital investment plan that includes projects and programs related to (1) customer focus, (2) asset condition replacement, (3) reliability improvements, (4) clean energy transformation, (5) resiliency, (6) system operations, (7) modernization, (8) compliance requirements, and (9) innovation.

In addition, the Companies also review the capital investments needed to support functions such as information technology, fleet, facilities, physical and cyber security, operational smart grids and training.

The overall five-year investment plan needs of \$12.2 billion are large and the impact on customer rates is something that cannot be ignored; especially given the current macroeconomic conditions. The current macroeconomic and geopolitical issues coupled with the effects of the COVID pandemic also introduce other investment plan variables such as supply chain constraints and delays, material shortages, challenges finding enough qualified external resources, etc. These could introduce investment volatility with downward pressure of up to 15 – 30% depending on the program and project in question. The Companies look forward to the upcoming rate case filing to address the needs of the systems and explore creative solutions to moderate the rate impacts associated with these important investments.

The Plan contains projects and programs categorized by their main driver of the investment as follows, listed in no particular order, below. A project or program may have aspects that could be assigned to several different categories; however, the plan has assigned each project or program to one and only one category that reflects the most predominant underlying system need being addressed..

- **Asset Condition**: This category includes those projects and programs that are needed to address assets deemed to be beyond their useful operating life expectancy. These projects / programs are identified as a result of various Planning studies, ongoing Maintenance programs, and immediate needs brought forth by System Operations. For Gas, this group includes the Leak Prone Main Replacement program, regulator and gate station improvements, distribution and transmission main replacement projects, pressure reliability projects, and other asset condition projects.

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- **Reliability**: This category includes those projects and programs that are needed to address immediate and longer-term system needs such as thermal / capacity overloads, voltage, and loss-of-load violations.
- **Resiliency**: This category includes those projects and programs that are needed to improve system restoration capabilities following any number of unplanned transmission and distribution contingency events. These projects/programs seek to improve overall system flexibility and provide system operators with the appropriate visibility and field infrastructure to quickly restore power and minimize customer exposure following a contingency event.
- **Compliance (Electric Only)**: This category includes those projects and programs that are needed to address compliance requirements/criteria, mandates, orders, or other regulatory / governmental direction such as the NERC BES Program (TPL-001-4) or the NERC Alert Program.
- **Clean Energy Transformation**: This category includes those projects and programs that are needed to enhance system capabilities and accommodate an increased level of renewable resource penetration and/or support proposed local municipality grid modification initiatives (e.g., “electrification”). This category includes projects such as the CLCPA Transmission Projects that were recently developed in support of NY’s Climate Leadership and Community Protection Act (CLCPA).
- **Customer Focus**: This category includes those projects and programs that are needed to meet the needs of our customers. This category of projects / programs includes initiatives such as new connections, state and municipal projects, customer lighting, etc.
- **Modernization**: This category includes those projects and programs that are needed to enhance the companies’ ability to operate the system in a more effective and efficient manner. This category of projects / programs includes those which are designed to address outdated business systems, metering infrastructure, etc.

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- Mandatory (gas only): This category includes projects and program that are required by tariff, regulatory order or law and/or related to the safety of employees and/or the general public.
- Innovation: This category includes projects that introduce a new or significantly improved product or process, a new business practice or development of external relations.

The categorizations of Generation and Common expenditures group certain projects and programs into the main drivers of the investments. Generation projects and programs have been grouped into Asset Condition, Capacity, and System Operations. The Generation Asset Condition category provides the capital requirements to replace obsolete and aged infrastructure, the Generation Capacity category addresses other generating station updates, and the Generation System Operations category is aimed at minor capital expenditures to maintain these assets. The Common expenditures are grouped into Buildings and Facilities, Fleet, Information Technology, Operational Smart Grids, Security and Training.

The proposed capital expenditures in this plan will allow the Companies to meet its business objectives, including the provision to its customers of safe, reliable service while meeting future system needs, improving reliability and accommodating the increased proliferation of clean energy resources in support of NY's CLCPA initiative and local municipality decarbonization initiatives.

Chapter 2 Introduction / Objective

The objective of this document is to present a comprehensive five-year Capital Investment Plan for the electric and natural gas transmission, distribution, and hydro generation businesses of AVANGRID Networks' New York operating companies ("Companies"), New York State Electric & Gas Corporation ("NYSEG") and Rochester Gas and Electric Corporation ("RG&E"), for the period 2022 through 2026.

This investment plan includes those projects and programs that are most critical in the continued improvement / enhancement of system performance, focusing on key factors such as system reliability, resiliency, renewal of aged assets, and grid enhancements to accommodate an increased level of clean energy source penetration.

This proposed capital investment plan relies heavily on the prioritization of projects and programs based on their contribution to the improvement in system reliability and resiliency metrics. This includes, but is not limited to, the replacement of aged / deteriorated assets beyond their useful life, enhancing remote control (SCADA¹) / automation capabilities, and mitigating system violations such as transmission thermal/voltage violations and distribution system capacity needs.

The contents of this document are organized as follows:

- Executive Summary (*Chapter 1*): Offers an Executive Summary of the contents within this document.
- Introduction / Objective (*Chapter 2*): Introduces the document and its content.
- Planning Process (*Chapter 3*): Provides an overview of the Planning and Approval Processes including strategic objectives of the Companies. Also included in this chapter is a brief investment summary of electric and gas for each of the Companies.

¹ Supervisory Control and Data Acquisition

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- Project / Program Categorization (Chapter 4): Provides a list of categories and associated definitions that were developed as part of this plan. All projects and programs described herein have been categorized in accordance with these definitions.
- Electric Capital Investment Forecast (Chapter 6): Provides and describes the Electric Capital Investment Forecast required to meet the Companies' strategic objectives, consistent with NY State energy and climate goals. The forecast has been grouped into categories which describe the main drivers for the investments presented.
- Generation Capital Investment Forecast (Chapter 6**Error! Reference source not found.**): Provides and describes the Hydro Generation Capital Investment Forecast required to meet the Companies' strategic objectives, consistent with NY State energy and climate goals. The forecast has been grouped into categories which describe the main drivers for the investments presented.
- Gas Capital Investment Forecast (Chapter 7): describes the Natural Gas Capital Investment Forecast required to meet the Companies' strategic objectives, consistent with NY State energy and climate goals. Likewise, the plan has been grouped into categories which describe the main drivers for the investments.
- Common Capital Investment Forecast (Chapter 8): Outlines the Common Capital Investment Forecast to meet the strategic objectives of the Companies, consistent with NY State energy and climate goals. These projects and programs support more than one of the businesses and are categorized, by the most predominant area driving the investment.

Chapter 3 Planning Process

The process for planning and executing the Companies' capital investments is critical to the overall success of the Plan. The process is a rigorous approach that addresses selection, prioritization, approval, execution, and governance of the capital portfolio of projects and programs. The Plan is refreshed annually by reviewing and updating the projects and programs, aligning functional needs, and synchronizing resources, costs, and schedules.

Section 3.1 Planning Process

The following is a description of the annual capital investment planning process for NYSEG and RG&E. Details of each of the Company's investment forecasts are included in the chapters following this one.

Section 3.2 Planning Objectives

In identifying projects / programs included in a capital investment plan, each Company considers the following strategic objectives:

- Maintaining safety and improving, where needed, security.
- Meeting customers' electric and gas needs.
- Achieving service reliability and quality targets.
- Replacing assets and facilities based on underlying condition assessment and obsolescence.
- Improving the network's overall performance, effectiveness and efficiency.
- Sustaining the environment and transforming the grid, including enhancing system robustness to accommodate the increased proliferation of clean energy resources in support of NY's Climate Leadership and Community Protection Act (CLCPA) initiative, and local municipality decarbonization initiatives (e.g., "electrification").

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During the planning process, each Company selects projects aimed at achieving one or more of these objectives in a cost-effective and timely manner.

Section 3.3 Contributors

The contributors to the plan include both operational business areas as well as those areas that support the operation of the business. Each group is responsible for a sector of the business and coordination and communication occurs between each as the system needs are assessed and the investment plan is developed and refined.

The business and support areas that contribute to each Company plan are as follows:

- Operational Business Areas: Asset Management and Planning, Customer Service, Electric Operations, Gas Operations, Generation, Process & Technology, Projects, Operational Technology and Smart Grid Innovation.
- Support Business Areas: General Services and Fleet, Information Technology, Training and Physical and Cyber Security.

Section 3.4 Plan Overview

The investment plan is developed to meet the needs of customers, improve reliability, strengthen the system against the adverse effects of major storms, ensure that cyber and physical aspects of the system are secure, support grid enhancement to accommodate NY's aggressive CLCPA objectives, and achieve the long-term business objectives of the Company. The projects and programs proposed in the plan are those that have currently been analyzed and determined to be necessary to support the delivery of safe and reliable service to customers.

The Companies continually re-evaluate and re-prioritize projects / programs and review the system needs due to the continually changing environment in which the Companies operate. Therefore, at any single point in time, the plan is a current snapshot of the portfolio of projects and overall system needs, which will likely change as a result of ongoing re-evaluation and re-prioritization processes embedded within the investment planning process.

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For example, many of the electric projects reduce the risk of service outages in the event of contingency situations while other projects address mandates issued by state and federal regulators, and we expect that new regulations will be forthcoming during the term of this Plan. In addition, there are several projects that continue the process of bringing the electric delivery system up to present day standards by modernizing equipment, employing software and IT platforms, and expanding system automation. These standards are under reviewed regularly and reassessed to identify the best solution to meet the needs of our customers. The phases of the planning process are described in *Section 3.5*. While the plan phases are defined, the process is fluid and the re-iteration through the phases occurs many times throughout the year as new factors are introduced and other factors change such as regulatory requirements, customer needs and system conditions.

Section 3.5 Phases of the Planning Process

Phase I – Initiation and Planning: During this initial phase, the business areas focus on the Companies’ strategic objectives to meet the needs of the systems and of its customers effectively and efficiently. A description of each of those objectives are as follows:

- **Objective 1 – Maintain and Improve System Safety:** Safety is each Company’s number one priority, and each Company accordingly places significant emphasis on the safety of its employees and the public. The Companies operate a “no harm” culture and will continue to make investments to assure the safe and reliable operation of the system.

No aspect of the Companies’ operations is more important than accident prevention. Safety is a value that does not change. There is no job so important that established safety rules are ever compromised. Management strives to provide a hazard-free work environment that complies with all applicable health and safety laws and regulations, and educates employees,

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customers and the public about health and safety hazards associated with our operations. Further, management is committed to the recognition, assessment, and control of health and safety hazards related to each of the Company's facilities and operations.

Each Company continues to upgrade the physical security at and around the NYSEG and RG&E facilities as well as the overall cyber security infrastructure to keep the Companies' employees and the public safe, to help ensure the integrity of the Companies' systems and provide reliable service to customers. These upgrades include improved access control, video surveillance and alarming capabilities. More stringent NERC standards require the Companies to improve and expand its security capabilities to protect critical electric system infrastructure. Further, the challenges that each Company faces to ensure data protection, privacy and ensuring compliance with regulatory and legal mandates continue to grow as threats evolve and grow increasingly more sophisticated.

- **Objective 2 – Meet the Electric Needs of our Customers:** Each Company needs to provide reliable and dependable electric service to large commercial and industrial customers as well as residential customers. Often large commercial and industrial customers require an upgrade to a Company's electric facilities to meet their needs, and the Companies strive to make these upgrades in a timely manner. In certain cases, all, or a portion of the costs of these upgrades may be offset by contributions from the specifically affected customers. Additionally, with the increased proliferation of distributed energy resources (DER) on the electric system, the Companies must interconnect large and small generation projects to its transmission and distribution system, as requested by customers and in accordance with applicable regulatory requirements.

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- **Objective 3 – Achieve Service Reliability and Quality Targets:** The Electric Plan supports this strategic objective by the following actions:
 - Prevent or minimize system violations on lines and transformers and other electrical elements under normal operating conditions (N-0) at peak demand.
 - Prevent or minimize system adverse impacts caused by contingency situations (N-1) and (N-1-1); and
 - Enhance operation and restoration of the system through replacement and modernization of end-of-life equipment.

- **Objective 4 – Replace Assets and Facilities Based on Condition and Obsolescence:** Each Company continuously reviews equipment and facilities to determine which assets may be in need of replacement. Typically, those assets are identified due to one of the following conditions:
 - Equipment and facilities with high failure rates.
 - Technological obsolescence (e.g. inability to obtain spare parts).
 - Facilities that are determined to be beyond their useful operating life and the maintenance of such equipment is no longer cost effective.
 - Equipment with high maintenance costs for reasons other than their deteriorating condition.
 - Risk of not meeting safety, reliability, and environmental objectives; and
 - Other indicators of asset health.

- **Objective 5 – Improve Effectiveness and Efficiency Through Modernization:** Each Company continually looks for ways to make operations more effective and efficient. One of those ways is through network automation. The Companies continue to modernize the operations of its systems, enhancing the effectiveness with which NYSEG and RG&E serves customers, and

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enhancing reliability and efficiency. On the electric system, the primary customer benefit of automation is more efficient and effective response to distribution circuit outages thereby limiting the number of customers impacted by an outage event. The crews restoring service will receive notification of an outage sooner than they would have absent an automated system of notification. Adding reclosers on distribution lines reduces the potential number of customers whose service is impacted during an outage and reclosers will quickly relay the location of an outage to the Companies' energy control centers (ECCs). Additionally, the Companies project an increase in crew efficiency due to the reduction of travel time to assess an outage. Investment in automation will also be compatible with technologies required for the development of a smart grid.

- **Objective 6 – Enable Clean Energy Transformation:** Advance New York State's CLCPA goals and other clean energy / decarbonization ("electrification") initiatives being proposed by the state and local municipalities.

Phase II – Data Gathering and Analysis: Given the objectives of the Companies, the business areas analyze data to determine whether the objectives are being met. The data is collected and provided through several different methods such as asset condition health assessments, inspection programs, failed equipment information, and asset replacement practices.

The business areas determine the data that needs to be collected and reviewed to assess the system needs. For instance, fleet replacement is determined by application of the established fleet replacement procedure which contains specific criteria for replacement including age, maintenance, and condition. With electric and gas equipment, there are many factors which contribute to the inclusion of projects in the

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plan, including customer and capacity needs, the overall obligation to serve, reliability indices, asset health, system hardening needs, adherence to operating standards, and support of normal operations. New projects are initiated, and current projects may be adjusted, based on the information that has been collected and analyzed.

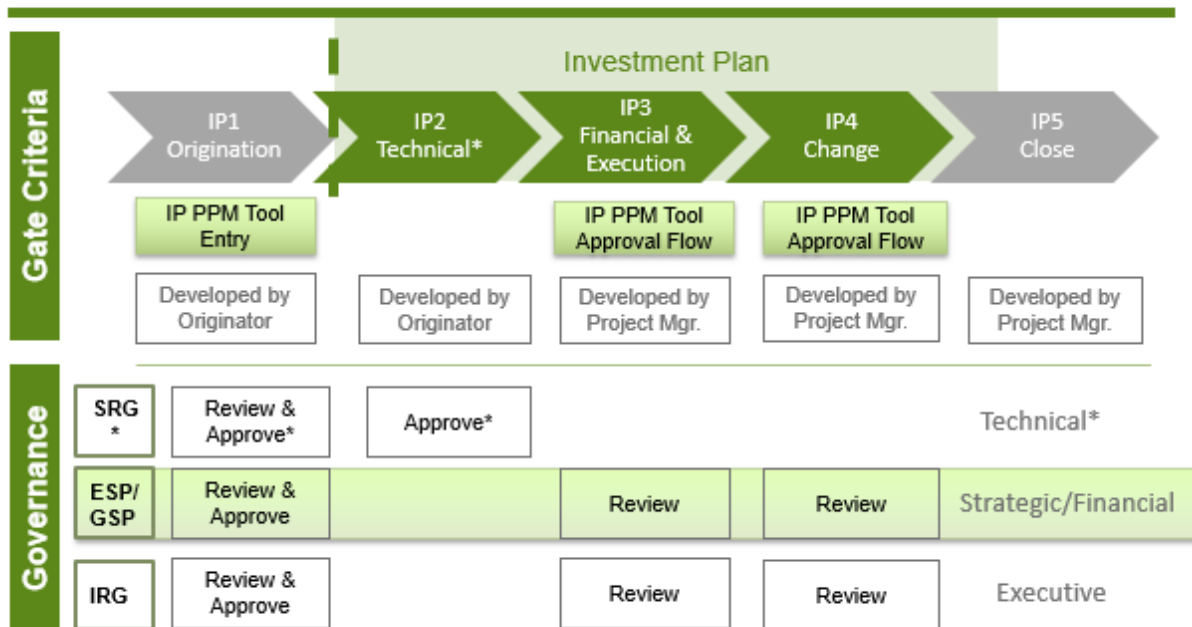
Phase III – Individual Budget and Plan Development: Upon the completion of the analysis and data gathering efforts, the business areas then develop and/or modify the individual project forecasts. These individual project forecasts comprise a business area's forecast which in turn becomes a component of the Companies total capital plan. Business area plans can-and-do change based on a variety of factors, including system conditions, customer needs and regulatory requirements. These conditions are reviewed and addressed by the business areas.

Phase IV – Plan Review and Alignment: Utilizing the information and budget data from each area's individual plans, the Companies' capital investment plan is compiled. The plan is reviewed for alignment across the business areas and may be adjusted during the review process.

Section 3.6 Capital Investment Planning Approval Process

The Companies' have designed the Planning and Investment Approval Process to be in alignment with the Companies' planning objectives as described above. The process includes Governance oversight, and project review and approval stage gates with an overall focus on project justification, review, and prioritization. A graphic representation of the planning processes is shown below.

Planning/Approval Process



*Currently the IP2 phase and SRG is designed strictly for Electric. This may be extended to other areas in the future.

Figure 1 – Investment Planning and Approval Process

Governance:

Depending on the value, complexity and nature of the investment, proposed projects and previously identified projects are reviewed by one or more of the following governance review groups through the approval process.

- System Review Group (SRG) – This group reviews the technical and engineering aspects of certain electric system investments.

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- Electric Strategic Planning Group (ESP) – This group provides for the review the regulatory and financial aspects of a project in relation to the current portfolio. This group reviews projects across all electric, and common business areas and for new and existing projects original approval and changes.
- Investment Review Group (IRG) – This group is comprised of executives and provides them the opportunity to review investments to move forward as suggested.

Stages in the Investment Planning Approval Process:

The approval process consists of a staged approach. This staged approach to investment approval where investments are approved at distinct points (gates, noted as IP1, IP2, etc. in Figure 1) throughout the process provides for:

- Separate concept and technical/engineering approval stages that ensure only those projects that have viable solutions have resources allocated to develop full technical specifications.
- Separate governance reviews and approvals for financial/execution before expending funds.
- Re-approval of investments while not necessary for all projects does allow for Governance Teams to challenge the underlying reasons for those that do propose a change to the scope, schedule or cost of a project. This also has the advantage in that it tends to draw out lessons learned for application to future projects.

The five-stage Investment Planning Approval gates are described in detail below and illustrated in **Error! Reference source not found.** .

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- **Conceptual Approval (IP1)**: An IP1 is required to initiate a new project/program for its inclusion into the capital investment plan. All projects not currently in the capital investment plan begin with this phase. IP1's are presented to the appropriate governance groups for approval or further action based on the level and complexity of the projects.
- **Technical/Engineering Approval (IP2)**: The approval is facilitated by the SRG governance group to review the need and technical aspects of certain electric projects including proposed solution design, alternatives considered, capital expenditure levels, project timeline, environmental concerns, and other pertinent information deemed necessary.
- **Financial/Execution Approval (IP3)**: This stage represents the approval to expend funds on the execution of the project. For those projects requiring IP2 approval, this stage follows that approval. This is done by submitting an IP3 for review and approval. They are presented to appropriate governance groups for approval or further action based on the level and complexity of the projects and then flows through the required grants of signing authority. Discussions at governance groups include level of the budget, regulatory position, alternative options, project risks, and other project details.
- **Change Approval (IP4)**: An IP4 is required for all project changes that fall outside allowed project tolerance parameters. Project changes are presented to the governance review groups based on the complexity and level of the investment. The discussions include reason for the change to scope, schedule and/or cost, nature of the expenditure, impact on current budget/forecast/plan, and regulatory considerations.

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- **Project Close (IP5):** When a project is materially, technically and financially complete, the project manager follows through with closure procedures.

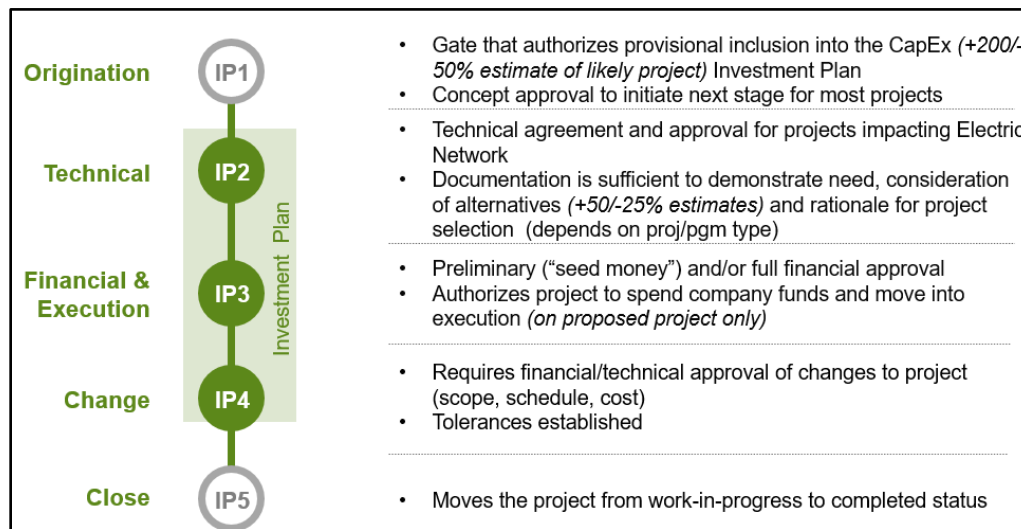


Figure 2 – Investment Planning Gates

Chapter 4 Project / Program Categorization

The following is a list of principal categories that were applied across the portfolio of projects / programs with associated descriptions for each. *It should be noted that these categories are not listed in any particular order.*

- Asset Condition: This category includes those projects and programs that are needed to address assets deemed to be beyond their useful operating life expectancy. These projects / programs are identified as a result of various Planning studies, ongoing Maintenance programs, and immediate needs brought forth by System Operations. For Gas, this group includes the Leak Prone Main Replacement program, regulator and gate station improvements, distribution and transmission main replacement projects, pressure reliability projects, and other asset condition projects.
- Reliability: This category includes those projects and programs that are needed to address immediate and long-term system needs such as thermal / capacity overloads, voltage, and loss-of-load violations.
- Resiliency: This category includes those projects and programs that are needed to improve system restoration capabilities following any number of unplanned transmission and distribution contingency events. These projects/programs seek to improve overall system flexibility and provide system operators with the appropriate visibility and field infrastructure to quickly restore power and minimize customer exposure following a contingency event.
- Compliance (Electric Only): This category includes those projects and programs that are needed to address compliance requirements/criteria, mandates, orders, or other regulatory / governmental direction such as the NERC BES Program (TPL-001-4) or the NERC Alert Program.
- Clean Energy Transformation: This category includes those projects and programs that are needed to enhance system capabilities and accommodate an increased level of renewable resource penetration and/or support proposed local municipality

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grid modification initiatives (e.g., “electrification”). This category includes projects such as the CLCPA Transmission Projects that were recently developed in support of NY’s CLCPA.

- Customer Focus: This category includes those projects and programs that are needed to meet the needs of our customers. This category of projects / programs includes initiatives such as new connections, state and municipal projects and customer lighting.
- Modernization: This category includes those projects and programs that are needed to enhance the companies’ ability to operate the system in a more effective and efficient manner. This category of projects / programs includes those which are designed to address outdated business systems and metering infrastructure.
- Mandatory (gas only): This category includes projects and programs that are required by tariff, regulatory order or law and/or related to the safety of employees and/or the public.
- Innovation: This category includes projects that introduce a new or significantly improved product or process, a new business practice or development of external relations.

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Chapter 5 Investment Amount Summary

The Capital Investment Plan, summarized by Company and Line of Business for the five-years, 2022-2026, is presented below:

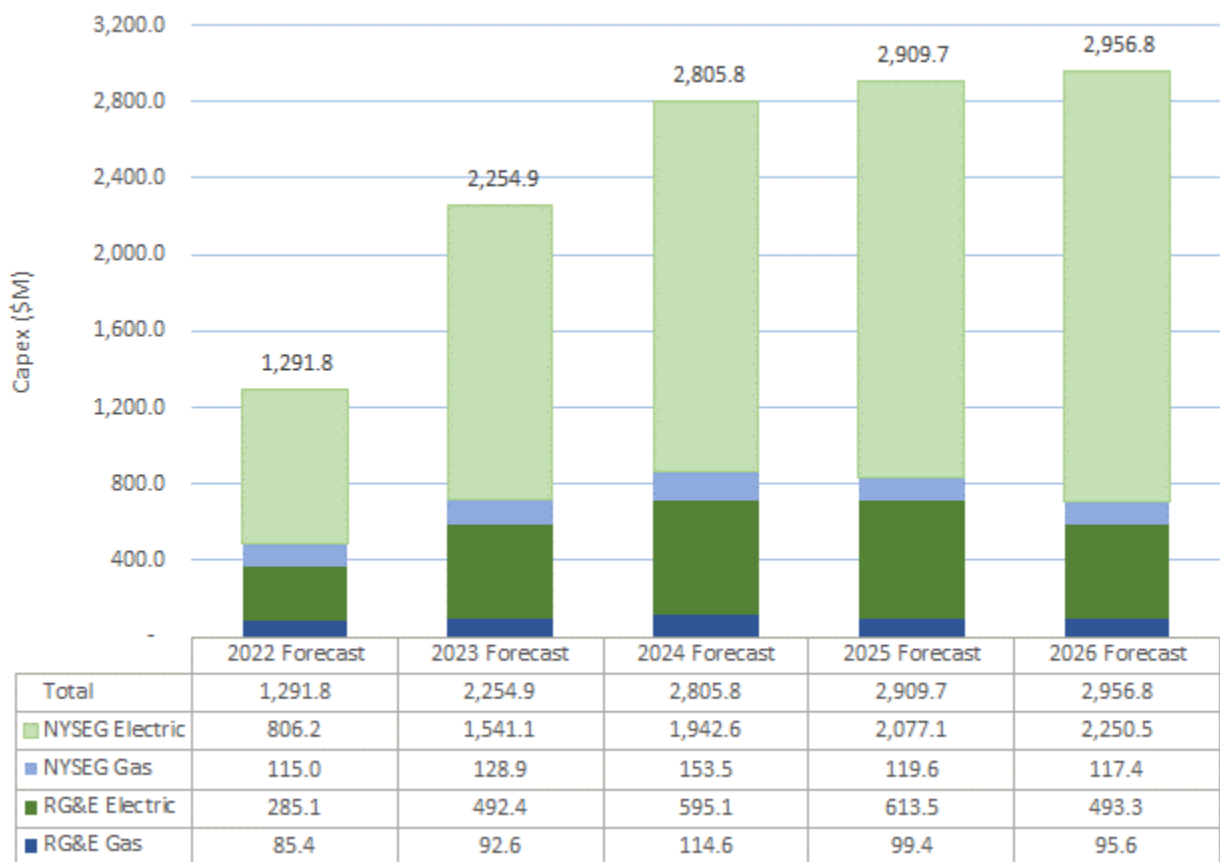


Figure 3 – NYSEG and RG&E Capital Investment Plan

NYSEG and RG&E 5-Year Capital Investment Plan

Chapter 6 Electric and Generation Capital Investment Forecast

This section will further detail by major investment category the overall Electric and Generation capital investments. The categorization of the Plan is grouped into Asset Condition, Reliability, Resiliency, Compliance, Clean Energy Transformation, Customer Focus, Modernization, Innovation, and Hydro Generation. The sub sections below summarize the major investment categories for the five years 2022-2026.

Section 6.1 Electric and Generation Capital Investment Requirements

The Capital Investment Forecast for the five year period 2022-2026 for NYSEG Electric and Generation² Table 1 and for RG&E Electric and Generation³ Table 2 are shown below.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Asset Condition	\$ 124,194	\$ 309,006	\$ 467,768	\$ 576,269	\$ 612,535	\$ 2,089,772	
2 Reliability	82,662	110,805	90,917	103,509	79,861	467,753	
3 Resiliency	69,050	91,085	103,960	102,681	103,542	470,318	
4 Compliance	81,261	137,812	157,194	121,938	121,880	620,085	
5 Clean Energy Transformation	7,903	20,233	-	-	-	28,136	
6 Customer Focus	106,968	150,627	152,644	160,259	164,038	734,535	
7 Modernization	62,638	63,965	72,260	49,959	13,755	262,576	
8 Innovation	10,615	12,344	48,015	72,655	2,482	146,111	
9 Hydro-Generation	7,525	7,353	19,742	24,905	57,838	117,363	
10 Subtotal Electric Capital	552,815	903,230	1,112,500	1,212,174	1,155,931	4,936,650	
11							
12 Common Allocation to Electric Business	102,808	136,422	178,914	117,003	104,050	639,197	
13 Subtotal Electric Capital	655,623	1,039,653	1,291,414	1,329,177	1,259,981	5,575,848	
14							
15 NYSEG Projects - CLCPA Transmission and Ithaca Electrification CAPEX							
16 CLCPA Transmission Projects - Phase I	125,700	188,200	305,000	310,300	429,100	1,358,300	
17 CLCPA Transmission Projects - Phase II	24,800	310,200	330,200	417,600	545,400	1,628,200	
18 Ithaca Electrification Projects - Phase 1	100	3,000	6,000	10,000	6,000	25,100	
19 Ithaca Electrification Projects - Phase 2	-	-	10,000	10,000	10,000	30,000	
20 Subtotal CLCPA Transmission, Ithaca CAPEX	150,600	501,400	651,200	747,900	990,500	3,041,600	
21 Total NYSEG Electric Capital	\$ 806,223	\$ 1,541,053	\$ 1,942,614	\$ 2,077,077	\$ 2,250,481	\$ 8,617,448	

Table 1 – NYSEG Electric and Generation Capital Investment Forecast

² Note: NYSEG Common allocation to the Electric Line of Business is 80.26%.

³ Note: RG&E Common allocation to the Electric Line of Business is 71.39%.



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A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Asset Condition	\$ 54,054	\$ 131,520	\$ 153,976	\$ 183,726	\$ 146,208	\$ 669,484
2 Reliability	70,041	144,946	141,567	112,647	69,513	538,714
3 Resiliency	19,073	23,746	28,654	31,930	34,984	138,386
4 Compliance	20,456	32,891	50,401	63,962	77,563	245,273
5 Clean Energy Transformation	-	-	-	-	-	-
6 Customer Focus	32,338	68,375	77,510	82,028	80,197	340,448
7 Modernization	26,246	25,876	29,558	17,453	4,481	103,614
8 Innovation	6,289	6,247	25,394	38,485	1,722	78,138
9 Hydro-Generation	9,791	7,253	24,945	19,090	9,278	70,357
10 Subtotal Electric Capital	238,288	440,854	532,003	549,321	423,946	2,184,413
11						
12 Common Allocation to Electric Business	46,261	44,452	56,958	54,203	44,073	245,946
13 Subtotal RG&E Electric Capital	284,549	485,306	588,961	603,524	468,019	2,430,359
14						
15 RG&E Project - CLCPA Transmission CAPEX						
16 CLCPA Transmission Projects - Phase II	600	7,100	6,100	10,000	25,300	49,100
17 Subtotal RG&E CLCPA Transmission	600	7,100	6,100	10,000	25,300	49,100
18 Total RG&E Electric Capital	\$ 285,151	\$ 492,408	\$ 595,063	\$ 613,526	\$ 493,321	\$ 2,479,459

Table 2 – RG&E Electric and Generation Capital Investment Forecast

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Section 6.2 Electric Asset Condition Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to asset condition improvements. The Electric Asset Condition Capital Investment Forecast is summarized for NYSEG Electric in Table 3 and for RG&E Electric in Table 4.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Asset Condition	\$ 124,194	\$ 309,006	\$ 467,768	\$ 576,269	\$ 612,535	\$ 2,089,772	
2 TLD Replacements	14,500	44,000	87,000	130,000	174,000	449,500	
3 Pole Replace (WPIT) Program CAP	24,338	68,260	76,799	83,873	102,704	355,974	
4 Distribution Line Deficiencies	28,700	40,228	46,440	52,169	58,581	226,118	
5 Elec Better	13,297	31,321	32,261	33,228	34,225	144,332	
6 Gardenville Substation Rebuild	2,503	13,177	29,429	46,219	40,663	131,991	
7 T&S Asset Condition Replacement Program	1,200	10,000	30,000	30,000	30,000	101,200	
8 Substation Modernization - South Owego	-	-	14,919	29,838	34,811	79,569	
9 Line 968 115 kV Rebuild	-	-	3,933	27,501	43,880	75,314	
10 Substation Modernization - Noyes Island T	1,245	23,152	21,309	24,139	-	69,845	
11 PCB Transformer Replacements	-	17,169	17,169	17,169	17,169	68,675	
12 Substation Modernization - Wright Avenue	-	5,719	23,133	22,022	15,961	66,835	
13 South Perry New Sub & Trans Line Upgrade	599	6,418	26,103	9,158	-	42,278	
14 Substation Modernization - Clark Street	-	-	1,992	3,074	34,014	39,080	
15 Meyer New 2nd 115/34.5kV Transformer	-	-	9,946	19,892	4,973	34,811	
16 Substation Minor Capital	6,313	6,338	6,310	6,427	6,547	31,935	
17 Line 890 Rebuild	1,709	18,598	10,732	14	-	31,052	
18 Circuit 590 Rebuild	-	-	9,946	14,919	4,973	29,838	
19 Line 880 Rebuild	8,748	13,041	7,550	-	-	29,339	
20 General Equipment - OPS-T&D	3,565	5,219	5,287	3,972	4,090	22,133	
21 Line 803 - Croton to Tilly Foster Rebuild	9	355	1,636	16,796	-	18,796	
22 Substation Major Program	5,254	1,924	1,481	1,511	1,542	11,713	
23 URD Replacement Program	-	2,000	3,000	3,000	3,000	11,000	
24 Woodlawn SS Transformer	6,220	143	-	-	-	6,364	
25 Battery Program	980	833	874	918	964	4,570	
26 Bennet Transformer	3,515	-	-	-	-	3,515	
27 General Equipment - OPS-SO	1,215	412	420	429	437	2,913	
28 ARIES Purchase & program improvements	125	700	100	-	-	925	
29 Checkpoint Firewall Upgrades Subs	156	-	-	-	-	156	
30 Total	\$ 124,194	\$ 309,006	\$ 467,768	\$ 576,269	\$ 612,535	\$ 2,089,772	

Table 3 – NYSEG Electric Asset Condition Capital Investment Forecast

NYSEG and RG&E 5-Year Capital Investment Plan

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Asset Condition	\$ 54,054	\$ 131,520	\$ 153,976	\$ 183,726	\$ 146,208	\$ 669,484
2 T&S Asset Condition Replacement Program	600	4,000	20,000	20,000	20,000	64,600
3 Pole Replace (WPIT) Program CAP	10,472	11,522	12,906	13,832	15,143	63,874
4 Station 29 Modernization Project	300	4,864	9,727	29,181	14,591	58,663
5 Elec Better	6,069	12,373	12,744	13,126	13,520	57,832
6 Station 82 Upgrades	2,007	9,470	10,636	10,752	22,604	55,469
7 Station 37 Modernization Project	300	4,491	8,982	26,947	13,474	54,194
8 Station 43 Modernization Project	7,771	10,833	10,012	8,411	3,025	40,053
9 Station 34 Modernization Project	300	4,491	8,982	13,474	8,982	36,230
10 UG Cable Replacements	3,717	7,821	7,821	7,821	7,821	35,001
11 Station 156 Transf./Facilities upgrade	4,911	8,802	7,509	4,808	4,101	30,131
12 Station 192 Trans Facilities Upgrade	2,908	5,549	12,056	7,079	-	27,591
13 Station 5 Substation Mod D	287	13,304	6,459	6,236	164	26,450
14 Distribution Line Deficiencies	2,006	4,165	4,807	5,481	6,207	22,666
15 URD Replacement Program	-	3,000	5,000	5,000	5,000	18,000
16 Circuit 794 Rebuild	4,051	11,353	-	-	-	15,404
17 PCB Transformer Replacements	-	3,714	3,714	3,714	3,714	14,855
18 Station 51	2,192	5,403	5,295	46	-	12,936
19 TLD Replacements	1,107	1,000	2,000	3,000	3,000	10,107
20 Substation Minor Program	495	1,525	1,556	1,587	1,619	6,781
21 Substation Major Program	522	1,872	1,380	1,408	1,436	6,618
22 General Equipment - OPS-T&D	586	1,001	1,401	815	779	4,582
23 Battery Prog	785	801	817	834	851	4,088
24 Rochester Circuit 649 Upgrade	1,488	-	-	-	-	1,488
25 General Equipment - OPS-SO	350	168	171	175	178	1,042
26 Station 208 - Modernization Project	671	-	-	-	-	671
27 Checkpoint Firewall Upgrades Subs	159	-	-	-	-	159
28 Total	\$ 54,054	\$ 131,520	\$ 153,976	\$ 183,726	\$ 146,208	\$ 669,484

Table 4 – RG&E Electric Asset Condition Capital Investment Forecast

The following describes the key project and program investments which are forecasted under the Electric Asset Condition category:

- Transmission Line Deficiency (TLD) Replacement Program – The Transmission Line Deficiencies (TLD) Replacement program focuses on an “in-kind” structure replacement strategy on transmission lines with known structural / equipment needs. Line segments requiring upgrades are based on needs identified through various inspection programs (crossarm inspections, aerial inspections, infrared inspections, Transmission Line Inspection program and Wood Pole Inspect and Treat Program). The order in which this work is executed is informed by a prioritization tool/algorithm and individual line intervention scopes are determined following a detailed review of facility need(s).
- Distribution Line Deficiencies (DLD) – The Distribution Line Deficiencies (DLD) program seeks to perform permanent repairs on all existing open notifications resulting from distribution line inspections. The program strategy on completing this work is in a “circuit sweep” methodology. By prioritizing circuits based on

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their impact to customer reliability and SAIFI/CAIDI scores, permanent repairs on will be performed on all open DLD notifications of the selected circuit. The intention is to complete work on the backlog while simultaneously working to become current on all due dates, meeting the inspection priority requirements.

- Wood Pole Inspect and Treat (WPIT) Program – The Wood Pole Inspect and Treat (WPIT) program is a program focused on the inspection and refurbishment of wooden poles across the distribution system. The inspection uses specialized contractors to inspect wood poles at ground line for wood decay and insect damage. The inspection also consists of excavation and boring into the pole to identify decay at and below ground line. When a pole is deemed insufficient, it is rejected and identified as requiring a pole replacement generating a notification.
- Electric Betterment Program – The Betterments Program focuses on the replacement of various distribution system elements that contribute to high SAIFI measures. Electric Betterment projects are aimed at improving the reliability of worst performing circuits and maintaining the safe and reliable delivery of electricity to our customers. These projects focus on the reliability, operability, and flexibility of the electric distribution system. This program allows divisions to respond to smaller identified jobs to better improve reliability metrics and reduce the frequency and duration of customer outages. The Companies have funded this program at levels well above those approved in the current Joint Proposal. The Companies are proposing increased investment in this program to address projects identified within the Divisions that will benefit the system and our customers in the future.
- Transmission & Substation (T&S) Asset Condition Replacement Program – The objective of the T&S Asset Condition Replacement Program is to conduct system-wide T&S facility surveys, to determine the overall health of the NYSEG and RG&E systems and develop a long-term mitigation strategy (projects) to enhance the condition of these assets. These comprehensive T&S surveys will

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include an assessment of electrical and structural assets which will be scored against individually weighted categories such as age of equipment, resiliency/flooding impacts, substation P&C assessment, capacity (MVA), substation reliability performance, etc. The overall T&S health scores will then be used to inform a system-wide prioritization of asset condition replacement/upgrade projects across the NYSEG and RG&E portfolio of existing T&S assets.

- Substation Minor Program – The Substation Minors Program covers work at substations under \$200K which is the lower threshold for any major project. This program includes the replacement of substation components such as: (1) CCVT/CT/PT's, (2) transformer component replacements, (3) substation fences, (4) insulators, (5) Relays, (6) arresters, etc. The scheduled replacement of the above elements contributes to the reduction of outages as a result of substation equipment failures, which has been identified as the main root cause of substation outages. Because of this, the Substation Minors Program is expected to contribute to a reduction in SAIFI.
- NYSEG/RG&E PCB Transformer Replacement Program – The objective of this program is to proactively replace the PCB transformers that remain on the distribution system. Although the manufacture of polychlorinated biphenyls (PCBs) was banned in the United States in 1979 due to their numerous adverse health impacts, a portion of NYSEG and RG&E in-service mineral oil-filled pole top transformers still contain PCBs in concentrations above 50 ppm, as these units were manufactured before the national ban was put into effect. (NYSEG) There are currently 8,006 remaining transformers at NYSEG and 3,507 are considered high priority and 4,499 are considered mid priority. (RG&E) There are currently 2,249 remaining at RG&E and 268 are considered high priority and 1,981 are considered mid priority.

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- RG&E UG Cable Replacement Program – The objective of the program is to replace aged / obsolete underground cables proactively and preventatively at RG&E, predominantly in the Rochester Region (City of Rochester).
Approximately 510 sections of aged and obsolete cable were identified, with the oldest installation being 101 years old as of 2021. Priority One; is to address the ‘4-core’ cable as identified in our records. These cable sections will be prioritized first by the total number of downstream customers connected. In addition to the obsolete cable, any ‘pump-log’ duct (i.e., wooden ducts) that are encountered will be replaced in conjunction with any cable replacements. Likewise, any collapsed ducts will be replaced as encountered. External vendors will be utilized for camera inspections to help predetermine scope, i.e., cable replacement or total rebuild of the ducted system. While the mainlines with the highest customer counts will be done first, any ‘side taps’, i.e., smaller laterals off the mainline will also be replaced at that time. This is both for the obvious synergistic efficiencies gained, as well as to avoid negative impacts from stakeholders such as customers, public officials, or the media, if we were to revisit and disturb an area twice. One caveat to the priority noted in #1 above; if a given street is on the City of Rochester’s Moratorium List, then it will be deferred until the city will allow any Utility work to commence. Similarly, if there are repeat and/or frequent outages to a section of cable already identified per this program, that section will be moved up the priority list accordingly. Lastly, pending cable replacements will be reviewed regarding any planned Highway Reconstruction or Relocations. The timing can be advanced or delayed, to align our schedules.

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Section 6.3 Electric Reliability Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to reliability. The Electric Reliability Capital Investment Forecast is summarized for NYSEG Electric in Table 5 and for RG&E Electric in Table 6.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Reliability	\$ 82,662	\$ 110,805	\$ 90,917	\$ 103,509	\$ 79,861	\$	\$ 467,753
2 Breaker Program	18,279	22,848	28,560	29,988	31,488	-	131,163
3 Comprehensive Area Studies	3,000	10,000	15,000	20,000	30,000	-	78,000
4 Transmission Reinforcement Program	5,000	10,000	10,000	10,000	-	-	35,000
5 Distribution Load Relief Program	500	4,500	10,000	10,000	5,000	-	30,000
6 Animal Guard Program	4,366	4,988	5,116	5,245	5,373	-	25,088
7 Milo Substation Rebuild	1,010	17,616	1,007	-	-	-	19,633
8 Wood Street New 3rd 345/115kV Trans	15,747	3,011	-	-	-	-	18,758
9 Crayville New Substation Breaker and Circuit Upgrade	-	4,950	6,560	6,560	-	-	18,070
10 Dingle Ridge - 2nd Bank and 13.2kV Conv	5,557	7,179	-	-	-	-	12,735
11 Circuit Sensor Implementation Plan	1,000	5,000	5,000	1,680	-	-	12,680
12 NeverSink Substation Transformer & Circuit Upgrade	-	500	2,000	8,500	-	-	11,000
13 Hilldale Substation Transformer Replacment & New Circuit	-	600	1,120	1,000	8,000	-	10,720
14 Crafts Substation Transformer Upgrade	-	500	1,000	8,500	-	-	10,000
15 North Brewster Reinforcement	2,218	7,504	30	-	-	-	9,751
16 Hillcrest Transformer Replacement -Cap	8,299	1,242	-	-	-	-	9,541
17 Heritage Hills Upgrade	4,584	2,619	-	-	-	-	7,203
18 Line 620 Rebuild - 34.5 kV	39	1,710	4,086	-	-	-	5,835
19 BIM	-	600	615	2,035	-	-	3,251
20 Sackett Lake Replace Transformer	3,037	-	-	-	-	-	3,037
21 Substation Modernization - Raquette Lake	2,934	11	-	-	-	-	2,946
22 Mobile #4 Replacement	1,555	922	-	-	-	-	2,477
23 Mobile #2 Replacement	1,792	670	-	-	-	-	2,462
24 Afton 34.5KV Line Addition	1,000	1,000	-	-	-	-	2,000
25 Sloan Substation Load Relief	-	850	550	-	-	-	1,400
26 Ithaca - College Ave Underground	1,371	-	-	-	-	-	1,371
27 NY Spectrum HW Refresh CapEx	1,258	-	-	-	-	-	1,258
28 Switched Source Tie Controller	50	885	272	-	-	-	1,207
29 Energy Control Center (ECC) Distribution Room Expansion	-	1,100	-	-	-	-	1,100
30 Willet New 2nd 115-34.5kV Transformer	67	-	-	-	-	-	67
31 Total	\$ 82,662	\$ 110,805	\$ 90,917	\$ 103,509	\$ 79,861	\$	\$ 467,753

Table 5 – NYSEG Electric Reliability Capital Investment Forecast

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	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Reliability	\$ 70,041	\$ 144,946	\$ 141,567	\$ 112,647	\$ 69,513	\$ 538,714	
2 Webster Area Projects	22,942	61,789	16,302	2,774	-	103,806	
3 Station 46 - Replace #1 #3 Transf. Banks T	6,791	11,698	22,533	16,445	2,344	59,811	
4 Line 901/902/942/943/744 Replacement	-	15,072	27,504	16,198	-	58,774	
5 Sta 210 Modernization Prj - Install WO	1,175	1,594	4,730	16,598	20,784	44,880	
6 Breaker Prog	5,015	6,268	7,835	8,227	8,639	35,984	
7 Transmission Reinforcement Program	5,000	10,000	10,000	10,000	-	35,000	
8 Comprehensive Area Studies	500	5,000	5,000	10,000	10,000	30,500	
9 Station 117	3,065	5,296	6,356	9,850	4,553	29,119	
10 Station 49 4KV to 12KV Upgrade	1,000	4,000	8,000	8,000	8,000	29,000	
11 GMI-Station 168 Srvc Area Reinforcements	6,555	7,198	12,512	3	-	26,268	
12 Replace DC Pilot Wire System	320	2,779	9,185	3,734	5,329	21,348	
13 Distribution Load Relief Program	200	1,000	5,800	6,500	6,500	20,000	
14 Animal Guards CAP	2,605	3,119	3,201	3,283	3,365	15,573	
15 Sta-127 115kV System Upgrade D	8,597	6,390	-	-	-	14,987	
16 Circuit Sensor Implementation Plan	1,000	3,000	2,290	-	-	6,290	
17 Station 38 Total Refurbishment D	3,033	438	-	-	-	3,471	
18 RARP Rochester Area Reliability Project	1,731	-	-	-	-	1,731	
19 BIM	-	305	318	1,036	-	1,660	
20 NY Spectrum HW Refresh CapEx	360	-	-	-	-	360	
21 Station 49 Transformer Addition	90	-	-	-	-	90	
22 UG Cable Injection	61	-	-	-	-	61	
23 Total	\$ 70,041	\$ 144,946	\$ 141,567	\$ 112,647	\$ 69,513	\$ 538,714	

Table 6 – RG&E Electric Reliability Capital Investment Forecast

The following describes the key project and program investments which are forecasted under the Electric Reliability category:

- **Breaker Replacement Program** – The Substation Circuit Breaker Replacement program prioritizes the substation circuit breakers in need of upgrades based on the latest health and risk assessment conducted by T&S Asset Management. The assessment lists candidate units to be evaluated for replacement by investigating specific needs including operational and maintenance issues identified for each unit, and coordinating with system operations, maintenance engineering, and the project teams.
- **Comprehensive Area Studies (Distribution-Planning)** – The Distribution Comprehensive Area Improvement Program will consist of several projects that will be identified by the Electric Distribution Planning management team through a process of identifying needs and performance issues that exist under current and future (10 year) loading/topology projections that will negatively impact the ability to provide reliable and consistent power to our customers. Comprehensive area studies are performed on substations and distribution feeders, analyzing present and future conditions related to distribution system capacity loading,

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common operating voltage conditions, load balancing, reliability and resiliency, loss of load, voltage and power factor quality, distributed generation, hosting capacity and distribution automation and SCADA needs.

- Animal Guard Program – This program will target the worst performing circuits for animal guard installation with the goal of increasing service reliability through minimizing animal contact on distribution transformers. Guards are to be installed on distribution transformer bushings, arresters, and LA brackets, if applicable.
- Distribution Load Relief Program – The objective of the Distribution Load Relief Program is to conduct system-wide facility analyses on substations that are overloaded and/or start to exceed 90% capacity and to develop a mitigation strategy (projects) to enhance the condition of these assets so they don't exceed their associated Planned Loading Beyond Nameplate (PLBN) thermal rating. These comprehensive analyses will include an electrical assessments and asset condition screening assessments which will include an assessment of age of equipment, resiliency/flooding impacts, substation P&C assessment, substation reliability performance, etc.
- Transmission Reinforcement Program – In 2021 AVANGRID Transmission Planning completed a needs assessment on the local transmission system and identified over 170 loss of load, thermal, and voltage criteria violations that can directly affect our customers. Based on the quantity of identified needs AVANGRID expects that a significant investment is needed to reinforce the local transmission systems so that they meet the AVANGRID Transmission Planning loss of load, thermal, and voltage criteria. Development of comprehensive solutions for the identified needs, coupled with asset condition assessments will begin in 2022 with many solution designs expected to be finalized by 2024. Solution development and project execution will be prioritized based on several factors such as customer benefit, asset health, and solution complexity. This Program is to address needs identified on the NYSEG Transmission System.

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Section 6.4 Electric Resiliency Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to resiliency. The Electric Resiliency Capital Investment Forecast is summarized for NYSEG Electric in Table 7 and for RG&E Electric in Table 8.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>		2022	2023	2024	2025	2026	Total 2022-2026
1 Resiliency		\$ 69,050	\$ 91,085	\$ 103,960	\$ 102,681	\$ 103,542	\$ 470,318
2 Resiliency Automation, Hardening and Topology		28,236	41,924	48,012	45,912	45,912	209,996
3 DSIP - Grid Automation		28,575	33,782	37,288	37,288	37,288	174,222
4 SCADA/Automation		10,503	13,128	16,410	17,231	18,092	75,365
5 Recloser Automation		1,736	2,250	2,250	2,250	2,250	10,736
6 Total		\$ 69,050	\$ 91,085	\$ 103,960	\$ 102,681	\$ 103,542	\$ 470,318

Table 7 – NYSEG Electric Resiliency Capital Investment Forecast

	A	B	C	D	E	F	G
<i>\$ in thousands</i>		2022	2023	2024	2025	2026	2027
1 Resiliency		\$ 19,073	\$ 23,746	\$ 28,654	\$ 31,930	\$ 34,984	\$ 138,386
2 Resiliency Automation, Hardening and Topology		9,425	13,013	14,815	17,984	20,929	76,166
3 DSIP - Grid Automation		4,652	4,000	7,000	7,000	7,000	29,652
4 SCADA/Automation		4,128	5,233	5,338	5,446	5,555	25,700
5 Recloser Automation		868	1,500	1,500	1,500	1,500	6,868
6 Total		\$ 19,073	\$ 23,746	\$ 28,654	\$ 31,930	\$ 34,984	\$ 138,386

Table 8 – RG&E Electric Resiliency Capital Investment Forecast

The following describes the key project and program investments which are forecasted under the Electric Resiliency category:

- Distribution System Implementation Plan (DSIP) Grid Automation Program – The Distribution Automation program is intended to provide smart devices on all parts of the electric distribution system. A system fully metered, monitored, and controlled provides integrated system operations, access for competing providers, and enhanced customer services that maximize benefits. This program will include only the purchase and installation of devices that have full communications and control capabilities. All new distribution equipment will be “smart.” NYSEG/RG&E also has a strategic plan to deploy digital Remote Terminal Units (RTUs) to provide for status and control of smart devices within substations and on the distribution system. In short, NYSEG/RG&E will continue

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to automate its entire system, consistent with all applicable standards and requirements.

- Resiliency Program – NYSEG/RG&E’s 2022-2026 Distribution Resiliency Plan (“Resiliency Plan”) will enhance resiliency and reliability on the worst performing circuits across the NYSEG and RG&E service territories. These circuits were identified by the Electric Distribution Planning management team as having deficiencies and performance issues that negatively impact service reliability to our customers. The Resiliency Plan is designed to enhance the resiliency of our electric distribution system in response to more intense and more frequent storms. This is driven by a consensus among our Companies, our customers, state policy makers, and regulators, about the importance of grid resiliency given the number and severity of storms over the past several years. NYSEG/RG&E resiliency programs sit alongside numerous other capital and O&M programs that our Companies use to ensure the reliable operation of the transmission and distribution systems. These include betterments, grid modernization programs such as distribution automation and smart grid, and vegetation management. The Resiliency Plan focuses on three critical program components: (1) enhanced vegetation management, (2) hardening, and (3) topology, with automation.
- SCADA/Automation Program – The goal of this program is to install a remote terminal unit (RTU) in all substations that do not currently have an RTU, as well as integrate all the bays into our master supervisory control and data acquisition (SCADA) system of those stations where there is an RTU is already in service. This program covers the replacement of electromechanical relays with digital relay to get the bays digitalized. The addition of supervisory control and data acquisition in the substations in conjunction with the installation of digital relays will allow for improved visibility and remote control, proper system protection coordination and outage assessment which in turn will result in quicker response and improved CAIDI and can also improve SAIFI performance over the longer

term. Providing remote control capabilities will contribute to increasing the safety of workers while operating the switchgear, preventing them from performing manual commands.

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Section 6.5 Electric Compliance Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to compliance. The Electric Compliance Capital Investment Forecast is summarized for NYSEG Electric in Table 9 and for RG&E Electric in Table 10.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Compliance	\$ 81,261	\$ 137,812	\$ 157,194	\$ 121,938	\$ 121,880	\$ 620,085	
2 BES Program - FERC Compliance	76,555	116,488	132,375	98,566	99,546	523,530	
3 NERC Alert Priority III	4,706	20,273	19,969	22,822	20,933	88,703	
4 FERC Order 2222 DER Aggregations/Billing/Metering	-	667	4,000	-	-	4,667	
5 FERC Order 881	-	350	500	550	1,400	2,800	
6 DER- ICCP connection to NYISO	-	35	350	-	-	385	
7 Total	\$ 81,261	\$ 137,812	\$ 157,194	\$ 121,938	\$ 121,880	\$ 620,085	

Table 9 – NYSEG Electric Compliance Capital Investment Forecast

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Compliance	\$ 20,456	\$ 32,891	\$ 50,401	\$ 63,962	\$ 77,563	\$ 245,273	
2 BES Program - FERC Compliance	20,456	32,393	48,041	63,722	76,963	241,575	
3 FERC Order 2222 DER Aggregations/Billing/Metering	-	333	2,000	-	-	2,333	
4 FERC Order 881	-	150	210	240	600	1,200	
5 DER- ICCP connection to NYISO	-	15	150	-	-	165	
6 Total	\$ 20,456	\$ 32,891	\$ 50,401	\$ 63,962	\$ 77,563	\$ 245,273	

Table 10 – RG&E Electric Compliance Capital Investment Forecast

The following describes the key project and program investments which are forecasted under the Electric Compliance category:

- BES Program NERC Compliance** – The objective of the NYSEG/RG&E Bulk Electric System (BES) Program is to identify and address system deficiencies on the portion of the BES of NYSEG and RG&E in accordance with mandatory North American Electric Reliability Corporation (NERC) reliability standards. The criteria and system performance requirements for the BES are provided in NERC’s TPL-001-4 standard. Each transmission owner has an obligation to demonstrate through planning studies that its portion of the BES meets all mandatory NERC requirements. In cases where unacceptable reliability performance is detected, a documented Corrective Action Plan (project) showing how these deficiencies will be mitigated must be developed. To be compliant with NERC TPL requirements a comprehensive planning assessment was

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performed, initially in 2014, and again in 2018 to incorporate several changes with the most significant being a decline in forecasted load levels. Although the primary focus of this program is to address BES reliability deficiencies, some of the recommended solutions have also been designed to mitigate asset condition and local reliability deficiencies at the same substation locations where significant BES upgrades are being recommended. This approach supports that a comprehensive and cost-effective solution is developed. It should be noted that 14 previously identified BES projects are now included in the CLCPA Transmission Projects Phase 1 suite of projects in support NY's CLCPA objectives. As a result, the portfolio of BES Projects has been adjusted and the remaining projects have been re-prioritized and updated schedules / cost estimate projections have been developed.

- NERC Alert Priority III Program – NERC Alert Phase III scope is to primarily identify asset(s) that are in critical condition to ensure the safety and reliability of the bulk power system mandated by FERC. The program provides concise and actionable information to update the delivery system of our service areas; those upgrades include structure replacements and/or the amendment of structures that are deemed to be in direct violation with the NESC Code or very poor condition and ground clearances that affects the safety & reliability to our customers.

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Section 6.6 Electric Clean Energy Transformation Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to Clean Energy Transformation. The Electric Clean Energy Transformation Capital Investment Forecast is summarized for NYSEG Electric in Table 11 and for RG&E Electric in Table 12.

	A	B	C	D	E	F	G
	<i>\$ in thousands</i>						
1	Clean Energy Transformation	\$ 158,503	\$ 521,633	\$ 651,200	\$ 747,900	\$ 990,500	\$ 3,069,736
2	CLCPA Transmission Projects - Phase II	24,800	310,200	330,200	417,600	545,400	1,628,200
3	CLCPA Transmission Projects - Phase I	125,700	188,200	305,000	310,300	429,100	1,358,300
4	Ithaca Electrification Projects – Phase 2	-	-	10,000	10,000	10,000	30,000
5	Java SS Microgrid BESS	6,076	20,233	-	-	-	26,310
6	Ithaca Electrification Projects – Phase 1	100	3,000	6,000	10,000	6,000	25,100
7	Stillwater NWA	1,827	-	-	-	-	1,827
8	Total	\$ 158,503	\$ 521,633	\$ 651,200	\$ 747,900	\$ 990,500	\$ 3,069,736

Table 11 – NYSEG Electric Clean Energy Transformation Capital Investment Forecast

	A	B	C	D	E	F	G
	<i>\$ in thousands</i>						
1	Clean Energy Transformation	\$ 600	\$ 7,100	\$ 6,100	\$ 10,000	\$ 25,300	\$ 49,100
2	CLCPA Transmission Projects - Phase II	600	7,100	6,100	10,000	25,300	49,100
3	Total	\$ 600	\$ 7,100	\$ 6,100	\$ 10,000	\$ 25,300	\$ 49,100

Table 12 – RG&E Electric Clean Energy Transformation Capital Investment Forecast

The following describes the key project and program investments which are forecasted under the Electric Clean Energy Transformation category:

- CLCPA Transmission Projects Phase I** – The portfolio of Phase I CLCPA Transmission Projects consists of 23 projects that will serve a dual purpose of mitigating both asset condition and reliability needs (including NERC BES compliance requirements), and increasing transmission system headroom to accommodate existing and planned transmission-connected renewable resources. The 23 projects are spread throughout the Binghamton, Ithaca, Lancaster, Lockport, and Oneonta areas within NYSEG’s territory. These projects were submitted in the form of a petition to the NY PSC on December 23, 2021 (Case 20-E-0197). The projects are not truly incremental, but rather an

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acceleration of projects for CLCPA purposes that would be needed anyway to address traditional reliability and asset condition needs.

- CLCPA Transmission Projects Phase II “Areas of Concern” – The portfolio of Phase II CLCPA Transmission Projects consists of 46 projects for the purpose of unlocking an incremental amount of transmission-connected renewable resources and to increase headroom on the system. The 46 projects are spread throughout the Elmira, Geneva, Hornell, Lancaster, and Rochester areas within NYSEG’s and RG&E’s territory. These projects were submitted in the form of a petition to the NY PSC on March 8, 2021 (Case 20-E-0197). The Phase II projects were developed with a goal of removing transmission bottlenecks for renewable energy, but will have numerous added benefits by addressing traditional reliability and asset condition needs that need to be solved either now or in the future (i.e. the next 10 – 20 years).
- Ithaca Electrification Projects Phase 1 – These local transmission and distribution projects are needed to solve existing reliability needs and will help to support timely execution of the City of Ithaca’s electrification initiative. Voltage and thermal violations exist under a range of contingency conditions in the transmission and distribution network between Coddington and Etna Substations in NYSEG’s Ithaca Division. To resolve the voltage violations, three shunt capacitors are proposed at (1) West Hill, (2) Trumansburg, and (3) Cayuga Heights. There is a plan to rebuild Coddington substation as part of the CLCPA Transmission Projects Phase 1 effort, which will resolve the thermal violations in the long term (2026-2027), but in the short term a mobile 115/34.5 kV transformer will be installed at Coddington. Two transformers at Fourth Street will be replaced with larger units, and the 8.3 kV distribution network (which is islanded from the 12.5 kV surrounding network) will be upgraded to 12.5 kV.
- Ithaca Electrification Projects Phase 2 – The load growth projected due to the City of Ithaca’s Electrification initiative is expected to result in new thermal needs

on the transmission and distribution systems, which will require mitigation. As a result, NYSEG expects that five projects would be needed to support the full extent of load growth projected by 2030: (1) The West Hill 34.5/12.5 kV transformer will be replaced with a larger unit. (2) Both 34.5/12.5 kV transformers at South Hill will be replaced with larger units. (3) A new 12.5 kV distribution circuit will be routed out of East Ithaca. (4) 34.5 kV Line 526 between Coddington and South Hill Substations, 2.7 miles, will be upgraded. (5) 34.5 kV Line 532 between Coddington and West Hill Substations, 4.5 miles, will be upgraded.

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Section 6.7 Electric Customer Focus Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to customer focus. The Electric Customer Focus Investment Forecast is summarized for NYSEG Electric in

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Customer Focus	\$ 106,968	\$ 150,627	\$ 152,644	\$ 160,259	\$ 164,038	\$ 734,535
2 Dist Line	22,341	42,430	43,702	45,014	46,364	199,851
3 Make Ready	29,467	33,250	33,250	42,750	42,750	181,467
4 Trans line	17,981	22,907	23,594	24,302	25,031	113,815
5 Res Line	10,030	12,774	13,157	13,552	13,958	63,472
6 Serv Conn	7,400	12,228	12,595	12,973	13,362	58,556
7 Ind/Comm	6,987	7,336	7,556	7,783	8,016	37,677
8 Gov't Highway	3,492	4,621	4,759	4,902	5,049	22,824
9 Street Light	3,572	4,592	4,729	4,871	5,017	22,781
10 LED Streetlighting	3,572	5,000	5,000	-	-	13,572
11 DataCapable	100	2,431	2,431	2,431	2,431	9,823
12 Electric Meters	1,605	1,098	1,098	1,098	1,464	6,363
13 Storms Electric	421	562	573	584	596	2,735
14 LSE Tracker (Life Support Equipment)	-	1,400	200	-	-	1,600
15 Total	\$ 106,968	\$ 150,627	\$ 152,644	\$ 160,259	\$ 164,038	\$ 734,535

Table 13 and for RG&E Electric in

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Customer Focus	\$ 32,338	\$ 68,375	\$ 77,510	\$ 82,028	\$ 80,197	\$ 340,448
2 Make Ready	1,886	19,000	16,150	20,900	20,900	78,836
3 Dist Line	7,057	14,741	15,184	15,639	16,108	68,730
4 Gov't HW	977	9,998	12,057	14,119	14,183	51,334
5 Res Line	4,725	4,961	5,110	5,264	5,421	25,482
6 Aquaduct Re-Imagined	350	3,000	10,000	7,000	4,000	24,350
7 Town of Brighton Arc Light Conversion	300	2,500	5,000	5,000	5,000	17,800
8 Serv Conn	2,486	3,200	3,296	3,395	3,497	15,872
9 Ind/Comm	1,857	3,027	3,117	3,211	3,307	14,519
10 Trans line	1,825	2,929	3,017	3,107	3,200	14,078
11 Gov't Highway Majors CAP	3,278	1,998	2,057	2,119	2,183	11,635
12 DataCapable	100	1,034	1,034	1,034	1,034	4,237
13 Mandated RG&E - East Main St HWY Project	3,255	-	-	-	-	3,255
14 Electric Meters Program	666	322	322	645	752	2,708
15 Street Light	259	379	391	402	414	1,846
16 Mandated - State St	1,426	-	-	-	-	1,426
17 LED Streetlighting	380	500	500	-	-	1,380
18 ROC 5 Amazon	1,328	-	-	-	-	1,328
19 STORM ELECTRIC	182	186	189	193	197	947
20 LSE Tracker (Life Support Equipment)	-	600	85	-	-	685
21 Total	\$ 32,338	\$ 68,375	\$ 77,510	\$ 82,028	\$ 80,197	\$ 340,448

Table 14.

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A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Customer Focus	\$ 106,968	\$ 150,627	\$ 152,644	\$ 160,259	\$ 164,038	\$ 734,535
2 Dist Line	22,341	42,430	43,702	45,014	46,364	199,851
3 Make Ready	29,467	33,250	33,250	42,750	42,750	181,467
4 Trans line	17,981	22,907	23,594	24,302	25,031	113,815
5 Res Line	10,030	12,774	13,157	13,552	13,958	63,472
6 Serv Conn	7,400	12,228	12,595	12,973	13,362	58,556
7 Ind/Comm	6,987	7,336	7,556	7,783	8,016	37,677
8 Gov't Highway	3,492	4,621	4,759	4,902	5,049	22,824
9 Street Light	3,572	4,592	4,729	4,871	5,017	22,781
10 LED Streetlighting	3,572	5,000	5,000	-	-	13,572
11 DataCapable	100	2,431	2,431	2,431	2,431	9,823
12 Electric Meters	1,605	1,098	1,098	1,098	1,464	6,363
13 Storms Electric	421	562	573	584	596	2,735
14 LSE Tracker (Life Support Equipment)	-	1,400	200	-	-	1,600
15 Total	\$ 106,968	\$ 150,627	\$ 152,644	\$ 160,259	\$ 164,038	\$ 734,535

Table 13 – NYSEG Electric Customer Focus Capital Investment Forecast

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Customer Focus	\$ 32,338	\$ 68,375	\$ 77,510	\$ 82,028	\$ 80,197	\$ 340,448
2 Make Ready	1,886	19,000	16,150	20,900	20,900	78,836
3 Dist Line	7,057	14,741	15,184	15,639	16,108	68,730
4 Gov't HW	977	9,998	12,057	14,119	14,183	51,334
5 Res Line	4,725	4,961	5,110	5,264	5,421	25,482
6 Aquaduct Re-Imagined	350	3,000	10,000	7,000	4,000	24,350
7 Town of Brighton Arc Light Conversion	300	2,500	5,000	5,000	5,000	17,800
8 Serv Conn	2,486	3,200	3,296	3,395	3,497	15,872
9 Ind/Comm	1,857	3,027	3,117	3,211	3,307	14,519
10 Trans line	1,825	2,929	3,017	3,107	3,200	14,078
11 Gov't Highway Majors CAP	3,278	1,998	2,057	2,119	2,183	11,635
12 DataCapable	100	1,034	1,034	1,034	1,034	4,237
13 Mandated RG&E - East Main St HWY Project	3,255	-	-	-	-	3,255
14 Electric Meters Program	666	322	322	645	752	2,708
15 Street Light	259	379	391	402	414	1,846
16 Mandated - State St	1,426	-	-	-	-	1,426
17 LED Streetlighting	380	500	500	-	-	1,380
18 ROC 5 Amazon	1,328	-	-	-	-	1,328
19 STORM ELECTRIC	182	186	189	193	197	947
20 LSE Tracker (Life Support Equipment)	-	600	85	-	-	685
21 Total	\$ 32,338	\$ 68,375	\$ 77,510	\$ 82,028	\$ 80,197	\$ 340,448

Table 14 – RG&E Electric Customer Focus Capital Investment Forecast

The following describes the key project and program investments which are forecasted under the Electric Customer Focus category:

- **Make Ready** – The Make Ready program is working to make our infrastructure available to meet the broadband communication needs of our customers. As this work has evolved, we have developed, with input from NY-DPS Staff and other stakeholders, guidelines for the cost treatment of the different situations encountered in the field.

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- Distribution (Dist.) Line Program – The Distribution Line program consists of replacing infrastructure due to emergency situations causing interruptions in service. This program is for unplanned, reactive work on the electric distribution system such as car hit poles, damaged conductors, transformers, and poles. This program is budgeted each year based on the cost that has occurred in previous years. It is difficult to predict what may break and/or be damaged by others, so a historical-based estimate is used.
- Residential (Res.) Line Program – This program provides distribution line extensions and necessary facilities (poles, transformers, conductors, conduit, hand holds, manholes, etc.) to provide service to both large scale residential development projects and individual residential units or meters. The requirement for each project is unique based on the requirements of development projects, the project locations, and the existing electric system infrastructure. This program is budgeted based on historical spend and any added increase or decrease from various residential customers if communicated in advance. If a project is greater than \$200K a separate tracking order is created.
- Government (Gov't) Highway Program – This program relocates electric facilities that conflict with highway, road, and street projects being undertaken by municipalities and other government agencies. This program is budgeted based on historical spend while considering any added increase or decrease based on information received from various government agencies, if communicated in advance. Many of these requests are made in-year by the government agencies and are therefore unplanned.
- Industrial Commercial (Ind/Comm) Program – This program provides service connections for industrial and commercial customers. Included within the program is anything required for constructing, expanding, replacing, or relocating electric infrastructure assets to connect commercial customers. The cost of the service is comprised of tariff portions as well as customer payments for the

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amounts above the tariff required provision. This program is budgeted based on historical spend and any added increase or decrease from the various commercial customers if communicated in advance.

- Service Connection (Serv. Conn.) Program – This program installs or upgrades new electric service to individual residential units at the customer’s request. Included within the program is anything required for constructing, expanding, replacing, or relocating electric infrastructure assets to connect residential customers. Meters required as part of customer projects are also included on this line item. The cost of the service is comprised of tariff portions as well as customer payments for the amounts above the tariff required provision.
- Transmission (Trans.) Line Program – The Transmission Line program consists of addressing safety concerns by replacing reject poles, car hit poles, damaged conductors, and similar unplanned, reactive work on the electric transmission system 34.5kv or higher. Work is also performed to replace individual units of property identified as emergent from the transmission line inspection program in addition to addressing CAIDI/SAIFI hot spots in the same calendar year.



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Section 6.8 Electric Modernization Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to modernization. The Electric Modernization Investment Forecast is summarized for NYSEG Electric in Table 15 and for RG&E Electric in Table 16 respectively.

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Modernization	\$ 62,638	\$ 63,965	\$ 72,260	\$ 49,959	\$ 13,755	\$ 262,576
2 AMI Project E	57,393	57,542	57,542	36,043	5,296	213,816
3 Siemens Spectrum upgrade to V7	-	-	-	6,000	6,000	12,000
4 15 Loop Automation Schemes	2,198	1,929	1,929	1,929	1,929	9,914
5 REV - Electric Vehicles	904	1,551	2,132	3,415	-	8,003
6 AMI Integration for ISO	-	739	4,144	-	-	4,883
7 IEE Service Mode	-	528	2,112	570	-	3,211
8 DSIP - ADMS	-	375	1,625	1,000	-	3,000
9 Application Interface Upgrades	39	182	1,541	47	-	1,810
10 Distribution Automation	206	209	432	445	458	1,751
11 DSIP - Enterprise Analytics	1,268	-	-	-	-	1,268
12 Transmission GIS and GIS Interface optimization	-	525	225	-	-	750
13 SMSI Field Deployment	-	-	207	414	-	622
14 Automate SAP CCS Dist Gen Billing	599	-	-	-	-	599
15 Spectrum Planned Work Module	-	219	176	72	72	539
16 Electric Reliability Application (ERA) Integration	16	165	60	24	-	265
17 DSIP - Advanced Planning Tools	-	-	132	-	-	132
18 Purchase Plum Devices	15	-	-	-	-	15
19 Total	\$ 62,638	\$ 63,965	\$ 72,260	\$ 49,959	\$ 13,755	\$ 262,576

Table 15 – NYSEG Electric Modernization Capital Investment Forecast

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Modernization	\$ 26,246	\$ 25,876	\$ 29,558	\$ 17,453	\$ 4,481	\$ 103,614
2 AMI Project E	24,314	24,144	24,144	12,958	2,209	87,769
3 Siemens Spectrum upgrade to V7	-	-	-	2,000	2,000	4,000
4 REV - Electric Vehicles	406	704	972	1,586	-	3,668
2 IEE Service Mode	-	284	1,137	307	-	1,729
3 AMI Integration for ISO	-	246	1,381	-	-	1,628
4 DSIP - ADMS	-	125	1,275	100	-	1,500
5 Distribution Automation	44	42	238	245	252	820
6 Automate SAP CCS Dist Gen Billing	649	-	-	-	-	649
7 DSIP - Enterprise Analytics	640	-	-	-	-	640
8 SMSI Field Deployment	-	-	104	207	-	311
9 Transmission GIS and GIS Interface optimization	-	175	75	-	-	250
10 Spectrum Planned Work Module	77	62	54	20	20	233
11 Application Interface Upgrades	56	52	30	20	-	158
12 DSIP - Advanced Planning Tools	-	-	132	-	-	132
13 Electric Reliability Application (ERA) Integration	45	42	15	10	-	112
14 Purchase Plum Devices	15	-	-	-	-	15
15 Total	\$ 26,246	\$ 25,876	\$ 29,558	\$ 17,453	\$ 4,481	\$ 103,614

Table 16 – RG&E Electric Modernization Capital Investment Forecast

The key project within the Electric Modernization category is the on-going installation of the Advanced Metering Infrastructure (AMI) in NYSEG and RG&E service territories.

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AMI will be an essential foundational system in realizing CLCPA goals to empower customers, through new tools and information, to effectively manage and reduce usage, establish and animate new markets to promote the implementation of Distributed Energy Resources (DER) and minimize environmental impacts of power generation and energy consumption. New York State Electric & Gas (NYSEG) and Rochester Gas and Electric (RG&E) will gain early outage detection to assist with restoration efforts as well as streamline internal business processes.

Section 6.9 Electric Innovation Capital Investment Forecast

This category provides a further breakdown of expenditures required to accommodate projects and programs related to innovation. The Electric Innovation Investment Forecast is summarized for NYSEG Electric in Table 157 and for RG&E Electric in Table 168.

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>						
1	Innovation	\$ 10,615	\$ 12,344	\$ 48,015	\$ 72,655	\$ 2,482	\$ 146,111
2	Low Income Clean Generation	-	-	27,333	27,333	-	54,667
3	EV Charging Hub	-	-	6,006	24,026	-	30,032
4	DSIP - GIS Enhancements GMEP	6,417	6,548	6,679	6,813	-	26,457
5	IEDR	3,898	3,898	3,295	3,295	1,647	16,033
6	Medium & Heavy Duty EV Make-Ready Program	-	785	2,355	4,709	-	7,849
7	Distributed Energy Resource Management System (DERMS)	-	-	-	2,538	-	2,538
8	Stephentown Energy Storage	-	-	666	1,553	-	2,219
9	Wales Center Energy Storage	-	-	666	1,553	-	2,219
10	NY Energy Storage RFP	-	-	-	760	760	1,520
11	Distributed Energy Storage pilot- Load Managed Distribution System Optim	-	576	600	-	-	1,176
12	FICS Scalability Plan	300	300	-	-	-	600
13	Tompkins County Demand Side LMI HVAC Management Pilot	-	-	340	-	-	340
14	Academic Institution Collaboration	-	75	75	75	75	300
15	CYME Server	-	163	-	-	-	163
16	Total	\$ 10,615	\$ 12,344	\$ 48,015	\$ 72,655	\$ 2,482	\$ 146,111

Table 17 – NYSEG Electric Innovation Capital Investment Forecast

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	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>						
1	Innovation	\$ 6,289	\$ 6,247	\$ 25,394	\$ 38,485	\$ 1,722	\$ 78,138
2	Low Income Clean Generation	-	-	11,606	11,606	-	23,212
3	Station 125 Energy Storage	-	-	5,824	13,590	-	19,414
4	DSIP - GIS Enhancements GMEP	3,870	3,374	3,442	3,510	-	14,196
5	IEDR	2,099	2,099	1,774	1,774	887	8,633
6	Station 89 Energy Storage	-	-	1,664	3,883	-	5,547
7	Medium & Heavy Duty EV Make-Ready Program	-	336	1,009	2,018	-	3,364
8	NY Energy Storage RFP	-	-	-	760	760	1,520
9	Distributed Energy Resource Management System (DERMS)	-	-	-	1,269	-	1,269
10	FICS Scalability Plan	200	200	-	-	-	400
11	Academic Institution Collaboration	-	75	75	75	75	300
12	CYME Server	-	163	-	-	-	163
13	Integrated EV and ES Controller	-	121	-	-	-	121
14	Total	\$ 6,289	\$ 6,247	\$ 25,394	\$ 38,485	\$ 1,722	\$ 78,138

Table 18 – RG&E Electric Innovation Capital Investment Forecast

The Innovation category focuses on new or significantly improved products, processes or new organizational methods. The capital projects included in this category focus on new or improved products, processes, and/or organizational methods in business practices or external relations. Projects may have various aspects that could overlap product, process and/or organizational method descriptors.

Many of the project in this category support CLCPA in a wide variety of ways – from developing Energy Storage projects to expanding analytical capabilities through grid modelling enhancements; to developing new or strengthening existing relationships with academic institutions to explore and develop new concepts and approaches related to more sustainable generation, distribution, and usage of energy. Additional areas within Innovation that are supporting CLCPA include integrated energy data resources and the development of a geothermal energy district.

Product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Projects that support this aspect of Innovation and are being advanced at both NYSEG and RG&E include Grid Automation and Management, Grid Modelling Enhancement Project (GMEP) and Integrated Energy Data Resource (IEDR) projects and installation of energy storage

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facilities at various substations. Projects in this category also support and encourage the use of electric vehicles (EV) and include the Medium and Heavy-Duty EV Make-Ready Program that supports the utility side infrastructure for new chargers serving medium and heavy-duty vehicles. Additional projects that introduce new products and support CLCPA, include, an EV Charging Hub at NYSEG, and an Integrated EV and ES Controller Project at RG&E.

Process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Projects that support this aspect of innovation include the installation of a CYME server to support load and DER forecasting, Advanced Load and DER Forecasting to improve the granularity of load and DER forecasting in terms of time and location, a Hosting Capacity project that entails evolving the current DG and EV Hosting Capacity Maps.

Organizational innovation is the implementation of a new organizational method in the firm's business practices, workplace organization or external relations. Several projects support this portion of innovation include Low Income Clean Generation that the Companies' would own, operate, utility scale solar PV facilities with the purpose of allocating the revenues to low-income customers, advancing relationships with academic institutions to explore and develop new concepts and approaches related to more sustainable generation, distribution and usage of energy and developing a Demand Side LMI HVAC Management Pilot that would involve certain members of the LMI community to pilot HVAC management device implementation to enable and evaluate energy and cost savings, carbon reduction, smart control and energy usage insights.

Section 6.10 Hydro Generation Capital Investment Forecast

The Companies own and operate hydroelectric and fossil fuel generating facilities. The NYSEG generating facilities currently include six active hydroelectric generating

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facilities and 4 four small fossil-fuel facilities having a total nameplate capacity of approximately 69.5MW (61.4MW hydro and 8.1MW fossil). The active hydroelectric and fossil-fuel generating facilities are located from Plattsburgh (northeast New York) to Rochester. The RG&E facilities include three active hydroelectric facilities having a total nameplate capacity of 57.1MW; all facilities are located within the City of Rochester. All active hydroelectric facilities are under the Federal Energy Regulatory Commission (“FERC”) jurisdiction with three retired NYSEG and RG&E hydroelectric facilities, NYSEG Keuka, RG&E Station 160 and Station 170, located in the southern tier region. The water retaining structures that remain at the retired hydroelectric facilities are operational and under jurisdiction of the New York State Department of Environmental Conservation. All active hydroelectric generating facilities are operated as run-of-river, meaning that water that enters the facility impoundment cannot be stored, but produce energy from the river flow that is available at a given time in the respective watershed.

NYSEG presently has four fossil-fuel standby diesel generators, with a total combined capacity of 8.1MW. The diesel generators are located at Harris Lake (two generators), Blue Mountain and Long Lake substations in the Adirondack region. The diesel generators are dispatched to generate electric energy to serve local customers upon loss of the transmission lines that serve these stations. RG&E does not have any fossil-fuel generating facilities.

This category provides a further breakdown of the expenditures required to accommodate projects and programs related to the Hydro Generation facilities owned by the Companies. The Hydro Generation Investment Forecast is summarized for NYSEG and RG&E in Table 159 and Table 20, respectively.

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	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Hydro-Generation	\$ 7,525	\$ 7,353	\$ 19,742	\$ 24,905	\$ 57,838	\$ 117,363	
2 Mechanicville Intake Upgrades and Downstream Passage Project	465	919	2,056	6,498	18,919	28,857	
3 Kent Falls - CAPITAL Project	210	212	763	5,039	17,952	24,176	
4 High Falls Intake Upgrades Project	724	550	3,747	4,783	-	9,804	
5 Minor Capital Program	1,389	1,500	1,500	1,500	1,500	7,389	
6 Kents Falls U2 T-G Major Rebuild	4	5	473	883	3,756	5,120	
7 Cadyville U1 T-G Major Rebuild	2	2	478	1,014	2,848	4,345	
8 Mechanicville Upstream Eel Ladder Project	714	628	2,522	278	-	4,141	
9 Cadyville Upgrade U1 & U2 Cooling water systems	-	-	347	406	2,748	3,501	
10 KF Dam Left Abutment & Drainage Improvement	387	2,953	-	-	-	3,340	
11 Saranac Plant Control Systems Upgrade Project	-	-	763	563	1,912	3,238	
12 Keuka/Bradford Concrete Spillway and Toe Resurfacing Repairs/Improvem	-	-	445	360	2,157	2,961	
13 High Falls U2 Generator Rewind	-	-	317	441	1,956	2,714	
14 KF Internal Riser Shaft and Tank	3	3	3	878	1,586	2,473	
15 Keuka/Bradford Dam Automation	-	-	393	323	1,658	2,374	
16 Kents Falls Upstream Training Wall Extension	199	130	1,904	-	-	2,233	
17 Cadyville Right Abutment / Spillway Improvements Project	307	110	1,726	87	-	2,231	
18 Mill C Spillway Concrete Improvements Project	9	70	420	1,450	-	1,949	
19 Rainbow Falls Powerhouse Entrance / Hill Stabilization	115	206	1,622	-	-	1,943	
20 Mechanicville Bay A, Bay B, Bay C Bag Replacement Program & Inclinemel	1,530	20	-	-	-	1,550	
21 Kents Falls Low Level Floodgate	-	-	263	228	707	1,198	
22 Kents Falls Right Abutment & Toe Scour Upgrades Project	714	44	-	-	-	758	
23 Mill C Intake Trash Rack & Raker Project	340	-	-	-	-	340	
24 Upper Mechanicville Plant Control System Upgrade Project	-	-	-	175	141	316	
25 RainbowFalls-fishbypassstudy-Env.Complia	242	-	-	-	-	242	
26 Fossil Hydro Operations	161	-	-	-	-	161	
27 High Falls Draft Tube Stop Logs and Gantry Project	6	-	-	-	-	6	
28 HYDRO Regulatory Mandates	3	-	-	-	-	3	
29 Total	\$ 7,525	\$ 7,353	\$ 19,742	\$ 24,905	\$ 57,838	\$ 117,363	

Table 19 – NYSEG Hydro Generation Capital Investment Forecast

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Hydro-Generation	\$ 9,791	\$ 7,253	\$ 24,945	\$ 19,090	\$ 9,278	\$ 70,357	
2 Hydro Generation S2 Modernization	1,406	9,298	20,895	15,158	1,453	48,211	
3 Minor Capital Program	2,137	1,500	1,500	1,500	1,500	8,137	
4 S5 Intake Stop Log Gantry Upgrade Project	356	188	2,289	150	-	2,983	
5 Station #5 surge Tank Rock fall Pro	2,485	-	-	-	-	2,485	
6 S2 Central Ave Dam Superstructure Modernization	-	-	-	569	1,211	1,779	
7 S5 Spillgate #2 Rock Stabilization - 1st priority	-	-	-	619	587	1,206	
8 S5 Gate 2 Hinge Upgrade	-	-	-	467	493	960	
9 S5 Unit 3 Turbine-Generator New Runner	-	-	-	385	443	828	
10 S26 Generator Protection and Controls Upgrade	-	-	130	121	484	735	
11 Station 2 Generator Protection and Controls Upgrade	-	-	130	121	484	735	
11 S5 Gate 5 Rubplate and Bottom Seal Upgrade Project	-	-	-	-	610	610	
12 S5 Surge Tank Expansion (Align with tunnel inspection)	-	-	-	-	575	575	
13 S5 Tunnel System (Construction Joints, Intake Shaft Transition, Surge Tank	-	-	-	-	557	557	
14 Station 5 Gate 3 Rubplate, Rubplate and Breastwall Seal Upgrade Project	-	-	-	-	463	463	
15 S5 Unit 3 Turbine-Generator New Turbine Isolation Valve	-	-	-	-	419	419	
16 S5 Powerhouse T-G Rotating Equipment Guards	283	-	-	-	-	283	
17 Hydro Upgrade	152	-	-	-	-	152	
18 HYDRO Regulatory Mandates	92	-	-	-	-	92	
19 Fossil HYDRO-General Equipment	17	-	-	-	-	17	
20 Station 5 Headgates/Dam	2,864	(3,733)	-	-	-	(869)	

Table 20 – RG&E Hydro Generation Capital Investment Forecast

The major projects being undertaken by the Companies include the Kent Falls Capital Project, the Mechanicville Upstream Eel Ladder Project and the High Falls Intake



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Upgrades Project at NYSEG. The major projects at RG&E include the Station 2 Modernization Project and the Station 5 Headgates/Dam Project.

The Kent Falls Capital Project involves the installation of new ring girders that will replace the end-of-life penstock saddles, the installation of new penstock section trifurcation, and the installation of new penstocks from the outlet of the existing penstock trifurcation to each turbine-generator.

The Mechanicville Upstream Eel Ladder Project is a project that is required as an outcome of the 50-year operating license issued by the FERC, effective April 1, 2021. NYSEG is required to comply with the Settlement Agreement that requires modification of the facility's intake to protect aquatic species, specifically the American eel, that are upstream of the water intake structure for the hydroelectric facility.

The High Falls Intake Upgrades Project is being undertaken by NYSEG as a part of the current FERC license for the Facility, The Company is required to upgrade the existing intake trash racks from 2-inch clear space opening to 1-inch openings for fish protection per the License and per the New York State Department of Environmental Conservation (NYSDEC) 401 Water Quality Certification. Installation of the new intake trash racks at High Falls is required to be completed by no later than January 19, 2026, as outlined in the Settlement Agreement and FERC License.

The Station 2 Modernization Project involves deepening the area in front of and under the facility's water intake to allow the installation of a new and larger penstock that will allow increased water conveyance, improved conveyance of aquatic species downstream of the intake structure to comply with the FERC License Amendment and the installation of a new turbine isolation valve for the Unit 1 turbine-generator.

Sections of the existing penstock are at end-of-life (circa 1900's) and do not allow for potential future expansion of the hydroelectric facility. The investment will restore reliable operation of the 8.5MW facility and further supports the New York State Clean Energy Goal initiatives for generation of clean, renewable energy.

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The Station 5 Headgates project will upgrade to crest gates 4A and 4B, gate hinges and hydraulic operating cylinders used to impound river water that is used in the generation of electric energy. These gates and equipment were damaged in 2018 during extreme weather. The station is unable to generate power until these upgrades are completed.



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Chapter 7 Gas Capital Investment Forecast

This section will further detail, by major investment category, the overall Gas capital investments. The categorization of the Plan is grouped into, in no particular order, Asset Condition, Mandatory, Modernization, Reliability, Resiliency, Compliance, Clean Energy Transformation, Customer Focus, Modernization and Innovation (NYSEG only). The sub sections below summarize the major investment categories for the five years 2022-2026.

Section 7.1 Gas Capital Investment Requirements

The Capital Investment Forecast for five year period 2022-2026 for NYSEG⁴ and RG&E⁵ Gas Lines of Business are shown in Table 1 and Table 2, respectively.

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Asset Condition	\$ 15,344	\$ 14,565	\$ 10,717	\$ 10,640	\$ 21,151	\$ 72,416
2 Mandatory	13,578	16,219	20,101	21,750	22,816	94,463
3 Modernization	18,514	17,396	14,735	9,229	1,632	61,506
4 Reliability	42,239	43,196	51,958	48,363	45,303	231,059
5 Innovation	-	4,000	12,000	890	890	17,780
6 Subtotal Gas Capital	89,675	95,375	109,510	90,871	91,792	477,224
7						
8 Common Allocation to Gas Business	25,286	33,553	44,004	28,777	25,591	157,211
9 Total NYSEG Gas Capital	\$ 114,960	\$ 128,928	\$ 153,514	\$ 119,648	\$ 117,383	\$ 634,435

Table 21 – NYSEG Gas Capital Investment Forecast

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Asset Condition	\$ 5,517	\$ 8,351	\$ 30,603	\$ 23,100	\$ 27,948	\$ 95,519
2 Mandatory	9,947	10,509	18,257	19,648	20,453	78,815
3 Modernization	14,759	13,872	13,872	7,445	1,851	51,798
4 Reliability	36,685	42,016	29,003	27,522	27,699	162,926
5 Subtotal Gas Capital	66,911	74,750	91,737	77,717	77,953	389,057
6						
7 Common Allocation to Gas Business	18,540	17,814	22,826	21,722	17,662	98,565
8 Total RG&E Gas Capital	\$ 85,448	\$ 92,562	\$ 114,561	\$ 99,437	\$ 95,613	\$ 487,622

Table 22 – RG&E Gas Capital Investment Forecast

⁴ Note: NYSEG Common allocation to the Gas Line of Business is 19.74%.

⁵ Note: RG&E Common allocation to the Gas Line of Business is 28.61%.



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Section 7.2 Gas Asset Condition Capital Investment Forecast

The Asset Condition Capital Investment Forecast for NYSEG Gas are shown in Table 23 and for RG&E in Table 24.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Asset Condition	\$ 15,344	\$ 14,565	\$ 10,717	\$ 10,640	\$ 21,151	\$ 72,416	
2 Distribution Main Replacement	5,736	4,299	4,753	4,613	4,811	24,212	
3 Regulator Modernization and Automation Program	4,086	4,265	5,064	5,128	5,127	23,671	
4 Vienna Road Regulator Station	-	-	-	-	10,286	10,286	
5 Hornby Regulator Station	-	5,128	-	-	-	5,128	
6 Chambers Road Regulator Station	4,713	-	-	-	-	4,713	
7 Gas Operations Departmental	809	873	899	899	927	4,407	
8 Total	\$ 15,344	\$ 14,565	\$ 10,717	\$ 10,640	\$ 21,151	\$ 72,416	

Table 23 – NYSEG Gas Asset Condition Capital Investment Forecast

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Asset Condition	\$ 5,517	\$ 8,351	\$ 30,603	\$ 23,100	\$ 27,948	\$ 95,519	
2 Regulator Modernization and Automation Program	2,717	5,009	6,849	7,305	7,546	29,425	
3 Caledonia Station Rebuild	-	1,008	18,697	-	-	19,705	
4 CM-1 Pipeline Section 4 Chili GS to Ballantyne Road	-	-	-	-	18,025	18,025	
5 Mendon Gate Station	-	-	2,200	11,511	-	13,710	
6 Distribution Main Replacement	2,175	2,044	2,016	1,972	2,060	10,266	
7 Mt Read SF115 psi, Replace Gas Mains	122	-	543	2,005	-	2,670	
8 Gas Operations Departmental	301	290	299	308	317	1,515	
9 CM-1 (CM-6) Transmission Gas Main Replacement	203	-	-	-	-	203	
10 Total	\$ 5,517	\$ 8,351	\$ 30,603	\$ 23,100	\$ 27,948	\$ 95,519	

Table 24 – RG&E Gas Asset Condition Investment Forecast

The Gas asset condition category can be separated into four broad groups – Equipment, Main Replacement and Regulator Station Modernization.

The Equipment group is related the purchase of tools and equipment needed and used by gas field employees to inspect, operate, maintain or repair the gas system.

The Main Replacement group is related to repairing or replacing mains (defined as non-leak prone) that are due to condition, damage caused by third parties, conflicts with existing or proposed construction (other than highway work) and other miscellaneous field conditions. Major projects that are undertaken by the Companies also fall within this group. These major projects are in response to mains that are in poor condition

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and need to be replaced to maintain a safe and reliable system. The major programs and projects in this group are:

Distribution Main Replacement: This is a program to replace gas mains as required due to several factors including, but not limited to, poor asset conditions, conflicts with existing or proposed structures, and other miscellaneous field conditions discovered as part of normal operations or other construction and inspection activities.

CM-1 Pipeline Section 4 Chili GS to Ballantyne Rd: This project addresses asset condition by replacing transmission pipe installed in the 1950s. The new pipeline will be designed to operate at less than 20% SMYS. Replacement of the pipeline will maintain gas supply to the Rochester area and improve transmission system and distribution system reliability by replacing existing 22 1/2-inch gas main parallel to CM-5 pipeline (Chili GS to Ballantyne Road) with 23,400 linear feet of 16-inch wrapped steel pipe.

Gate Station Modernization group is included in this category if the primary reason for upgrading or rebuilding a gate station is due to asset condition. The key projects in this group are:

Vienna Road Reg Station GRMP: Vienna Road Regulator Station is critical for NYSEG Gas Control to balance daily nominations between National Fuel and DETI. The station has been in operation for over 60 years, with much of the equipment is at or beyond its service life. The overpressure protection relief valves, and regulators are obsolete. Replacement parts are no longer available. The existing heater experiences operational issues multiple times in the coldest points during the heating season, requiring manual restart of the equipment. The flow meter that measures the gas coming from the Arcadia Gate station is located in a vault below grade that is prone to filling with water, leading to intermittent signal loss. The majority of gas into the northern part of the NYSEG Geneva franchise pass through this station and is a critical component to ensuring reliable service to approximately 27,000 customers.

Caledonia Station Rebuild: The Caledonia Gate Station is the primary gas supply source into the RG&E system and supplies gas to the western and eastern portion of the franchise. The RG&E franchise requires upgrades to this gate station for safe, continuous and efficient operation and to address facilities and equipment that are at end of life. The upgrades and replacements associated with this project are necessary to avoid potentially significant future maintenance cost.

Mendon Gate Station: This project will upgrade equipment that is at end of life, modernize facilities, increase operational efficiencies, eliminate potential environmental concerns, install additional Gas Control/ECC remote control equipment and increase safety and security at the primary gate station feeding the eastern portion of the RG&E Rochester franchise that serves approximately 150,000 customers. These improvements will help to continue to provide a safe and reliable natural gas supply to customers.

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Section 7.3 Gas Mandatory Capital Investment Forecast

The Mandatory Capital Investment Forecast for NYSEG and RG&E are shown in Table 25 and Table 26, respectively

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>						
1	Mandatory	\$ 13,578	\$ 16,219	\$ 20,101	\$ 21,750	\$ 22,816	\$ 94,463
2	New Services	3,904	4,264	4,514	4,796	4,974	22,452
3	Distribution Mains - New Business	2,167	4,320	4,683	5,095	5,313	21,578
4	Non Leak Prone Service Replacement Program	3,333	3,846	4,253	4,127	4,304	19,864
5	Gas Meters	2,131	1,689	2,027	2,702	2,972	11,520
6	Government Jobs	1,713	1,750	1,887	2,044	2,129	9,522
7	Large Government Jobs	-	-	2,337	2,560	2,674	7,572
8	Regulators	330	350	400	425	450	1,955
9	Total	\$ 13,578	\$ 16,219	\$ 20,101	\$ 21,750	\$ 22,816	\$ 94,463

Table 25 – NYSEG Gas Mandatory Capital Investment Forecast

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>						
1	Mandatory	\$ 9,947	\$ 10,509	\$ 18,257	\$ 19,648	\$ 20,453	\$ 78,815
2	Distribution Mains New Business	2,402	2,710	2,964	3,254	3,399	14,729
3	Gas Meters	2,577	1,921	2,172	3,341	3,508	13,519
4	New Services	2,034	2,313	2,529	2,777	2,901	12,554
5	Large Government Jobs	-	-	3,991	3,911	4,030	11,932
6	Non Leak Prone Service Replacement Program	1,580	2,086	2,057	2,012	2,102	9,839
7	Incremental Customer Growth	-	-	2,934	2,596	2,675	8,205
8	Government Jobs	1,264	1,349	1,470	1,607	1,678	7,368
9	Regulators	90	130	140	150	160	670
10	Total	\$ 9,947	\$ 10,509	\$ 18,257	\$ 19,648	\$ 20,453	\$ 78,815

Table 26 – RG&E Gas Mandatory Capital Investment Forecast

The projects and programs in the Mandatory category are required by tariff, law or safety. Below are the major projects and programs in this category:

Distribution Mains – New Business: This program installs new gas mains to customers in accordance with tariff. This program extends new gas mains to new customers to comply with our obligation to provide service.

New Services: This program installs new gas services to new customers (residential or business customers) in accordance with tariff. This program extends new gas service lines to new customers to comply with our obligation to serve.

Non-Leak Prone (LP) Service Replacements: This program replaces any service associated with a gas main replacement project that does not qualify as a leak prone

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service in accordance with the Distribution Integrity Management Plan (DIMP), replaces gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public rights-of-way and actively leaking services etc.

Government Jobs: This program addresses work related to moving facilities that are located in a public right-of-way and are in conflict with proposed highway or road work being done by various municipalities. The Large Government Job program is reserved for projects that will be equal to or exceed \$500K. Each project of this type will be tracked with a unique project structure. The Government Job program is a blanket program that contains all projects that are less than \$500K.

Gas Meters: This program is for the purchase and installation of gas meters to replace existing, aged meters as they are removed from service as well as for new installations. Gas meters are exchanged for annual PSC required programs including statistical sampling, remediation programs and for other various reasons including relocation, load increases, meter damaged and special testing. The programs help to ensure accurate recording of customers usage and results in accurate customer billing. The costs included in this program do not include the installation of AMI equipment on existing meters.

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Section 7.3 Gas Modernization Capital Investment Forecast

The Gas Modernization Capital Investment Forecast for NYSEG is shown in Table 27 and for RG&E is shown in Table 28.

	A		B	C	D	E	F	G
			2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>							
1	Modernization	\$	18,514	\$ 17,396	\$ 14,735	\$ 9,229	\$ 1,632	\$ 61,506
2	AMI Project Gas		14,696	14,735	14,735	9,229	1,632	55,027
3	Gas RTU/Telemetry Upgrade		2,477	2,661	-	-	-	5,138
4	Click-Gas Inspections and Scheduling		1,160	-	-	-	-	1,160
5	Common Gas SCADA Platform		180	-	-	-	-	180
6	Total	\$	18,514	\$ 17,396	\$ 14,735	\$ 9,229	\$ 1,632	\$ 61,506

Table 27 – NYSEG Gas Modernization Capital Investment Forecast

	A		B	C	D	E	F	G
			2022	2023	2024	2025	2026	2027
1	<i>\$ in thousands</i>							
1	Modernization	\$	14,759	\$ 13,872	\$ 13,872	\$ 7,445	\$ 1,851	\$ 51,798
2	AMI Project Gas		13,970	13,872	13,872	7,445	1,851	51,009
3	Click-Gas Inspections and Scheduling		579	-	-	-	-	579
4	Common Gas SCADA Platform		210	-	-	-	-	210
5	Total	\$	14,759	\$ 13,872	\$ 13,872	\$ 7,445	\$ 1,851	\$ 51,798

Table 28 – RG&E Gas Modernization Capital Investment Forecast

The key project within the Gas Modernization category is the on-going installation of the Advanced Metering Infrastructure (AMI) in NYSEG and RG&E service territories. AMI will be an essential foundational system in realizing CLCPA goals to empower customers, through new tools and information, to effectively manage and reduce usage and minimize environmental impacts of energy consumption.

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Section 7.4 Gas Reliability Capital Investment Forecast

The Gas Reliability Capital Investment Forecast for NYSEG is shown in Table 29 and Table 30 for RG&E.

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Reliability	\$ 42,239	\$ 43,196	\$ 51,958	\$ 48,363	\$ 45,303	\$ 231,059
2 Leak Prone Main Replacement Program - LPM	28,331	28,659	31,687	30,751	32,072	151,501
3 Leak Prone Service Replacement Program	5,317	6,878	7,605	7,380	7,697	34,878
4 Boswell Hill 124 Psig Bare Steel Leak Prone Main	-	232	3,214	3,450	-	6,896
5 Hebron Station/Line J Retirement	-	-	-	6,336	-	6,336
6 Pendleton - SW System and Regulator Station Upgrade	-	-	-	-	5,070	5,070
7 West Genesee Street Leak Prone Main	2,506	2,526	-	-	-	5,032
8 Broad St Norwich Leak Prone Main	2,478	2,351	-	-	-	4,829
9 Winney Hill Regulator Station	-	-	4,308	-	-	4,308
10 Canandaigua Feeder Main Reinforcement Project	-	-	2,889	-	-	2,889
11 Gardner Regulator Station	-	2,168	-	-	-	2,168
12 Winney Hill Leak Prone Main	-	-	1,843	-	-	1,843
13 Limestone Regulator Station	1,285	-	-	-	-	1,285
14 North Main Cortland Leak Prone Main	1,198	-	-	-	-	1,198
15 Low Pressure Relief Valve Program	198	215	231	250	261	1,155
16 Critical Valve Installations, Binghamton	302	168	180	195	203	1,048
17 Spruce Haven Farm RNG	623	-	-	-	-	623
18 Total	\$ 42,239	\$ 43,196	\$ 51,958	\$ 48,363	\$ 45,303	\$ 231,059

Table 29 – NYSEG Gas Reliability Capital Investment Forecast

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Reliability	\$ 36,685	\$ 42,016	\$ 29,003	\$ 27,522	\$ 27,699	\$ 162,926
2 Leak Prone Main Replacement Program - LPM	18,954	20,864	20,573	20,125	21,023	101,539
3 Leak Prone Service Replacement Program	4,522	4,089	4,031	3,944	4,120	20,705
4 Ridgeway Ave Leak Prone Main	5,776	4,777	-	-	-	10,553
5 MF120 Eastern Monroe, State Road, Install Gas Main	122	108	4,399	3,453	-	8,082
6 Winton Road South Leak Prone Main	7,028	-	-	-	-	7,028
7 CM-1A Regulator Station	-	5,317	-	-	-	5,317
8 Transmission Short Segments, Install Gas Mains	-	3,006	-	-	-	3,006
9 MF60 Southeast Phase 4 (County Rd 9), Install Gas Main, Rebuild Station	-	-	-	-	2,557	2,557
10 MF60 Southeast Phase 3 (Malone Rd), Install Gas Main	122	2,193	-	-	-	2,315
11 MF60 Southeast Phase 1 (Mendon Gate - Rte 64), Install Gas Main	122	1,662	-	-	-	1,784
12 Chambers St. Reinforcement Leak Prone Main	40	-	-	-	-	40
13 Total	\$ 36,685	\$ 42,016	\$ 29,003	\$ 27,522	\$ 27,699	\$ 162,926

Table 30 – RG&E Gas Reliability Capital Investment Forecast

The projects in this category include work being performed on mains and at regulator stations. Projects addressing Leak Prone Main (LPM) replacement at both the program (projects costing less than \$500K each) and major LPM projects (projects costing \$500K or greater). Projects to increase the automation at regulator station and to upgrade regulator stations (not due to asset condition) are included in this category. Regulator station work that costs less than \$500K per project is included in the

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Regulator Modernization and Automation Program; regulator station projects costing \$500K or more are listed individually. The major projects and program in this category are described below. The Companies also apply a screen to determine if LPM projects could be candidates for Non-Pipe Alternatives.

Leak Prone Main Replacement Program: This program replaces leak prone gas mains identified as leak prone and includes mains replaced due to condition (Distribution Integrity Management Plan, DIMP, and leaks) and municipal projects. This work includes, but is not limited to, replacing gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way; leak prone gas main replacements; tariff or code requirements; and actively leaking services. The leak prone main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition at high risk for failure. The gas mains are prioritized for replacement in accordance with DIMP regulations and leak information. The gas main replacements result in a distribution system that is safer and more reliable. Projects that are included in the program have costs less than \$500K.

Leak Prone Service Program: This program replaces services that are classified as Leak Prone and are required by various regulations to be replaced. This work includes, but is not limited to, replacing gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way; leak prone gas main replacements; tariff or code requirements; and actively leaking services.

Ridgeway Ave LPM: The Ridgeway Ave. leak prone main project includes the replacement of approximately 11,500 linear feet of medium-pressure leak prone main (c. 1951-1959) with new 2,4,6,12, and 16-inch pipe. This project extends along Ridgeway Ave. (from Mount Read Blvd., east to Ramona St.) and specifically at intersections with Mount Read Blvd. and Hollywood St. These pipes are essential for maintaining reliability to existing customers in the City of Rochester. The extent of this project is also associated with a potential highway improvement project.

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Regulator Station Modernization and Automation Program: This program includes the improvements to regulator and gate stations within the Companies' gas systems. There are several types of typical upgrades, including the replacement of: regulators; filters; chart recorders; valves; inlet and outlet piping; and enclosures. The noted equipment is replaced with standardized equipment, piping and associated fittings, and includes corrosion protection for both equipment and piping. This Program also includes the installation of remote terminal units (RTUs), other automation improvements and replacement of obsolete equipment for which there are no repair parts available. These improvements enhance system reliability associated with corroded piping, fittings and some end-of-life equipment. Additional benefits of this program include the reduction of potential outages due to equipment failures, improvement of equipment standardization and safety. The projects included in this program have costs less than \$500K per project.



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Section 7.5 Gas Innovation Capital Investment Forecast

The Gas Innovation Capital Investment Forecast for NYSEG is shown in Table 1. This project included in this category is the development of a Geothermal District Energy System Pilot Project. In the 2019 Joint Proposal, the Companies were required to retain a vendor with experience in geothermal district energy systems and heat pump heating and cooling solutions to assist in developing a study to examine the feasibility of deploying geothermal district energy systems in its respective service territory and to develop plans for subsequent pilot projects, where feasible, to be proposed in the 2022 Rate Case for implementation. The Companies plan to deploy a geothermal district energy system pilot project in the NYSEG service territory. By the end of April 2022, NYSEG will have further details regarding the selected pilot project based on the completion of the geothermal district energy feasibility study. The estimated capital costs associated with this project are shown below.

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	2027
1	<i>Innovation</i>	\$ -	\$ 4,000	\$ 12,000	\$ 890	\$ 890	\$ 17,780
2	Geothermal District Energy System Pilot Project	-	4,000	12,000	890	890	17,780
3	Total	\$ -	\$ 4,000	\$ 12,000	\$ 890	\$ 890	\$ 17,780

Table 31 – NYSEG Gas Innovation Capital Investment Forecast

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Chapter 8 Common Capital Investment Forecast

The common classification is for projects and programs which are applicable to both the electric and the gas lines of business. For projects that are applicable to both NYSEG and REG&E, the costs are first allocated to each Company based on factors that can vary by project. Once the amount has been established for each Company, an allocation factor is used to allocate the costs to the electric and gas lines of business. The lines of business allocation factors for common costs for NYSEG and RG&E reflect those from the currently approved Joint Proposal and are shown in Figure 4.

Company	Allocation to Electric Line of Business	Allocation to Gas Line of Business
NYSEG	80.26%	19.74%
RG&E	71.39%	28.61%

Figure 4 – NYSEG and RG&E Common Allocation Factors

The amounts shown in all tables of this Chapter are unallocated amounts. The allocation to each line of business are shown below each table. Tables 32 and 33 show the unallocated capital investments for each of the areas within Common at each Company. The Sections that follow detail the specific projects within each of the seven areas.

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
<i>\$ in thousands</i>							
1 Buildings and Facilities		\$ 4,410	\$ 37,475	\$ 89,050	\$ 36,118	\$ 16,087	\$ 183,139
2 Customer Service		2,065	4,038	1,937	1,977	3,114	13,132
3 Fleet		29,420	20,000	20,000	20,000	20,000	109,420
4 Information Technology		12,244	17,322	16,324	15,370	16,744	78,003
5 Operational Smart Grids		41,531	46,938	68,070	53,023	52,572	262,134
6 Physical and Cyber Security		35,538	30,165	26,961	18,681	20,345	131,690
7 Training		2,885	14,038	576	610	780	18,889
8 Total		\$ 128,093	\$ 169,976	\$ 222,918	\$ 145,780	\$ 129,642	\$ 796,408
9							
10 Allocation to Electric Business		\$ 102,808	\$ 136,422	\$ 178,914	\$ 117,003	\$ 104,050	\$ 639,197
11 Allocation to Gas Business		\$ 25,286	\$ 33,553	\$ 44,004	\$ 28,777	\$ 25,591	\$ 157,211

Table 32 – NYSEG Common Capital Investment Forecast

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A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Buildings and Facilities	\$ 4,823	\$ 8,167	\$ 7,874	\$ 6,453	\$ 5,053	\$ 32,371
2 Customer Service	1,189	3,244	1,951	1,983	2,504	10,872
3 Fleet	6,717	5,689	9,208	6,111	6,214	33,940
4 Information Technology	6,492	10,357	10,028	9,576	9,700	46,152
5 Operational Smart Grids	22,227	19,009	38,656	41,356	25,754	147,001
6 Physical and Cyber Security	23,088	15,661	12,003	10,312	12,508	73,572
7 Training	265	139	63	134	2	603
8 Total	\$ 64,801	\$ 62,266	\$ 79,784	\$ 75,925	\$ 61,735	\$ 344,511
9						
10 Allocation to Electric Business	\$ 46,261	\$ 44,452	\$ 56,958	\$ 54,203	\$ 44,073	\$ 245,946
11 Allocation to Gas Business	\$ 18,540	\$ 17,814	\$ 22,826	\$ 21,722	\$ 17,662	\$ 98,565

Table 33 – RG&E Common Capital Investment Forecast

Section 8.1 Buildings and Facilities Capital Forecast

The Building and Facilities area is responsible for maintaining and improving the Companies owned and leased facilities, which include office buildings, service centers, and training centers, ensuring they meet health and safety standards, code compliance and required upgrades to maximize asset life cycles.

The capital investments of the Building and Facilities area are needed to maintain, upgrade, or replace the Companies' facilities or equipment, due to asset condition, age, risk mitigation, efficiency loss, functional obsolescence, code compliance requirements, safety and/or environmental considerations. Project improvements typically include mechanical, electrical, building structure and envelope, and control systems. The facilities projects are aimed at providing safe working conditions, greater efficiencies and maximizing asset life cycles at all the Company's locations – office buildings, operation service centers and training facilities.

The projects in this area typically include upgrading HVAC systems to energy efficient models, (BMS) Building Management Systems upgrades/installations, LED lighting with controls, building envelope upgrades, environmental and site improvements (tanks, spill containment, etc.), back-up systems, UPS systems, generators, solar panels, installation of EV charges and consolidation projects to optimize our space utilization at Company facilities.

Building and Facilities collaborates with internal departments, to address requests for additional space, improvements to existing locations, expansion requests for new locations, and site-specific upgrades for operational benefits, which examples include new structures for covered parking or equipment storage.

Other types of projects include equipment replacement due to day to day wear and tear, roof replacements due to end of life or to mitigate cumulative repair costs, general replacement of material, systems and equipment required to keep the facilities in proper

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working order. The facility amounts for NYSEG and RG&E are shown in Table 34 and Table 35, respectively.

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Buildings and Facilities	\$ 4,410	\$ 37,475	\$ 89,050	\$ 36,118	\$ 16,087	\$ 183,139
2 Binghamton Service Center	-	1,500	40,000	9,000	-	50,500
3 Minor Projects	2,000	3,750	3,750	3,750	3,750	17,000
4 Solar Panels	-	2,750	3,000	3,250	3,500	12,500
5 EV Chargers	-	2,250	4,250	4,250	1,250	12,000
6 Consolidation KGO	-	5,000	6,500	-	-	11,500
7 Consolidation Ithaca	-	750	4,500	4,500	-	9,750
8 Auburn Service Center Projects	-	750	1,050	-	3,275	5,075
9 BMS System	1,000	1,657	750	750	750	4,907
10 Liberty Service Center Projects	-	1,900	3,000	-	-	4,900
11 Geneva Service Center East Projects	-	150	2,000	2,000	-	4,150
12 Brewster Service Center Projects	-	100	2,945	500	530	4,075
13 Walton Service Center Projects	-	250	3,800	-	-	4,050
14 Oneonta Service Center Projects	-	100	2,170	1,725	-	3,995
15 Mechanicville Service Center Projects	-	1,200	1,497	600	300	3,597
16 Tablet Project	-	1,704	-	-	1,478	3,182
17 Hamburg Operations Center Projects	-	150	2,000	1,000	-	3,150
18 ECC Projects	-	2,225	570	325	-	3,120
19 Brewster HVAC	150	1,500	1,000	-	-	2,650
20 KGO Projects	-	750	1,610	100	50	2,510
21 Lancaster Service Center Projects	-	75	150	2,075	-	2,300
22 Progressive Style	120	750	750	530	-	2,150
23 Low Risk Buildings Projects	-	500	500	500	500	2,000
24 Elmira Service Center Projects	-	1,210	425	250	50	1,935
25 Long Lake Building Expansion	-	250	1,500	-	-	1,750
26 KGO UPS/Battery Upgrades	500	750	-	-	-	1,250
27 Plattsburgh Service Center	-	390	450	-	410	1,250
28 Binghamton Service Center Underground Tank Removal	100	900	-	-	-	1,000
29 Ithaca Underground Tank Removal/Replacement	100	900	-	-	-	1,000
30 Stamford Operations Center Projects	-	230	455	150	-	835
31 KGO Cooling Tower Replacement	-	750	-	-	-	750
32 KGO House Power/Transformer Upgrade	-	750	-	-	-	750
33 Brewster Generator	-	450	150	-	-	600
34 Lockport Service Center Projects	100	500	-	-	-	600
35 Norwich Operations Center Projects	-	500	-	50	-	550
36 Lancaster Service Center Garage Projects	-	-	-	350	75	425
37 Video Conferencing	-	90	110	110	110	420
38 Hornell Service Center Projects	-	-	-	300	-	300
39 Mobile Phones Project	40	44	48	53	59	244
40 SPCC West	200	-	-	-	-	200
41 Mailroom Digitization	-	-	119	-	-	119
42 Plattsburgh Site Upgrades	100	-	-	-	-	100
43 Total	\$ 4,410	\$ 37,475	\$ 89,050	\$ 36,118	\$ 16,087	\$ 183,139
44						
45 Allocation to Electric Business	\$ 3,539	\$ 30,077	\$ 71,471	\$ 28,988	\$ 12,911	\$ 146,987
46 Allocation to Gas Business	\$ 871	\$ 7,397	\$ 17,578	\$ 7,130	\$ 3,176	\$ 36,152

Table 34 – NYSEG Building and Facilities Capital Investment Forecast

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	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Buildings and Facilities	\$ 4,823	\$ 8,167	\$ 7,874	\$ 6,453	\$ 5,053	\$ 32,371	
2 Minor Projects	600	1,500	1,500	1,500	1,500	6,600	
3 EV Chargers	100	1,500	1,750	1,750	-	5,100	
4 Solar Panels	-	750	1,500	1,500	500	4,250	
5 Tablet Project	692	138	996	199	1,435	3,461	
6 Scottsville Rd Service Center Projects	1,575	535	1,000	200	-	3,310	
7 Scottsville Road Consolidation Proj.	1,258	1,500	-	-	-	2,758	
8 BMS System	404	-	300	300	300	1,304	
9 Scottsville Rd HVAC Phase I	54	1,250	-	-	-	1,304	
10 Low Risk Building Projects	-	250	250	250	250	1,000	
11 Progressive Office	-	500	250	250	-	1,000	
12 Mushroom Blvd Projects	-	-	-	-	750	750	
13 Video Conferencing	-	75	110	110	110	405	
14 3 City Center	101	50	50	50	50	301	
15 Mobile Phones Project	40	44	48	53	59	244	
16 Canandaigua Truck Garage Projects	-	75	-	-	100	175	
17 Mailroom Digitization	-	-	119	-	-	119	
18 Sodus Service Center Projects	-	-	-	110	-	110	
19 Eastern Monroe Operations Center Projects	-	-	-	105	-	105	
20 Fillmore Operations Center Projects	-	-	-	75	-	75	
21 Total	\$ 4,823	\$ 8,167	\$ 7,874	\$ 6,453	\$ 5,053	\$ 32,371	
22							
23 Allocation to Electric Business	\$ 3,443	\$ 5,831	\$ 5,621	\$ 4,606	\$ 3,608	\$ 23,110	
24 Allocation to Gas Business	\$ 1,380	\$ 2,337	\$ 2,253	\$ 1,846	\$ 1,446	\$ 9,261	

Table 35 – RG&E Building and Facilities Capital Investment Forecast

The major projects being undertaken at the Companies are:

Binghamton Service Center: The current Binghamton Service Center needs significant investment to renovate the building, bring it up to current code compliance, meet NYSEG future needs for a modernized service center and meet the needs of our customers. A new location will be built by and leased (on a long-term basis) from a developer.

Minor Projects: The Minor Projects program is made up of many small projects that make improvements or upgrade systems in any facility due to end of life, failures associated with mechanical, electrical, control systems, efficiency improvements, energy efficiency improvements, deduction of greenhouse emissions or addressing security and safety issues. These projects may create reliability, extend end of life of systems, avoid disruption to Operations, support green and sustainable initiatives, and/or create safer buildings and facilities.

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Solar Panels: This project will install solar panels at Company facilities for use at the facilities. The solar panels will reduce system demand, and are in alignment with Company sustainability goals and NY State energy objectives.

EV Chargers: This is a comprehensive program to install approximately 600 electric vehicle chargers at Company facilities (approximately 450 at NYSEG and 150 at RG&E). These chargers will support the electrification of fleet vehicles.

KGO (Kirkwood General Office) Consolidation: This project will consolidate the existing 215,000 square feet of used space into 110,000 square feet of used space. The existing square footage is divided between the east and west sides of the building. The consolidation would utilize space only on the east side of the building. Equipment including lighting and HVAC would be updated to more energy efficient equipment. This will reduce the maintenance and usage costs of the facility.

Ithaca Consolidation: The existing Ithaca office, Service Center and Trumansburg Service Center are in poor condition, requiring significant investment to bring them current standards. Due to the amount of capital required, this project will consolidate these three facilities into one strategically located service center. All existing locations would be offered for sale as part of the consolidation.

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Section 8.2 Customer Service Capital Forecast

The Customer Service investments focus on providing customers the systems and information they request, when requested. These investments also help doing business with the Companies easy and efficient for the customer. The investments planned in the next five years are shown below in Table 36 for NYSEG and Table 37 for RG&E.

	A	B	C	D	E	F	G				
	2022		2023		2024		2025		2026		Total 2022-2026
	<i>\$ in thousands</i>										
1	Customer Service	\$ 2,065	\$ 4,038	\$ 1,937	\$ 1,977	\$ 3,114	\$ 13,132				
2	Regulatory Driven Efforts	425	1,379	886	912	764	4,366				
3	Customer Journey Redesign	688	688	701	715	730	3,522				
4	Energy Manager Enhancements	501	552	100	100	1,370	2,623				
5	Lab Equipment	150	150	250	250	250	1,050				
6	Contact Center Knowledge Database	-	769	-	-	-	769				
7	Orchestration Platform - Customer Journey	-	500	-	-	-	500				
8	Kiosk Upgrade	302	-	-	-	-	302				
9	Total	\$ 2,065	\$ 4,038	\$ 1,937	\$ 1,977	\$ 3,114	\$ 13,132				
10											
11	Allocation to Electric Business	\$ 1,658	\$ 3,241	\$ 1,555	\$ 1,587	\$ 2,499	\$ 10,540				
12	Allocation to Gas Business	\$ 408	\$ 797	\$ 382	\$ 390	\$ 615	\$ 2,592				

Table 36 – NYSEG Customer Service Capital Investment Forecast

	A	B	C	D	E	F	G				
	2022		2023		2024		2025		2026		Total 2022-2026
	<i>\$ in thousands</i>										
1	Customer Service	\$ 1,189	\$ 3,244	\$ 1,951	\$ 1,983	\$ 2,504	\$ 10,872				
2	Regulatory Driven Efforts	425	1,379	886	912	764	4,366				
3	Energy Manager Enhancements	105	707	500	500	1,162	2,974				
4	Customer Journey Redesign	308	308	315	321	328	1,580				
5	Lab Equipment	150	336	250	250	250	1,236				
6	Contact Center Knowledge Database	-	384	-	-	-	384				
7	Kiosk Upgrade	201	-	-	-	-	201				
8	Orchestration Platform - Customer Journey	-	130	-	-	-	130				
9	Total	\$ 1,189	\$ 3,244	\$ 1,951	\$ 1,983	\$ 2,504	\$ 10,872				
10											
11	Allocation to Electric Business	\$ 849	\$ 2,316	\$ 1,393	\$ 1,416	\$ 1,788	\$ 7,761				
12	Allocation to Gas Business	\$ 340	\$ 928	\$ 558	\$ 567	\$ 716	\$ 3,110				

Table 37 – RG&E Customer Service Capital Investment Forecast

The major projects within Customer Service are:

Regulatory Driven Efforts: 'This program covers software system upgrades and enhancements that are required by New York regulatory mandates and rate case initiatives. On an annual basis, there are anticipated regulatory requirements that require resources to develop and implement the necessary system changes. The work is anticipated to include system impacts to the areas of Billing, Retail Access, FICA/Credit and Collections.

Customer Journey Redesign: The Customer Journey Redesign Project will reimagine how customers interact with Companies across the Companies' most critical touchpoints. 2021 JD Power and Associates residential satisfaction studies and the Companies' Voice of the Customer (VOC) program have highlighted the need to further develop key customer journeys. Through the development of a matrix, key journeys for redesign have been identified and prioritized based on the following criteria: customer satisfaction, cost reduction, strategic value and complexity. The project will ultimately drive down the cost to serve customers because customers will become more empowered to act on new and improved self-service actions and will be able to rely less on the call center for support. The improved user interface and designs will translate to a simpler journey for the customer, which lends to improved customer satisfaction and better operational efficiencies on the back end. With new journeys in place, digital adoption will be integrated from end to end, providing more automated steps that help customers and call agents.

Energy Manager Enhancements: The program will enable the Companies to utilize the data obtained from the AMI system and provide real time insights to our customers about their energy usage and associated costs. The first object of the project will enable the Companies to integrate the data from the AMI system so we can send mid-cycle bill alerts to those customers who are forecasted to have higher than expected bills. The second aspect of the project will enhance the mobile device capabilities and "widgets" to allow customers to have the same full, rich energy manager and usage experience that they experience on the website. These widgets will include usage and comparison graphs, home surveys, energy efficiency advice, usage alerts, bill comparisons, near real-time interval data, and rates comparisons.

Section 8.3 Fleet Capital Forecast

Fleet Services' overall objective is to provide a safe, reliable, regulatory compliant and cost-effective fleet of vehicles and equipment for the Companies. The capital expenditures for Fleet are for the replacement of vehicles and equipment and are based

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on established life cycle criteria (years, mileage, and/or hours). Fleet Services supports noted objectives through the use of the following:

1. Cost-effective and timely processes for the acquisition, maintenance and disposal of fleet vehicles and equipment including light-, medium- and heavy-duty vehicles and equipment (e.g. trailers, backhoes, ATVs, etc.).
2. Replacements are based on established life cycle criteria (years, mileage, and/or hours). Each year the Companies review the existing fleet according to the established criteria and identify those vehicles that meet or exceed the replacement criteria. These are the units that are proposed for replacement.
3. Model year advancements by the vehicle and equipment manufacturers are factored into the acquisition process to ensure that the latest technical and safety features are included. Changes in operational requirements are also considered, based on feedback from the end-users of the fleet.
4. Supports sustainability efforts through the purchase of alternatively fueled vehicles.

The capital investment for Fleet at NYSEG and RG&E are shown in Table 38 and Table 39, respectively.

	A	B	C	D	E	F	G
	<i>\$ in thousands</i>						
	2022	2023	2024	2025	2026	Total 2022-2026	
1 Fleet	\$ 29,420	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 109,420
2 Fleet Replacement Program	29,000	20,000	20,000	20,000	20,000	20,000	109,000
3 Global Telematics Solution	420	-	-	-	-	-	420
4 Total	\$ 29,420	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 109,420
5							
6 Allocation to Electric Business	\$ 23,612	\$ 16,052	\$ 16,052	\$ 16,052	\$ 16,052	\$ 16,052	\$ 87,820
7 Allocation to Gas Business	\$ 5,808	\$ 3,948	\$ 3,948	\$ 3,948	\$ 3,948	\$ 3,948	\$ 21,600

Table 38 – NYSEG Fleet Capital Investment Forecast

	A	B	C	D	E	F	G
	<i>\$ in thousands</i>						
	2022	2023	2024	2025	2026	Total 2022-2026	
1 Fleet	\$ 6,717	\$ 5,689	\$ 9,208	\$ 6,111	\$ 6,214	\$ 33,940	\$ 33,940
2 Fleet Replacement Program	6,700	5,689	9,208	6,111	6,214	33,923	33,923
3 Global Telematics Solution	17	-	-	-	-	17	17
4 Total	\$ 6,717	\$ 5,689	\$ 9,208	\$ 6,111	\$ 6,214	\$ 33,940	\$ 33,940
5							
6 Allocation to Electric Business	\$ 4,795	\$ 4,061	\$ 6,574	\$ 4,363	\$ 4,436	\$ 24,229	\$ 24,229
7 Allocation to Gas Business	\$ 1,922	\$ 1,628	\$ 2,635	\$ 1,748	\$ 1,778	\$ 9,710	\$ 9,710

Table 39 – RG&E Fleet Capital Investment Forecast



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Section 8.4 Information Technology Capital Forecast

As technology advances, NYSEG and RG&E's goal is to implement solutions that enable the business to implement solutions that deliver value to the business and to our customers. The projects and programs included in this area are upgrades and updates to hardware, software applications, new digital applications and platforms, as well as asset condition-based replacements. The capital investments for Information Technology are shown in Table 40 and Table 41 for NYSEG and RG&E, respectively.

A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026
1 Information Technology	\$ 12,244	\$ 17,322	\$ 16,324	\$ 15,370	\$ 16,744	\$ 78,003
2 Client Project Requests and Integration Projects	-	8,177	9,767	9,284	9,312	36,540
3 END USER Life Cycle	1,927	1,070	1,095	1,100	1,116	6,308
4 Microsoft Deployment Life Cycle	-	2,645	-	-	2,700	5,345
5 WINTEL Life Cycle	1,396	806	835	839	853	4,729
6 UNIX Life Cycle	327	386	916	925	1,140	3,694
7 STORAGE Life Cycle	341	695	709	724	739	3,208
8 SAP Enhancements	-	828	1,332	828	-	2,988
9 NETENG Life Cycle	469	565	591	588	600	2,813
10 GIS Utility Network Model Implementation	-	801	801	801	-	2,404
11 Digital Journey EDB Transformation	901	819	-	-	-	1,720
12 NETSEC Life Cycle	345	236	278	280	283	1,422
13 Click Upgrade & Long Cycle Work	1,366	-	-	-	-	1,366
14 ESRI UN Deployment	955	-	-	-	-	955
15 Liferay WCM Implementation	875	-	-	-	-	875
16 PureEngage to PureConnect Migration	841	-	-	-	-	841
17 RPA Electric & Gas Operation	460	294	-	-	-	754
18 Contractor Portal	664	-	-	-	-	664
19 Customer Insights	636	-	-	-	-	636
20 Damage Assessment	600	-	-	-	-	600
21 Regulatory Driven Efforts	140	-	-	-	-	140
22 Total	\$ 12,244	\$ 17,322	\$ 16,324	\$ 15,370	\$ 16,744	\$ 78,003
23						
24 Allocation to Electric Business	\$ 9,827	\$ 13,902	\$ 13,102	\$ 12,336	\$ 13,439	\$ 62,605
25 Allocation to Gas Business	\$ 2,417	\$ 3,419	\$ 3,222	\$ 3,034	\$ 3,305	\$ 15,398

Table 40 – NYSEG Information Technology Investment Forecast

NYSEG and RG&E 5-Year Capital Investment Plan

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Information Technology	\$ 6,492	\$ 10,357	\$ 10,028	\$ 9,576	\$ 9,700	\$ 46,152	
2 Client Project Requests and Integration Projects	-	4,249	5,124	4,888	5,759	20,020	
3 GIS Utility Network Model Implementation	-	1,822	1,822	1,822	-	5,465	
4 END USER Life Cycle	830	545	613	561	569	3,119	
5 WINTEL Life Cycle	897	438	459	456	464	2,715	
6 Microsoft Deployment Life Cycle	-	1,322	-	-	1,350	2,672	
7 STORAGE Life Cycle	392	376	383	392	400	1,943	
8 UNIX Life Cycle	167	196	466	471	569	1,869	
9 NETSEC Life Cycle	176	299	344	347	363	1,528	
10 SAP Enhancements	-	419	671	419	-	1,509	
11 Digital Journey EDB Transformation	458	417	-	-	-	875	
12 Click Upgrade & Long Cycle Work	837	-	-	-	-	837	
13 NETENG Life Cycle	63	125	146	220	225	778	
14 ESRI UN Deployment	485	-	-	-	-	485	
15 Liferay WCM Implementation	444	-	-	-	-	444	
16 PureEngage to PureConnect Migration	420	-	-	-	-	420	
17 RPA Electric & Gas Operation	234	149	-	-	-	384	
18 Contractor Portal	331	-	-	-	-	331	
19 Customer Insights	323	-	-	-	-	323	
20 Damage Assessment	300	-	-	-	-	300	
21 Regulatory Driven Efforts	71	-	-	-	-	71	
22 Primavera PPM Cloud	61	-	-	-	-	61	
23 Total	\$ 6,492	\$ 10,357	\$ 10,028	\$ 9,576	\$ 9,700	\$ 46,152	
24							
25 Allocation to Electric Business	\$ 4,635	\$ 7,394	\$ 7,159	\$ 6,836	\$ 6,925	\$ 32,948	
26 Allocation to Gas Business	\$ 1,857	\$ 2,963	\$ 2,869	\$ 2,740	\$ 2,775	\$ 13,204	

Table 41 – RG&E Information Technology Investment Forecast

The major projects and programs being implemented within Information Technology includes the follow:

Client Projects Requests and Integration Projects: This program is for business initiatives identified by the various business areas for future efficiency projects. The Company has a rigorous process of identifying the technology needs of the business, gathering information, vetting the project list and prioritizing based on need, business value and resource availability. The Project Demand Planning cycle runs annually and involves collating the requirements across all business areas for projects requiring IT expenditure. This process runs from the beginning of May through the end of August each year. The final portfolio is then presented back to senior management at the end of August for acceptance. Given the above timetable the final project list for 2023 and beyond does not exist at the time of this filing.

GIS Utility Network Model Implementation: This the second phase of a project to transition the Companies' to the geometric Utility Network Model for our Geospatial Solutions. These solutions provide map-based master data to field and office personnel and enable business process execution through map-based user interfaces. The

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geospatial data model is integrated with the Asset Management Systems (SAP), Outage Management Systems (OMS) and CYME simulation and forecasting models. The existing data model is to be retired by the vendor in the coming years. This enhancement will change the data model used by the Companies and move to a more modern utility specific model.

IOC-NET-End User Life Cycle (LC): The program refreshes the computing devices issued to employees by the Company. Computing devices refresh lifecycle defined by the Companies is four years. This project also provides computing devices for new hires. Replacing aged equipment with new equipment will avoid service disruptions due to devices not working properly due to their age. New computers will provide higher computing capabilities.

Microsoft Deployment LC: This project captures the work associated with Microsoft Enterprise Agreements and all the services provided to the Company end user. These services include business collaboration (email, messaging, and virtual meetings), operating system, applications, and security protection. The program ensures that all users are provided with the correct Microsoft products to perform their business functions, run applications and ensure effective collaboration. This program also provides Microsoft software and licenses to new employees and new server infrastructure.

IOC-WINTEL LC: The purpose of this program is to refresh the Companies' Wintel infrastructure following the defined four-year refresh lifecycle. Wintel infrastructure includes primarily servers, chassis, and server blades. This infrastructure is primarily hosting applications and SQL databases and will provide Wintel Infrastructure that supports the company's organic growth. Hardware running beyond four years is more likely to have performance issues that may affect the applications hosted on it. Replace aged equipment with new Wintel equipment will avoid application performance issues or service disruptions due to hardware not working properly. New devices also provide

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higher performance and capabilities for better application and data management performance.



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Section 8.5 Operational Smart Grids Capital Forecast

Projects in this category are aimed at building the backbone necessary to enable the Companies to effectively plan, monitor and control the electric distribution and transmission systems and the gas systems. These projects are intended to increase the efficiency in accessing critical systems and information and ensure that communication between various devices on the networks and the Energy Control Center (ECC) is always available, efficient and secure. The capital investments needed to ensure these aspects of the business are shown for NYSEG in Table 42 and for RG&E in Table 43.

	A	B	C	D	E	F	G
<i>\$ in thousands</i>	2022	2023	2024	2025	2026	Total 2022-2026	
1 Operational Smart Grids	\$ 41,531	\$ 46,938	\$ 68,070	\$ 53,023	\$ 52,572	\$ 262,134	
2 Data Center Consolidation	575	4,019	24,120	20,440	11,187	60,341	
3 Telecomm Infrastructure	11,347	7,729	7,265	6,756	6,840	39,937	
4 Telecomm Fiber	7,728	7,975	7,277	5,650	5,085	33,714	
5 NY WAN Expansion	7,331	6,726	6,322	5,880	5,500	31,759	
6 OSG Communications Tower, shelter Facility Improvements (Com)	1,000	3,000	3,000	4,000	4,000	15,000	
7 FCC License Radio Spectrum purchase	4,000	4,400	2,000	1,000	1,000	12,400	
8 Energy Control Systems Infrastructure	415	2,725	4,971	2,061	2,016	12,188	
9 FAN + mobile technology refresh and expansion	400	2,300	3,200	3,100	3,100	12,100	
10 Telecomm Vertical Builds	2,360	2,459	2,459	1,459	1,459	10,196	
11 NY AMI Lifecycle	-	-	-	-	6,928	6,928	
12 ECC Life cycle	768	956	1,100	1,250	1,320	5,394	
13 Virtualization Expansion	-	1,645	1,541	-	1,600	4,786	
14 Historian and Analytic Upgrades Program	-	134	3,480	142	146	3,902	
15 Rochester Consolidation	2,028	882	-	-	-	2,910	
16 NMC Solar Winds	494	379	379	379	379	2,011	
17 OMS Enhancements	375	375	375	375	375	1,875	
18 Solar Battery Backup Integration	500	500	250	200	200	1,650	
19 Veritas Growth	44	484	81	81	601	1,290	
20 Microsoft Licensing	898	-	-	-	-	898	
21 Oracle Exadata	12	-	-	-	836	848	
22 Networks ECTRM	769	-	-	-	-	769	
23 Full OMS Functional alignment ABB-Spectrum	-	250	250	250	-	750	
24 Itron Mobile hardware replacement	488	-	-	-	-	488	
25 Total	\$ 41,531	\$ 46,938	\$ 68,070	\$ 53,023	\$ 52,572	\$ 262,134	
26							
27 Allocation to Electric Business	\$ 33,333	\$ 37,672	\$ 54,633	\$ 42,556	\$ 42,194	\$ 210,389	
28 Allocation to Gas Business	\$ 8,198	\$ 9,266	\$ 13,437	\$ 10,467	\$ 10,378	\$ 51,745	

Table 42 – NYSEG Operational Smart Grids Investment Forecast

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	A	B	C	D	E	F	G				
	2022		2023		2024		2025		2026		Total 2022-2026
<i>\$ in thousands</i>											
1 Operational Smart Grids		\$ 22,227	\$ 19,009	\$ 38,656	\$ 41,356	\$ 25,754	\$ 147,001				
2 Data Center Consolidation		345	2,685	13,929	12,671	7,766	37,397				
3 ROC Hydrogen Pilot		-	-	6,000	14,000	-	20,000				
4 Telecomm Infrastructure		5,007	2,686	2,525	2,348	2,380	14,945				
5 Telecomm NY WAN Buildout		3,107	3,397	3,193	2,970	2,200	14,867				
6 Telecomm Fiber		3,243	2,325	1,418	1,276	1,148	9,410				
7 FAN + mobile technology refresh and expansion		400	1,300	2,200	2,100	2,100	8,100				
8 Telecomm Vertical Builds		3,442	959	959	959	959	7,278				
9 OSG Communications Tower, shelter Facility Improvements (Com)		500	1,000	1,500	2,500	1,500	7,000				
10 Energy Control Systems Infrastructure		827	970	2,579	1,203	872	6,451				
11 FCC License Radio Spectrum purchase		2,000	1,000	1,000	500	500	5,000				
12 NY AMI Lifecycle		-	-	-	-	4,059	4,059				
13 Virtualization Expansion		-	1,003	946	-	890	2,839				
14 Historian and Analytic Upgrades Program		-	158	1,709	79	82	2,028				
15 Rochester Consolidation		1,268	535	-	-	-	1,803				
16 NMC Solar Winds		313	229	229	229	229	1,229				
17 ECC Life cycle		160	160	162	164	166	812				
18 Veritas Growth		26	294	49	49	371	789				
19 OMS Enhancements		125	125	125	125	125	625				
20 Solar Battery Backup Integration		250	100	50	100	50	550				
21 Microsoft Licensing		536	-	-	-	-	536				
22 Networks ECTRM		408	-	-	-	-	408				
23 Oracle Exadata		10	-	-	-	356	366				
24 Itron Mobile hardware replacement		260	-	-	-	-	260				
25 Full OMS Functional alignment ABB-Spectrum		-	83	83	83	-	250				
26 Total		\$ 22,227	\$ 19,009	\$ 38,656	\$ 41,356	\$ 25,754	\$ 147,001				
27											
28 Allocation to Electric Business		\$ 15,868	\$ 13,570	\$ 27,597	\$ 29,524	\$ 18,386	\$ 104,944				
29 Allocation to Gas Business		\$ 6,359	\$ 5,438	\$ 11,059	\$ 11,832	\$ 7,368	\$ 42,057				

Table 43 – RG&E Operational Smart Grids Investment Forecast

The major projects that are included in this area are describe below:

Data Center Consolidation: This project will standardized hardware, software and applications for all the Operational Smart Grids (OSG) data centers and will consolidate and reduce the overall total number of data centers across the New York Companies. Resources can be utilized across the Companies to provide additional support capabilities when needed. The overall cost to operate will be reduced with fewer data centers and facilities that need to be supported.

Telecomm Infrastructure: This project will continue to deploy and expand telecom infrastructure to enhance communications capabilities and connectivity throughout the Companies' territories for distribution automation and monitoring activity. Routers and ethernet switches will be deployed utilizing a mix of fiber, copper and wireless technologies for interconnections with redundancy and diversity. Various protocols will be implemented to support dynamic rerouting of traffic in the event of a transport or circuit failure. This project will also support the deployment of a lifecycle replace of the existing

Private Land Mobile Radio Systems (LMR) with a new Digital Mobile Radio solution (DMR). The current LMR systems are at or beyond end-of-life.

Telecomm NY WAN Buildout: This program will continue to deploy WiMAX to support automation activities. NY WAN (Wide Area Network) Expansion involves WiMAX (Worldwide Interoperability of Microwave Access) or future broadband microwave technologies deployments to support automation activities at the Companies. These will primarily involve a point-to-multipoint setup which includes the deployment of a Base Station (with associated network backhaul) and multiple end point devices to provide service for SCADA and AMI data.

ROC Hydrogen Pilot: RG&E is partnering with RED Rochester, LLC (the utility provider for the Eastman Business Park) on a phased project to blend up to 20% hydrogen into RED's 40 psi fuel lines with the goal of reducing RED's greenhouse gas (GHG) emissions and evaluating the ability of the existing technology to blend and combust hydrogen in a safe and efficient manner. The first three phases of the project would include isolated system testing to evaluate the impact of hydrogen blends from 5% to 20%, collecting data and information used to determine the ultimate blending percentage for on-site electrolysis, hydrogen storage and blending in Phase 4. Hydrogen blending aims to reduce on-site greenhouse gases (GHG) emissions and provide an opportunity for a baseline demonstration project. The third phase, on-site electrolysis of up to 20 MW could provide sufficient hydrogen for blending, as well as provide hydrogen for on-site fueling of the local bus fleet, with additional capacity to supply off-site vehicle fueling stations as well. Section 6.9

Telecomm Fiber: This project will continue to purchase fiber optic cable to enhance our connectivity and create high bandwidth communications and backhaul points. New fiber will be constructed or existing dark fiber pairs will be purchased through local carriers to provide connectivity for substations and service centers across the Companies' service territories. Wherever viable, the fiber will be deployed in redundant rings with unique entrances into our facilities. This will allow for connectivity with routers and ethernet

switching equipment to dynamically reroute traffic in the event of a fiber failure.

OSG Communications Tower, Shelter Facilities Improvements: This project will repair existing telecommunications towers and shelters and will build new towers and shelters where needed. Remote communication tower and shelter locations house critical communication network elements. Each location has specific needs to support critical network equipment for fiber, microwave and radio systems. These systems include AC and DC backup power systems, cabling, heating, ventilation and cooling systems, single point grounding systems and security access systems. They also provide for a redundant and diverse design for the network. Failures associated with these components will cause failures to critical communications circuits needed for reliable energy delivery and their associated monitoring systems. Failure to critical wireless networks that support day to day field operational voice systems and worker health and safety monitoring systems. Through ongoing wireless and fiber expansion projects, the Companies will build communication facilities (towers and shelters) for Company communications equipment. The new facilities will be security enhanced communication huts, indoor racks and cabinets and outdoor enclosures. The facilities will include the building structure, AC and DC power plant, HVAC, racks, inside plant fiber / wireless network elements and ancillary equipment to make the equipment operational and functional on the networks.

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Section 8.6 Physical and Cyber Security Capital Forecast

Security capital investments are required for both the physical safety and security of employees and Company assets as well to ensure that computer and communication systems are secure from cyber threats. These investments are required to meet various security mandates and regulations, such as the NERC Critical Infrastructure Protection (CIP) Standards as well as Executive Orders. The investments in both physical and cyber security are shown below in Table 44 for NYSEG and Table 45 for RG&E.

	A	B	C	D	E	F	G
	<i>\$ in thousands</i>						
	2022	2023	2024	2025	2026	Total 2022-2026	
1 Physical and Cyber Security	\$ 35,538	\$ 30,165	\$ 26,961	\$ 18,681	\$ 20,345	\$ 131,690	
2 Avangrid Security Domain (ASD) OSG Telecommunications	7,209	12,594	7,125	6,125	6,125	39,176	
3 ASD Security System Installation	10,867	5,343	7,293	8,456	5,637	37,597	
4 Global Cybersecurity Directors Plan	10,574	4,975	6,468	727	727	23,471	
5 Avangrid Security Domain (ASD) OSG Infrastructure	3,867	4,004	2,988	424	3,607	14,890	
6 FIRE PROTECTION	2,000	2,500	2,500	2,500	2,500	12,000	
7 QSR - Security Plan	173	373	390	388	396	1,721	
8 Tripwire Implementation	-	-	-	-	1,318	1,318	
9 IT-OT DR/DMZ	848	-	-	-	-	848	
10 Cybersecurity Innovation Lab	-	377	196	23	35	631	
11 DRAGOS	-	-	-	38	-	38	
12 Total	\$ 35,538	\$ 30,165	\$ 26,961	\$ 18,681	\$ 20,345	\$ 131,690	
13							
14 Allocation to Electric Business	\$ 28,523	\$ 24,210	\$ 21,639	\$ 14,994	\$ 16,329	\$ 105,694	
15 Allocation to Gas Business	\$ 7,015	\$ 5,955	\$ 5,322	\$ 3,688	\$ 4,016	\$ 25,996	

Table 44 – NYSEG Physical and Cyber Security Investment Forecast

	A	B	C	D	E	F	G
	<i>\$ in thousands</i>						
	2022	2023	2024	2025	2026	Total 2022-2026	
1 Physical and Cyber Security	\$ 23,088	\$ 15,661	\$ 12,003	\$ 10,312	\$ 12,508	\$ 73,572	
2 Avangrid Security Domain (ASD) OSG Telecommunications	4,916	4,184	3,353	3,353	3,353	19,159	
3 ASD Security System Installation	6,402	2,890	275	4,750	2,965	17,282	
4 Avangrid Security Domain (ASD) OSG Infrastructure	3,595	4,004	2,988	424	3,607	14,617	
5 Global Cybersecurity Directors Plan	6,480	3,050	3,959	437	437	14,362	
6 FIRE PROTECTION	1,090	1,090	1,090	1,090	1,090	5,450	
7 QSR - Security Plan	88	213	217	222	227	967	
8 Tripwire Implementation	-	-	-	-	808	808	
9 IT-OT DR/DMZ	517	-	-	-	-	517	
10 Cybersecurity Innovation Lab	-	231	120	14	21	387	
11 DRAGOS	-	-	-	23	-	23	
12 Total	\$ 23,088	\$ 15,661	\$ 12,003	\$ 10,312	\$ 12,508	\$ 73,572	
13							
14 Allocation to Electric Business	\$ 16,482	\$ 11,181	\$ 8,569	\$ 7,362	\$ 8,929	\$ 52,523	
15 Allocation to Gas Business	\$ 6,605	\$ 4,481	\$ 3,434	\$ 2,950	\$ 3,578	\$ 21,049	

Table 45 – RG&E Physical and Cyber Security Investment Forecast

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The main projects being undertaken with Physical and Cyber Security are:

Avangrid Security Domain (ASD) OSG Telecommunications: This project continues to the installation of telecommunications infrastructure including fiber, Wi-MAX, network architecture design telecommunications infrastructure, implementation of switching and routing within transport backbone for DWDM IP/MPLS.

Avangrid Security Domain (ASD) OSG Infrastructure: This project will continue the development of tools and capabilities with cyber security for the Companies. This includes the professional services and hardware/software lifecycle of all direct and auxiliary systems that include advanced cybersecurity technologies and capabilities.

Avangrid Security Domain (ASD) Security System Installation: This program, formerly known as System Cutover, relates to security work on various facilities to continue implementing the five-year Security Deployment plan. Systems to be installed are based on a security tier for each facility that is based on risk. Tier 1 and 2 facilities (e.g., bulk substation) receive card access control systems, Public Address (PA) systems, video surveillance, video analytics and thermal cameras (Tier 1 also receives additional physical hardening due to critical nature). Tier 3 facilities (e.g., large office/service center, cash office, hydro) receive card access control systems, video surveillance and video analytics. Tier 4 facilities (e.g., small offices, store yards) receive card access control systems and video surveillance. Additional work includes the enhancement of communication networks to allow for the transport of video back to the Security Operations Center (SOC) for remote monitoring of security network, access control and video monitoring systems. to allow for the transport of video back to the SOC for remote monitoring of security network, access control and video monitoring systems.

Global Cybersecurity Directors Plan: This program will improve all aspects of cybersecurity on all Operational Smart Grids assets and systems related to both the electric and gas systems. The program will increase the cybersecurity alignment with and conformity to the National Institute of Standards and Technology – Cloud Security Framework (NIST-CSF).

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Fire Protection: This program addresses fire protection system projects to ensure the safety of our facilities as well as ensuring our systems are up to date and in compliance with local and federal requirements as well as the National Fire Protection Association (NFPA) Standards, the Fire Code of New York State and OSHA Regulations. Fire protection projects include the design and installation and/or replacement of smoke detector/fire alarm systems, mass notification systems, automated extinguisher monitoring systems and fire suppression systems. Compliance with local and federal laws as well as applicable NFPA Standards reduces fire risk and loss to Company infrastructure by increasing resiliency to maintain operations.

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Section 8.7 Training Capital Forecast

The Companies' existing training facilities are outdated, are not technologically current and do not have enough capacity to safely provide increasing training needs. To address the training needs, the Companies are improving the facilities, program and methodologies of training. The capital projects needed to improve these facilities are shown below in Table 46 and Table 47 for NYSEG and RG&E, respectively.

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>						
1	Training	\$ 2,885	\$ 14,038	\$ 576	\$ 610	\$ 780	\$ 18,889
2	Training Facility	2,000	12,200	350	350	500	15,400
3	Training – Fleet	325	1,560	-	-	-	1,885
4	Training Equipment and Tools	500	250	200	250	250	1,450
5	Training Technology Projects	60	28	26	10	30	154
7	Total	\$ 2,885	\$ 14,038	\$ 576	\$ 610	\$ 780	\$ 18,889
8							
9	Allocation to Electric Business	\$ 2,316	\$ 11,267	\$ 462	\$ 490	\$ 626	\$ 15,160
10	Allocation to Gas Business	\$ 569	\$ 2,771	\$ 114	\$ 120	\$ 154	\$ 3,729

Table 46 – NYSEG Training Investment Forecast

	A	B	C	D	E	F	G
		2022	2023	2024	2025	2026	Total 2022-2026
1	<i>\$ in thousands</i>						
1	Training	\$ 265	\$ 139	\$ 63	\$ 134	\$ 2	\$ 603
2	Training Equipment and Tools	250	125	50	125	-	550
3	Training Technology Projects	15	14	13	9	2	53
4	Total	\$ 265	\$ 139	\$ 63	\$ 134	\$ 2	\$ 603
5							
6	Allocation to Electric Business	\$ 189	\$ 99	\$ 45	\$ 96	\$ 2	\$ 431
7	Allocation to Gas Business	\$ 76	\$ 40	\$ 18	\$ 38	\$ 1	\$ 173

Table 47 – RG&E Training Investment Forecast

The major project in the Training area is the Training Facility project.

Training Facility: Currently, Electric, Gas and Field Customer Service training facilities are dispersed across a 40 acre training site in Johnson City, NY. The current facilities are at end of life and do not meet the capacity requirements needed for training. The project consists of building a new, three-story training facility, along with renovation of current facilities to increase capacity. The new facility will bring these separate areas together at a single location to better leverage synergies among the programs, reducing time to mastery and increasing safety. Additionally, the facility will have areas dedicated to innovative and progressive training techniques and technologies such as Augmented

Reality (AR) and Virtual Reality (VR). All components of the project are focused on safety and building/maintaining a qualified workforce at NYSEG and RG&E will enhance emergency response and day to day operations for customers.

Training Equipment & Tools and Fleet: Equipment and tooling project will secure tools equivalent to those being used in the field by operational groups. The fleet project supplements the tooling project with the addition of fleet vehicles equivalent to those used in the field. Current training fleet is outdated with different controls and functionality than vehicles used in day to day operations. Acquisition of these tools and fleet will allow for replication real world scenarios within the training environment. Time to mastery is reduced through precise replication of field scenarios creating a safer more efficient workforce.

Training Technology Projects: Emerging technologies such as Augmented Reality (AR) and Virtual Reality (VR) require capital investment for deployment. Hardware to execute initiatives include headsets, computing equipment, sensors, and other items to create a fully safe and immersive mixed reality experience.

Appendix A - Capital Investment Forecast

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NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Electric Projects

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
NYSEG - Electric						
Asset Condition	124,194	309,006	467,768	576,269	612,535	2,089,772
TLD Replacements	14,500	44,000	87,000	130,000	174,000	449,500
Pole Replace (WPIT) Program CAP	24,338	68,260	76,799	83,873	102,704	355,974
Distribution Line Deficiencies	28,700	40,228	46,440	52,169	58,581	226,118
Elec Better	13,297	31,321	32,261	33,228	34,225	144,332
Gardenville Substation Rebuild	2,503	13,177	29,429	46,219	40,663	131,991
T&S Asset Condition Replacement Program	1,200	10,000	30,000	30,000	30,000	101,200
Substation Modernization - South Owego	-	-	14,919	29,838	34,811	79,569
Line 968 115 kV Rebuild	-	-	3,933	27,501	43,880	75,314
Substation Modernization - Noyes Island T	1,245	23,152	21,309	24,139	-	69,845
PCB Transformer Replacements	-	17,169	17,169	17,169	17,169	68,675
Substation Modernization - Wright Avenue	-	5,719	23,133	22,022	15,961	66,835
South Perry New Sub & Trans Line Upgrade	599	6,418	26,103	9,158	-	42,278
Substation Modernization - Clark Street	-	-	1,992	3,074	34,014	39,080
Meyer New 2nd 115/34.5kV Transformer	-	-	9,946	19,892	4,973	34,811
Substation Minor Capital	6,313	6,338	6,310	6,427	6,547	31,935
Line 890 Rebuild	1,709	18,598	10,732	14	-	31,052
Circuit 590 Rebuild	-	-	9,946	14,919	4,973	29,838
Line 880 Rebuild	8,748	13,041	7,550	-	-	29,339
General Equipment - OPS-T&D	3,565	5,219	5,287	3,972	4,090	22,133
Line 803 - Croton to Tilly Foster Rebuild	9	355	1,636	16,796	-	18,796
Substation Major Program	5,254	1,924	1,481	1,511	1,542	11,713
URD Replacement Program	-	2,000	3,000	3,000	3,000	11,000
Woodlawn SS Transformer	6,220	143	-	-	-	6,364
Battery Program	980	833	874	918	964	4,570
Bennet Transformer	3,515	-	-	-	-	3,515
General Equipment - OPS-SO	1,215	412	420	429	437	2,913
ARIES Purchase & program improvements	125	700	100	-	-	925
Checkpoint Firewall Upgrades Subs	156	-	-	-	-	156
Reliability	82,662	110,805	90,917	103,509	79,861	467,753
Breaker Program	18,279	22,848	28,560	29,988	31,488	131,163
Comprehensive Area Studies	3,000	10,000	15,000	20,000	30,000	78,000
Transmission Reinforcement Program	5,000	10,000	10,000	10,000	-	35,000
Distribution Load Relief Program	500	4,500	10,000	10,000	5,000	30,000
Animal Guard Program	4,366	4,988	5,116	5,245	5,373	25,088
Milo Substation Rebuild	1,010	17,616	1,007	-	-	19,633
Wood Street New 3rd 345/115kV Trans	15,747	3,011	-	-	-	18,758
Craryville New Substation Breaker and Circuit Upgrade	-	4,950	6,560	6,560	-	18,070
Dingle Ridge - 2nd Bank and 13.2kV Conv	5,557	7,179	-	-	-	12,735
Circuit Sensor Implementation Plan	1,000	5,000	5,000	1,680	-	12,680
NeverSink Substation Transformer & Circuit Upgrade	-	500	2,000	8,500	-	11,000
Hilldale Substation Transformer Replacment & New Circuit	-	600	1,120	1,000	8,000	10,720
Crafts Substation Transformer Upgrade	-	500	1,000	8,500	-	10,000
North Brewster Reinforcement	2,218	7,504	30	-	-	9,751
Hillcrest Transformer Replacement -Cap	8,299	1,242	-	-	-	9,541
Heritage Hills Upgrade	4,584	2,619	-	-	-	7,203
Line 620 Rebuild - 34.5 kV	39	1,710	4,086	-	-	5,835
BIM	-	600	615	2,035	-	3,251
Sackett Lake Replace Transformer	3,037	-	-	-	-	3,037
Substation Modernization - Raquette Lake	2,934	11	-	-	-	2,946
Mobile #4 Replacement	1,555	922	-	-	-	2,477
Mobile #2 Replacement	1,792	670	-	-	-	2,462
Afton 34.5kV Line Addition	1,000	1,000	-	-	-	2,000
Sloan Substation Load Relief	-	850	550	-	-	1,400
Ithaca - College Ave Underground	1,371	-	-	-	-	1,371
NY Spectrum HW Refresh CapEx	1,258	-	-	-	-	1,258
Switched Source Tie Controller	50	885	272	-	-	1,207
Energy Control Center (ECC) Distribution Room Expansion	-	1,100	-	-	-	1,100
Willet New 2nd 115-34.5kV Transformer	67	-	-	-	-	67



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Electric Projects (Cont.)

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
NYSEG - Electric						
Resiliency	69,050	91,085	103,960	102,681	103,542	470,318
Resiliency Automation, Hardening and Topology	28,236	41,924	48,012	45,912	45,912	209,996
DSIP - Grid Automation	28,575	33,782	37,288	37,288	37,288	174,222
SCADA/Automation	10,503	13,128	16,410	17,231	18,092	75,365
Recloser Automation	1,736	2,250	2,250	2,250	2,250	10,736
Compliance	81,261	137,812	157,194	121,938	121,880	620,085
BES Program - FERC Compliance	76,555	116,488	132,375	98,566	99,546	523,530
NERC Alert Priority III	4,706	20,273	19,969	22,822	20,933	88,703
FERC Order 2222 DER Aggregations/Billing/Metering	-	667	4,000	-	-	4,667
FERC Order 881	-	350	500	550	1,400	2,800
DER- ICCP connection to NYISO	-	35	350	-	-	385
Clean Energy Transformation	158,503	521,633	651,200	747,900	990,500	3,069,736
CLCPA Transmission Projects - Phase II	24,800	310,200	330,200	417,600	545,400	1,628,200
CLCPA Transmission Projects - Phase I	125,700	188,200	305,000	310,300	429,100	1,358,300
Ithaca Electrification Projects – Phase 2	-	-	10,000	10,000	10,000	30,000
Java SS Microgrid BESS	6,076	20,233	-	-	-	26,310
Ithaca Electrification Projects – Phase 1	100	3,000	6,000	10,000	6,000	25,100
Stillwater NWA	1,827	-	-	-	-	1,827
Customer Focus	106,968	150,627	152,644	160,259	164,038	734,535
Dist Line	22,341	42,430	43,702	45,014	46,364	199,851
Make Ready	29,467	33,250	33,250	42,750	42,750	181,467
Trans line	17,981	22,907	23,594	24,302	25,031	113,815
Res Line	10,030	12,774	13,157	13,552	13,958	63,472
Serv Conn	7,400	12,228	12,595	12,973	13,362	58,556
Ind/Comm	6,987	7,336	7,556	7,783	8,016	37,677
Gov't Highway	3,492	4,621	4,759	4,902	5,049	22,824
Street Light	3,572	4,592	4,729	4,871	5,017	22,781
LED Streetlighting	3,572	5,000	5,000	-	-	13,572
DataCapable	100	2,431	2,431	2,431	2,431	9,823
Electric Meters	1,605	1,098	1,098	1,098	1,464	6,363
Storms Electric	421	562	573	584	596	2,735
LSE Tracker (Life Support Equipment)	-	1,400	200	-	-	1,600
Modernization	62,638	63,965	72,260	49,959	13,755	262,576
AMI Project E	57,393	57,542	57,542	36,043	5,296	213,816
Siemens Spectrum upgrade to V7	-	-	-	6,000	6,000	12,000
15 Loop Automation Schemes	2,198	1,929	1,929	1,929	1,929	9,914
REV - Electric Vehicles	904	1,551	2,132	3,415	-	8,003
AMI Integration for ISO	-	739	4,144	-	-	4,883
IEE Service Mode	-	528	2,112	570	-	3,211
DSIP - ADMS	-	375	1,625	1,000	-	3,000
Application Interface Upgrades	39	182	1,541	47	-	1,810
Distribution Automation	206	209	432	445	458	1,751
DSIP - Enterprise Analytics	1,268	-	-	-	-	1,268
Transmission GIS and GIS Interface optimization	-	525	225	-	-	750
SMSI Field Deployment	-	-	207	414	-	622
Automate SAP CCS Dist Gen Billing	599	-	-	-	-	599
Spectrum Planned Work Module	-	219	176	72	72	539
Electric Reliability Application (ERA) Integration	16	165	60	24	-	265
DSIP - Advanced Planning Tools	-	-	132	-	-	132
Purchase Plum Devices	15	-	-	-	-	15
Innovation	10,615	12,344	48,015	72,655	2,482	146,111
Low Income Clean Generation	-	-	27,333	27,333	-	54,667
EV Charging Hub	-	-	6,006	24,026	-	30,032
DSIP - GIS Enhancements GMEP	6,417	6,548	6,679	6,813	-	26,457
IEDR	3,898	3,898	3,295	3,295	1,647	16,033
Medium & Heavy Duty EV Make-Ready Program	-	785	2,355	4,709	-	7,849
Distributed Energy Resource Management System (DERMS)	-	-	-	2,538	-	2,538
Stephentown Energy Storage	-	-	666	1,553	-	2,219
Wales Center Energy Storage	-	-	666	1,553	-	2,219
NY Energy Storage RFP	-	-	-	760	760	1,520
Distributed Energy Storage pilot- Load Managed Distribution System Optimization	-	576	600	-	-	1,176
FICS Scalability Plan	300	300	-	-	-	600
Tompkins County Demand Side LMI HVAC Management Pilot	-	-	340	-	-	340
Academic Institution Collaboration	-	75	75	75	75	300
CYME Server	-	163	-	-	-	163



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Electric Projects (Cont.)

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
NYSEG - Electric						
Hydro-Generation	7,525	7,353	19,742	24,905	57,838	117,363
Mechanicville Intake Upgrades and Downstream Passage Project	465	919	2,056	6,498	18,919	28,857
Kent Falls - CAPITAL Project	210	212	763	5,039	17,952	24,176
High Falls Intake Upgrades Project	724	550	3,747	4,783	-	9,804
Minor Capital Program	1,389	1,500	1,500	1,500	1,500	7,389
Kents Falls U2 T-G Major Rebuild	4	5	473	883	3,756	5,120
Cadyville U1 T-G Major Rebuild	2	2	478	1,014	2,848	4,345
Mechanicville Upstream Eel Ladder Project	714	628	2,522	278	-	4,141
Cadyville Upgrade U1 & U2 Cooling water systems	-	-	347	406	2,748	3,501
KF Dam Left Abutment & Drainage Improvement	387	2,953	-	-	-	3,340
Saranac Plant Control Systems Upgrade Project	-	-	763	563	1,912	3,238
Keuka/Bradford Concrete Spillway and Toe Resurfacing Repairs/Improvements	-	-	445	360	2,157	2,961
High Falls U2 Generator Rewind	-	-	317	441	1,956	2,714
KF Internal Riser Shaft and Tank	3	3	3	878	1,586	2,473
Keuka/Bradford Dam Automation	-	-	393	323	1,658	2,374
Kents Falls Upstream Training Wall Extension	199	130	1,904	-	-	2,233
Cadyville Right Abutment / Spillway Improvements Project	307	110	1,726	87	-	2,231
Mill C Spillway Concrete Improvements Project	9	70	420	1,450	-	1,949
Rainbow Falls Powerhouse Entrance / Hill Stabilization	115	206	1,622	-	-	1,943
Mechanicville Bay A, Bay B, Bay C Bag Replacement Program & Inclinator Upgrade	1,530	20	-	-	-	1,550
Kents Falls Low Level Floodgate	-	-	263	228	707	1,198
Kents Falls Right Abutment & Toe Scour Upgrades Project	714	44	-	-	-	758
Mill C Intake Trash Rack & Raker Project	340	-	-	-	-	340
Upper Mechanicville Plant Control System Upgrade Project	-	-	-	175	141	316
RainbowFalls-fishbypassstudy-Env.Complia	242	-	-	-	-	242
Fossil Hydro Operations	161	-	-	-	-	161
High Falls Draft Tube Stop Logs and Gantry Project	6	-	-	-	-	6
HYDRO Regulatory Mandates	3	-	-	-	-	3
Total	7,525	7,353	19,742	24,905	57,838	117,363

NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Electric Projects

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
RG&E - Electric						
Asset Condition	54,054	131,520	153,976	183,726	146,208	669,484
T&S Asset Condition Replacement Program	600	4,000	20,000	20,000	20,000	64,600
Pole Replace (WPIT) Program CAP	10,472	11,522	12,906	13,832	15,143	63,874
Station 29 Modernization Project	300	4,864	9,727	29,181	14,591	58,663
Elec Better	6,069	12,373	12,744	13,126	13,520	57,832
Station 82 Upgrades	2,007	9,470	10,636	10,752	22,604	55,469
Station 37 Modernization Project	300	4,491	8,982	26,947	13,474	54,194
Station 43 Modernization Project	7,771	10,833	10,012	8,411	3,025	40,053
Station 34 Modernization Project	300	4,491	8,982	13,474	8,982	36,230
UG Cable Replacements	3,717	7,821	7,821	7,821	7,821	35,001
Station 156 Transf./Facilities upgrade	4,911	8,802	7,509	4,808	4,101	30,131
Station 192 Trans Facilities Upgrade	2,908	5,549	12,056	7,079	-	27,591
Station 5 Substation Mod D	287	13,304	6,459	6,236	164	26,450
Distribution Line Deficiencies	2,006	4,165	4,807	5,481	6,207	22,666
URD Replacement Program	-	3,000	5,000	5,000	5,000	18,000
Circuit 794 Rebuild	4,051	11,353	-	-	-	15,404
PCB Transformer Replacements	-	3,714	3,714	3,714	3,714	14,855
Station 51	2,192	5,403	5,295	46	-	12,936
TLD Replacements	1,107	1,000	2,000	3,000	3,000	10,107
Substation Minor Program	495	1,525	1,556	1,587	1,619	6,781
Substation Major Program	522	1,872	1,380	1,408	1,436	6,618
General Equipment - OPS-T&D	586	1,001	1,401	815	779	4,582
Battery Prog	785	801	817	834	851	4,088
Rochester Circuit 649 Upgrade	1,488	-	-	-	-	1,488
General Equipment - OPS-SO	350	168	171	175	178	1,042
Station 208 - Modernization Project	671	-	-	-	-	671
Checkpoint Firewall Upgrades Subs	159	-	-	-	-	159
Reliability	70,041	144,946	141,567	112,647	69,513	538,714
Webster Area Projects	22,942	61,789	16,302	2,774	-	103,806
Station 46 - Replace #1 #3 Transf. Banks T	6,791	11,698	22,533	16,445	2,344	59,811
Line 901/902/942/943/744 Replacement	-	15,072	27,504	16,198	-	58,774
Sta 210 Modernization Prj - Install WO	1,175	1,594	4,730	16,598	20,784	44,880
Breaker Prog	5,015	6,268	7,835	8,227	8,639	35,984
Transmission Reinforcement Program	5,000	10,000	10,000	10,000	-	35,000
Comprehensive Area Studies	500	5,000	5,000	10,000	10,000	30,500
Station 117	3,065	5,296	6,356	9,850	4,553	29,119
Station 49 4KV to 12KV Upgrade	1,000	4,000	8,000	8,000	8,000	29,000
GMI-Station 168 Srv Area Reinforcements	6,555	7,198	12,512	3	-	26,268
Replace DC Pilot Wire System	320	2,779	9,185	3,734	5,329	21,348
Distribution Load Relief Program	200	1,000	5,800	6,500	6,500	20,000
Animal Guards CAP	2,605	3,119	3,201	3,283	3,365	15,573
Sta-127 115KV System Upgrade D	8,597	6,390	-	-	-	14,987
Circuit Sensor Implementation Plan	1,000	3,000	2,290	-	-	6,290
Station 38 Total Refurbishment D	3,033	438	-	-	-	3,471
RARP Rochester Area Reliability Project	1,731	-	-	-	-	1,731
BIM	-	305	318	1,036	-	1,660
NY Spectrum HW Refresh CapEx	360	-	-	-	-	360
Station 49 Transformer Addition	90	-	-	-	-	90
UG Cable Injection	61	-	-	-	-	61
Resiliency	19,073	23,746	28,654	31,930	34,984	138,386
Resiliency Automation, Hardening and Topology	9,425	13,013	14,815	17,984	20,929	76,166
DSIP - Grid Automation	4,652	4,000	7,000	7,000	7,000	29,652
SCADA/Automation	4,128	5,233	5,338	5,446	5,555	25,700
Recloser Automation	868	1,500	1,500	1,500	1,500	6,868



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Electric Projects (Cont.)

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
RG&E - Electric						
Compliance	20,456	32,891	50,401	63,962	77,563	245,273
BES Program - FERC Compliance	20,456	32,393	48,041	63,722	76,963	241,575
FERC Order 2222 DER Aggregations/Billing/Metering	-	333	2,000	-	-	2,333
FERC Order 881	-	150	210	240	600	1,200
DER- ICCP connection to NYISO	-	15	150	-	-	165
Clean Energy Transformation	600	7,100	6,100	10,000	25,300	49,100
CLCPA Transmission Projects - Phase II	600	7,100	6,100	10,000	25,300	49,100
Customer Focus	32,338	68,375	77,510	82,028	80,197	340,448
Make Ready	1,886	19,000	16,150	20,900	20,900	78,836
Dist Line	7,057	14,741	15,184	15,639	16,108	68,730
Gov't HW	977	9,998	12,057	14,119	14,183	51,334
Res Line	4,725	4,961	5,110	5,264	5,421	25,482
Aqueduct Re-Imagined	350	3,000	10,000	7,000	4,000	24,350
Town of Brighton Arc Light Conversion	300	2,500	5,000	5,000	5,000	17,800
Serv Conn	2,486	3,200	3,296	3,395	3,497	15,872
Ind/Comm	1,857	3,027	3,117	3,211	3,307	14,519
Trans line	1,825	2,929	3,017	3,107	3,200	14,078
Gov't Highway Majors CAP	3,278	1,998	2,057	2,119	2,183	11,635
DataCapable	100	1,034	1,034	1,034	1,034	4,237
Mandated RG&E - East Main St HWY Project	3,255	-	-	-	-	3,255
Electric Meters Program	666	322	322	645	752	2,708
Street Light	259	379	391	402	414	1,846
Mandated - State St	1,426	-	-	-	-	1,426
LED Streetlighting	380	500	500	-	-	1,380
ROC 5 Amazon	1,328	-	-	-	-	1,328
STORM ELECTRIC	182	186	189	193	197	947
LSE Tracker (Life Support Equipment)	-	600	85	-	-	685
Modernization	26,246	25,876	29,558	17,453	4,481	103,614
AMI Project E	24,314	24,144	24,144	12,958	2,209	87,769
Siemens Spectrum upgrade to V7	-	-	-	2,000	2,000	4,000
REV - Electric Vehicles	406	704	972	1,586	-	3,668
IEE Service Mode	-	284	1,137	307	-	1,729
AMI Integration for ISO	-	246	1,381	-	-	1,628
DSIP - ADMS	-	125	1,275	100	-	1,500
Distribution Automation	44	42	238	245	252	820
Automate SAP CCS Dist Gen Billing	649	-	-	-	-	649
DSIP - Enterprise Analytics	640	-	-	-	-	640
SMSI Field Deployment	-	-	104	207	-	311
Transmission GIS and GIS Interface optimization	-	175	75	-	-	250
Spectrum Planned Work Module	77	62	54	20	20	233
Application Interface Upgrades	56	52	30	20	-	158
DSIP - Advanced Planning Tools	-	-	132	-	-	132
Electric Reliability Application (ERA) Integration	45	42	15	10	-	112
Purchase Plum Devices	15	-	-	-	-	15
Innovation	6,289	6,247	25,394	38,485	1,722	78,138
Low Income Clean Generation	-	-	11,606	11,606	-	23,212
Station 125 Energy Storage	-	-	5,824	13,590	-	19,414
DSIP - GIS Enhancements GMEP	3,870	3,374	3,442	3,510	-	14,196
IEDR	2,099	2,099	1,774	1,774	887	8,633
Station 89 Energy Storage	-	-	1,664	3,883	-	5,547
Medium & Heavy Duty EV Make-Ready Program	-	336	1,009	2,018	-	3,364
NY Energy Storage RFP	-	-	-	760	760	1,520
Distributed Energy Resource Management System (DERMS)	-	-	-	1,269	-	1,269
FICS Scalability Plan	200	200	-	-	-	400
Academic Institution Collaboration	-	75	75	75	75	300
CYME Server	-	163	-	-	-	163
Integrated EV and ES Controller	121	-	-	-	-	121



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Electric Projects (Cont.)

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
RG&E - Electric						
Hydro-Generation	9,791	7,253	24,945	19,090	9,278	70,357
Hydro Generation S2 Modernization	1,406	9,298	20,895	15,158	1,453	48,211
Minor Capital Program	2,137	1,500	1,500	1,500	1,500	8,137
S5 Intake Stop Log Gantry Upgrade Project	356	188	2,289	150	-	2,983
Station #5 surge Tank Rock fall Pro	2,485	-	-	-	-	2,485
S2 Central Ave Dam Superstructure Modernization	-	-	-	569	1,211	1,779
S5 Spillgate #2 Rock Stabilization - 1st priority	-	-	-	619	587	1,206
S5 Gate 2 Hinge Upgrade	-	-	-	467	493	960
S5 Unit 3 Turbine-Generator New Runner	-	-	-	385	443	828
S26 Generator Protection and Controls Upgrade	-	-	130	121	484	735
Station 2 Generator Protection and Controls Upgrade	-	-	130	121	484	735
S5 Gate 5 Rubplate and Bottom Seal Upgrade Project	-	-	-	-	610	610
S5 Surge Tank Expansion (Align with tunnel inspection)	-	-	-	-	575	575
S5 Tunnel System (Construction Joints, Intake Shaft Transition, Surge Tank Found)	-	-	-	-	557	557
Station 5 Gate 3 Rubplate, Rubplate and Breastwall Seal Upgrade Project	-	-	-	-	463	463
S5 Unit 3 Turbine-Generator New Turbine Isolation Valve	-	-	-	-	419	419
S5 Powerhouse T-G Rotating Equipment Guards	283	-	-	-	-	283
Hydro Upgrade	152	-	-	-	-	152
HYDRO Regulatory Mandates	92	-	-	-	-	92
Fossil HYDRO-General Equipment	17	-	-	-	-	17
Station 5 Headgates/Dam	2,864	(3,733)	-	-	-	(869)
Total	9,791	7,253	24,945	19,090	9,278	70,357

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Gas Projects

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
NYSEG - Gas						
Asset Condition	15,344	14,565	10,717	10,640	21,151	72,416
Distribution Main Replacement	5,736	4,299	4,753	4,613	4,811	24,212
Regulator Modernization and Automation Program	4,086	4,265	5,064	5,128	5,127	23,671
Vienna Road Regulator Station	-	-	-	-	10,286	10,286
Hornby Regulator Station	-	5,128	-	-	-	5,128
Chambers Road Regulator Station	4,713	-	-	-	-	4,713
Gas Operations Departmental	809	873	899	899	927	4,407
Mandatory	13,578	16,219	20,101	21,750	22,816	94,463
New Services	3,904	4,264	4,514	4,796	4,974	22,452
Distribution Mains - New Business	2,167	4,320	4,683	5,095	5,313	21,578
Non Leak Prone Service Replacement Program	3,333	3,846	4,253	4,127	4,304	19,864
Gas Meters	2,131	1,689	2,027	2,702	2,972	11,520
Government Jobs	1,713	1,750	1,887	2,044	2,129	9,522
Large Government Jobs	-	-	2,337	2,560	2,674	7,572
Regulators	330	350	400	425	450	1,955
Modernization	18,514	17,396	14,735	9,229	1,632	61,506
AMI Project Gas	14,696	14,735	14,735	9,229	1,632	55,027
Gas RTU/Telemetry Upgrade	2,477	2,661	-	-	-	5,138
Click-Gas Inspections and Scheduling	1,160	-	-	-	-	1,160
Common Gas SCADA Platform	180	-	-	-	-	180
Reliability	42,239	43,196	51,958	48,363	45,303	231,059
Leak Prone Main Replacement Program - LPM	28,331	28,659	31,687	30,751	32,072	151,501
Leak Prone Service Replacement Program	5,317	6,878	7,605	7,380	7,697	34,878
Boswell Hill 124 Psig Bare Steel Leak Prone Main	-	232	3,214	3,450	-	6,896
Hebron Station/Line J Retirement	-	-	-	6,336	-	6,336
Pendleton - SW System and Regulator Station Upgrade	-	-	-	-	5,070	5,070
West Genesee Street Leak Prone Main	2,506	2,526	-	-	-	5,032
Broad St Norwich Leak Prone Main	2,478	2,351	-	-	-	4,829
Winney Hill Regulator Station	-	-	4,308	-	-	4,308
Canandaigua Feeder Main Reinforcement Project	-	-	2,889	-	-	2,889
Gardner Regulator Station	-	2,168	-	-	-	2,168
Winney Hill Leak Prone Main	-	-	1,843	-	-	1,843
Limestone Regulator Station	1,285	-	-	-	-	1,285
North Main Cortland Leak Prone Main	1,198	-	-	-	-	1,198
Low Pressure Relief Valve Program	198	215	231	250	261	1,155
Critical Valve Installations, Binghamton	302	168	180	195	203	1,048
Spruce Haven Farm RNG	623	-	-	-	-	623
Innovation	-	4,000	12,000	890	890	17,780
Geothermal District Energy System Pilot Project	-	4,000	12,000	890	890	17,780
Total	89,675	95,375	109,510	90,871	91,792	477,224

NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Gas Projects

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
RG&E - Gas						
Asset Condition	5,517	8,351	30,603	23,100	27,948	95,519
Regulator Modernization and Automation Program	2,717	5,009	6,849	7,305	7,546	29,425
Caledonia Station Rebuild	-	1,008	18,697	-	-	19,705
CM-1 Pipeline Section 4 Chili GS to Ballantyne Road	-	-	-	-	18,025	18,025
Mendon Gate Station	-	-	2,200	11,511	-	13,710
Distribution Main Replacement	2,175	2,044	2,016	1,972	2,060	10,266
Mt Read SF115 psi, Replace Gas Mains	122	-	543	2,005	-	2,670
Gas Operations Departmental	301	290	299	308	317	1,515
CM-1 (CM-6) Transmission Gas Main Replacement	203	-	-	-	-	203
Mandatory	9,947	10,509	18,257	19,648	20,453	78,815
Distribution Mains New Business	2,402	2,710	2,964	3,254	3,399	14,729
Gas Meters	2,577	1,921	2,172	3,341	3,508	13,519
New Services	2,034	2,313	2,529	2,777	2,901	12,554
Large Government Jobs	-	-	3,991	3,911	4,030	11,932
Non Leak Prone Service Replacement Program	1,580	2,086	2,057	2,012	2,102	9,839
Incremental Customer Growth	-	-	2,934	2,596	2,675	8,205
Government Jobs	1,264	1,349	1,470	1,607	1,678	7,368
Regulators	90	130	140	150	160	670
Modernization	14,759	13,872	13,872	7,445	1,851	51,798
AMI Project Gas	13,970	13,872	13,872	7,445	1,851	51,009
Click-Gas Inspections and Scheduling	579	-	-	-	-	579
Common Gas SCADA Platform	210	-	-	-	-	210
Reliability	36,685	42,016	29,003	27,522	27,699	162,926
Leak Prone Main Replacement Program - LPM	18,954	20,864	20,573	20,125	21,023	101,539
Leak Prone Service Replacement Program	4,522	4,089	4,031	3,944	4,120	20,705
Ridgeway Ave Leak Prone Main	5,776	4,777	-	-	-	10,553
MF120 Eastern Monroe, State Road, Install Gas Main	122	108	4,399	3,453	-	8,082
Winton Road South Leak Prone Main	7,028	-	-	-	-	7,028
CM-1A Regulator Station	-	5,317	-	-	-	5,317
Transmission Short Segments, Install Gas Mains	-	3,006	-	-	-	3,006
MF60 Southeast Phase 4 (County Rd 9), Install Gas Main, Rebuild Station 449	-	-	-	-	2,557	2,557
MF60 Southeast Phase 3 (Malone Rd), Install Gas Main	122	2,193	-	-	-	2,315
MF60 Southeast Phase 1 (Mendon Gate - Rte 64), Install Gas Main	122	1,662	-	-	-	1,784
Chambers St. Reinforcement Leak Prone Main	40	-	-	-	-	40
Total	66,909	74,748	91,735	77,715	77,951	389,057



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
NYSEG - Common						
Buildings and Facilities	4,410	37,475	89,050	36,118	16,087	183,139
Binghamton Service Center	-	1,500	40,000	9,000	-	50,500
Minor Projects	2,000	3,750	3,750	3,750	3,750	17,000
Solar Panels	-	2,750	3,000	3,250	3,500	12,500
EV Chargers	-	2,250	4,250	4,250	1,250	12,000
Consolidation KGO	-	5,000	6,500	-	-	11,500
Consolidation Ithaca	-	750	4,500	4,500	-	9,750
Auburn Service Center Projects	-	750	1,050	-	3,275	5,075
BMS System	1,000	1,657	750	750	750	4,907
Liberty Service Center Projects	-	1,900	3,000	-	-	4,900
Geneva Service Center East Projects	-	150	2,000	2,000	-	4,150
Brewster Service Center Projects	-	100	2,945	500	530	4,075
Walton Service Center Projects	-	250	3,800	-	-	4,050
Oneonta Service Center Projects	-	100	2,170	1,725	-	3,995
Mechanicville Service Center Projects	-	1,200	1,497	600	300	3,597
Tablet Project	-	1,704	-	-	1,478	3,182
Hamburg Operations Center Projects	-	150	2,000	1,000	-	3,150
ECC Projects	-	2,225	570	325	-	3,120
Brewster HVAC	150	1,500	1,000	-	-	2,650
KGO Projects	-	750	1,610	100	50	2,510
Lancaster Service Center Projects	-	75	150	2,075	-	2,300
Progressive Style	120	750	750	530	-	2,150
Low Risk Buildings Projects	-	500	500	500	500	2,000
Elmira Service Center Projects	-	1,210	425	250	50	1,935
Long Lake Building Expansion	-	250	1,500	-	-	1,750
KGO UPS/Battery Upgrades	500	750	-	-	-	1,250
Plattsburgh Service Center	-	390	450	-	410	1,250
Ithaca Underground Tank Removal/Replacement	100	900	-	-	-	1,000
Binghamton Service Center Underground Tank Removal	100	900	-	-	-	1,000
Stamford Operations Center Projects	-	230	455	150	-	835
KGO Cooling Tower Replacement	-	750	-	-	-	750
KGO House Power/Transformer Upgrade	-	750	-	-	-	750
Brewster Generator	-	450	150	-	-	600
Lockport Service Center Projects	100	500	-	-	-	600
Norwich Operations Center Projects	-	500	-	50	-	550
Lancaster Service Center Garage Projects	-	-	-	350	75	425
Video Conferencing	-	90	110	110	110	420
Hornell Service Center Projects	-	-	-	300	-	300
Mobile Phones Project	40	44	48	53	59	244
SPCC West	200	-	-	-	-	200
Mailroom Digitization	-	-	119	-	-	119
Plattsburgh Site Upgrades	100	-	-	-	-	100
Customer Service	2,065	4,038	1,937	1,977	3,114	13,132
Regulatory Driven Efforts	425	1,379	886	912	764	4,366
Customer Journey Redesign	688	688	701	715	730	3,522
Energy Manager Enhancements	501	552	100	100	1,370	2,623
Lab Equipment	150	150	250	250	250	1,050
Contact Center Knowledge Database	-	769	-	-	-	769
Orchestration Platform - Customer Journey	-	500	-	-	-	500
Kiosk Upgrade	302	-	-	-	-	302
Fleet	29,420	20,000	20,000	20,000	20,000	109,420
Fleet Replacement Program	29,000	20,000	20,000	20,000	20,000	109,000
Global Telematics Solution	420	-	-	-	-	420

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Commons Project (Cont.)

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
NYSEG - Common						
Information Technology	12,244	17,322	16,324	15,370	16,744	78,003
Client Project Requests and Integration Projects	-	8,177	9,767	9,284	9,312	36,540
END USER Life Cycle	1,927	1,070	1,095	1,100	1,116	6,308
Microsoft Deployment Life Cycle	-	2,645	-	-	2,700	5,345
WINTEL Life Cycle	1,396	806	835	839	853	4,729
UNIX Life Cycle	327	386	916	925	1,140	3,694
STORAGE Life Cycle	341	695	709	724	739	3,208
SAP Enhancements	-	828	1,332	828	-	2,988
NETENG Life Cycle	469	565	591	588	600	2,813
GIS Utility Network Model Implementation	-	801	801	801	-	2,404
Digital Journey EDB Transformation	901	819	-	-	-	1,720
NETSEC Life Cycle	345	236	278	280	283	1,422
Click Upgrade & Long Cycle work	1,366	-	-	-	-	1,366
ESRI UN Deployment	955	-	-	-	-	955
Liferay WCM Implementation	875	-	-	-	-	875
PureEngage to PureConnect Migration	841	-	-	-	-	841
RPA Electric & Gas Operation	460	294	-	-	-	754
Contractor Portal	664	-	-	-	-	664
Customer Insights	636	-	-	-	-	636
Damage Assessment	600	-	-	-	-	600
Regulatory Driven Efforts	140	-	-	-	-	140
Operational Smart Grids	41,531	46,938	68,070	53,023	52,572	262,134
Data Center Consolidation	575	4,019	24,120	20,440	11,187	60,341
Telecomm Infrastructure	11,347	7,729	7,265	6,756	6,840	39,937
Telecomm Fiber	7,728	7,975	7,277	5,650	5,085	33,714
NY WAN Expansion	7,331	6,726	6,322	5,880	5,500	31,759
OSG Communications Tower, shelter Facility Improvements (Com)	1,000	3,000	3,000	4,000	4,000	15,000
FCC License Radio Spectrum purchase	4,000	4,400	2,000	1,000	1,000	12,400
Energy Control Systems Infrastructure	415	2,725	4,971	2,061	2,016	12,188
FAN + mobile technology refresh and expansion	400	2,300	3,200	3,100	3,100	12,100
Telecomm Vertical Builds	2,360	2,459	2,459	1,459	1,459	10,196
NY AMI Lifecycle	-	-	-	-	6,928	6,928
ECC Life cycle	768	956	1,100	1,250	1,320	5,394
Virtualization Expansion	-	1,645	1,541	-	1,600	4,786
Historian and Analytic Upgrades Program	-	134	3,480	142	146	3,902
Rochester Consolidation	2,028	882	-	-	-	2,910
NMC Solar Winds	494	379	379	379	379	2,011
OMS Enhancements	375	375	375	375	375	1,875
Solar Battery Backup Integration	500	500	250	200	200	1,650
Veritas Growth	44	484	81	81	601	1,290
Microsoft Licensing	898	-	-	-	-	898
Oracle Exadata	12	-	-	-	836	848
Networks ECTRM	769	-	-	-	-	769
Full OMS Functional alignment ABB-Spectrum	-	250	250	250	-	750
Itron Mobile hardware replacement	488	-	-	-	-	488
Physical and Cyber Security	35,538	30,165	26,961	18,681	20,345	131,690
Avangrid Security Domain (ASD) OSG Telecommunications	7,209	12,594	7,125	6,125	6,125	39,176
ASD Security System Installation	10,867	5,343	7,293	8,456	5,637	37,597
Global Cybersecurity Directors Plan	10,574	4,975	6,468	727	727	23,471
Avangrid Security Domain (ASD) OSG Infrastructure	3,867	4,004	2,988	424	3,607	14,890
FIRE PROTECTION	2,000	2,500	2,500	2,500	2,500	12,000
QSR - Security Plan	173	373	390	388	396	1,721
Tripwire Implementation	-	-	-	-	1,318	1,318
IT-OT DR/DMZ	848	-	-	-	-	848
Cybersecurity Innovation Lab	-	377	196	23	35	631
DRAGOS	-	-	-	38	-	38
Training	2,885	14,038	576	610	780	18,889
Training Facility	2,000	12,200	350	350	500	15,400
Training – Fleet	325	1,560	-	-	-	1,885
Training Equipment and Tools	500	250	200	250	250	1,450
Training Technology Projects	60	28	26	10	30	154
Total	92,198	108,463	111,931	87,685	90,441	490,717



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Common Projects

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
RG&E - Common						
Buildings and Facilities	4,823	8,167	7,874	6,453	5,053	32,371
Minor Projects	600	1,500	1,500	1,500	1,500	6,600
EV Chargers	100	1,500	1,750	1,750	-	5,100
Solar Panels	-	750	1,500	1,500	500	4,250
Tablet Project	692	138	996	199	1,435	3,461
Scottsville Rd Service Center Projects	1,575	535	1,000	200	-	3,310
Scottsville Road Consolidation Proj.	1,258	1,500	-	-	-	2,758
BMS System	404	-	300	300	300	1,304
Scottsville Rd HVAC Phase I	54	1,250	-	-	-	1,304
Low Risk Building Projects	-	250	250	250	250	1,000
Progressive Office	-	500	250	250	-	1,000
Mushroom Blvd Projects	-	-	-	-	750	750
Video Conferencing	-	75	110	110	110	405
3 City Center	101	50	50	50	50	301
Mobile Phones Project	40	44	48	53	59	244
Canandaigua Truck Garage Projects	-	75	-	-	100	175
Mailroom Digitization	-	-	119	-	-	119
Sodus Service Center Projects	-	-	-	110	-	110
Eastern Monroe Operations Center Projects	-	-	-	105	-	105
Fillmore Operations Center Projects	-	-	-	75	-	75
Customer Service	1,189	3,244	1,951	1,983	2,504	10,872
Regulatory Driven Efforts	425	1,379	886	912	764	4,366
Energy Manager Enhancements	105	707	500	500	1,162	2,974
Customer Journey Redesign	308	308	315	321	328	1,580
Lab Equipment	150	336	250	250	250	1,236
Contact Center Knowledge Database	-	384	-	-	-	384
Kiosk Upgrade	201	-	-	-	-	201
Orchestration Platform - Customer Journey	-	130	-	-	-	130
Fleet	6,717	5,689	9,208	6,111	6,214	33,940
Fleet Replacement Program	6,700	5,689	9,208	6,111	6,214	33,923
Global Telematics Solution	17	-	-	-	-	17
Information Technology	6,492	10,357	10,028	9,576	9,700	46,152
Client Project Requests and Integration Projects	-	4,249	5,124	4,888	5,759	20,020
GIS Utility Network Model Implementation	-	1,822	1,822	1,822	-	5,465
END USER Life Cycle	830	545	613	561	569	3,119
WINTEL Life Cycle	897	438	459	456	464	2,715
Microsoft Deployment Life Cycle	-	1,322	-	-	1,350	2,672
STORAGE Life Cycle	392	376	383	392	400	1,943
UNIX Life Cycle	167	196	466	471	569	1,869
NETSEC Life Cycle	176	299	344	347	363	1,528
SAP Enhancements	-	419	671	419	-	1,509
Digital Journey EDB Transformation	458	417	-	-	-	875
Click Upgrade & Long Cycle work	837	-	-	-	-	837
NETENG Life Cycle	63	125	146	220	225	778
ESRI UN Deployment	485	-	-	-	-	485
Liferay WCM Implementation	444	-	-	-	-	444
PureEngage to PureConnect Migration	420	-	-	-	-	420
RPA Electric & Gas Operation	234	149	-	-	-	384
Contractor Portal	331	-	-	-	-	331
Customer Insights	323	-	-	-	-	323
Damage Assessment	300	-	-	-	-	300
Regulatory Driven Efforts	71	-	-	-	-	71
Primavera PPM Cloud	61	-	-	-	-	61



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Common Projects (Cont.)

(\$000)	2022	2023	2024	2025	2026	Total 2022-2026
RG&E - Common						
Operational Smart Grids	22,227	19,009	38,656	41,356	25,754	147,001
Data Center Consolidation	345	2,685	13,929	12,671	7,766	37,397
ROC Hydrogen Pilot	-	-	6,000	14,000	-	20,000
Telecomm Infrastructure	5,007	2,686	2,525	2,348	2,380	14,945
Telecomm NY WAN Buildout	3,107	3,397	3,193	2,970	2,200	14,867
Telecomm Fiber	3,243	2,325	1,418	1,276	1,148	9,410
FAN + mobile technology refresh and expansion	400	1,300	2,200	2,100	2,100	8,100
Telecomm Vertical Builds	3,442	959	959	959	959	7,278
OSG Communications Tower, shelter Facility Improvements (Com)	500	1,000	1,500	2,500	1,500	7,000
Energy Control Systems Infrastructure	827	970	2,579	1,203	872	6,451
FCC License Radio Spectrum purchase	2,000	1,000	1,000	500	500	5,000
NY AMI Lifecycle	-	-	-	-	4,059	4,059
Virtualization Expansion	-	1,003	946	-	890	2,839
Historian and Analytic Upgrades Program	-	158	1,709	79	82	2,028
Rochester Consolidation	1,268	535	-	-	-	1,803
NMC Solar Winds	313	229	229	229	229	1,229
ECC Life cycle	160	160	162	164	166	812
Veritas Growth	26	294	49	49	371	789
OMS Enhancements	125	125	125	125	125	625
Solar Battery Backup Integration	250	100	50	100	50	550
Microsoft Licensing	536	-	-	-	-	536
Networks ECTRM	408	-	-	-	-	408
Oracle Exadata	10	-	-	-	356	366
Itron Mobile hardware replacement	260	-	-	-	-	260
Full OMS Functional alignment ABB-Spectrum	-	83	83	83	-	250
Physical and Cyber Security	23,088	15,661	12,003	10,312	12,508	73,572
Avangrid Security Domain (ASD) OSG Telecommunications	4,916	4,184	3,353	3,353	3,353	19,159
ASD Security System Installation	6,402	2,890	275	4,750	2,965	17,282
Avangrid Security Domain (ASD) OSG Infrastructure	3,595	4,004	2,988	424	3,607	14,617
Global Cybersecurity Directors Plan	6,480	3,050	3,959	437	437	14,362
FIRE PROTECTION	1,090	1,090	1,090	1,090	1,090	5,450
QSR - Security Plan	88	213	217	222	227	967
Tripwire Implementation	-	-	-	-	808	808
IT-OT DR/DMZ	517	-	-	-	-	517
Cybersecurity Innovation Lab	-	231	120	14	21	387
DRAGOS	-	-	-	23	-	23
Training	265	139	63	134	2	603
Training Equipment and Tools	250	125	50	125	-	550
Training Technology Projects	15	14	13	9	2	53
Total	45,579	34,809	50,722	51,802	38,264	221,176

Appendix B - Capital Project Summaries

Electric Asset Condition

NYSEG

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NYSEG

TLD Replacements

Line of Business: Electric
Category: Asset Condition

Scope:

The Transmission Line Deficiencies Replacement program (TLD Replacement Program) prioritizes the line segments needing intervention based on deficiencies identified on the transmission system by the various inspection programs (Crossarm Inspections, Aerial Inspections, Infrared Inspections, Transmission Line Inspection program and Wood Pole Inspect and Treat Program). Interventions are determined for each line segment and these interventions are engineered and scheduled for construction.

Reasons and Benefits:

- At the end of 2021 there were 3065 overdue transmission line deficiencies.
- To address the consistent presence of backlogged transmission notifications, the Company needs to assign additional project management, engineering, construction, and funding resources in addition to the Operations resources that historically have addressed transmission notifications,
- Each division is responsible for maintenance of their own service territory, so repairs are not necessarily prioritized at an Opco level,
- Factors such as transmission circuit customer count, SAIFI metrics and percent of a line needing structure replacements are not factored into current prioritization of work.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
14,500	44,000	87,000	130,000	174,000

NYSEG

Pole Replace (WPIT) Program CAP

Line of Business: Electric
Category: Asset Condition

Scope:

The Wood Pole Inspect and Treat (WPIT) program uses specialized contractors to inspect wood poles at ground line for wood decay and insect damage. The inspection also consists of excavation and boring into the pole to identify decay at and below ground line. When a pole is deemed insufficient, it is rejected and identified as requiring a pole replacement generating a notification.

Priority levels of WPIT notifications:

- Level 1 (recommended replacement within 1 Week)
- Level 2A (recommended replacement within 30 days)
- Level 2 (less than 35% remaining strength) (recommended replacement within 1 year with priority)
- Level 2 (recommended replacement within 1 year)

Pole replacements under this program are determined by the following criteria:

Loss of Pole Strength

Decay in the pole will cause the pole to lose strength from its condition when it is new. The NESC, table 261-1A, requires the pole to be replaced or rehabilitated when the reduced strength is 2/3 of that required when installed new.

- 67% of Initial Strength Reject pole – replace or reinforce within one year
- 40% of Initial Strength Hazard pole – replace or reinforce ASAP

To inspect a pole below groundline where most pole decay occurs, a pole must be excavated. The type of inspection that each pole receives is based on the age of the pole. Unless otherwise specified by the Company, the pole shall be inspected according to the following tables:

For Distribution poles

<u>Age of Pole (Yrs.)</u>	<u>Type of Inspection/Treatment</u>
0-19	Visual
20+	Sound & Bore and partial excavate inspection

Selective treatment

The partial excavation and inspection of Distribution wood poles for NYSEG is removal of a spade full of soil at the groundline in two locations to ascertain the presence of any external decay below ground, typical of Southern Pine utility poles. If no decay is detected during this partial excavate inspection, then an external preservative treatment below groundline is not called for in the NYSEG Specification. If the inspection detects decay, the Contractor shall treat for internal or external decay as applicable according to Section 4.0 and include a full excavate and treat for external decay (if present) according to Sections 2.04 and 2.05. In addition to the poles classified above, all Penta in LPG treated (Cellon) poles or Copper Naphthenate treated Southern Pine poles encountered, regardless of age, are to be fully excavated, externally and fumigant treated (where possible) according to these specifications.

Poles unable to receive the external treatment are to receive the most thorough inspection and/or treatment possible.

All phases of inspection and/or treatment shall include the visual inspection as part of the procedures. Sounding and boring shall be included in all phases of inspection and/or treatment except the visual inspection.

Reject Criteria

Deductions shall be made from the original circumference of the pole to account for internal decay pockets and removal of external decay. The pole shall have sufficient good wood remaining to meet minimum: NESC grade B loading requirements.

Any pole whose remaining pole capacity is less than 40% of original capacity is a Priority Pole and will be marked in the field. Priority Poles shall be reported the same day they are found.

Determining Remaining Strength and Reject Criteria

Inspector is to define the data and explain how the data is processed to evaluate remaining pole capacity. Inspector will be able to defend and explain criteria used to determine whether a pole is serviceable, a reject restorable or a reject non-restorable.

Fully excavated poles shall be chipped to remove exterior decayed wood, surface rot, and decay pockets. After the chipping process is complete, an evaluation of the pole at or beneath the groundline will be completed to determine whether the pole is serviceable, restorable, or unserviceable. The effective pole circumference shall be determined by measuring the pole at the location of minimum pole circumference and adjusting for internal decay that may also exist. For situations with large areas of internal decay additional measurements may be necessary to determine the effective pole circumference.

Based on these criteria, poles are identified for replacement. Our WPIT inspections will be on a 10-year cycle.

Currently, the WPIT program has a backlog of notifications that should be addressed at the OpCo’s earliest availability. Interruptions due to company equipment failure is a large contributor to customer interruptions.

NYSEG 2.3.2022					
	WPIT Lvl 1	WPIT Lvl 2A	WPIT Lvl 2<35%	WPIT Lvl 2	Total
Notifications	1	62	167	7469	7699

Level 1 notifications are typically addressed within the prescribed timeline, few of these go “overdue”, hence the small number of open Level I notifications.

The Pole Replacement Program is seeking to perform pole replacements on all poles found as requiring replacement from past inspections. The program strategy for completing this work is based on notifications priority. All Level 2A and Level 2<35% discovered in 2021 and prior will all be repaired within the calendar year. To address the WPIT 2 notifications, a “circuit sweep” methodology. By prioritizing circuits based on their impact on customer reliability and SAIFI/CAIDI scores, permanent repairs on will be performed on all open WPIT notifications of the selected circuit. The intention is to complete work on the backlog while simultaneously working to become current on all due dates, meeting the inspection priority requirements.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

These poles were discovered as deficient as part of routine inspections performed on the distribution system. The condition of the poles will only worsen over time, thus leaving them unaddressed risks reliability and increases the chance of service interruptions. Interruptions due to company equipment failure is a large contributor to customer interruptions. Adequate funding, material, and available field crews are necessary to keep repairs consistently performed.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
24,338	68,260	76,799	83,873	102,704

NYSEG

Distribution Line Deficiencies

Line of Business: Electric
Category: Asset Condition

Scope:

Based on inspection criteria, distribution notifications are created as part of the pole inspection programs, Distribution Infrared Inspections and Distribution Line inspections. The grouping of these notifications is called Distribution Line Deficiencies (DLD).

Distribution Line Inspection (DLI)

Inspections are performed on the pole from the ground up and all associated components. Not all DLIs are initially identified as pole replacements, many are for repair or replacement of the pole's cross arms and equipment. Some are written to alert of a component issue, but due to pole age and complexity of the deficiency, many are changed into capital pole replacements through the Planning process of Work Order creation.

Priority of DLI Description

- Level I – Repair as soon as possible but not longer than one week. A Level I deficiency is an actual or imminent safety hazard to the public or poses a serious and immediate threat to the delivery of power. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated.
- Level II – Repair within one year. A Level II deficiency is likely to fail prior to the next inspection cycle and represents a threat to safety and/or reliability should a failure occur prior to repair.
- Level III – Repair within three years. A Level III deficiency does not present immediate safety or operational concerns and would likely have minimal impact on the safe and reliable delivery of power should it fail prior to repair.

Distribution Infrared Inspections (DIR)

The objective of this program is to perform a thorough infrared inspection of Distribution equipment from ground patrols, with any deficiencies being thoroughly documented with a high-resolution thermographic image, including observed temperature scale. These notifications are identified as “IR” notifications. Any visual damage (burning, tracking, etc.) observed because of the thermographic identification is also documented and reported for repair. Any visual deficiencies are also

NYSEG and RG&E 5-Year Capital Investment Plan

documented for repair during the inspection. These notifications are identified as “NIR”.

- **Level I Condition:** A Level I is a condition of any electrical equipment, device or structure that poses a serious and immediate threat to either the safety of the public or the reliability of the electric transmission or distribution system. Such conditions shall be repaired as soon as possible but not longer than one week. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated.
- **Level II:** A Level II is a condition of any electrical equipment, device or structure that, if not corrected, could develop into a Level I Condition. Such conditions shall be repaired within a one-year period based on the evaluation of the inspector.

Currently, both the DLI and DIR programs have a backlog of notifications that should be addressed at the Company’s earliest availability. Interruptions due to equipment failure is a large contributor to customer interruptions.

NYSEG 2.3.2022						
	DLI Level 1	DLI Level 2	DLI Level 3	DIR Level 1	DIR Level 2	Total
Notifications	2	1,137	20,549	2	4317	26,007
Total	21,668			4,319		

Level 1 notifications are typically addressed within the prescribed timeline, few of these go “overdue”, hence the low number of open Level I notifications.

The DLD Program seeks to perform permanent repairs on existing open notifications resulting from past inspections. The program strategy used to complete this work is based on a “circuit sweep” methodology. By prioritizing circuits based on their impact on customer reliability and SAIFI/CAIDI scores, permanent repairs on will be performed on all open DLD notifications of the selected circuit. The intention is to complete work on the backlog while simultaneously working due dates based on current inspection findings, meeting the inspection priority requirements.

Reasons and Benefits:

These deficiencies were discovered as part of routine inspections performed on the distribution system. The deficiencies will only worsen over time, thus leaving them unaddressed risks reliability and increases the chance of service interruptions. Interruptions due to company equipment failure are a large contributor to customer

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interruptions. Adequate funding, materials, and available field crews are necessary to keep repairs consistently performed.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
28,700	40,228	46,440	52,169	58,581

NYSEG

Elec Better

Line of Business: Electric
Category: Asset Condition

Scope:

The Electric Betterments program replaces various distribution system elements that contribute to high SAIFI measures. Electric Betterment projects are aimed at improving the reliability of worst performing circuits and maintaining the safe and reliable delivery of electricity to our customers. These projects focus on the reliability, operability, and flexibility of the electric distribution system. The list of projects is approved by the distribution planning group and/or senior management as an identified item needing upgrade and/or replacement causing substantial risk for customer outages and potential safety hazards. This program allows divisions to respond to smaller identified jobs to better improve reliability metrics and reduce the frequency and duration of customer outages. The budget is planned based on historical spending levels and any projects identified and communicated by the divisions in advance.

Reasons and Benefits:

Maintaining a safe and reliable distribution system is paramount in meeting regulatory targets. This program provides the company with the agility required to correct what is negatively impacting reliability in the present and provides a safe and robust system for the future.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
13,297	31,321	32,261	33,228	34,225

NYSEG

Gardenville Substation Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

After a comprehensive study by Asset Planning, a full rebuild of the New Gardenville Substation was determined as necessary. This decision was chosen as one of many alternatives, consisting of an Expandable 230 kV Ring bus, a 4 Bay 115 kV GIS, a three-bus section 34.5 kV straight bus utilizing MV GIS, one new 448 230/115/34.5 kV transformers, two 50 MVA 115/34.5 kV transformers and a new control house.

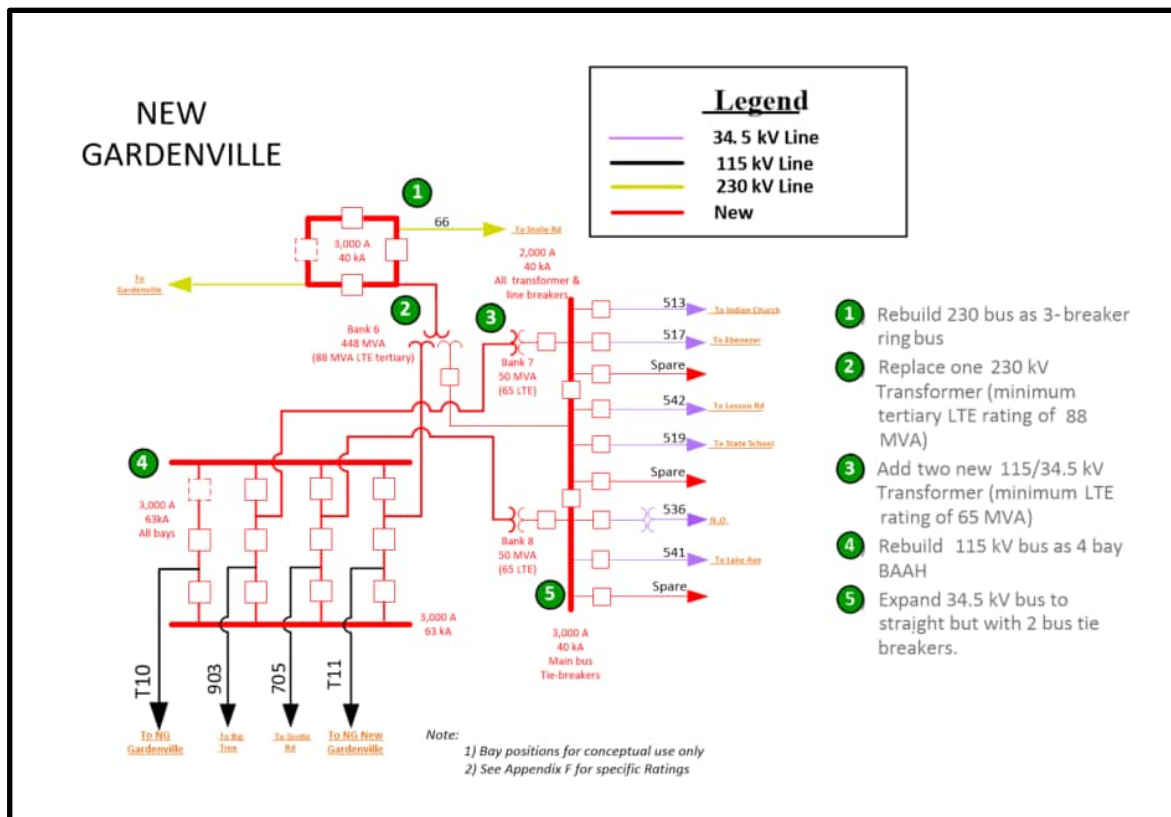


Figure 8-2 Solution (Regional One-Line Diagram)

Reasons and Benefits:

A Comprehensive Area study was conducted to address all reliability, distribution and asset condition needs in this area. In addition, a Comprehensive Reliability Study was performed in 2019 which revealed three key NERC TPL BES violations. N-1 loss of a transformer that causes a thermal overload, N-1-1 both transformer banks are OOS and N-1 Stuck breaker violations.

A comprehensive needs and solutions assessment was performed to address these reliability needs while also addressing asset condition needs.

Reliability Needs:

- Voltage collapse caused by multiple scenarios (single element (N-1) stuck breaker contingency, or by loss of both 230/115/34.5 kV transformers).
- Severe thermal violations on BPS elements (~129% & 107% LTE on the tertiary winding of the 230/115/34.5 kV transformers).
- Approximately 76.2 MW non-consequential loss-of-load exposure.

Asset Condition:

- Widespread structural deficiencies indicate risk of failures of the supporting yard structures under the required NESC loading conditions.
- Control house has code violations¹ due to clearances, ventilation, & fire ratings.
- Obsolete electromechanical relays which are unsupported by the manufacturer.
- All 230 kV and 115 kV major equipment must be upgraded due asset health or reliability.
- All 230 & 115 kV breakers (3-230 kV & 6-115 kV) were determined² to be in poor condition.

SP&C Requirements:

- NPCC Directory #4 Implementation requires a 2nd battery and protection system A&B separation at the substation. A temporary battery solution is being planned that will allow for partial NPCC compliant while a permanent solution is implemented.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,503	13,177	29,429	46,219	40,663



NYSEG

T&S Asset Condition Replacement Program

Line of Business: Electric
Category: Asset Condition

Scope:

The objective of the T&S Asset Condition Replacement Program is to conduct system-wide T&S facility surveys, to determine the overall health of RG&E’s system, and develop a long-term mitigation strategy (projects) to enhance the condition of these assets. These comprehensive T&S surveys will include an assessment of electrical and structural assets which will be scored against individually weighted categories such as age of equipment, resiliency/flooding impacts, substation P&C assessment, capacity (MVA), substation reliability performance, etc. The overall T&S health scores will then be used to inform a system-wide prioritization of asset condition replacement/upgrade projects across the RG&E’s fleet of existing T&S assets.

Reasons and Benefits:

There are ~180 substations and ~995 miles of electric transmission (overhead and underground) at RG&E. Over 45% of substations in RG&E have assets that are over 60 years old, by 2030 this number increases to 73%. 7% of power transformers and 27% of substation breakers are in poor or very poor condition. 26% of power transformers and 15% of substation breakers are over 60 years old. By 2030, this number will increase to 47% and 26% respectively. (*Age is only an indicator for asset replacement. Actual replacement is driven by condition-based analysis*). 7% of substations contributed to SAIFI in 2020-2021.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,200	10,000	30,000	30,000	30,000

NYSEG

Substation Modernization - South Owego

Line of Business: Electric
Category: Asset Condition

Scope:

This project requires a complete rebuild of the substation on the existing site or a new site to replace components due to asset condition and address operational deficiencies to improve reliability, load-serving capability, and system contingencies. Substation work will be coordinated with transmission line projects that feed into the substation.

Reasons and Benefits:

Asset condition Needs and Justification;

Widespread structural deficiencies indicate risk of failures of the supporting yard structures under the required NESC loading conditions.
Control house has code violations due to clearances, ventilation, & fire ratings.
Obsolete electromechanical relays which are unsupported by the manufacturer.
Nine circuit breakers assessed as Poor or Very Poor
Majority of switch insulators are aged brown glass types that are obsolete and prone to failure.

Reliability Needs and Justification;

If the bus-tie is closed in and both transformers are paralleled, the breakers become overdutied.
Upon the loss of transformer Bank 2, approximately 30 MW of load is lost (unacceptable loss N-1 according to Loss of Load criteria). If load transferred to Bank 1 by closing the bus-tie, the transformer can become overloaded (128% LTE) past its emergency rating of approximately 44 MVA attempting to feed about 55.125 MVA. Bank 2 is able to pick up the load lost if Bank 1 is lost without overloading.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	14,919	29,838	34,811

NYSEG

Line 968 115 kV Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

This project emanates from an existing study of 43 miles of 115 kV transmission line (Line 968, 722 and 724). Line 968 runs from Flat Street Substation to Greenidge Substation. Line 722 runs from Flat Street to Eelpot Road Substation. Line 724 runs from Eelpot Road Substation to Meyer Substation. The latest NYSEG Transmission Line screening identified these transmission lines as in poor overall condition. See one-lines below:

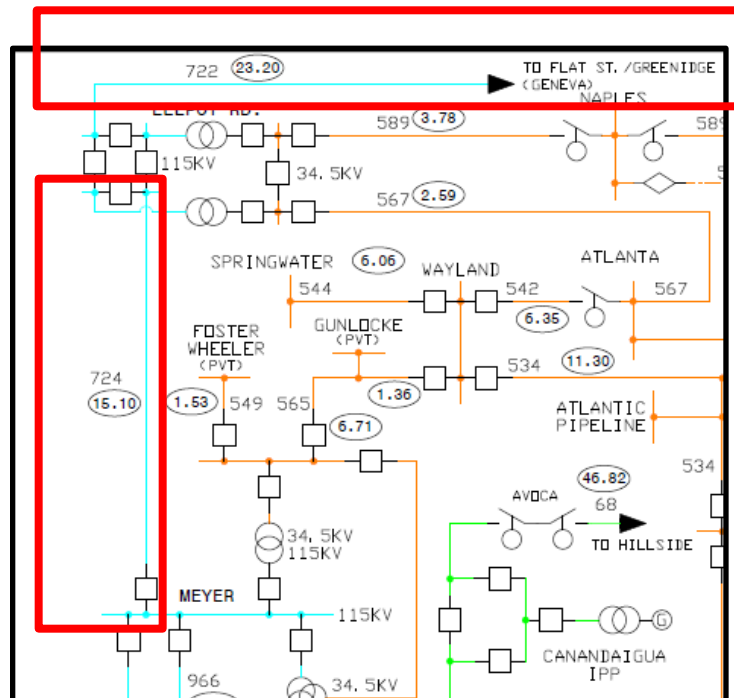


Figure 1: Line 722 and 724 Existing One Line

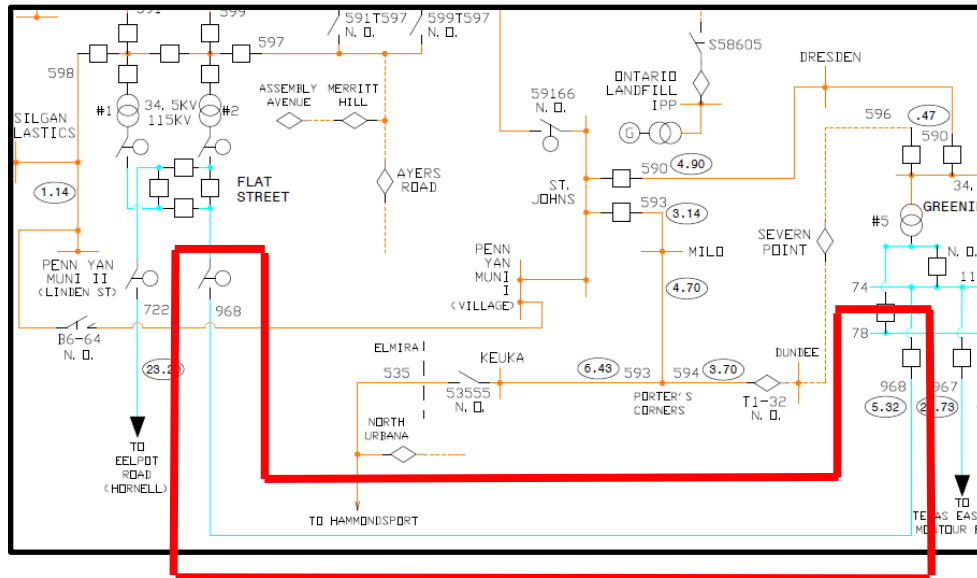


Figure 2: Line 968 Existing One Line

Reasons and Benefits:

Line 968, 722 and 724 all have conductors that are 70 years old. As reported by Havard et al., in Aged ACSR Conductors, Part II – Prediction of Remaining Life, the tensile strength of ACSR conductors can decrease over their service life. Havard et al. concludes that for planning purposes a mean useful life of 70 years is considered valid for existing conductors. By the time this conductor gets replaced, it will have exceeded its useful life. The NYSEG Planned Maintenance Report (PMR) was reviewed to see if there were any outstanding Transmission Line Deficiencies (TLD)s for these lines. Line 968, 722 and 724 have 41 TLDs total.

As part of the NERC Alert Program, NYSEG utilized LIDAR and modeling data to perform a clearance assessment of Lines 968, 722 and 724 against the NESC code. 45 clearance violations were identified. The latest NYSEG Transmission Line Assessment identified these transmission lines as in poor overall condition. A visual assessment, operational assessment and structural assessment will be performed as part of a Needs and Solutions Assessment to further justify this project.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	3,933	27,501	43,880

NYSEG

Substation Modernization - Noyes Island T

Line of Business: Electric
Category: Asset Condition

Scope:

The Noyes Island Rebuild Project is the full rebuild of the existing substation with two new (37) MVA 34.5/12.5 kV transformers, 34.5 and 12.5 kV GIS, two control buildings and one 13.2 MVar cap bank. This project will also be designed to resolve known flooding hazards. Seven distribution circuits will be converted from 8.3 kV to 12.5 kV.

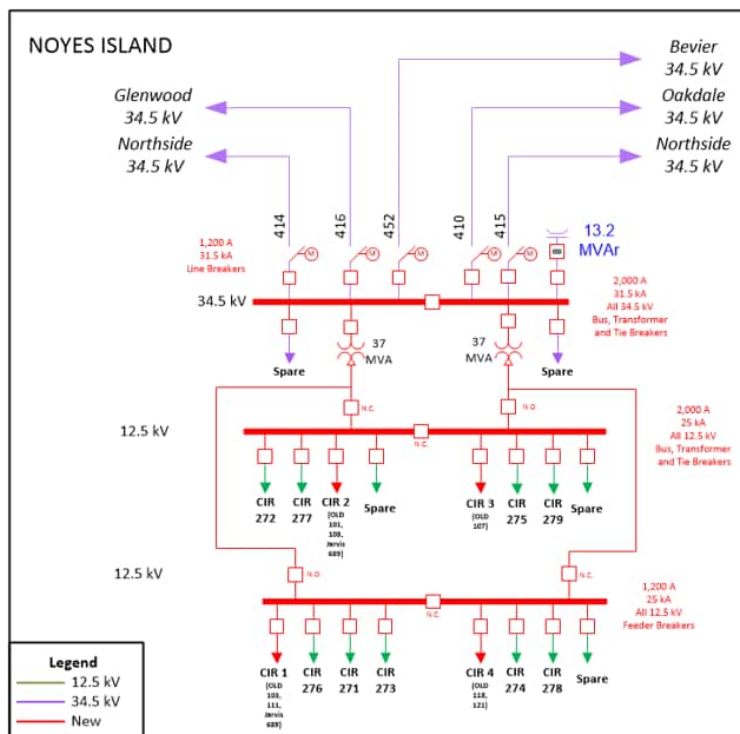


Figure 1: Noyes Island One Line

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

A large majority of breakers at the station in need of replacement due to age and design and manufacturing issues. They are older style OCB breakers and have been deemed obsolete. The transformers are rated poor, mainly driven by age, poor DGA results, and problematic LTCs. Many foundations are in an advanced state of deterioration with spalling concrete and exposed rebar.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,245	23,152	21,309	24,139	0

NYSEG

PCB Transformer Replacements

Line of Business: Electric
Category: Asset Condition

Scope:

The objective of this program is to proactively replace the PCB transformers that remain on the distribution system. Although the manufacture of polychlorinated biphenyls (PCBs) was banned in the United States in 1979 due to their numerous adverse health impacts, a portion of NYSEG's in-service mineral oil-filled pole top transformers still contain PCBs in concentrations above 50 ppm, as these units were manufactured before the national ban was put into effect. PCBs are suspected to be human carcinogens and they have a variety of other negative environmental and human health-related impacts. There are currently 8,006 PCB transformers remaining at NYSEG and 3,507 are considered high priority and 4,499 are considered mid priority. The foundational work of completing this project has been completed as we first conducted an analysis of historical NYSEG transformer disposal records and the 2016 transformer ID project to get a rough understanding of which transformer characteristics could be linked to identifying in-service PCB-contaminated (50-500 ppm PCB contents) and PCB transformers (≥ 500 ppm PCB contents.) We bolstered the information gained from these records by consulting similar large-scale PCB transformer studies conducted by third parties so that we could be more confident in the link between the applicable transformer characteristics and their probability of contamination.

As a result of the transformer disposal record analysis and the secondary research, we were able to determine that our search should focus on identifying two categories of transformers: high priority and mid- priority units for recommended replacement. High priority units for recommended replacement include Westinghouse transformers manufactured in their Sharon, Pennsylvania plant between the years of 1965 and 1970 (Huffman's study from the Northern Indiana Public Service Company determined that between 90-100% of these units were confirmed to be PCB-contaminated.) High priority units also include all ≤ 10 kVA units manufactured at General Electric's Pittsfield, Massachusetts plant before 1974. The Indiana Public Service Company's study confirms that most units manufactured at this plant during these years are contaminated. Mid-priority units include transformers manufactured by Westinghouse before 1965 at their Sharon, Pennsylvania plant. They also include all > 10 kVA includes units manufactured by GE at their Pittsfield, Massachusetts plant before 1974. Once these characteristics were identified, Master Data provided us with a list of active



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG pole top transformers from SAP. A search through this list was conducted to identify units with High and Mid priority unit characteristics.

Reasons and Benefits:

On July 22, 2019, a storm caused a spill from a 5 kVA transformer manufactured by General Electric in 1967. Approximately 10 gallons of oil were spilled onto pavement and soil from the transformer at 5912 State Route 80 in Cooperstown, New York. The oil was confirmed through testing to contain 460 ppm PCBs, and two roll off cans of contaminated material (NYS waste code B007) were generated and disposed of during spill contractor NRC's cleanup process. The total cost of this spill cleanup amounted to \$75,000. If this incident had involved a non-PCB transformer instead of a PCB-contaminated transformer, the cost would only have been approximately \$20,000, according to spill response contractor NRC's Operations Manager.

On May 12, 2019, a crew of NYSEG workers responding to an outage during a rainstorm at 2209 Connor Rd., Baldwinsville, NY came across a spill from a downed 10 kVA transformer manufactured by Westinghouse at their Sharon, Pennsylvania plant in 1969. Testing determined that the transformer oil contained 161 ppm PCBs. Heavy rain posed an issue for the crew because it made the spill more difficult to contain to one area and caused the workers to track contaminated mud throughout the worksite and ultimately into the company vehicles. Once the workers returned the vehicles to the service center, it was difficult to distinguish which vehicles from the fleet had been contaminated by the spill. It was also suspected that the locker room had become contaminated while the crew doffed their work gear upon returning from the job. All work gear had to be disposed of as hazardous waste, the seat covers of nearly the entire fleet of Auburn Service Center vehicles had to be replaced, and several locations around the service center needed to be decontaminated after the spill. Due to the large amount of potential worker exposures that occurred during this cleanup process, the spill from the 10 kVA unit became a much more serious issue than a spill from a non-PCB transformer. The cost of cleanup, material disposal, seat cover replacement, and work gear replacement for this spill totaled approximately \$57,000.

On 11/01/2019, a bank of three 50 kVA transformers manufactured by GE at the Pittsfield, Mass plant in 1944 and 1946 was downed in a storm in Van Buren, Onondaga County. The oil from these transformers spilled onto soil and pavement. One unit contained 450 ppm PCBs, while the other two units contained 452 ppm PCBs. The total costs of the on-going response to this spill are going to exceed an estimated \$100,000.



NYSEG and RG&E 5-Year Capital Investment Plan

The transformers involved in both the Cooperstown and Baldwinsville spill would have been identified during this project to be High Priority units for recommended replacement, while the transformers involved in the Van Buren spill were identified during this project to be Mid Priority units for recommended replacement.

These spill incidents demonstrate the value of identifying and replacing probable PCB and PCB-contaminated pole top transformers. PCB transformer spills are costly, resource-intensive, and they can increase the risk of PCB exposure for NYSEG employees. NYSEG experiences estimated 300-500 spills each year across New York State. Approximately 3% of all in-service transformers have been identified through this project as being likely or highly likely to be contaminated with PCBs, which means that a total of 9 to 15 PCB-contaminated or PCB transformer spills each year could be avoided if all high and mid-priority units were replaced.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	17,169	17,169	17,169	17,169

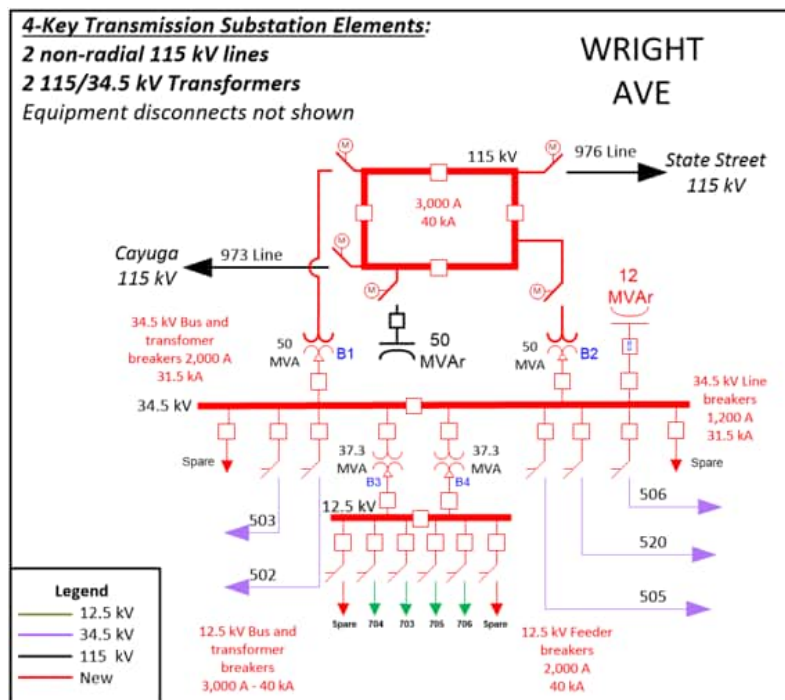
NYSEG

Substation Modernization - Wright Avenue

Line of Business: Electric
Category: Asset Condition

Scope:

The Wright Ave Substation Rebuild Project is the full rebuild of the substation with new 115 kV HV GIS configured as a ring bus, two new 115/34.5 kV (50) MVA transformers, two new (37) MVA 34.5/12.5 kV transformers, 34.5 & 12.5 kV GIS, one new control building and one new 12 MVAr 34.5 kV cap bank.



Example Figure 1: Picture of Work Area, One Line, Etc.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Many 115kV line termination and bus support structures have overstressed steel members and anchor bolts. The line termination structure foundations have failed visual inspections. Most breakers at all three voltage levels are poor or very poor mainly based on age and design/manufacturing issues. The summer peak loading on the distribution transformer exceeds its rating.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	5,719	23,133	22,022	15,961

NYSEG

South Perry New Sub & Trans Line Upgrade

Line of Business: Electric
Category: Asset Condition

Scope:

This project will construct a new 230 ring bus with a 230/115kV transformer at South Perry and install a new 115/34.5kV, 56 MVA transformer. The scope to construct the new 230 ring bus with a 230/115kV transformer was completed and energized with no-load due to voltage and thermal issues identified on existing 115kV bus. Currently, the 115kV scope is not completed due to several additional asset health issues identified in the existing 115/69/34.5kV yard. A comprehensive study/evaluation is being performed for the 115/69/34.5kV yard at South Perry.

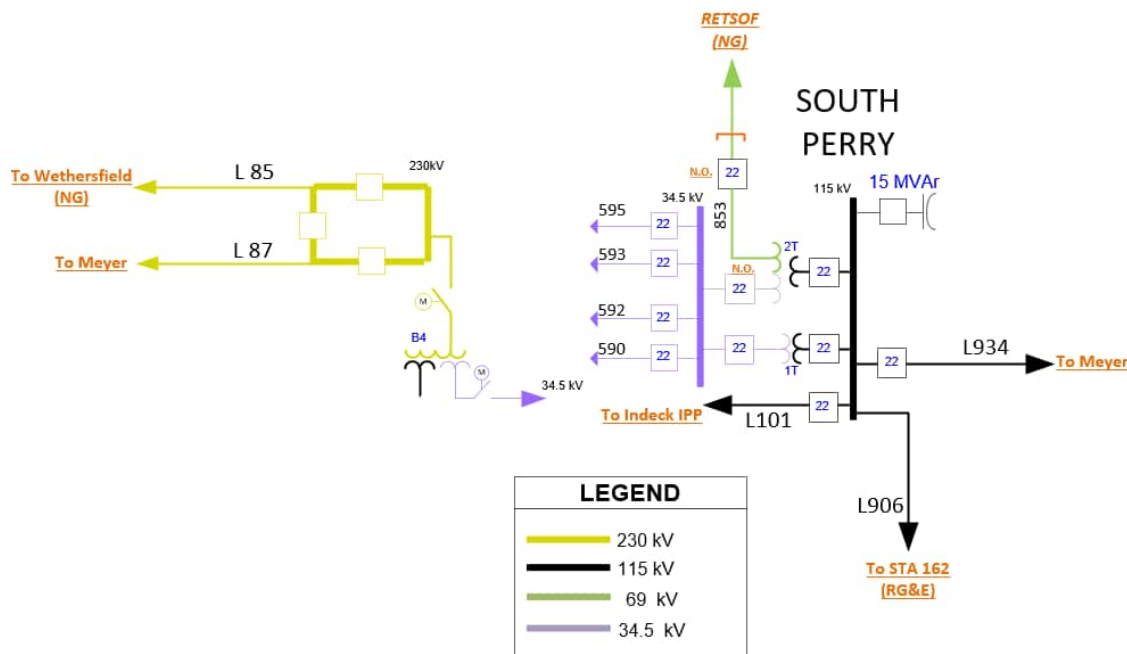


Figure 1: Existing One Line

Reasons and Benefits:

During the summer peak load period, loss of the existing South Perry 115/34.5kV 56MVA transformer (Bank #1) causes the entire South Perry area to be out of service. The load at potential risk is 30.5 MW (unacceptable loss N-1 according to Loss of Load criteria) and customer count is 8218 including the Town of Castile. If load transferred to Bank #2 tertiary (9MVA) by closing the bus-tie, the transformer can become overloaded (254% LTE) past its emergency rating of approximately 12 MVA attempting to feed about 30.5 MVA.

On-going comprehensive needs assessment has identified asset health issues which include:

- 2021 Breaker asset report identified 40% (2 out of 5) of the 115 kV breakers, 33% (2 out of 6) of the 34.5 kV breakers, and the 69 kV breaker (1 out of 1) as poor/very poor in health condition.
- Widespread structural deficiencies per recent visual inspection. It is anticipated that the in-progress detailed structural analysis shall confirm structural deficiencies under the required NESC loading conditions.
- 48 foundations assessed as failing inspection in accordance with ACI 201.1R-08 (Guide for Conducting a Visual Inspection of Concrete in Service) requirements. Most foundations are in very poor condition, not possible to repair and the majority are on the main 115kV bus of the station.
- 45% of 115kV switches, 85% of 34.5kV switches, 100% of 69kV switches are determined to be poor in condition.
- The majority of 115kV main bus strain bus insulators are aged brown glass types that are obsolete and prone to failure.
- Portions of 34.5kV bus consist of conductors can become thermally overloaded past its emergency ratings under transformer S-LTE loadings.
- Substation relies mostly on obsolete electromechanical relays and SCADA automation with limited capabilities and are unsupported by their manufacturers.
- The 115kV control building has very limited/no room for any major upgrade. Building interior and exterior finishes do not meet building NEC/NFPA 70 code requirements for fire barrier and propagation.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
599	6,418	26,103	9,158	0



NYSEG

Substation Modernization - Clark Street

Line of Business: Electric
Category: Asset Condition

Scope:

A comprehensive needs analysis was performed for the Clark Street substation in Binghamton. This analysis showed that a large majority of electrical assets at the station are in poor or worse health. A full rebuild of this station is recommended which will include two new (37) MVA 34.5/12.5 kV transformers, 34.5 and 12.5 kV GIS, one control building and one 5.4 MVar cap bank. From a reliability perspective, it is recommended that all 4.8 kV distribution circuits from Clark St and Endicott Railway be upgraded to 12.5 kV. The upgrade of distribution will allow all Endicott Railway load to be fed from the Clark St substation and Endicott Railway to be decommissioned.

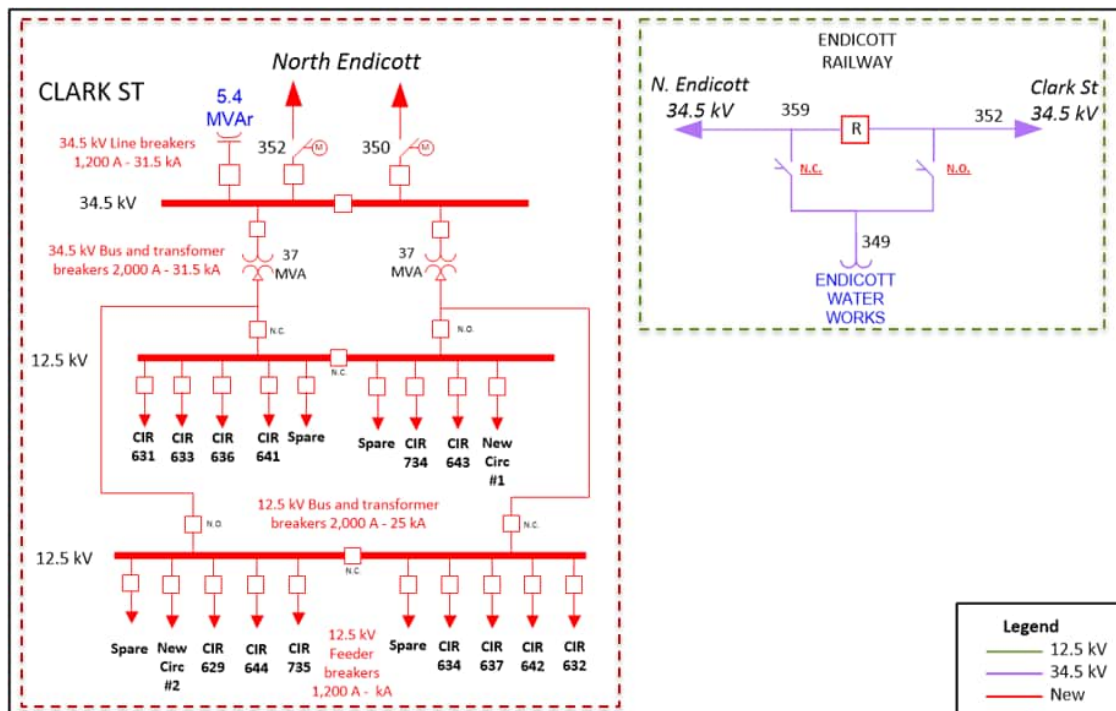


Figure 1: Clark St One Line

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- All 34.5, 12.5 and 4.8 kV major equipment must be upgraded due to asset condition.
- The majority of the 34.5, 12.5 and 4.8 kV breakers (25 of 27) will be in poor condition by 2026
- The two 34.5/12.5 kV transformers are rated poor due to LTCs having poor oil quality with the presence of gassing.
- Control house has limited space, HVAC issues and peeling paint on the exterior.
- Most relays are obsolete electromechanical types which are unsupported by the manufacturer.
- One 34.5/4.8 kV transformer of Bank 2 rated fair due to marginal DGA results.
- Foundations generally fair with several in very poor condition.
- Unable to backup all 4.8 kV distribution circuit load under N-1 conditions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	1,992	3,074	34,014

NYSEG

Meyer New 2nd 115/34.5kV Transformer

Line of Business: Electric
Category: Asset Condition

Scope:

This project will install a new second 115/34.5kV, 37 MVA transformer at Meyer Substation. Due to several asset health issues identified at Meyer, a comprehensive study and evaluation is being performed.

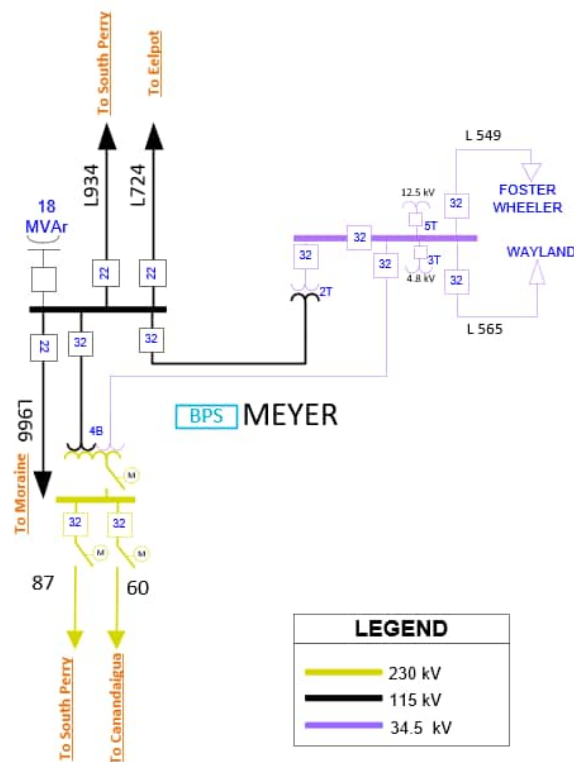


Figure 1: Existing One Line

Reasons and Benefits:

On-going comprehensive needs assessment has identified asset health issues which include:

- 2021 equipment asset report and analysis identified transformers and breakers below for poor health issues.
 - 230kV/115kV/34kV transformer (bank #4) determined be in poor health condition. transformer has indicated a very poor insulation and oil quality with a high probability of failure according to recent maintenance testing and analysis.
 - New 115/34.5kV transformer (Bank #1) has failed testing onsite and show signs of oil leakage. The transformer currently remains unenergized and unusable.
 - 115/34.5kV three-single phase transformers (Bank #2) is assessed as poor in health condition, mainly due to poor oil quality and insulation.
 - The 34.5/4.8kV three-single phase transformers (Bank #3) is assessed as fair. However, the 70-year-old transformer shows serve rust/corrosion on tank, bushing flanges, terminals, and has no oil containment.
 - 17% (1 out of 6) of the 115 kV breakers, 60% (3 out of 5) of the 34.5 kV breakers, and 66% (2 out of 3) of the 12.5 kV breaker as poor/very poor in health condition. Additional, 50% of (3 out of 6) of the 115 kV breakers assessed as fair are 35 years old oil circuit breakers (OCB).
- Widespread structural deficiencies in the 115/34.5kV yard per detailed structural analysis under the required NESC loading conditions. These structural deficiencies indicate risk of failures of the supporting yard structures.
- 14 foundations assessed as failing inspection in accordance with ACI 201.1R-08 (Guide for Conducting a Visual Inspection of Concrete in Service) requirements.
- 80% of 115kV switches, 25% of 34.5kV switches, 25% of 12.5 kV switches determined to be in poor health condition.
- The majority of 115kV main bus strain bus insulators are aged brown glass types that are obsolete and prone to failure. Portions of 34.5kV bus consist of conductors can become thermally overloaded past its emergency ratings under transformer S-LTE loadings.
- Substation relies mostly on obsolete electromechanical relays and SCADA automation with limited capabilities and are unsupported by their manufacturers.
- The 115kV control building has very limited/no room for any major upgrade. Building interior and exterior finishes do not meet building NEC/NFPA 70 code requirements for fire barrier and propagation.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	9,946	19,892	4,973



NYSEG

Substation Minor Program

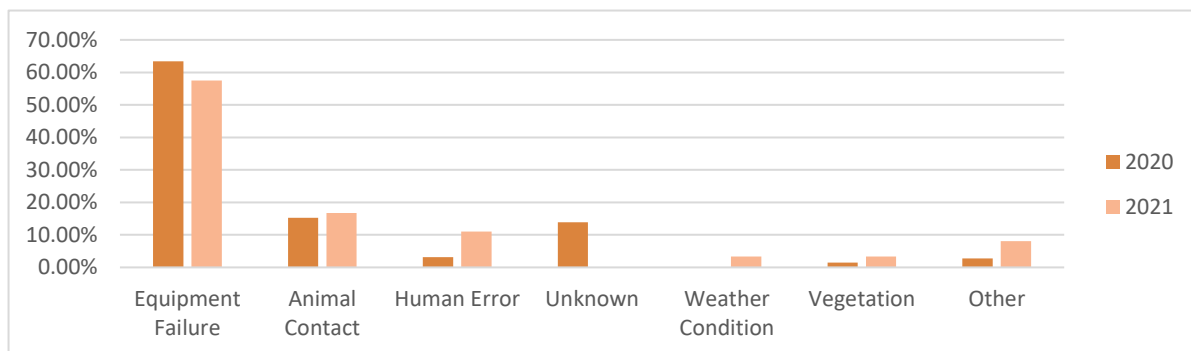
Line of Business: Electric
Category: Asset Condition

Scope:

The Substation Minors Betterments program covers work at substations under the \$200K threshold for a major project. This program includes the replacement of substation components such as:

- CCVT/CT/PT
- Transformers (component replacements)
- Fence / Gate
- Regulator.
- Insulator
- Control House (betterments)
- Arresters
- Switch
- Animal Fences
- AC-DC systems
- Relay Repl.
- Cap Banks
- SPCC mitigation
- Protection and Control relays

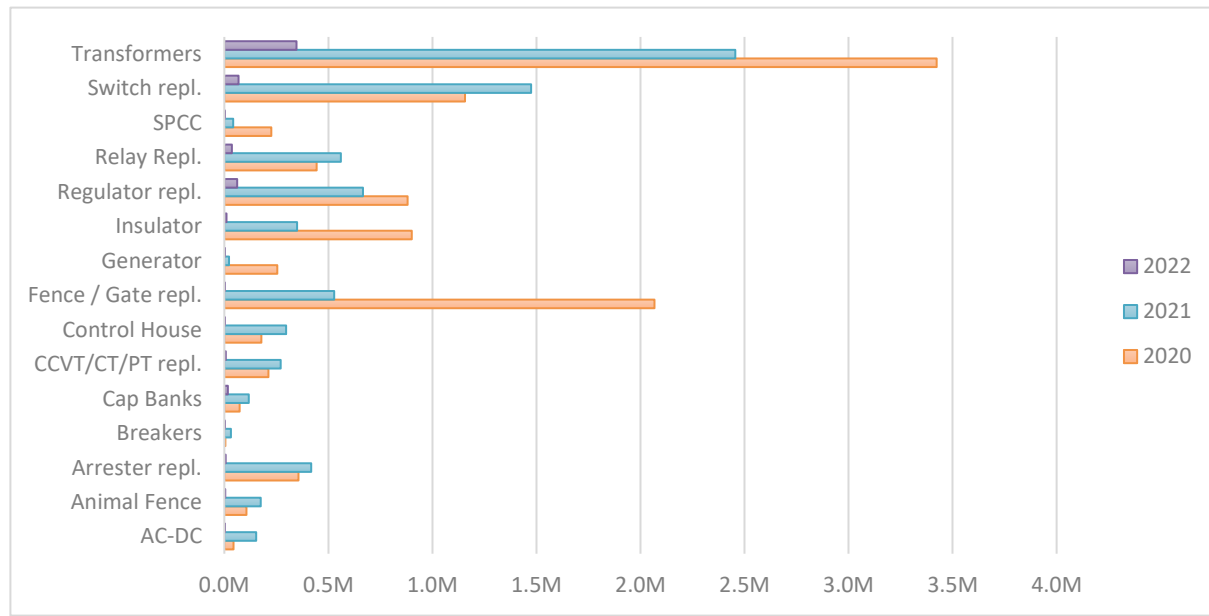
The scheduled replacement of the above elements contributes to the reduction of outages because of substation equipment failures, which has been identified as the main root cause of substation outages. Because of this, Substation Minors Betterments contributes to the reduction of SAIFI.



This program covers not only the planned activities but also it addresses unplanned events as a result of inspections or failures.

NYSEG and RG&E 5-Year Capital Investment Plan

Budget is planned based on historical spend levels and split between the thirteen divisions across the NYSEG territory.



Reasons and Benefits:

Maintain and improve substations equipment to provide a safe and reliable system as per regulatory targets. This program provides the company with the agility path to correct what is negatively impacting reliability in a proactive way.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,313	6,338	6,310	6,427	6,547

NYSEG

Line 890 Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

This project calls for the full rebuild of Line 890, replacing every pole with a combination of wood poles, steel poles, and self-supporting tangent structures. The project requires reconductoring the entire 13+ mile length with primarily Hendrix spacer cable and a short section of Pelican ACSR.

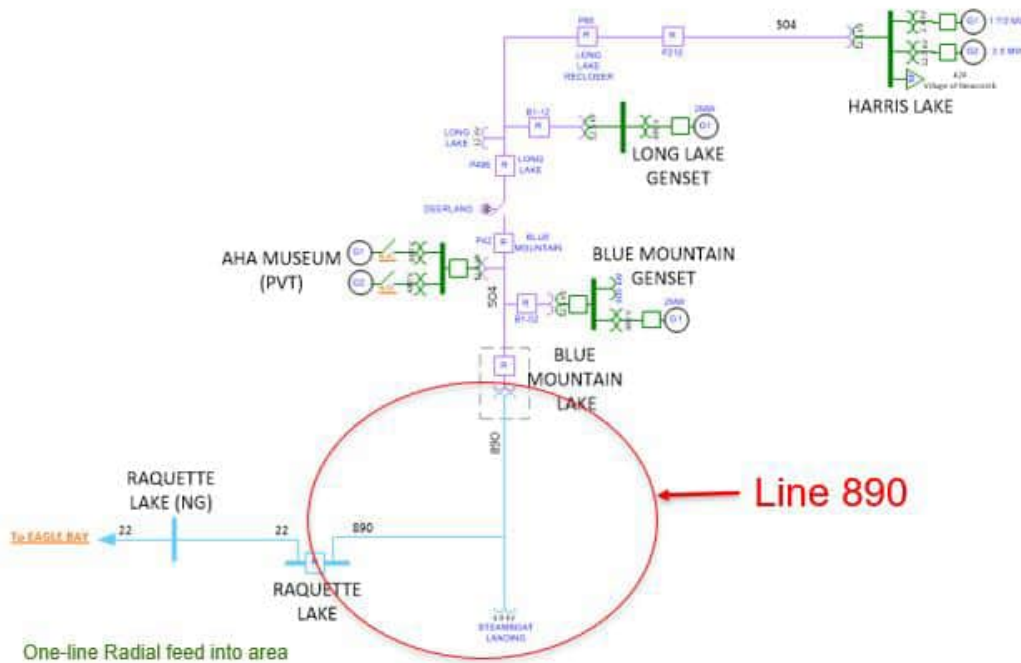


Figure 1: Line 890 One Line

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Over 80% of the poles are 66 years old. In addition, to age, deterioration consisting of weathering, cracks, splits, and rot, many of the poles have ants damage and woodpecker holes which further weaken the structure. Line section from Raquette Lake to Steamboat Landing is listed as Poor health condition and High risk in the 2018 Asset Management report. There is currently no static wire which poses increased risk for lightning related outages.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,709	18,598	10,732	14	0

NYSEG

Circuit 590 Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

The average age of the conductor is 54 to 70 years old. The average age of the structures is 45 to 53 years old. The main issues with this transmission line are asset age and inaccessible structures. There are not currently thermal needs for this transmission line.

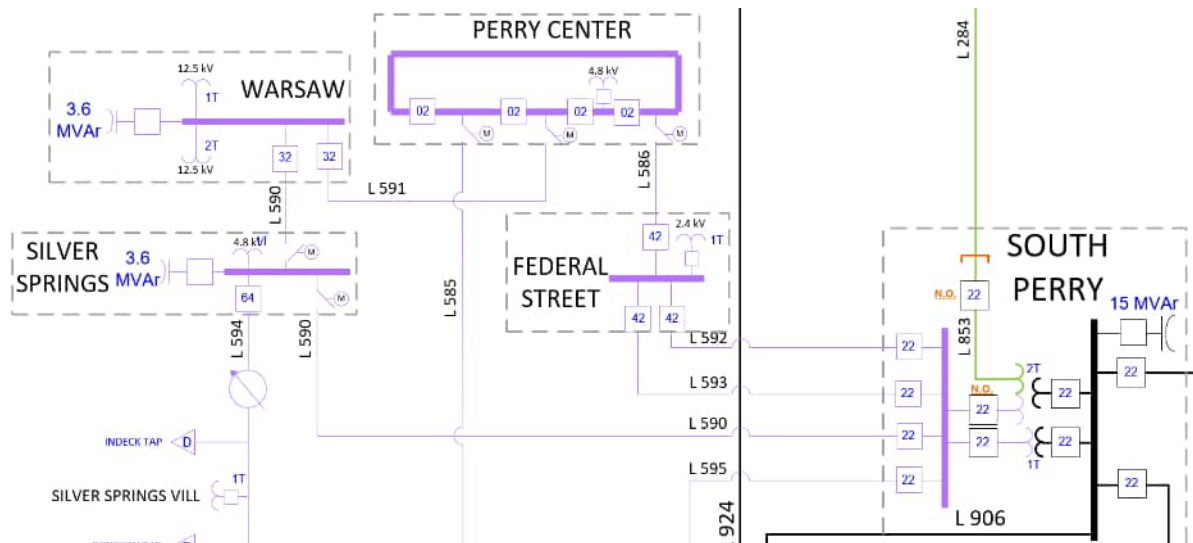


Figure 1: Area One Line

Reasons and Benefits:

Based on the 2018 updated assessment, the three segments that require work are as follows:

- Segment 1: Warsaw Substation (northwest end) to Warsaw Town Line (Pole 150 – formerly to pole 148) in a southerly direction, about 3.05 miles in length, is assessed as poor,
 - Subject matter expert input indicates conductor is in very poor condition, poles are in poor condition and appurtenances in very poor condition.
 - The average age of the conductor for segment 1 is 67.2 years with 98.6% of the conductors over 45 years of age and 91.4% over 60 years.
 - The conductor in this segment is about 60% copper weld conductor (CWLD/CU 1 2 STR 2A AWG) with an average age of 68 years, 31% is aluminum conductor steel reinforced (ACSR 1/0 6/1 STR BARE) with an average age of 75 years, 7% is aluminum conductor steel reinforced (ACSR 336 MCM 18/1 STR BARE) with an average age of 51 years and 2% is aluminum conductor steel reinforced (ACSR 477 MCM 18/1 STR BARE) with an average age of 4 years.
 - The average age of the poles for segment 1 is 54.1 years.
- Segment 2: Warsaw Town Line (Pole 150) to Silver Springs Substation in a southeasterly direction, about 4.15 miles in length, is assessed as fair,
 - Subject matter expert input indicates conductor is in poor condition, poles are in poor condition and appurtenances in good condition.
 - The average age of the conductor for segment 2 is 51.3 years with 92.2% of the conductors over 45 years of age and 20.8% over 60 years.
 - The conductor in this segment is about 71% aluminum conductor steel reinforced (ACSR 336 MCM 18/1 STR BARE) with an average age of 52 years, 21% aluminum conductor steel reinforced (ACSR 4/0 6/1 STR BARE) with an average age of 62 years, and 8% aluminum conductor steel reinforced (336 ACSR 18/1 BARE (CP) MERLIN) with an average age of 4 years.
 - The average age of the poles for segment 2 is 45.7 years.
- Segment 3: Silver Springs Substation to South Perry Substation in a northeasterly direction, about 5.65 miles in length, is assessed as fair.
 - Subject matter expert input indicates conductor is in fair condition, poles are in very good condition and appurtenances in good condition.
 - The average age of the conductor for segment 3 is 52.7 years with 85.4% of the conductors over 45 years of age.
 - The conductors in this segment are about 54% aluminum conductor steel reinforced (ACSR 336 MCM 18/1 STR BARE) with an average age of 53 years, 21% aluminum conductor steel reinforced (AL 336 19 STR BARE) with an average age of 56 years, 11% aluminum conductor steel reinforced (ACSR

NYSEG and RG&E 5-Year Capital Investment Plan

4/0 6/1 STR BARE) with an average age of 71 years, and 12% aluminum conductor steel reinforced (ACSR 477 MCM 30/7 STR BARE) with an average age of 40 years, and 2% aluminum conductor steel reinforced (336 ACSR 18/1 BARE (CP) MERLIN) with an average age of 4 years.

- The average age of the poles for segment 3 is 45.5 years.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	9,946	14,919	4,973

NYSEG

Line 880 Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

Line 880 has been identified by Asset Management as a line that needs replacement. The 15.4 miles of 46kV line from the Rainbow Falls Substation to the Cabot Substation provide Services for 2300 customers in the area. Phase 1 will be completed in 2022, Phase 2 will begin in March of 2023 and is expected to be completed this same year. Phase 2 is from Rainbow Falls Substation to Structure 127 and from Structure 290 to Cabot Substation for a total of 7.1 miles.

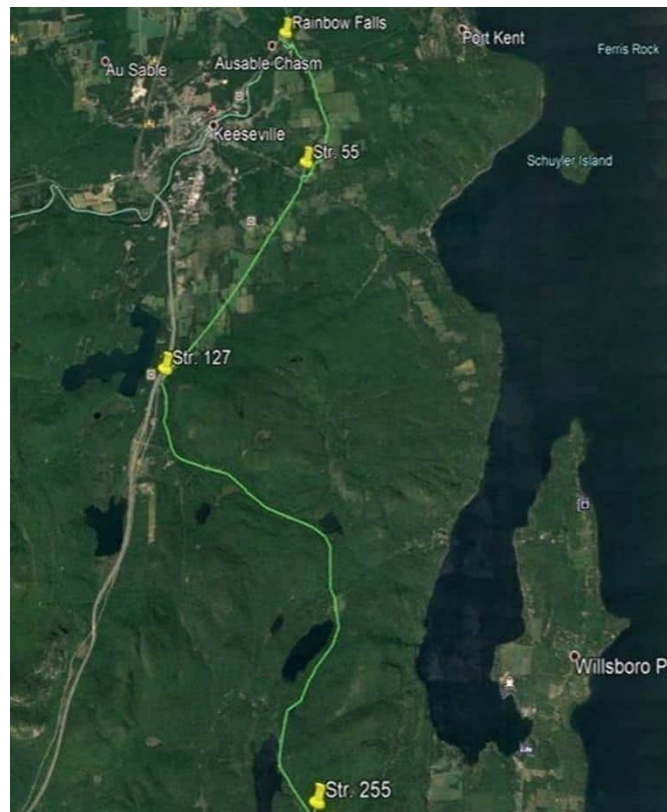


Figure 1: Line 880 Rebuild:
Phase 1: Str. 127 – Str. 290 (8.32 miles) – Planned Completion in 2022
Phase 2: Rainbow Falls to Str.127 and Str. 290 to Cabot Substation (7.1 miles)

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

There is presently no static wire existing for this line. Without a static wire, this line is presently at higher risk for lightning related outages and does not meet Avangrid's standards for lightning protection. The Line's poles have also been rated in from poor to fair condition, with the many of the poles being installed between 1947 and 1950 with an average age of 51 years.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
8,748	13,041	7,550	0	0



NYSEG

General Equipment - OPS-T&D

Line of Business: Electric
Category: Asset Condition

Scope:

The General Equipment program provides required electrical equipment, tools, and safety gear for new employees and to maintain safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives.

Reasons and Benefits:

Safety is NYSEG’s number one priority and places significant emphasis on the safety of its employees and the public. This program allows the Company to meet safety related regulatory compliance and OSHA requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,565	5,219	5,287	3,972	4,090

NYSEG

Line 803 - Croton to Tilly Foster Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

This project will rebuild 5.3 miles of 46kV line from the Croton Falls Substation to the Tilly Foster Substation. The project will include erecting new wood poles, self-supporting laminated wood and steel poles on angles and dead ends. Transmission lines will be completely reconducted and replaced with 477 conductor cable and OPGW static wire. Additionally, under build replacement and/or transfers will be required along select areas of the line.

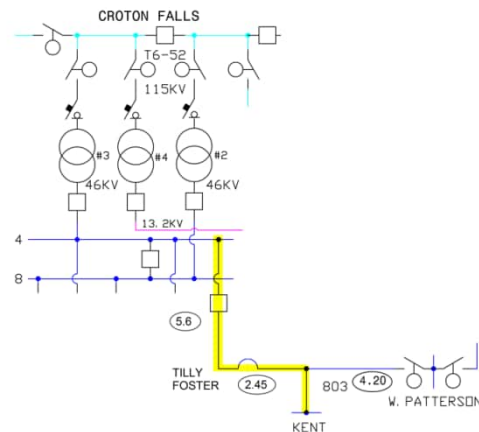


Figure 1: One Line Diagram.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The line has been identified as being in poor condition by Avangrid Asset Management. The majority of conductor was installed between 1926 and 1930, and many of the existing poles were installed in the 1930s. Currently there is no static wire for much of the line, and this does not meet current resiliency standards; and makes the line at risk for outage due to lightning strikes. Out of the existing poles, surveyed in 2018, almost half of the poles had woodpecker related damage. The Criticality and Risk to this line have been noted as High by Asset Management. The Needs & Solution Study for this project is currently in progress as part of obtaining IP2 Technical Approval.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
9	355	1,636	16,796	0



NYSEG

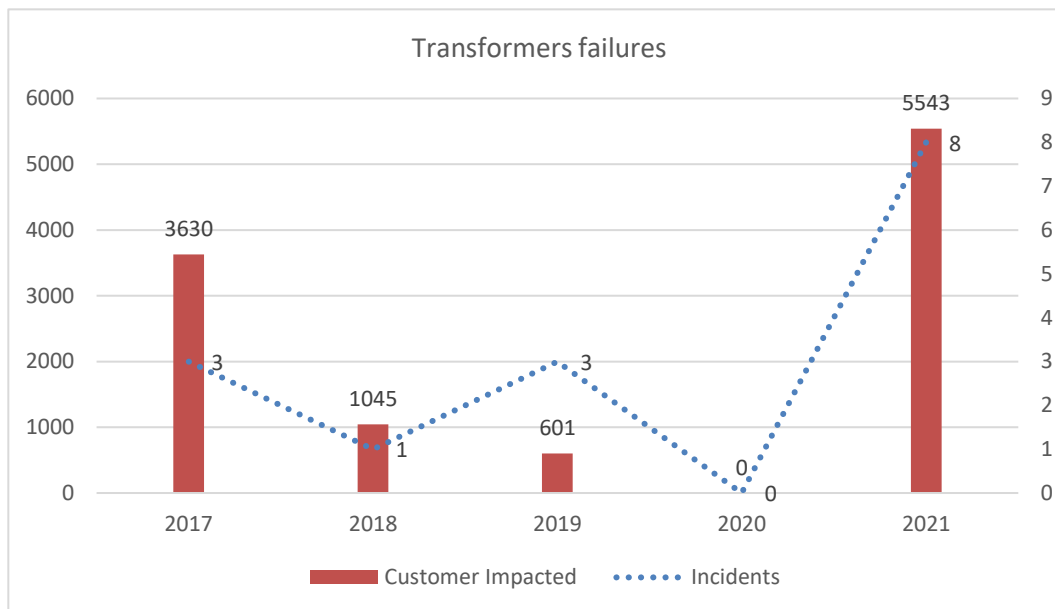
Substation Major Program

Line of Business: Electric
Category: Asset Condition

Scope:

The Substation Majors program covers work at substations over the \$200K threshold for a minor job. This program addresses the replacement of failed or poor transformers. When planned, this program contributes to the reduction of outages because of substation equipment failures, which has been identified as the main root cause of substation outages.

Transformer failures ratio has increased in 2021, impacting the reliability of the system.

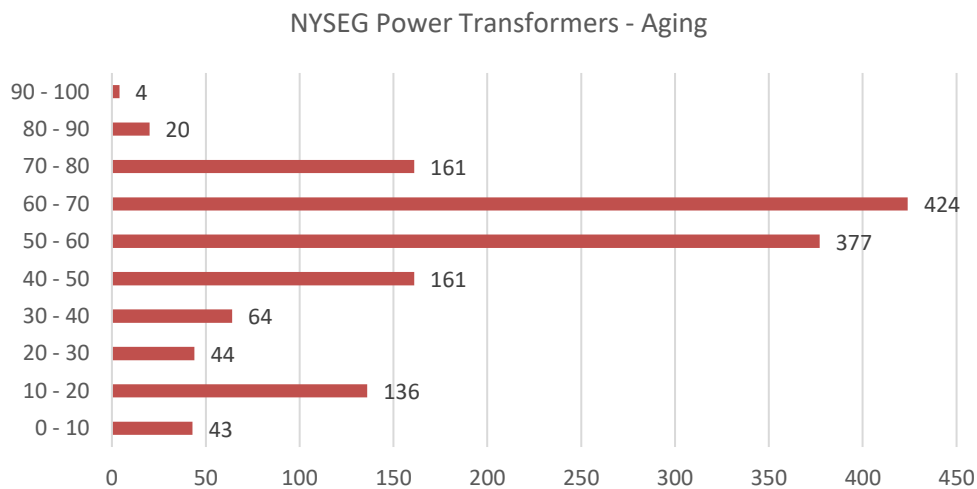
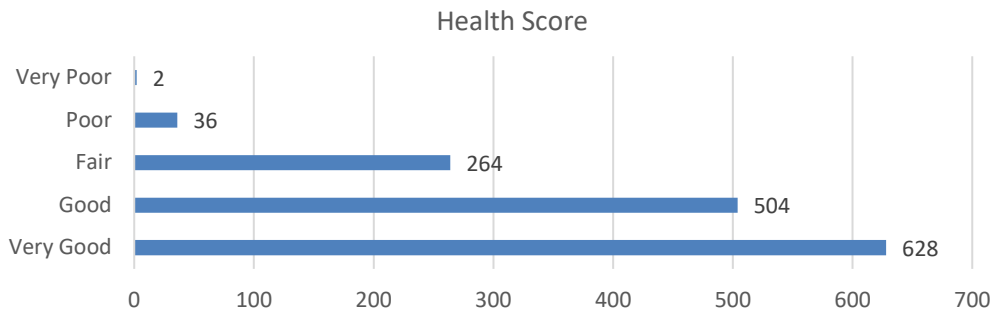


NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Replace failed or poor transformers units.

- The latest health assessment identifies 38 transformers in poor or very Health Condition as candidate units for replacement.
- 80 % of the power transformers are 40 years or older. This increases the difficulty to maintain due to lack of vendor support and inability to get parts.



NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,254	1,924	1,481	1,511	1,542

NYSEG

URD Replacement Program

Line of Business: Electric
Category: Asset Condition

Scope:

The purpose of this program is to replace underground facilities with aged or failing equipment and access difficulties. This program will be upgrading underground facilities by installing new underground cables in existing ductwork and replacing submersible equipment with new above ground pad mounted devices.

Reasons and Benefits:

Many of the NYSEG URD's were built in the 1970s and 1980s and are 40-50+ years old. The underground infrastructure in these developments are aging and experience an increasing number of failures as the infrastructure begins to break down. The electric cable utilized in these installations were traditionally a concentric neutral style design with the neutral located on the outside of the cable. This design leads to severe corrosion along the cable. In addition to an increase in full cable failures, the breakdown of the neutral also tends to lead to an increase in stray voltage conditions in the developments. All manufacturers of this style cable have highly recommended any current cable under this design be replaced as soon as possible. Many of the developments also utilized vaults with underground, submersible transformers as opposed to the current standard of above ground, pad-mounted transformers. The former design creates difficulties in accessing the equipment and can lead to extended outage times during maintenance and repairs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	2,000	3,000	3,000	3,000

NYSEG

Woodlawn SS Transformer

Line of Business: Electric
Category: Asset Condition

Scope:

The Woodlawn project includes the replacement of the Bank #1 transformer with a new 34.5/12.5kV (22) MVA transformer along with the corresponding ancillary equipment.

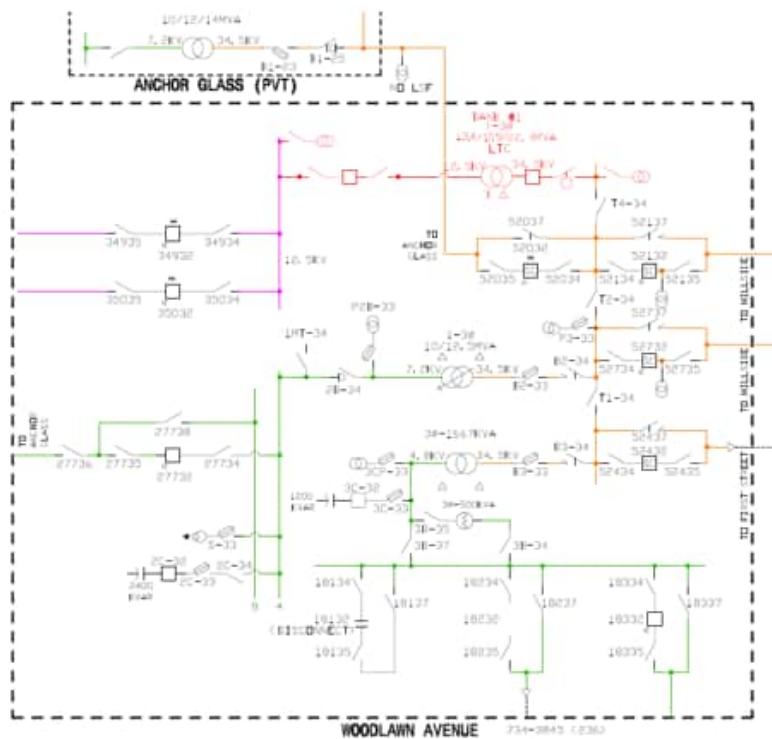


Figure 1: Woodlawn One Line

NYSEG and RG&E 5-Year Capital Investment Plan***Reasons and Benefits:***

Based on the recent Maintenance Engineering Evaluation, Bank #1 units demonstrate continued deterioration of the insulating capabilities. It has been deemed unfit for service due to failed DGIO testing in February 2019, and the load is currently being fed from Portable 10.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,220	143	0	0	0

NYSEG

Battery Program

Line of Business: Electric
Category: Asset Condition

Scope:

The Battery Replacement Program is responsible for the cycle replacement of substation batteries. Batteries are a critical component of the auxiliary DC System that powers the protection and control system. A failure in this system will negatively affect the reliability of the installations. The program budget is planned based on historical spend levels and split between the thirteen division across the NYSEG territory. Please see below for the historical investment in \$(000's) from 2016-2021.

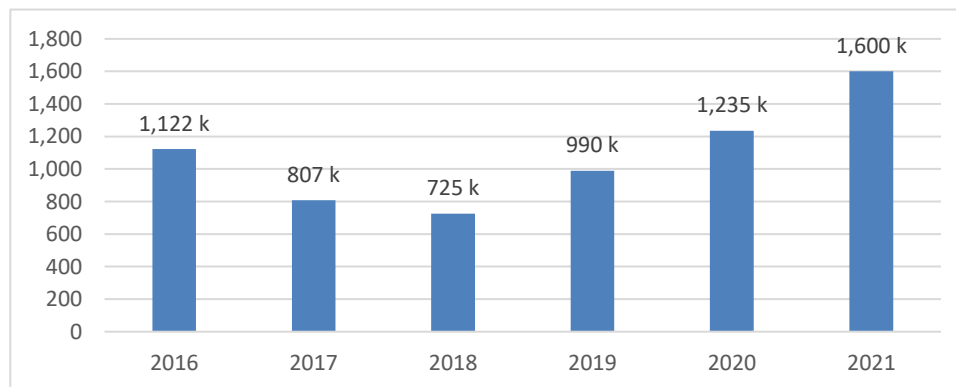


Figure 6 - Investment

Reasons and Benefits:

Batteries are replaced based upon the result of the periodic maintenance tests.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
980	833	874	918	964

NYSEG

Bennet Transformer

Line of Business: Electric
Category: Asset Condition

Scope:

This project is intended to replace transformer bank #3, the bank voltage regulators and 12.5 kV capacitor bank that were all destroyed by fire in February 2016. Replacement of transformer bank #1 and bank #2 circuit breakers are due to asset condition.

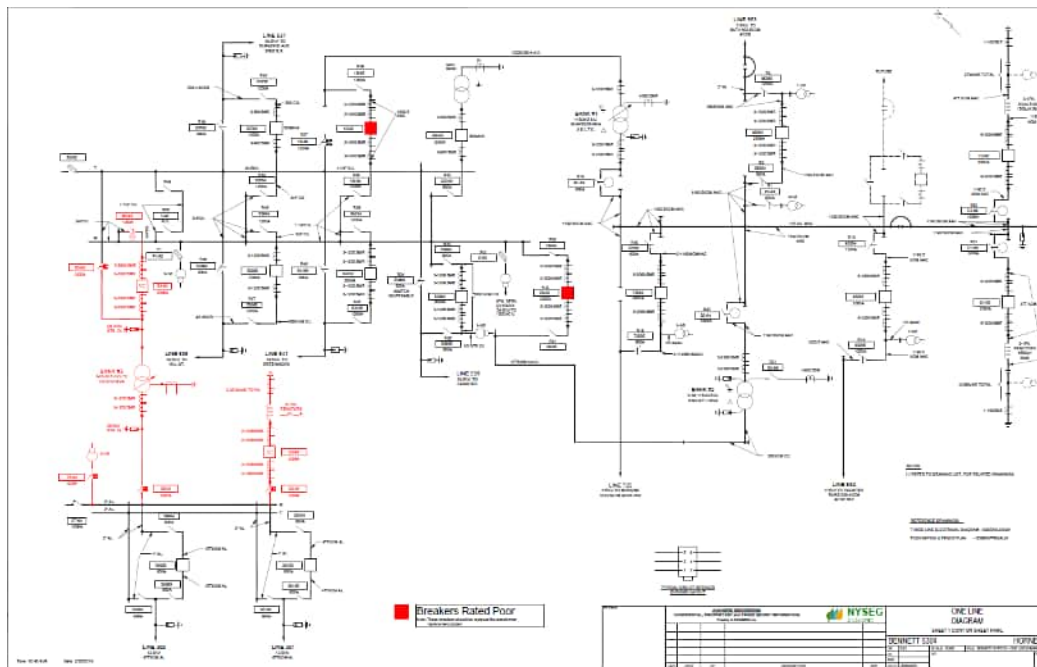


Figure 1: Bennett One-Line

Reasons and Benefits:

The transformer, regulators and capacitor bank were destroyed by fire and need to be replaced to bring the system back to its original condition. The transformer breakers are rated poor due to their age and known design and manufacturing issues.

NYSEG and RG&E 5-Year Capital Investment Plan

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,515	0	0	0	0

Disadvantaged Communities included in Project

#

NYSEG

General Equipment - OPS-SO

Line of Business: Electric
Category: Asset Condition

Scope:

The General Equipment program provides required electrical equipment, tools, and safety gear for new employees and to maintain safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives.

Reasons and Benefits:

- This program allows the Company to meet safety related regulatory compliance and OSHA requirements.
- This program provides the tools to perform testing activities in components such as the protection relays, batteries, transformers,

Requested funds will be used for the purchase and upgrade of Power Factor Test Sets, Power System Simulators and SF6 testers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,215	412	420	429	437

NYSEG

ARIES Purchase and Program Improvements

Line of Business: Electric
Category: Asset Condition

Scope:

This project will purchase the software rights to alter and make improvements to algorithm. NYSEG will tender a bid for a vendor to make improvements to the ARIES system. The costs will include provision for Lockheed to train the vendor on ARIES system. Lockheed Martin is no longer supporting the ARIES system.

Reasons and Benefits:

ARIES is a LiDAR based damage assessment method that uses a fixed wing aircraft or helicopter to obtain damages over a wide area. The advantage of ARIES is its use with medium to large events. ARIES uses LiDAR and pictures to determine damages which both create large data files. This project will purchase the rights from Lockheed Martin and then bid to a qualified vendor to make improvements to the algorithm. ARIES can assess damage over a 500 square miles area in 24 hours. It programmatically sorts damage type and provides detailed or summary reporting that can be electronically communicated to affected Incident Command locations.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
125	700	100	0	0

NYSEG

Checkpoint Firewall Upgrades Subs

Line of Business: Electric
Category: Asset Condition

Scope:

This project will replace the 5 Checkpoint Head End firewalls located in West Ave and Vestal with supported hardware and software to send the SCADA and remote access traffic to and from the current transmission substations throughout the NYSEG territory.

Reasons and Benefits:

Secure traffic transmission for ECC control to all substations and provide remote access to all gear within the substation for operations for maintenance and repair/troubleshooting purposes. It will also improve the CIP 005 standing of these substations since the re-application of IDS/IPS (Intrusion Detection/Intrusion Prevention) will be restored thus proving that our current deployment of the 61850 substation design is up to current compliance standards with NERC/FERC.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
156	0	0	0	0

Electric Asset Condition

RG&E

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RG&E

T&S Asset Condition Replacement Program

Line of Business: Electric
Category: Asset Condition

Scope:

The objective of the T&S Asset Condition Replacement Program is to conduct system-wide T&S facility surveys, to determine the overall health of NYSEG's system, and develop a long-term mitigation strategy (projects) to enhance the condition of these assets. These comprehensive T&S surveys will include an assessment of electrical and structural assets which will be scored against individually weighted categories such as age of equipment, resiliency/flooding impacts, substation P&C assessment, capacity (MVA), substation reliability performance, etc. The overall T&S health scores will then be used to inform a system-wide prioritization of asset condition replacement/upgrade projects across the NYSEG's fleet of existing T&S assets.

Reasons and Benefits:

There are 478 substations and 4550 miles of electric transmission (overhead and underground) at NYSEG. Over 59% of substations in NYSEG have assets that are over 60 years old, by 2030 this number increases to 74%. 3% of power transformers and 42% of substation breakers are in poor or very poor condition. 42% of power transformers and 17% of substation breakers are over 60 years old. By 2030, this number will increase to 68% and 35% respectively. (*Age is only an indicator for asset replacement. Actual replacement is driven by condition-based analysis*) 9% of substations contributed to SAIFI in 2020-2021.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
600	4,000	20,000	20,000	20,000



RG&E

Pole Replace (WPIT) Program CAP

Line of Business: Electric
Category: Asset Condition

Scope:

The Wood Pole Inspection and Treat (WPIT) Program uses specialized contractors to inspect wood poles at ground line for wood decay and insect damage. The inspection also consists of excavation and boring into the pole to identify decay at and below ground line. When a pole is deemed insufficient, it is rejected and identified as requiring a pole replacement generating a notification.

Priority levels of WPIT notifications:

- Level 1 (recommended replacement within 1 Week)
- Level 2A (recommended replacement within 30 days)
- Level 2 (less than 35% remaining strength) (recommended replacement within 1 year with priority)
- Level 2 (recommended replacement within 1 year)

Pole replacements under this program are determined by the following:

Loss of Pole Strength

Decay in the pole will cause the pole to lose strength from its condition when it is new. The NESC, table 261-1A, requires the pole to be replaced or rehabilitated when the reduced strength is 2/3 of that required when installed new.

- 67% of Initial Strength Reject pole – replace or reinforce within one year
- 40% of Initial Strength Hazard pole – replace or reinforce ASAP

To inspect a pole below groundline where most pole decay occurs, a pole must be excavated. The type of inspection that each pole receives is based on the age of the pole. Unless otherwise specified by the Company, pole shall be inspected according to the following tables:

For Distribution poles

<u>Age of Pole (Yrs.)</u>	<u>Type of Inspection/Treatment</u>
0-19	Visual
20+	Sound & bore and partial excavate inspection

Selective treatment

Partial inspection of Distribution wood poles for RG&E is the removal of a spade full of soil at the groundline in two locations to ascertain the presence of any external decay below ground, typical of Southern Pine utility poles. If no decay is detected during this partial excavate inspection, then an external preservative treatment below groundline is not called for in the RG&E Specification. If the inspection detects decay, the Contractor shall treat for internal or external decay as applicable according to Section 4.0 and include a full excavate and treat for external decay (if present) according to Sections 2.04 and 2.05. In addition to the poles classified above, all Penta in LPG treated (Cellon) poles or Copper Naphthenate treated Southern Pine poles encountered, regardless of age, are to be fully excavated, externally and fumigant treated (where possible) according to these specifications.

Poles unable to receive the external treatment are to receive the most thorough inspection and/or treatment possible.

All phases of inspection and/or treatment shall include the visual inspection as part of the procedures. Sounding and boring shall be included in all phases of inspection and/or treatment except the visual inspection.

Reject Criteria

Deductions shall be made from the original circumference of the pole to account for internal decay pockets and removal of external decay. The pole shall have sufficient good wood remaining to meet minimum: NESC grade B loading requirements.

Any pole whose remaining pole capacity is less than 40% of original capacity is a Priority Pole and will be marked in the field. Priority Poles shall be reported the same day they are found.

Determining Remaining Strength and Reject Criteria

The inspector is to define the data and explain how the data is processed to evaluate remaining pole capacity. Inspector will be able to defend and explain criteria used to determine whether a pole is serviceable, a reject restorable or a reject non-restorable.

Fully excavated poles shall be chipped to remove exterior decayed wood, surface rot, and decay pockets. After the chipping process is complete, an evaluation of the pole at or beneath the groundline will be completed to determine whether the pole is serviceable, restorable, or unserviceable. The effective pole circumference shall be determined by measuring the pole at the location of minimum pole circumference and adjusting for internal decay that may also exist. For situations with large areas of internal decay additional measurements may be necessary to determine the effective pole circumference.

Based on these criteria, poles are identified for replacement. Our WPIT inspections will be on a 10-year cycle.

Currently, the WPIT program has a backlog of notifications that should be addressed at the OpCo's earliest availability. Interruptions due to company equipment failure is a large contributor to customer interruptions.

RG&E 2.3.2022					
	WPIT Lvl 1	WPIT Lvl 2A	WPIT Lvl 2<35%	WPIT Lvl 2	Total
Notifications	0	2	110	1859	1971

Level 1 notifications are typically addressed within the prescribed timeline, few of these go "overdue", hence the low number of open Level I notifications.

The Pole Replacement Program is seeking to perform pole replacements on all poles found as requiring replacement from past inspections. The program strategy on completing this work is based on notifications priority. All Level 2A and Level 2<35% discovered in 2021 and prior will all be repaired within the calendar year. To address the WPIT 2 notifications, a "circuit sweep" methodology. By prioritizing circuits based on their impact to customer reliability and SAIFI/CAIDI scores, permanent repairs on will be performed on all open WPIT notifications of the selected circuit. The intention is to complete work on the backlog while simultaneously working to become current on all due dates, meeting the inspection priority requirements.

Reasons and Benefits:

These poles were discovered as deficient as part of routine inspections performed on the distribution system. The condition of the poles will only worsen over time, thus leaving them unaddressed risks reliability and increases the chance of service

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interruptions. Interruptions due to company equipment failure is a large contributor to customer interruptions. Adequate funding, material, and available field crews are necessary to keep repairs consistently performed.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
10,472	11,522	12,906	13,832	15,143



RG&E

Station 29 Modernization Project

Line of Business: Electric
Category: Asset Condition

Scope:

This project calls for the complete modernization of Station 29. The average age of the substation is 70 years old and the main issue in this substation is the breaker conditions. The existing technology on 4kV is obsolete and cannot be maintained further. Consequently, a full rebuild of the 4kV system is needed as 34.5kV breakers are over-duty. To reduce the short circuit current, a reactor will be installed. To improve the conditions of this substation, the following works is required:

- Install new 4kV GIS cubicles in new building in the extended area.
- Site expansion toward the east
- 2x9 4kV GIS cubicles in 2 sections in medium-size GIS building
- Replacement of 34kV breaker with associated switches, insulators, and foundation
- New HSEs and Battery system for new GIS building
- 3.5mVAR reactor on 34kV bus
- Remote end scope
- 4kV Power and Control cables rerouted to new GIS building
- Removal of regulated building materials (asbestos etc.) from the existing control house.

NYSEG and RG&E 5-Year Capital Investment Plan

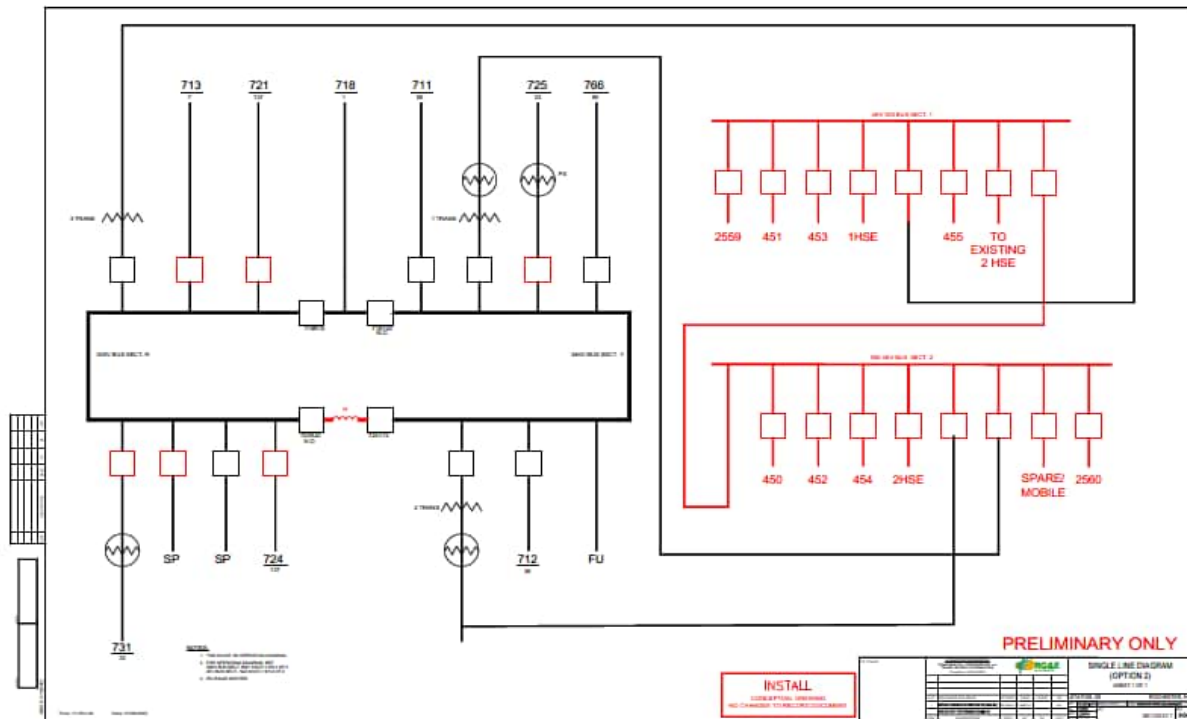


Figure 1: SINGLE LINE DIAGRAM

Reasons and Benefits:

- The Asset condition Report (4/29/2021) shows 10- 4kV breakers and 7-34.5kV Breakers need to be replaced due to the poor and very poor conditions.
- 34.5kV breakers over duty.
- Most of the relays are electromechanical.
- Some foundations are in bad condition –need replacement and repair.
- The short circuit level on the 34kV bus is very high, considering the ratings of the equipment currently in service, and requires a reactor to reduce it.
- Thermal overload at circuit 766

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
300	4,864	9,727	29,181	14,591

RG&E

Elec Better

Line of Business: Electric
Category: Asset Condition

Scope:

The General Equipment program provides required electrical equipment, tools, and safety gear for new employees and to maintain safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives.

Reasons and Benefits:

- This program allows the Company to meet safety related regulatory compliance and OSHA requirements.
- This program provides the tools to perform testing activities in components such as the protection relays, batteries, transformers,

Requested funds will be used mainly for the purchase and upgrade of Power Factor Test Sets, Power System Simulators and SF6 testers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,069	12,373	12,744	13,126	13,520



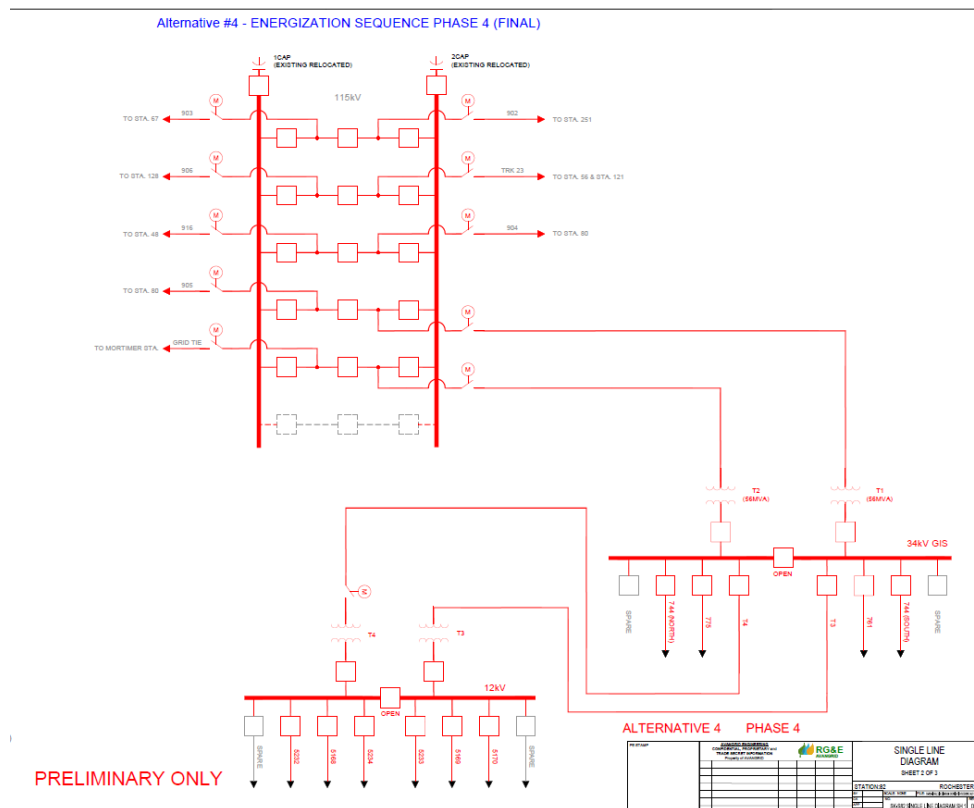
RG&E

Station 82 Upgrades

Line of Business: Electric
Category: Asset Condition

Scope:

Station 82 is a major hub in the transmission system in Rochester with 9 transmission elements and interconnection with National Grid Mortimer Station. The project will entail a complete rebuild including new 115 kV breaker-and-a-half AIS, 34 and 12 kV medium voltage GIS, complete protection and control package, control house, four transformers, site work, fence and security. The new station will be partially built on adjacent lands so that existing facilities remain energized throughout the construction period.



Reasons and Benefits:

- Station 82 was built in 1962 and a number of components are nearing end of life or are obsolete including breakers and transformers. In addition, there are a broad range of deficiencies such as obsolete or unsupported equipment, poor operating or maintenance history, and known operational issues or complexities.
- 115 kV bus is overstressed when evaluated using IEEE605
- Circuit breaker fault duties are approaching 100%
- There are system deficiencies that result from the application of regional and local planning standards.
- Aging P&C system will be updated in compliance with NPCC requirements
- Asset Conditions:
 - The following transformers need to be replaced:
 - 115/34.5kV 1T failed in 2019 and is temporarily using a system spare.
 - Transformer LTCs is rated in poor condition.
 - 115/34.5kV 2T is 50 years old
 - 115/34.5kV 3T is 45 years old
 - The following circuit breakers need to be replaced:
 - The age of the breaker is a significant variable for the health score; therefore, the breaker evaluation for Station 82 assumed an in-service date of 2030. Therefore, the score's breaker evaluations were projected based on the ISD date using the same exact metrics.
 - With that assumption, a total of 12 breakers are rated as HI-4: 4T, 2T8272, IT8272, 903, 906, 3T, 7X, 2T8252, 1T8252, 8X, 516902, 523302.
- Reliability needs:
 - **115 kV Circuit Breaker Fault Duty**
 - These breakers are rated for 40kA, and the current short circuit at 82 is 38.4kA (96%).
 - The breakers were then assessed for their fault duty as a part of the NYISO ATBA cases (CY19) and the duty percentage increased to ~98%.
 - In cases where significant modifications are being proposed, “High Duty” breakers (95%-100%) should be replaced. Therefore the following breakers need to be replaced: 916, 2 Cap, 1 Cap, 905, 9X, and TR23.
 - **115 kV Circuit Breaker Thermal Needs**
 - The 115 kV breakers 901/902 were assessed for their thermal capacity evaluate the needs for the 901/902 project. It was found that the 901 and 902 breakers CT and other series path

NYSEG and RG&E 5-Year Capital Investment Plan

equipment are the limiting element (203 MVA) therefore breaker 902 will need to be replaced. The 901 breaker will be replaced by National Grid and will be replaced in kind.

For additional details, see Station 82 Enhanced IP1 presentation.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,007	9,470	10,636	10,752	22,604



RG&E

Station 37 Modernization Project

Line of Business: Electric
Category: Asset Condition

Scope:

The substation is over 70 years old and the main issue in this substation is the Circuit breaker condition. The existing technology on 4kV is obsolete and cannot be maintained. A full rebuild of the 4kV and 11kV system is needed. 5-34.5kV breakers need to be replaced as well. To improve the conditions of this substation, the following work is required:

- Install New Medium Size 11kV (2 sections) GIS cubicles at the south side of the existing CH.
- Install New 4kV (4 sections) GIS cubicles at North side of the existing CH.
- Replace 5T with 20MVA, LTC
- Replace/reroute 4kV and 11kV UG cables up to manholes
- New remote ends, New AC and DC System
- Repair/replacement of foundations that are in bad conditions.
- Demolish 4kV system from Control house and 11kV system from AIS

NYSEG and RG&E 5-Year Capital Investment Plan

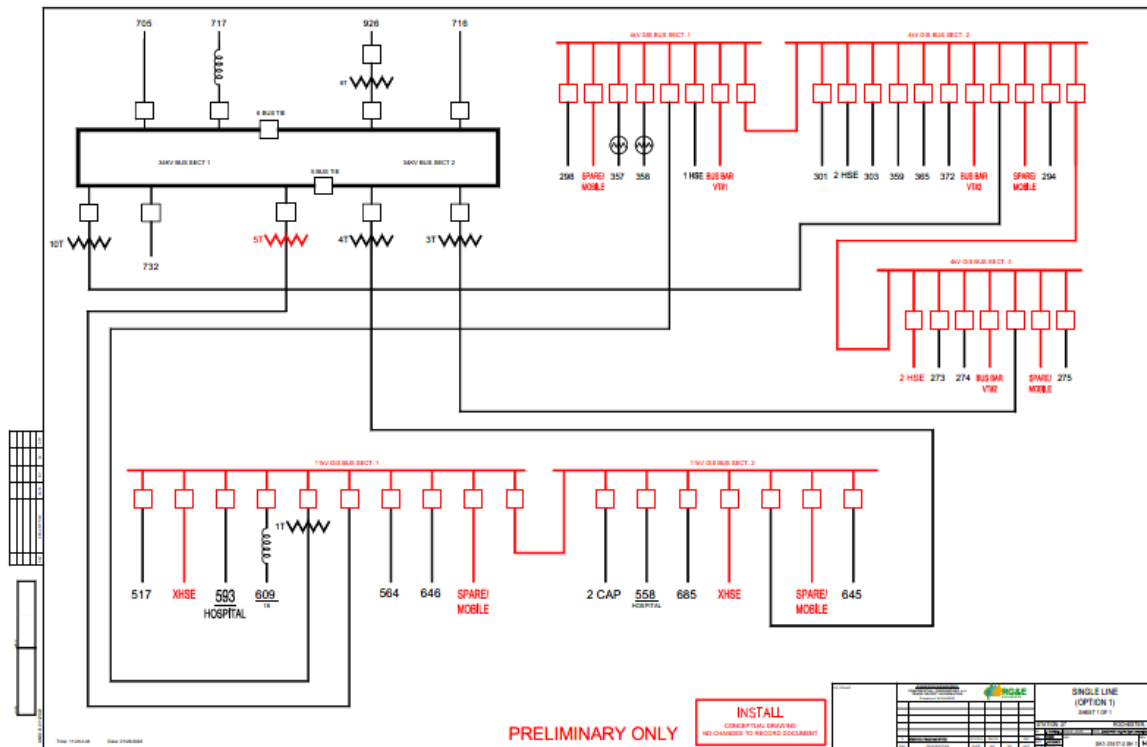


Figure 1: IN PROGRESS

Reasons and Benefits:

- The Asset condition Report (4/29/2021) shows that 5-34.5kV, 10- 11kV and 13-4kV Breakers need to be replaced due the poor and very poor conditions.
- 4kV existing breaker configuration is over duty.
- Some 11kV breakers are over duty as well. Shorth circuit current must be reduced.
- Most of the relays are electromechanical.
- Transformers 3T, 4T and 5T have failed in past and have been rewound and won't be replaced as part of this project.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
300	4,491	8,982	26,947	13,474

RG&E

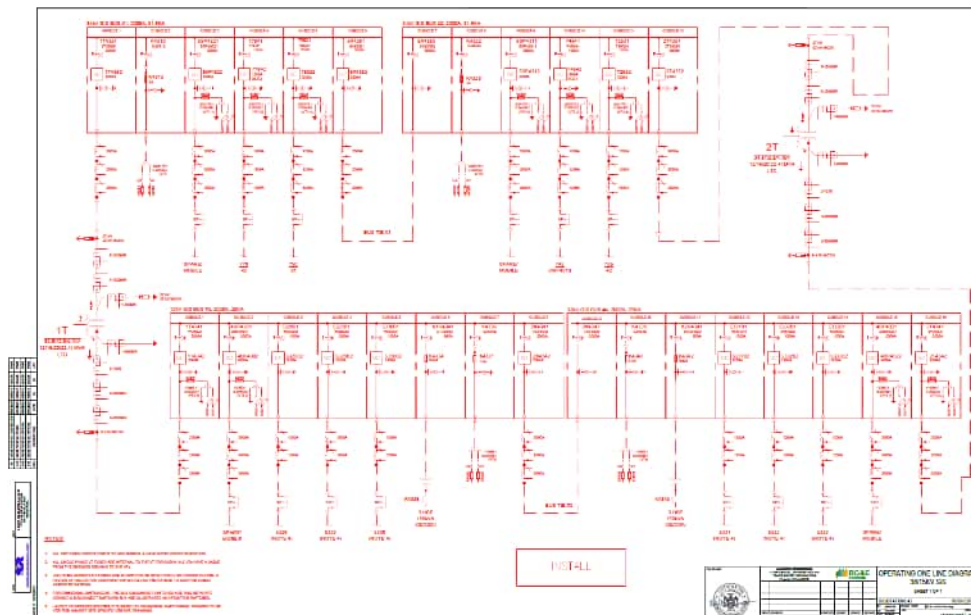
Station 43 Modernization Project

Line of Business: Electric
Category: Asset Condition

Scope:

The existing power transformers installed in the Station 43 are overloaded and they must be replaced as per Distribution Planning. In addition, the existing 4kV equipment is in poor and really poor condition. In order to improve the capacity of this substation the following works are required:

- Substation rebuild (Replace the two existing 6.25 MVA 34.5kV/4kV Power Transformers with two new 22.4 MVA 34.5kV/12kV Power transformers and new Control House with Medium Voltage Gas-Insulated Switchgear.
- Convert all 6 distribution circuits connected to this station from 4kV to 12kV to facilitate the interconnection with other adjacent 12kV circuits and improve the reliability of the distribution system.



NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- The load on the existing 6.25 MVA transformer banks #3 and #4 at Station 43 has reached 113% and 95% of their PLBN rating respectively during the summer peak.
- The transformers are older units, installed in the 1950's. The total peak loading at the station is above 12 MVA, attributable to the 6 circuits, 3 fed from each transformer.
- The Station serves approximately 6,467 residential and commercial customers. Loss of either transformer places the other transformer in a situation where it is loaded well above its LTE rating, which conflicts with Distribution Planning Criteria.
- The proposed larger transformer size will facilitate increased switching capabilities with adjacent circuits and is required for future 4-12kV conversion of area distribution.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,771	10,833	10,012	8,411	3,025



RG&E

Station 34 Modernization Project

Line of Business: Electric
Category: Asset Condition

Scope:

This project calls for the complete modernization of Station 34. The average age of the substation is 70 years old. This substation is in the City of Rochester in a building that has structural issues; the south area needs to be demolished and rebuilt. There is limited space to rebuild this station, and all the breakers need to be replaced due to poor asset condition. To improve this substation, the following works are required:

- Substation rebuild (Replace the existing 6.25 MVA 11 kV/4kV Power Transformers with new 14MVA 11 kV/4kV Power transformers and new Control House with Medium Voltage Gas-Insulated Switchgear.
- Rerouting the existing 11kV and 4kV circuits to the new location adjacent to the existing location inside the RG&E property.
- New Access Road
- Remote End Scope
- Complete decommissioning and cleanup of the existing station

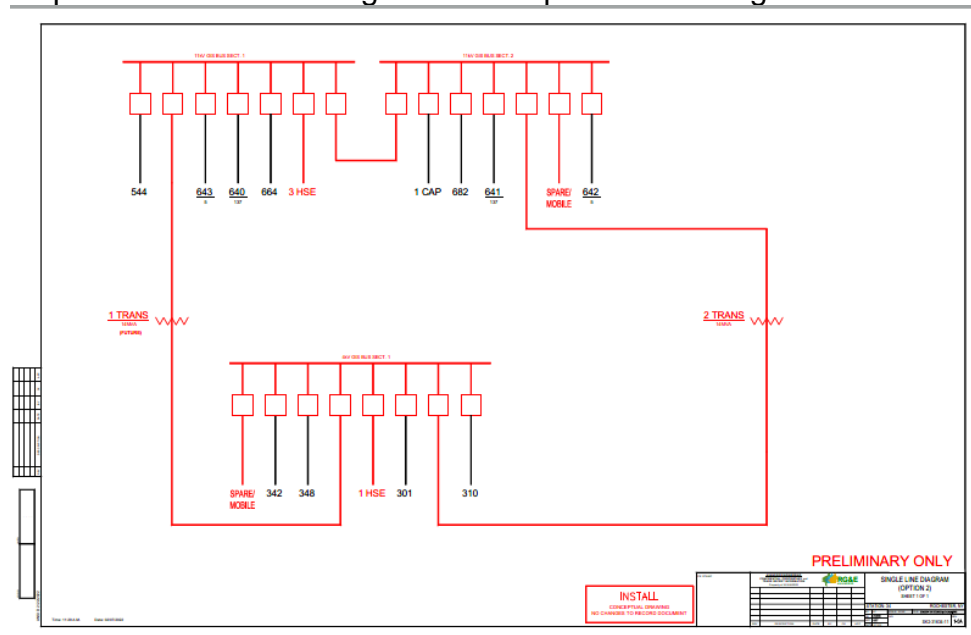


Figure 1: ONE LINE DIAGRAM

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- The existing building have some Cracked floor and wall and asbestos. Structural analysis was conducted and it was determined that the south wing needs to be rebuilt. After evaluating the rebuild on site it was found that no space will be available to work. There isn't any parking area or other area to work on this site.
- Asset condition Report (4/29/2021) shows 10- 11kV breakers and 5-4kV Breakers need to be replaced due the poor and poor health index. These breakers will be replaced with brand-new GIS equipment.
- Most of the relays are electromechanical and there isn't any existing SCADA.
- The proposed relocation of the substation will facilitate construction and reduction in outages and will be aligned with our current standards.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
300	4,491	8,982	13,474	8,982

RG&E

UG Cable Replacements

Line of Business: Electric
Category: Asset Condition

Scope:

The objective of the program is to replace aged underground cables proactively and preventatively at RG&E, in the Rochester Region (City of Rochester). Approximately 510 sections of aged and obsolete cable were identified, with the oldest installation being 101 years old as of 2021. Priority One is to address the '4-core' cable as identified in our records. These cable sections will be prioritized first by the total number of downstream customers connected. In addition to the obsolete cable, any 'pump-log' duct (i.e. wooden ducts) that are encountered will be replaced in conjunction with any cable replacements. Likewise, any collapsed ducts will be replaced as encountered. External vendors will be utilized for camera inspections to help predetermine scope, i.e. cable replacement or total rebuild of the ducted system. While the mainlines with the highest customer counts will be done first, any 'side taps', i.e. smaller laterals off the mainline will also be replaced at that time. This is both for the obvious synergistic efficiencies gained, as well as to avoid negative impacts from stakeholders such as customers, public officials, or the media, if we were to revisit and disturb an area twice. One caveat to the priority noted in #1 above; if a given street is on the City of Rochester's Moratorium List, then it will be deferred until the city will allow any Utility work to commence. Similarly, if there are repeat and/or frequent outages to a section of cable already identified per this program, that section will be moved up the priority list accordingly. Lastly, pending cable replacements will be reviewed regarding any planned Highway Reconstruction or Relocations. The timing can be advanced or delayed, to align our schedules.

Reasons and Benefits:

Without a dedicated and funded replacement program, the 'run to failure' model results in long duration unplanned outages, i.e., in many cases cable cannot be spliced (obsolete cable past its useful life) and/or new cable cannot be pulled in through the old conduit (blocked or collapsed).

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,717	7,821	7,821	7,821	7,821

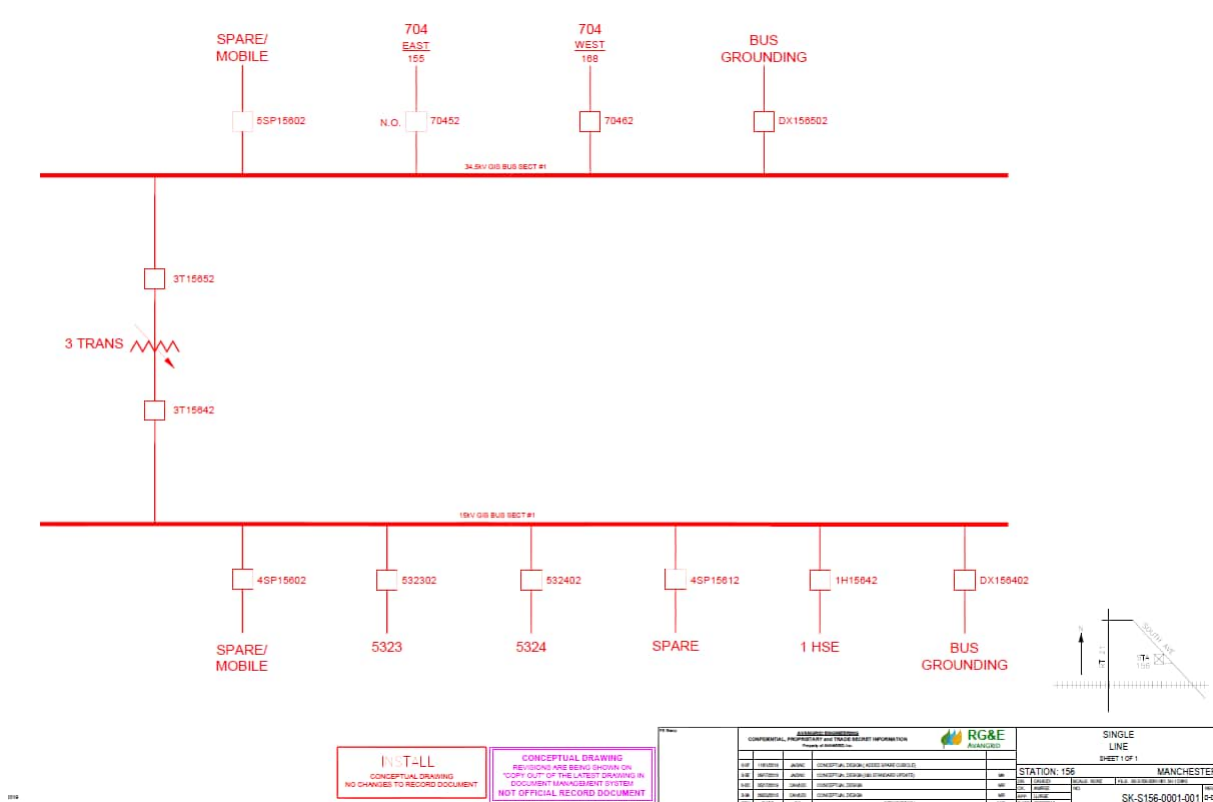
RG&E

Station 156 Transf./Facilities upgrade

Line of Business: Electric
Category: Asset Condition

Scope:

This project calls for the rebuild of an existing substation and convert three distribution lines from 4kV to 12kV, 10/12.5 (14) MVA with an On-Load Tap Changer (OLTC) transformer bank. The new station will be installed with state of art Gas Insulated Switchgear / Breakers for both the 34.5kV feeders and 12kV distribution lines. A new single 34.5-12kv, 10/12/14MVA transformer will replace the two existing units and provides optimum margins; redundancy requirements will be met by the adjacent 12kV stations in the event of a transformer failure.



NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- The substation transformer is overloaded and the exiting equipment is in poor condition.
- The existing transformers, #1T 1.5MVA, aged 53 years; and #2T 3.75MVA, aged 59 years, have exceedingly small margins during peak loading periods. The 4kV circuit breakers are poor all aged 40+ years can only be serviced or maintained with custom made parts as they are no longer manufactured. The control house is a 65+ year old block structure and needs major improvements
- The conversion to 12kV will enhance station capacity, and adjacent station 12kV circuit tie over for contingency.
- The larger transformer will improve system reliability by providing N-1 capacity to the station, and adjacent circuits that currently are without adequate circuit ties during high demand periods.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,911	8,802	7,509	4,808	4,101



RG&E

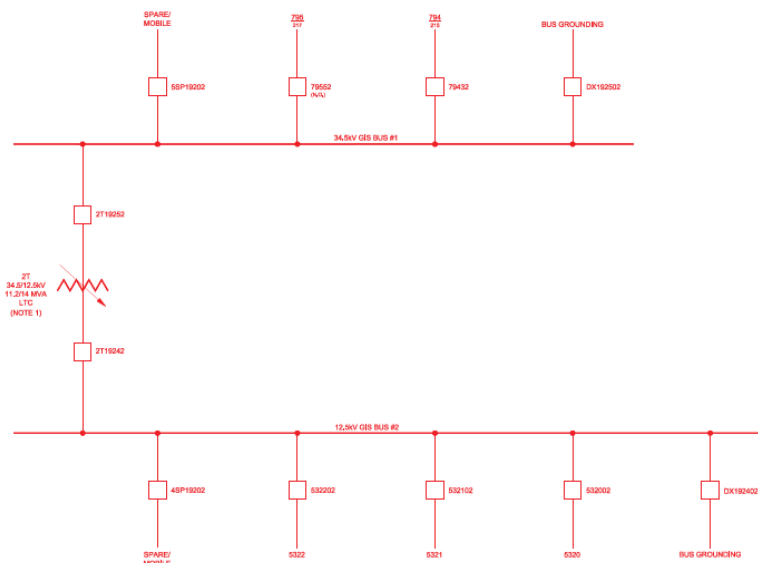
Station 192 Trans Facilities Upgrade

Line of Business: Electric
Category: Asset Condition

Scope:

Station 192 is a small substation that consists of one 34kV/4kV 1.5MVA transformer and three 4kV distribution circuits that's feeds roughly 600 customers. Distribution planning has identified the need to replace this transformer therefore the focal point of the project is replacing the existing transformer with a new 14MVA transformer along with other substation upgrades.

- Upgrade existing 34kV/4kV 1.5MVA transformer to a new 34/12 14MVA transformer
- Upgrade three 4kV distribution circuits to 12kV
- Installation of new 34 & 12kV GIS, control house, protection & control



NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- Station 192 had a peak transformer load of 113% in 2013
- The transformer upgrade will help improve substation capacity, and the upgrade to the distribution circuits will increase network reliability.
- Distribution upgrades to 12kV will facilitate future 12kV upgrades in the region, thus increasing cut over tie capabilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,908	5,549	12,056	7,079	0

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- Replace the breakers that are in “poor” and “very poor” condition.
- Replace the electromechanical relays with microprocessor relays to enable better protection and control.
- Replace the electromechanical generator control systems to allow for better operational control of the units
- Provide capacity to allow full send out of the plant’s 46MW and necessary system VAR / voltage support
- Would allow the plant to meet the NYISO plant rating and fully utilize the approximately \$115 MM Station 5 hydro facility investment completed in 2012. By enabling output up to the full rating will increase revenue potential and provide provision to dispatch this into the distribution system.
- Provide an alternate 11kV house service feed to provide full operational capability.
- Replace the distribution cables. These were previously damaged, and a short-term fix was put in place.
- Evaluate and upgrade/replace as necessary the grounding system and the neutral system and connections to the three generators.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
287	13,304	6,459	6,236	164

RG&E

Distribution Line Deficiencies

Line of Business: Electric
Category: Asset Condition

Scope:

Based on inspection criteria, distribution notifications are created as part of the pole inspection programs Distribution Infrared Inspections and Distribution Line inspections. The grouping of these notifications is called Distribution Line Deficiencies (DLD).

Distribution Line Inspection (DLI)

Inspections are performed on the pole from the ground up and all associated components. Not all DLIs are initially identified as pole replacements, many are for repair or replacement of the pole's cross arms and equipment. Some are written to alert of a component issue, but due to pole age and complexity of the deficiency, many are changed into capital pole replacements through the Planning process of Work Order creation.

Priority of DLI Description

- Level I – Repair as soon as possible but not longer than one week. A Level I deficiency is an actual or imminent safety hazard to the public or poses a serious and immediate threat to the delivery of power. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated.
- Level II – Repair within one year. A Level II deficiency is likely to fail prior to the next inspection cycle and represent a threat to safety and/or reliability should a failure occur prior to repair.
- Level III – Repair within three years. A Level III deficiency does not present immediate safety or operational concerns and would have minimum impact on the safe and reliable delivery of power if it does fail prior to repair.

Distribution Infrared Inspections (DIR)

The objective of this program is to perform a thorough infrared inspection of Distribution equipment from ground patrols, with any deficiencies being thoroughly documented with a high-resolution thermographic image, including observed temperature scale. These notifications are identified as “IR” notifications. Any visual damage (burning, tracking, etc.) observed because of the thermographic identification is also documented and reported for repair. Any visual deficiencies are also

NYSEG and RG&E 5-Year Capital Investment Plan

documented for repair during the inspection. These notifications are identified as “NIR.”

- Level I- A Level I is a condition of any electrical equipment, device or structure that poses a serious and immediate threat to either the safety of the public or the reliability of the electric transmission or distribution system. Such conditions shall be repaired as soon as possible but not longer than one week. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated.
- Level II- A Level II is a condition of any electrical equipment, device, or structure that, if not corrected, could develop into a Level I Condition. Such conditions shall be repaired within a one-year period based on the evaluation of the inspector.

Currently, both the DLI and DIR programs have a backlog of notifications that should be addressed at the Company’s earliest availability. Interruptions due to company equipment failure are a large contributor to customer interruptions.

RG&E 2.3.2022						
	DLI Level 1	DLI Level 2	DLI Level 3	DIR Level 1	DIR Level 2	Total
Notifications	0	103	4,728	0	317	5,148
Total	4,831			317		

Level 1 notifications are typically addressed within the prescribed timeline, few of these go “overdue”, hence the low number of open Level I notifications.

The DLD Program seeks to perform permanent repairs on existing open notifications resulting from past inspections. The program strategy used to complete this work is based on a “circuit sweep” methodology. By prioritizing circuits based on their impact on customer reliability and SAIFI/CAIDI scores, permanent repairs will be performed on all open DLD notifications of the selected circuit. The intention is to complete work on the backlog while simultaneously working due dates based on current inspection findings, meeting the inspection priority requirements.

Reasons and Benefits:

These deficiencies were discovered as part of routine inspections performed on the distribution system. The deficiencies will only worsen over time, thus leaving them unaddressed risks reliability and increases the chance of service interruptions. Interruptions due to company equipment failure are a large contributor to customer

NYSEG and RG&E 5-Year Capital Investment Plan

interruptions. Adequate funding, material, and available field crews are necessary to keep repairs consistently performed.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,006	4,165	4,807	5,481	6,207

RG&E

URD Replacement Program

Line of Business: Electric
Category: Asset Condition

Scope:

The purpose of this program is to replace underground facilities with aged or failing equipment and access difficulties. This program will be upgrading underground facilities by installing new underground cables in existing ductwork and replacing submersible equipment with new above ground pad mounted devices.

Reasons and Benefits:

Many of the RG&E URDs were built in the 1970s and 1980s and are 40-50+ years old. The underground infrastructure in these developments are aging and experience an increasing number of failures as the infrastructure begins to break down. The electric cable utilized in these installations were traditionally a concentric neutral style design with the neutral located on the outside of the cable. This design leads to severe corrosion along the cable. In addition to an increase in full cable failures, the breakdown of the neutral also tends to lead to an increase in stray voltage conditions in the developments. All manufacturers of this style cable have highly recommended any current cable under this design be replaced as soon as possible. Many of the developments also utilized vaults with underground, submersible transformers as opposed to the current standard of above ground, pad-mounted transformers. The former design creates difficulties in accessing the equipment and can lead to extended outage times during maintenance and repairs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	3,000	5,000	5,000	5,000



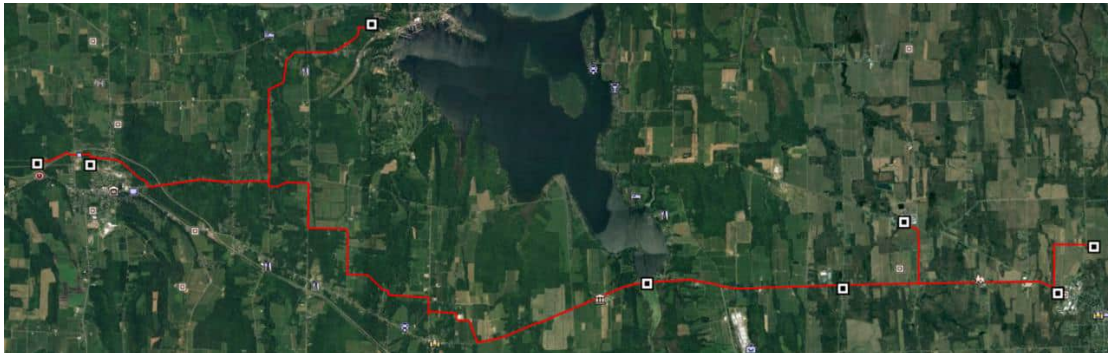
RG&E

Circuit 794 Rebuild

Line of Business: Electric
Category: Asset Condition

Scope:

Line 794 (34.5 kV) will be fully rebuilt using wood and steel poles to meet current RG&E and NESC standards, including Avangrid's system hardening standard. New 477 ACSR conductor will be used for the 34.5kV and the existing distribution underbuilt conductor will be transferred to the new structures and new hardware will be installed. Due to construction constraints, the following structures will not be replaced: T615 to T617, T619 to T622, T624, T1137-1, T1142, T1147, and T1071 to T1073. The total cost of the project is \$41.4M and the anticipated ISD is 12/30/2022.



Line 794

Reasons and Benefits:

Comprehensive list of needs used to support the selected solution alternative.

The RG&E Asset Management Health Report from 2013 identified two segments on the RG&E 34.5 kV Line 794 that require intervention (i.e., additional analysis required to determine the extent of needs and upgrades that can be supported). A full needs and solutions assessment study was conducted in 2020 and included a visual inspection and structural analysis. The results of this needs assessment found that 69% of the poles needed to be upgraded. Other considerations, such as the age of the line, lack of static provisions, and poor ancillary equipment, etc., were evaluated and included in the development of solution alternatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)



NYSEG and RG&E 5-Year Capital Investment Plan

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,051	11,353	0	0	0

RG&E

PCB Transformer Replacements

Line of Business: Electric
Category: Asset Condition

Scope:

The objective of this program is to proactively replace the PCB transformers that remain on the distribution system. Although the manufacture of polychlorinated biphenyls (PCBs) was banned in the United States in 1979 due to their numerous adverse health impacts, a portion of Avangrid's in-service mineral oil-filled pole top transformers still contain PCBs in concentrations above 50 ppm, as these units were manufactured before the national ban was put into effect. PCBs are suspected human carcinogens and they have a variety of other negative environmental and human health-related impacts. There are currently 2,249 remaining at RG&E and 268 are considered high priority and 1,981 are considered mid priority. The foundational work of completing this project has been completed as we first conducted an analysis of historical RG&E transformer disposal records and the 2016 transformer ID project to get a rough understanding of which transformer characteristics could be linked to identifying in-service PCB-contaminated (50-500 ppm PCB contents) and PCB transformers (≥ 500 ppm PCB contents.) We bolstered the information gained from these records by consulting similar large-scale PCB transformer studies conducted by third parties so that we could be more confident in the link between the applicable transformer characteristics and their probability of contamination. As a result of the transformer disposal record analysis and the secondary research, we were able to determine that our search should focus on identifying two categories of transformers: high priority and mid- priority units for recommended replacement. High priority units for recommended replacement include Westinghouse transformers manufactured in their Sharon, Pennsylvania plant between the years of 1965 and 1970 (Huffman's study from the Northern Indiana Public Service Company determined that between 90-100% of these units were confirmed to be PCB-contaminated.) High priority units also include all ≤ 10 kVA units manufactured at General Electric's Pittsfield, Massachusetts plant before 1974. The Indiana Public Service Company's study confirms that most units manufactured at this plant during these years are contaminated. Mid-priority units include transformers manufactured by Westinghouse before 1965 at their Sharon, Pennsylvania plant. They also include all > 10 kVA includes units manufactured by GE at their Pittsfield, Massachusetts plant before 1974.

NYSEG and RG&E 5-Year Capital Investment Plan

Once these characteristics were identified, Master Data provided us with a list of active RG&E pole top transformers from SAP. A search through this list was conducted to identify units with High and Mid priority unit characteristics.

Reasons and Benefits:

On July 22, 2019, a storm caused a spill from a 5 kVA transformer manufactured by General Electric in 1967. Approximately 10 gallons of oil were spilled onto pavement and soil from the transformer at 5912 State Route 80 in Cooperstown, New York. The oil was confirmed through testing to contain 460 ppm PCBs, and two roll off cans of contaminated material (NYS waste code B007) were generated and disposed of during spill contractor NRC's cleanup process. The total cost of this spill cleanup amounted to \$75,000. If this incident had involved a non-PCB transformer instead of a PCB-contaminated transformer, the cost would only have been approximately \$20,000, according to spill response contractor NRC's Operations Manager.

On May 12, 2019, a crew of NYSEG workers responding to an outage during a rainstorm at 2209 Connor Rd., Baldwinsville, NY came across a spill from a downed 10 kVA transformer manufactured by Westinghouse at their Sharon, Pennsylvania plant in 1969. Testing determined that the transformer oil contained 161 ppm PCBs. Heavy rain posed an issue for the crew because it made the spill more difficult to contain to one area and caused the workers to track contaminated mud throughout the worksite and ultimately into the company vehicles. Once the workers returned the vehicles to the service center, it was difficult to distinguish which vehicles from the fleet had been contaminated by the spill. It was also suspected that the locker room had become contaminated while the crew doffed their work gear upon returning from the job. All work gear had to be disposed of as hazardous waste, the seat covers of nearly the entire fleet of Auburn Service Center vehicles had to be replaced, and several locations around the service center needed to be decontaminated after the spill. Due to the large amount of potential worker exposures that occurred during this cleanup process, the spill from the 10 kVA unit became a much more serious issue than a spill from a non-PCB transformer. The cost of cleanup, material disposal, seat cover replacement, and work gear replacement for this spill totaled approximately \$57,000.

On 11/01/2019, a bank of three 50 kVA transformers manufactured by GE at the Pittsfield, Mass plant in 1944 and 1946 was downed in a storm in Van Buren, Onondaga County. The oil from these transformers spilled onto soil and pavement. One unit contained 450 ppm PCBs, while the other two units contained 452 ppm PCBs. The total costs of the on-going response to this spill are going to exceed an estimated \$100,000.



NYSEG and RG&E 5-Year Capital Investment Plan

The transformers involved in both the Cooperstown and Baldwinsville spill would have been identified during this project to be High Priority units for recommended replacement, while the transformers involved in the Van Buren spill were identified during this project to be Mid Priority units for recommended replacement.

These spill incidents demonstrate the value of identifying and replacing probable PCB and PCB-contaminated pole top transformers. PCB transformer spills are costly, resource-intensive, and they can increase the risk of PCB exposure for Avangrid employees. Avangrid experiences estimated 300-500 spills each year across New York State. Approximately 3% of all in-service transformers have been identified through this project as being likely or highly likely to be contaminated with PCBs, which means that a total of 9 to 15 PCB-contaminated or PCB transformer spills each year could be avoided if all high and mid-priority units were replaced.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	3,714	3,714	3,714	3,714

RG&E

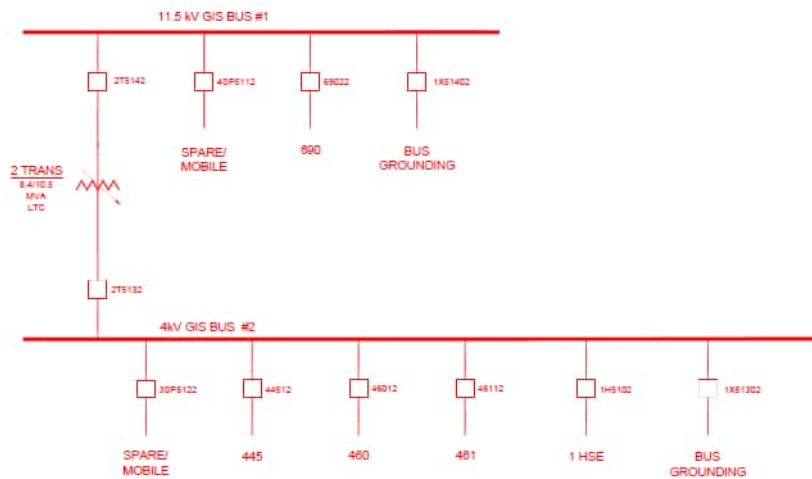
Station 51

Line of Business: Electric
Category: Asset Condition


Scope:

Substation 51 is a small substation that only has one 6.25MVA transformer that has been identified as needing to be replaced due to being overloaded. It is geographically isolated with limited relief options thus requiring an upgrade in the transformer capacity.

- Upgrade existing 1T from 6.25MVA to 10MVA
- Installation of new 11/4kV Gas Insulated Switchgear
- Installation of new control house



INSTALL

<p>CONCEPTUAL DRAWING REVISIONS ARE BEING REVIEWED THIS IS NOT A FINAL DRAWING NOT OFFICIAL, REVISIONS REQUIRED</p>				<p>SINGLE LINE SHEET 1 OF 1</p>
		<p>STATION: 51</p>		<p>DATE: 04/01/2022</p>



NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- Station 51 transformer 1 had a summer peak loading exceeded it's normal rating (103.4% of capacity)
- The substation is surrounded on three fronts by Irondequoit Bay on the east, Lake Ontario & Sea breeze Amusement Park on the north and Durand Eastman Park on the west.
- Station 51 has only two available time points to provide load relief. In addition, neighboring circuits and their substation transformers have insufficient capacity or are not physically located in a position to relieve station 51's transformer.
- The upgrade in the transformer will increase substation capacity and reliability to the 2300 customers that it serves.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,192	5,403	5,295	46	0

RG&E

TLD Replacements

Line of Business: Electric
Category: Asset Condition

Scope:

The Transmission Line Deficiencies Replacement program (TLD Replacement Program) prioritizes the line segments needing intervention based on deficiencies identified on the transmission system by the various inspection programs (Crossarm Inspections, Aerial Inspections, Infrared Inspections, Transmission Line Inspection program and Wood Pole Inspect and Treat Program) Interventions are determined for each line segment and these interventions are engineered and scheduled for construction.

Reasons and Benefits:

- At the end of 2021 there were 3065 overdue transmission line deficiencies.
- To address the consistent presence of backlogged transmission notifications, the Company needs to assign additional project management, engineering, construction and funding resources in addition to the Operations resources that historically have addressed transmission notifications,
- Each division is responsible for maintenance of their own service territory, so repairs are not necessarily prioritized at an Opco level,
- Factors such as transmission circuit customer count, SAIFI metrics and percent of a line needing structure replacements are not factored into current prioritization of work.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,107	1,000	2,000	3,000	3,000

RG&E

Substation Minor Program

Line of Business: Electric
Category: Asset Condition

Scope:

The Substation Minors Betterments programs cover work at substations under the \$200K threshold for a major project. This program includes the replacement of substation components such as:

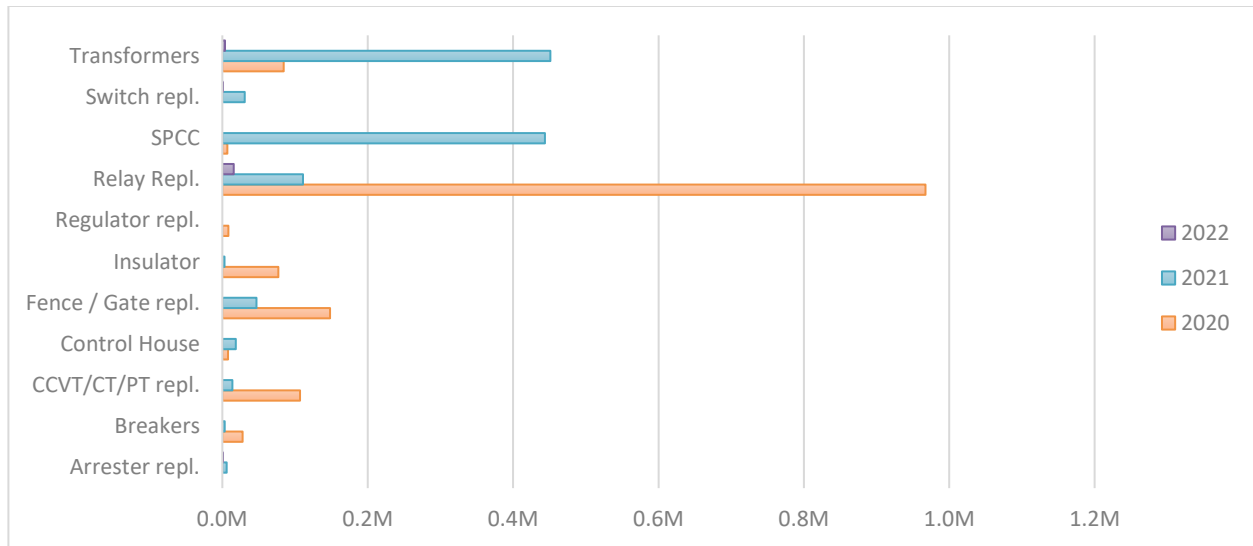
- CCVT/CT/PT
- Transformers (component replacements)
- Fence / Gate
- Regulator.
- Insulator
- Control House (betterments)
- Arresters
- Switch
- Animal Fence
- AC-DC systems
- Relay Repl.
- Cap Banks
- SPCC mitigation
- Protection and Control relays

The scheduled replacement of the above elements contributes to the reduction of outages because of substation equipment failures, which has been identified as the main root cause of substation outages. Because of this, Substation Minors Betterments contributes to the reduction of SAIFI.

This program covers not only the planned activities but also it addresses unplanned events because of inspections or failures.

Budget is planned based on historical spend levels and split between the divisions across the RG&E territory.

NYSEG and RG&E 5-Year Capital Investment Plan



Reasons and Benefits:

Maintain and improve substations equipment to provide a safe and reliable system as per regulatory targets. This program provides the company with the agility path to correct what is negatively impacting reliability in a proactive way.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
495	1,525	1,556	1,587	1,619

RG&E

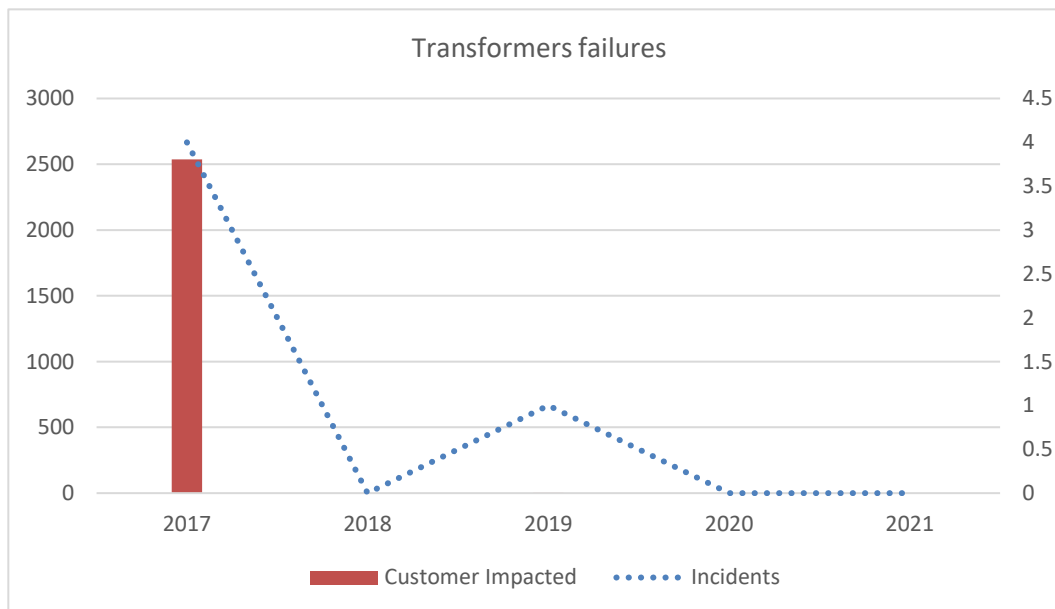
Substation Major Program

Line of Business: Electric
Category: Asset Condition

Scope:

The Substation Majors program covers work at substations over the \$200K threshold for a minor job. This program addresses the replacement of failed or poor power transformers. When planned, this program contributes to the reduction of outages because of substation equipment failures, which has been identified as the main root cause of substation outages.

Transformer failures ratio has increased in 2021, impacting the reliability of the system.



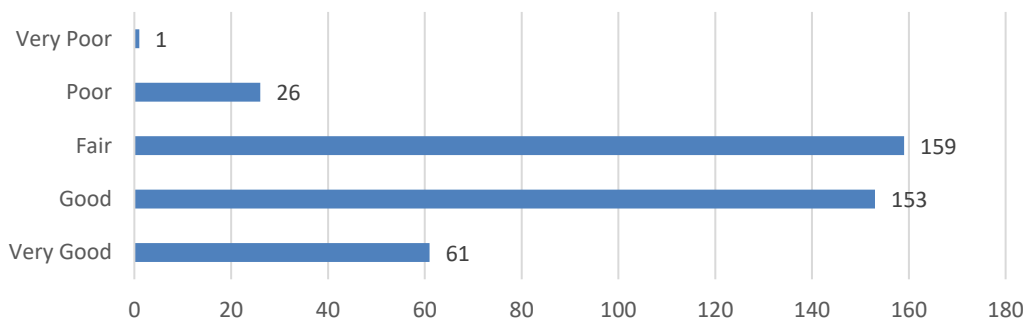
NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

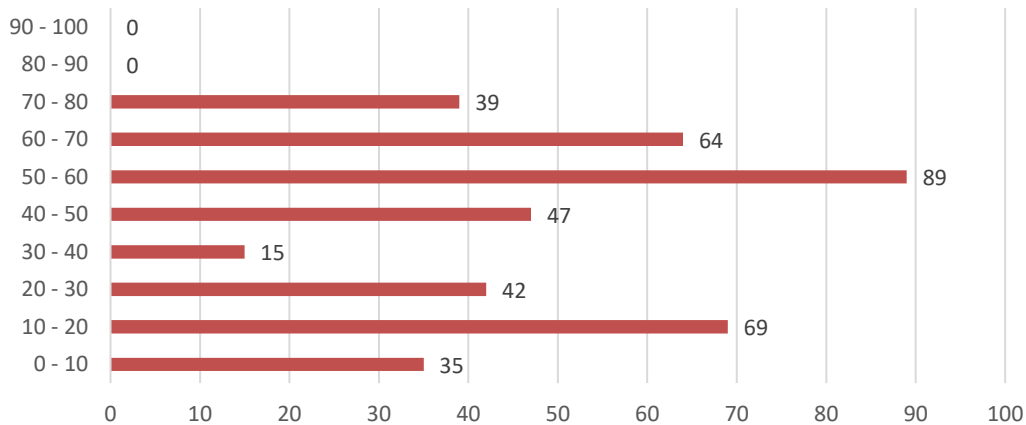
Replace failed or very poor transformers units.

- The latest health assessment identifies 27 transformers in poor or very Health Condition as candidate units for replacement.
- 40 % of the power transformers are 40 years or older. This increases the difficult to maintain due to lack of vendor support and inability to get parts.

Health Score



RGE Power Transformers - Aging



NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
522	1,872	1,380	1,408	1,436

RG&E

General Equipment - OPS-T&D

Line of Business: Electric
Category: Asset Condition

Scope:

The General Equipment program provides required electrical equipment, tools, and safety gear for new employees and to maintain safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives.

Reasons and Benefits:

Safety is RG&E's number one priority and places significant emphasis on the safety of its employees and the public. This program allows the Company to meet safety related regulatory compliance and OSHA requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
586	1,001	1,401	815	779

RG&E

Battery Prog

Line of Business: Electric
Category: Asset Condition

Scope:

The Battery Replacement Program is responsible for the cycle replacement of substation batteries. Batteries are a critical component of the auxiliary DC System that powers the protection and control system. A failure in this system will negatively affect the reliability of the installations.

The budget is planned based on historical spend levels and split between the thirteen division across the RG&E territory.

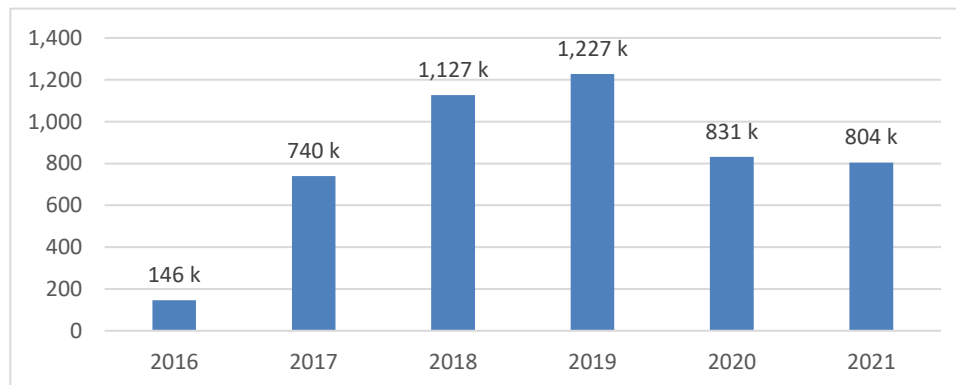


Figure 9 - Investment

Reasons and Benefits:

Replace the substation battery systems. Batteries are replaced based upon the result of the periodic maintenance test.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
785	801	817	834	851

RG&E

Rochester Circuit 649 Upgrade

Line of Business: Electric
Category: Asset Condition

Scope:

Circuit 649 (2.5 miles) runs from Station 745 located in East Rochester off Linden Ave to Yarmouth Rd in Brighton. 11kV Oil impregnated cable will be replaced in underground conduits along West Commercial St. in East Rochester. The 4kV line underbuild will be transferred to new Overhead pole s from West Commercial Street to State Route 441 and running parallel in the NYDOT ROW Rt I-490. Structures T-70 to T-63 will have new 4kV line installed.

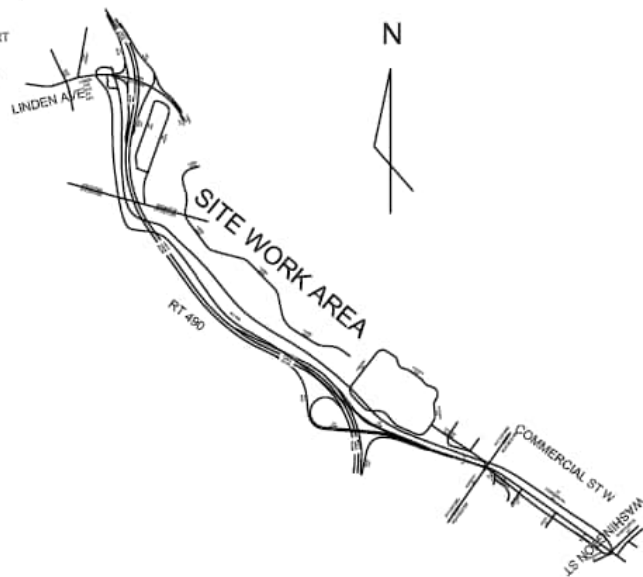
Figure 1: Circuit Location

Engineering Comments/Problems

CIRCUIT 649 HAS HAD MANY FAULTS ON THE AERIAL LINE FROM COMMERCIAL ST IN EAST ROCHESTER TO LINDEN AVE IN BRIGHTON. THE CIRCUIT RUNS UNDERGROUND FROM STATION 764 AND RISES ON COMMERCIAL ST TO POLE LINES BUILT 4KV (CIR 394) OVERBUILD AND 11KV AERIAL. THE CIRCUIT RUNS DOWN COMMERCIAL ST NW TO THE ON RAMP ON RAMP OF RT 490 IN NYSDOT ROW AND RGE EASEMENT PARALLEL TO THE CONCRETE BARRIER WALL. THE 4KV CIRCUIT HAS A TIE POINT WITH 2183 WHICH IS OUT OF STATION 420. THEN THE CIRCUIT FROM P# T-54 TO P# T-29 ALL 11KV BUILD. THE CIRCUIT THEN TRANSITIONS BACK TO A 4KV OVERBUILD CIRCUIT 2125 TO THE RT 490 CROSSING RISER POLE T-23. CIRCUIT 649 THEN RUNS UNDERGROUND WEST ACROSS RT 490 TO A 11KV RISER POLE T-22. THE CIRCUIT RUNS PARALLEL TO RT 490 ON THE WEST SIDE OF THE CONCRETE BARRIER WALL 11KV BUILD THEN RISERS DOWN ON P# T-14. CIRCUIT 2125 IS OVERBUILD AND CIRCUIT 649 CHANGES FROM OPEN WIRE TO AERIAL CABLE UNDERBUILD TO LINDEN AVE IN THE NYSDOT ROW AND RGE EASEMENT, THEN RUNS UNDERGROUND FROM T-3 TO RGE MH ON LINDEN AVE

BID

STATE PERMIT
TAST-C5R- COMMERCIAL ST E ROCH RT 94
TAST-CR4- RT 490 SHOULDER
TAST-E6- LINDEN AVE BRIGHTON RT 441



PETE DAWES
ELECTRIC ENGINEER
Phone# ____ - ____
Cellular# 585-781-0193

Rochester Gas and Electric Corporation

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

RG&E has had several outages on this circuit mainly on the overhead aerial cables due to several faulted conditions. There have been approx. 34 joint repairs on this line's aerial cables. In the Summer of 2020 several customers (Commercial and Industrial) including a Nursing Home/Outpatient Care facility was impacted by this line's on-going issues for several continuous days. The goal of this project is to improve the reliability of 2.5 miles circuit (reduce customer outages) and increase the resiliency of the area serviced by this distribution Circuit.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,488	0	0	0	0

RG&E

General Equipment - OPS-SO

Line of Business: Electric
Category: Asset Condition

Scope:

The General Equipment program provides required electrical equipment, tools, and safety gear for new employees and to maintain safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives.

Reasons and Benefits:

- This program allows the Company to meet safety related regulatory compliance and OSHA requirements.
- This program provides the tools to perform testing activities in components such as the protection relays, batteries, transformers,

Requested funds will be used mainly for the purchase and upgrade of Power Factor Test Sets, Power System Simulators and SF6 testers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
350	168	171	175	178

RG&E

Station 208 - Modernization Project

Line of Business: Electric
Category: Asset Condition

Scope:

The complete scope of this project is to replace the existing AIS with a new 34.5 kV GIS, a new 15kV GIS class working at 12kV, new step-down distribution transformers will be installed to feed the existing distribution circuits and provide optimal conditions for a future conversion and a new battery system and communication system. The new 34.5kV GIS equipment shall be tapped from the existing 34.5kV C796 to the new 14MVA transformer and the new 15kV GIS class shall be connected from the low side of the new 14MVA transformer to the step-down transformers to finally feed the existing 4kV C242 and C243.

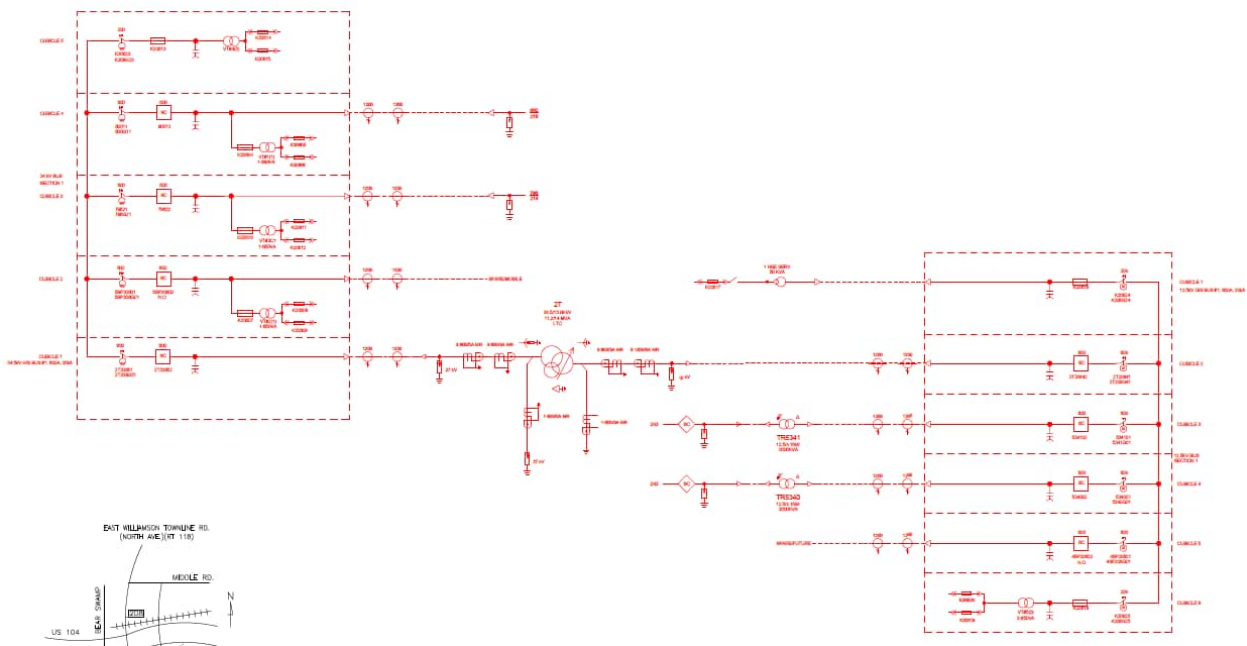


Figure 1: Operating Diagram

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The existing Station 208 has multiple equipment with a health index HI-5 (needs intervention) for all breakers and batteries. In addition, the station has no remote communication and there is no SCADA or control house. All bus structures are wood structures. The power transformer has no LTC and the power dissipation factor is poor.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
671	0	0	0	0

RG&E

Checkpoint Firewall Upgrades Subs

Line of Business: Electric
Category: Asset Condition

Scope:

This project will replace the 5 Checkpoint Head End firewalls located in West Ave and Vestal with supported hardware and software to send the SCADA and remote access traffic to and from the current transmission substations in the RG&E territory.

Reasons and Benefits:

Secure traffic transmission for ECC control to all substations and provide remote access to all gear within the substation for operations for maintenance and repair/troubleshooting purposes. It will also improve the CIP 005 standing of these substations since the re-application of IDS/IPS (Intrusion Detection/Intrusion Prevention) will be restored thus proving that our current deployment of the 61850 substation design is up to current Compliance standards with NERC/FERC.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
159	0	0	0	0

Electric Reliability

NYSEG

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NYSEG

Breaker Program

Line of Business: Electric
Category: Reliability

Scope:

The Substation Circuit Breaker Replacement program prioritizes the proactive replacement of substation circuit breakers needing intervention based on the latest health and risk assessment and breakers that have been identified as overdutied by Engineering. The assessment lists candidate units to be evaluated for replacement by investigating specific needs including operational and maintenance issues identified for each unit, and coordinating with system operations, maintenance engineering and the projects teams.

The Asset Health and Risk Assessment looks at a health, criticality, and risk index for specific asset class equipment. A Health Index quantifies equipment condition based on numerous condition parameters related to the long-term degradation factors that cumulatively lead to an asset's end of life. The health score is a composite indicator of the asset's overall health, relative to a brand-new asset, and is given in terms of percentage, with 100% representing an asset in "as new" condition. The health index is analogous to the probability of failure of an asset. The Criticality Index is analogous to and quantifies the consequence of a failure of the asset. For circuit breakers, the consequence or severity of a breaker misoperation or failure is represented by several factors including safety to utility personnel and the public, environmental impact, impact to customers, financial impact, impact to other parts of the electric grid, and regulatory compliance issues. A Risk Score quantifies the risk associated with each asset. The risk score is a combination of the Health Index (probability of failure) and the Criticality Index (consequence of failure). Risk scores can be used to show the level of need for intervention for each asset.

Reasons and Benefits:

The latest health assessment identifies 516 substation circuit breakers as in Poor health and 407 substation circuit breakers in Very Poor health as candidate units for replacement. The latest risk assessment scoring identifies 654 substation circuit breakers as High risk and 127 substation circuit breakers as Very High risk as a starting point for prioritizing candidate units. These breakers are included in the list of Poor and Very Poor health.

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Candidate circuit breakers typically fall in two categories:

1. Obsolete models that are older models that are increasingly difficult to maintain due to lack of vendor support and inability to get parts.
2. Older models that have components that need more frequent maintenance to assure proper operation.

Currently, 17% of breakers in NYSEG are over 60 years old, if no breakers are replaced that number grows to 35% by 2030. *(Aging is only an indicator for asset replacement. Actual replacement is driven by condition-based analysis)*

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
18,279	22,848	28,560	29,988	31,488

NYSEG

Comprehensive Area Studies

Line of Business: Electric
Category: Reliability

Scope:

The Distribution Comprehensive Area Improvement Program will consist of several projects that will be identified by the Electric Distribution Planning management team through a process of identifying deficiencies and performance issues both present and future (10 year projection) that will negatively impact the ability to provide reliable and consistent power to our customers.

Comprehensive area studies are performed on substations and distribution feeders, analyzing present and future conditions related to distribution system capacity loading, common operating voltage conditions, load balancing, reliability and resiliency, loss of load, voltage and power factor quality, distributed generation, hosting capacity and distribution automation and SCADA needs.

Reasons and Benefits:

Comprehensive Area studies will be conducted in the Auburn, Binghamton, Elmira, Hornell, Ithaca, Lancaster, Mechanicville, Oneonta Divisions to address reliability, distribution, and asset condition issues.

Several projects are under consideration that require intervention to maintain necessary reliability and performance for our customers.

Example projects will include (but not limited to):

- Scipio Substation Evaluation: This substation is 4.8kV and services 791 customer with undersized transformers and two feeders that are all expected to be overloaded during peak demand in 5years and is at 95% capacity with two circuits that are also at capacity. Consideration will be given to increasing capacity of transformers and feeders, improve N-1 capability with automation and capacity increase and target asset replacements based on condition and capability to achieve new capacity goals. Consideration will also be given to alternative solutions such as area station consolidation, voltage conversion and NWA.
- Additional studies will include distribution circuits that are < 95% capacity as demonstrated in Table 1.0. Consideration will be given to increasing capacity at each feeder, improve N-1 capability with automation and capacity increase and

NYSEG and RG&E 5-Year Capital Investment Plan

target asset replacements based on condition and capability to achieve new capacity goals.

Table 1.0 NYSEG Distribution Circuits > 95% Capacity

Opco Id	Division Id	Substation	Number of Customers	Summer CNR Rating (MVA)	Last Summer Thermal Rating	Summer 5 Year Avg Loading (MVA)	Summer 5 Year Avg PLBN OR Circuit Rating %
NYSEG	LOCKPORT	TRANSIT ST-4 4.16kV	822	1.656	152	1.98	119.70%
NYSEG	ONEONTA	N. NORWICH 4.8kV	440	0.884	102	0.92	104.00%
NYSEG	ONEONTA	SIDNEY 4.8kV #2	1547	3.873	105	3.84	99.10%
NYSEG	ONEONTA	SIDNEY 4.8kV #2	413	3.873	107	3.8	98.10%
NYSEG	HORNELL	CANISTEO 4.8kV	436	1.54	60	1.5	97.40%
NYSEG	BINGHAMTON	CENTER VIL 4.8kV	999	3.035	95	2.92	96.30%
NYSEG	ELMIRA	WEST ELMIRA 4.8kV	1264	2.954	105	2.84	96.00%
NYSEG	BINGHAMTON	MORRIS ST#1 4.8kV	1989	4	94	3.83	95.70%
NYSEG	LANCASTER	ALDEN 4.8kV	1405	4.62	109	4.4	95.30%

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,000	10,000	15,000	20,000	30,000

NYSEG

Transmission Reinforcement Program

Line of Business: Electric
Category: Reliability

Scope:

In 2021 AVANGRID Transmission Planning completed a needs assessment on the local transmission system and identified over 170 loss of load, thermal, and voltage criteria violations that can directly affect our customers.

Based on the quantity of identified needs AVANGRID expects that a significant investment is needed to reinforce the local transmission systems so that they meet the AVANGRID Transmission Planning loss of load, thermal, and voltage criteria.

Development of comprehensive solutions for the identified needs, coupled with asset condition assessments will begin in 2022 with many solution designs expected to be finalized by 2024. Solution development and project execution will be prioritized based on several factors such as customer benefit, asset health, and solution complexity.

This Program is to address needs identified on the NYSEG Transmission System.

Reasons and Benefits:

Benefits:

The 2021 AVANGRID Transmission Planning local transmission system needs assessment identified criteria violations throughout the NYSEG local transmission systems. A high-level summary of local needs is shown below.

Local Transmission Violations (N-1 only)			
OpCo.	Loss of Load	Thermal / Voltage	Total
NYSEG	61	67	128

There are at least 60 Loss of Load (LoL) criteria violations. A summary descriptive statistic of single contingency exposure on transmission system that violates loss of load criteria is presented below:

NYSEG and RG&E 5-Year Capital Investment Plan

Descriptive Statistic	MW	Customer Count	Miles
Min	10.1	717	0.34
Max	44.8	15,065	45.81
Mean	19.5	5,232	13.04
Median	16.7	4,752	12.15

Solution Alternatives:

Solutions to criteria violations on the transmission can take a variety of forms but can fall into a few main categories:

- Comprehensive Solutions – solutions that account for more than one type of need (i.e. thermal, voltage, asset health, and/or loss of load)
- Low Complexity Solutions – Solutions that address a single need without considering other nearby needs.
- NWA Solutions – Solutions that can be used to defer the need for a comprehensive solution

Prior to determining the preferred solution, all factors, including other nearby needs, will be considered to identify holistic area solutions.

Risk of No Action:

The AVANGRID Transmission Planning criteria are designed to ensure that customers receive adequate electric supply under conditions that can be reasonably expected to occur. If the transmission system does not meet these criteria there are risks including but not limited to unnecessary loss of customer load, and an increased likelihood for equipment failure.

This program will include projects that:

1. Improve customer reliability
2. Address thermal, voltage and loss of load criteria violations
3. Improve transmission system performance.

NYSEG and RG&E 5-Year Capital Investment Plan***Five Year Capital Plan***

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,000	10,000	10,000	10,000	



NYSEG

Distribution Load Relief Program

Line of Business: Electric
Category: Reliability

Scope:

The objective of the Distribution Load Relief Program is to conduct system-wide facility surveys on substations that are overloaded and/or start to exceed 90% capacity to develop a mitigation strategy (projects) to enhance the condition of these assets so they don't exceed Planned Loading Beyond Nameplate (PLBN). These comprehensive surveys will include an electrical and structural assessments which will be scored against individually weighted categories such as age of equipment, resiliency/flooding impacts, substation P&C assessment, substation reliability performance, etc.

For single transformer stations, the transformer loading should not exceed 100% of the Continuous Nameplate Rating (CNR), which is the 65C top nameplate rating. For normal loading conditions, new customer loads shall not exceed facility capabilities from point of interconnection to and including the substation and transmission area (sub-transmission). When the addition of new loads results in overloading of device thermal capacity from POI to substation transformer bank secondary bus, it is recommended by Distribution Planning to start system reinforcements. When the addition of new loads result in circuit capacity or substation bank capacity reach or exceed 90%, it is recommended by Distribution Planning to investigate long term strategy (projects) that could involve load shedding or substation upgrades to hold capacity at 90% with the new load.

Reasons and Benefits:

NYSEG has identified 14 substation banks in Table 1 that have reached or exceeded 90% capacity with 7 out of 14 of these banks exceeding 100% of the CNR. This program is design to focus on conducting system-wide facility surveys and pending the outcome focus on a strategy that could involve several solutions (projects) involving adding fans, retrofitting upgrades, infield switching to load shed, or retiring smaller substation.

NYSEG and RG&E 5-Year Capital Investment Plan

Table 1.0 NYSEG Substations at or exceeding 90% CNR Capacity

Division Id	Substation	Number of Customers	Calculated Summer Xfmr PLBN Rating (MVA)	Summer CNR Rating (MVA)	Summer 5 Year Avg Loading (MVA)	Available Capacity (MVA)	Summer 5 Year Avg CNR %	Summer 5 Year Avg PLBN OR Circuit_Rating %
LANCASTER	BENNINGTON 12.5kV	1227	3.43	3.12	3.38	-0.255	108%	98%
AUBURN	GENOA 4.8kV	668	3.3	3.00	3.17	-0.170	106%	96%
AUBURN	MARCELLUS 4.8kV	2126	5.50	5.00	5.22	-0.219	104%	95%
MECHANICVILLE	CROOKED LAKE 4.8kV	1394	3.08	2.80	2.9	-0.100	104%	94%
AUBURN	PORT BYRON 4.8kV	1634	5.50	5.00	5.14	-0.139	103%	93%
ELMIRA	WHISKEY CREEK 12.5kV	1634	4.62	4.2	4.28	-0.080	102%	93%
AUBURN	SWIFT ST 4.2kV	2794	5.5011	5.001	5.07	-0.069	101%	92%
LANCASTER	HOLLAND 4.8kV	2259	6.875	6.25	6.06	0.190	97%	88%
ONEONTA	W. WINFIELD 12.5kV	2719	7.084	6.44	6.23	0.210	97%	88%
ELMIRA	KANE ST 4.8kV	1952	5.5	5	4.8	0.200	96%	87%
HORNELL	WOODHULL 4.8kV	575	1.65	1.5	1.41	0.090	94%	85%
BINGHAMTON	WHIG ST 4.8kV	1027	3.85	3.5	3.23	0.270	92%	84%
ITHACA	CANDOR 4.8kV	501	2.75	2.5	2.3	0.200	92%	84%
HORNELL	ARKPORT 4.8kV	1025	3.3	3	2.7	0.300	90%	82%

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
500	4,500	10,000	10,000	5,000



NYSEG

Animal Guard Program

Line of Business: Electric
Category: Reliability

Scope:

This program will target the worst performing circuits across NYSEG for animal guard installation with the goal of increasing service reliability through minimizing animal contact on distribution transformers. Guards are to be installed on distribution transformer bushings, arresters, and LA brackets, if applicable.

Reasons and Benefits:

These installations have shown measurable SAIFI and CAIDI improvements along with decreased animal contact outages, which in turn has resulted in reduced O&M costs. Adequate funding, material, and available field crews are necessary to keep installations moving forward.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,366	4,988	5,116	5,245	5,373

NYSEG

Milo Substation Rebuild

Line of Business: Electric
Category: Reliability

Scope:

The existing Milo substation will be replaced by a new 34.5-12.5 kV GIS (Gas Insulated Switchgear) substation with a new/larger transformer installed at a location nearby to the existing site. The conversion to the 12.5kV low side will also require the conversion of approximately ten miles (five miles in each direction) of main line out of the Milo substation.

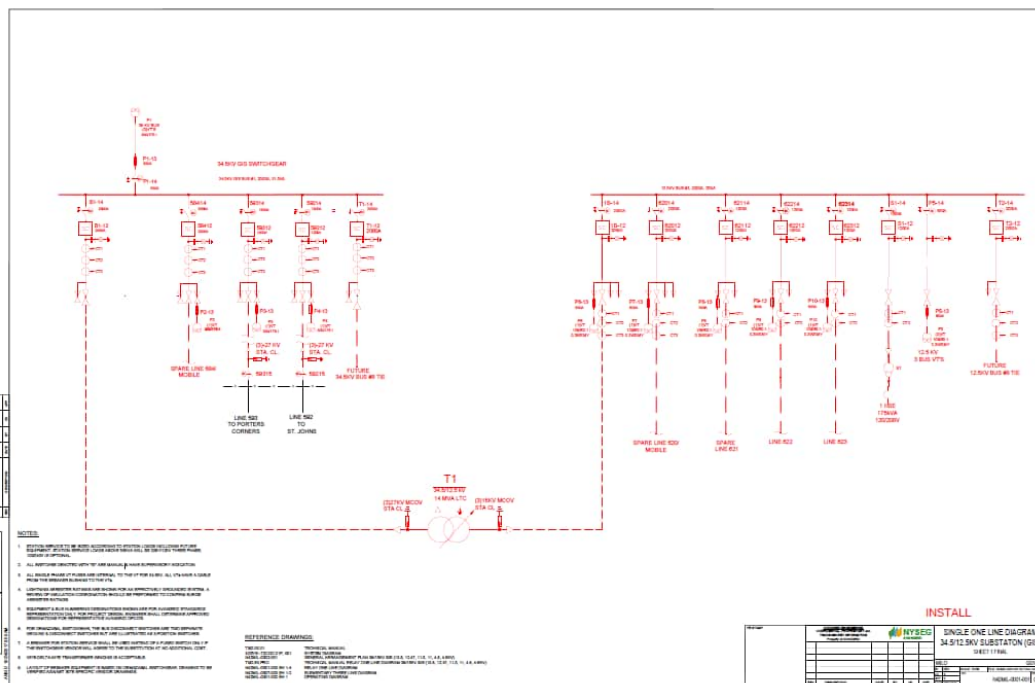


Figure 1: Milo Substation One Line Diagram

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

The Milo Substation circuit experiences low voltage and an 82-unit townhouse development is planned for this area. The existing transformer at the Milo Substation does not have enough capacity for the proposed 0.926 MVA load from the new development. The existing substation lot will not accommodate the new load from the development, given its size.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,010	17,616	1,007	0	0

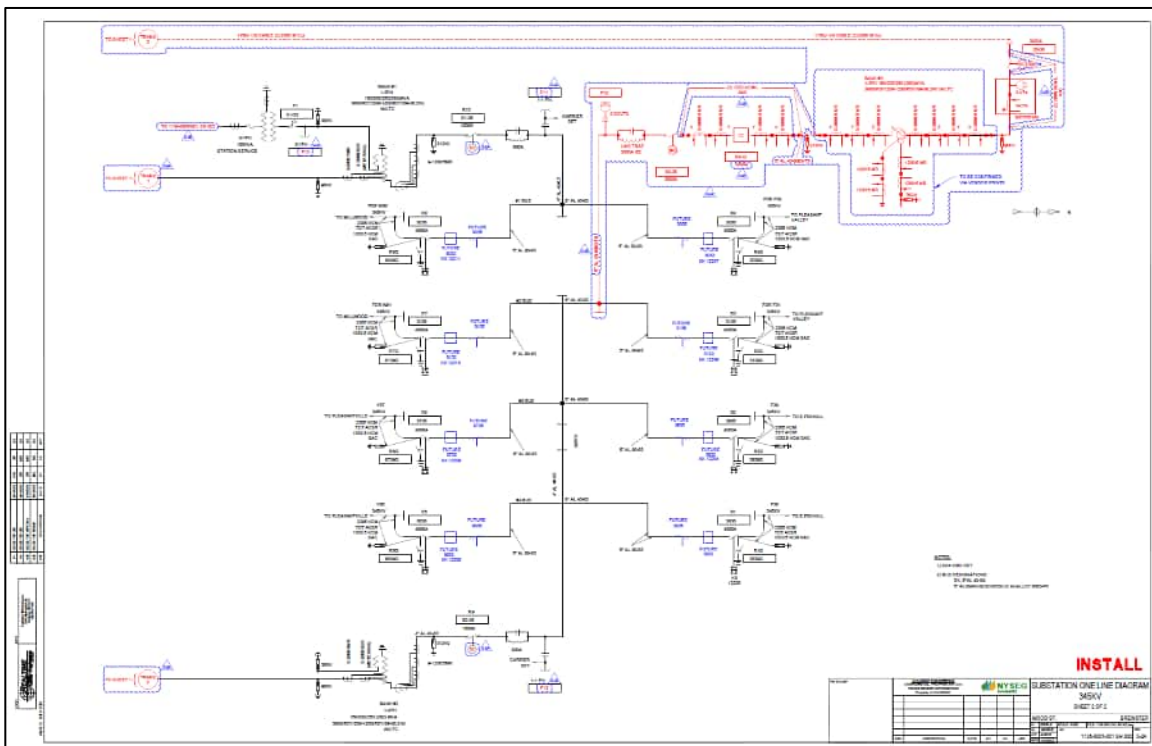
NYSEG

Wood Street New 3rd 345/115kV Trans

Line of Business: Electric
Category: Reliability

Scope:

The main purpose of the Wood Street Substation project is to install a third 345/115 kV LTC transformer rated 150/200/250 MVA at Wood Street Substation and operate it in parallel with the two existing 345/115 kV LTC transformers. This will improve the system reliability in the area of Brewster.



345kV One Line (New Bank #3 in red)

NYSEG

Craryville New Substation Breaker and Circuit Upgrade

Line of Business: Electric
Category: Reliability

Scope:

The Craryville New Substation Breaker and Circuit Upgrade involves:

- Converting a section of Craryville 610 main line from existing 12.47Kv to 34.5Kv from L-959 P-2 to L-297 P-9553 to 477AL (4.6mi).
- Reconductor Craryville #400 main line to 477AL covert to 34.5kv (5.69mi)
- Add breaker and connect 400 to transformer bank # 3
- Removing bank # 1 and 12.5Kv Breaker

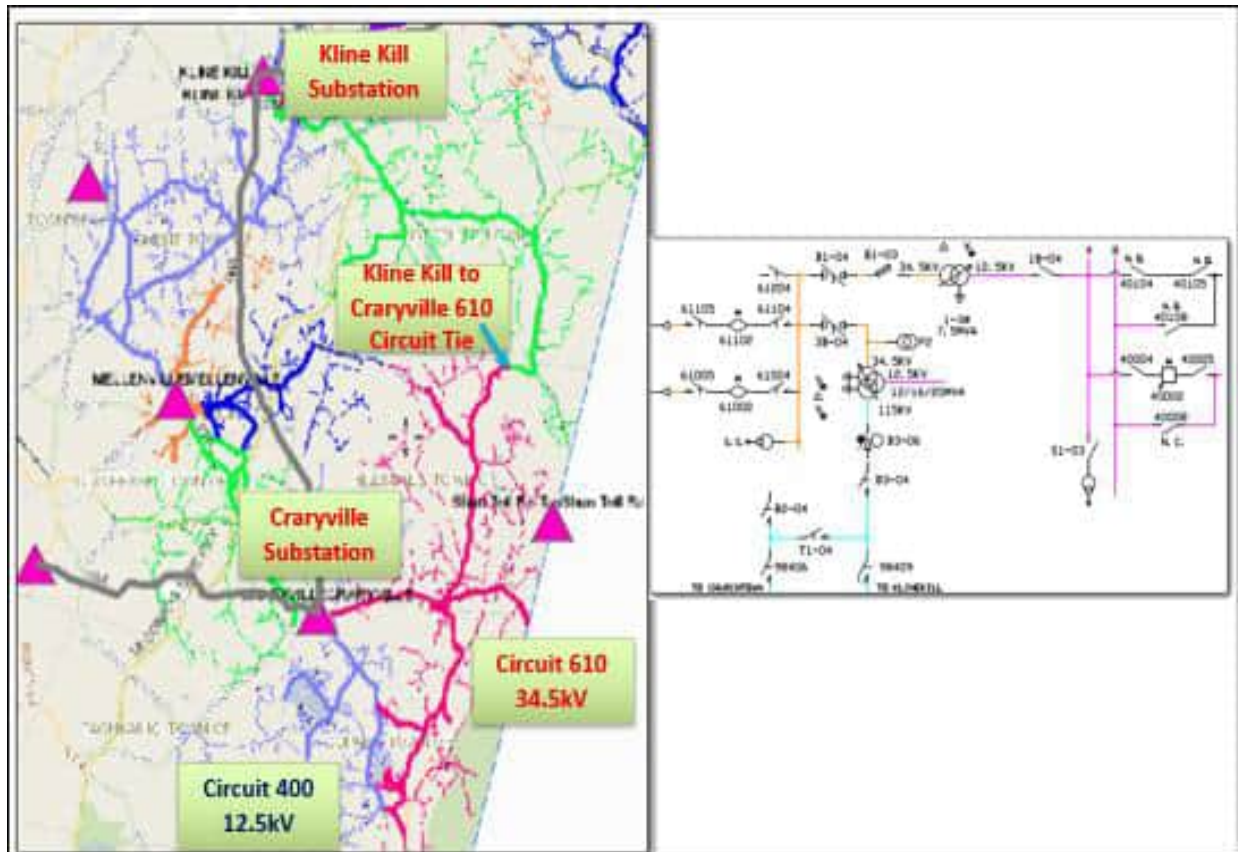


Figure 1: Solution (Regional One-Line Diagram)

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The Craryville Substation is located in the Mechanicville Division and has three distribution circuits consisting of two 34.5kV distribution circuit (610 and 611) on transformer bank # 3 and one 12.5kV distribution circuit (400) off transformer bank #1.

The Craryville 400 circuit does not have an N-1 solution and serves approximately 1,839 customers from one 12.5kV circuit. Craryville 400 has been listed on the Reliability Tracker Report (Issue 316) since 2019 as having issues on back feeding customers (No N-1 Solution). There are no field ties to back feed customers from another circuit during outage restoration. Craryville 400 has 195KW of existing and 41KW of queued generation on the circuit.

The Craryville 610 and 611 does not have any N-1 solutions at the substation and serve approximately 2172 customers on 610 and approximately 668 customers on 611. Craryville 610 and 611 has been on a mobile substation for approximately 3 years. Craryville 610 does have N-1 infield switching with Klinekill 631. However, it cannot pick-up the full load on Craryville 610 because of voltage issues. Craryville 610 has 1472KW of existing and 16KW of queued generation on the circuit. Craryville 611 has 501KW of existing and 8KW of queued generation on the circuit.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	4,950	6,560	6,560	0

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,557	7,179	0	0	0

NYSEG

Circuit Sensor Implementation Plan

Line of Business: Electric
Category: Reliability

Scope:

The Circuit Sensor Implementation program is intended to provide Line Sensors at the head-end of Distribution feeders on overhead conductors up to 35kV. The primary function of these sensors are to detect, monitor, & report electrical quantities on each circuit including watts, current, voltage, power factor, VARs, as well as electrical transients. Load, phase balance, faults, alarms, and events shall be monitored in real time and sent via telecommunications to a SCADA system. The sensors are also intended to detect fault current and location along with the subsequent change of voltage on a line that are reported to SCADA and sent to an analysis software. The data is also used to provide Summer and Winter Load information for forecasting, modeling, enhancing power quality, and making reliability improvements, and during emergency situations when needed to transfer load from adjacent circuits.



Figure 8: Monitoring Sensors for Networks up to 35kV

Reasons and Benefits:

There are 1138 circuits at NYSEG with 73% having no interval monitoring devices, 22% have partial interval monitoring, and 4% have full interval monitoring capabilities. This means that most of these circuits (832) have no means to detect, monitor, and report electrical quantities on the distribution system. The increased demand for Distribution Generation with Photo Voltic, Wind, and Battery Storage devices can lead to power quality issues and require constant monitoring for improvements in performance and reliability.

Table 1.0: NYSEG Monitoring Device Types

Type of Monitoring Device	# of Circuits (1138)	Percent	Substations to be Modernized
No Interval monitoring	832	73%	141 have no interval monitoring
Full Interval monitoring	50	4%	7 have full interval monitoring
Partial Interval monitoring	256	22%	33 have partial interval monitoring

The project requires the installation of 2,193 power line sensors at the head end of distribution feeders that don't have interval monitoring devices. Each three-phase circuit would need 3 devices. This program would install line sensors on 731 circuits over the next 4 years (2022 – 2025). 101 out of 832 circuits with no interval monitoring are part of the breaker replacement program which would install RTU's and SCADA devices to monitor substation and circuit load and are not part of the Line Sensor Program. The total cost for each Power line Sensor with Wireless Network is \$2,968 + \$2,782 for installation, materials, commissioning, and project management = ~\$5,750.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,000	5,000	5,000	1,680	0

NYSEG

Never Sink Substation Transformer & Circuit Upgrade

Line of Business: Electric
Category: Reliability

Scope:

The objective of this project is to replace a substation transformer that is beyond its Continuous Nameplate Rating (CRN) 112% and Planning Load Beyond Nameplate (PLBN)101% ratings. The Never Sink Distribution Substation located in the Liberty Division serves 999 customers. The substation serves a single 4.8 kV distribution feeder (circuit #080) which feeds the Town of Never Sink, New York. A new 12/16/20 MVA dual rated voltage 34.5-4.8*12.5 LTC and split the circuit into two feeders is required to address all the needs.

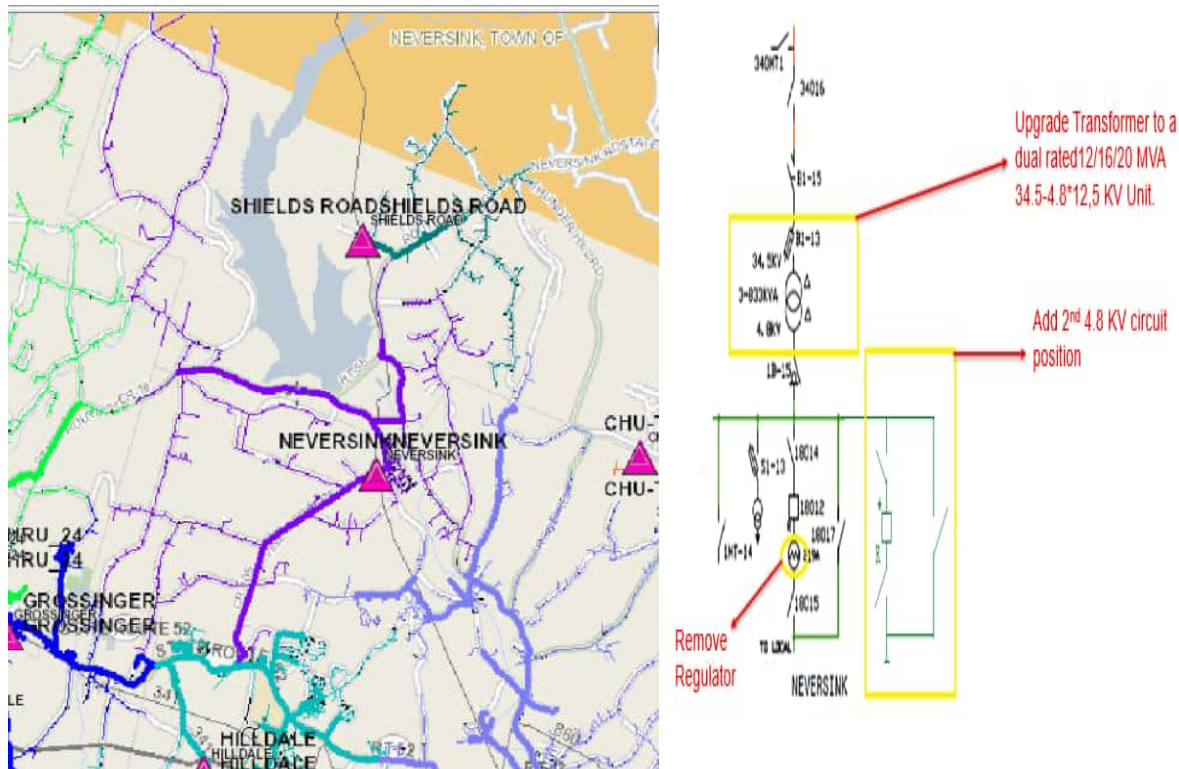


Figure 8: Solution Circuit Overview and Substation (One-Line Diagram)

Reasons and Benefits:

Based on a 5-year average, the substation transformer has been loaded to 112% of CNR (2.7MVA). In 2021, the transformer was loaded to 101% of its PLBN rating. There are existing voltage issues as low as 114V on the circuit. The minimum Avangrid standard is 117V. There is no capacity to add the new load and the voltage issues will worsen. The substation already passed its thermal rating and there is an immediate need to relieve the substation loading. A load transfer cannot be done to the nearby Grossinger 211, Old Falls 283 and Hilldale 225 due to the voltage difference (Hilldale sub and Old Falls has already loading issues). There is no N-1 contingency at the substation. A more comprehensive area study involving the nearby substations is needed in the future.

As a result, a substation upgrade to a 1-12/16/20MVA dual rated voltage 34.5-4.8*12.5kV LTC is needed. The #080 circuit splits northeast and southwest outside the substation. A 2nd circuit position will have to be established at the substation, and a short 69' line with 477AL will have to be built to the split (L-362 P-105). The northeastern and southwestern portions of the load will be split and served by individual circuits. Phase balancing on the distribution circuits are needed to balance single phase bank loading at the substation.

By implementing all the recommendations, permanent load relief through the installation of 12/16/20 MVA dual rated 34.5-4.8*12.5 kV transformer and capacity to add extra load will be obtained. This project is required to address all these needs and all these improvements allow for increased reliability on the 4.8 kV system which can have very serious reliability concerns.

Solution Alternatives:**1) Partial (“In-Kind”) Replacement Projects – Projects designed to address identified overload asset condition needs on a component-by-component basis.**

- a. Substation P&C replacements/upgrades such as electrotechnical (obsolete) relays, RTUs, batteries, SCADA, etc.
- b. Substation electrical and structural equipment replacements such as power transformers, circuit breakers, switches, insulators, bus, foundations, enclosures, etc.

2) Complete (“Full Rebuild”) Replacement Projects – Projects designed to address a wide variety of asset condition needs, at a single T&S facility, sufficient to justify the complete replacement or rebuild of a substation or transmission line.

- a. Substation rebuild projects.
- b. Distribution line rebuild projects.

NYSEG and RG&E 5-Year Capital Investment Plan

Risk of No Action:

Assets will continue to remain overloaded, resulting in damage to equipment and more outages.

Project Benefits:

Operational field data suggests that a program is needed to address overloaded substation transformers and circuit. As the data above indicates, the percentage of these overloaded transformers exceeds the PLBN and need immediate replacement and/or create outages.

Project Relationships (if applicable):

Division	Substation	Voltage (kV)	CNR (MVA)	2017 Summer Peak Load (MVA)	2018 Summer Peak Load (MVA)	2019 Summer Peak Load (MVA)	2020 Summer Peak Load (MVA)	2021 Summer Peak Load (MVA)	5 Year Average	Thermal Loading	Future Load	5 Year Avg + Future Load	10 Year Avg Summer Peak Load (MVA)	CNR (MVA)
Liberty	Never Sink	4.8	2.50	2.57	2.520	2.450	3.871	2.520	2.786	111.45%		2.79	2.79	2.5
	Load Growth Factor				0.981	0.972	1.580	0.651	0.995			1.000		
	% loading of Sub Exit 477AL 080 Circuit	4.8	5.03	2.57	2.520	2.450	3.871	2.520	2.786	55.39%		2.44	2.65	5.03
	Regulator	4.8	2.9	2.57	2.52	2.45	3.87	2.52	2.79	96.08%				2.9

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	500	2,000	8,500	0

NYSEG

Hilldale Substation Transformer Replacement & New Circuit

Line of Business: Electric
Category: Reliability

Scope:

This project aims to:

- Transfer Load to Grossinger 210 and Kiamesha 261 (temporary load relief).
- Establish 2nd circuit position at Sub & build a 0.24mi line with 477AL to split #225 load.
- Add 4-line regulators and 2 switched line capacitors (resolve voltage issues).
- Upgrade the Hilldale substation with a new 22.4MVA 34.5-12.5kV LTC unit.

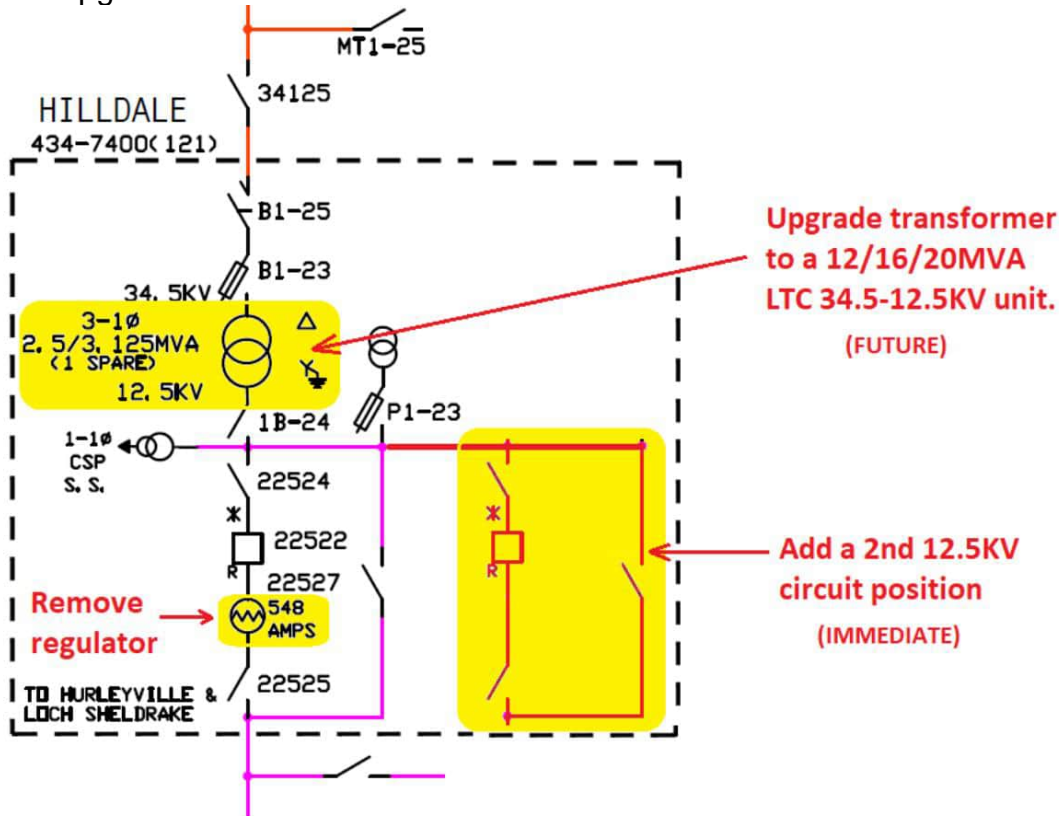


Figure 1 : Solution (Regional One-Line Diagram)

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The NYSEG Hilldale Distribution Substation located in the Liberty Division serves 2,220 customers via transformers with a continuous nameplate rating (CNR) of 10.5MVA. The substation serves a single 12.5kV distribution feeder (circuit #225) which feeds the Town of Fallsburg, New York. Based on a 5-year average, the substation transformers have been loaded to 107% of CNR (11.2MVA). Load growth has been averaging 4.5% annually. The loading on the transformer is projected to be 133% of CNR (13.98MVA) and 166% of CNR (17.43MVA) over the next 5 and 10 years respectively. In 2021, the transformer was loaded to 120% of its CNR rating. Based on a 5-year average, the substation exit 477AL conductor of the distribution feeder was loaded to 85% of its rating. At 4.5% annual growth, the loading is projected to be 106% and 132% over the next 5 and 10 years respectively. In 2021, the 477AL was loaded to 96% of its rating. There are existing voltage issues as low as 112V on the circuit. The minimum NYSEG standard is 117V. With the load growth, the voltage issues will worsen.

There are nearby circuits served from the Grossinger, Kiamesha, and Old Falls substation but they can only provide limited support to the load at the Hilldale substation.

There is 2088kW of existing and 11kW of queued generation on the circuit. The largest is the 2MW photovoltaic system at Sullivan Co. Community College connected April 2015.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	600	1,120	1,000	8,000

NYSEG

Crafts Substation Transformer Upgrade

Line of Business: Electric
Category: Reliability

Scope:

The objective of this program is to replace a substation transformer that is beyond its Continuous Nameplate Rating (CNR) and has thermal overload issues that have resulted in taking the substation offline and installing a mobile substation during summer peak load conditions over the past several years. The Crafts Distribution Substation is located in the Brewster Division and serves 5,266 customers with a transformer CNR of 22.4MVA. The substation serves a three 13.2 kV distribution feeder (circuit #422, 423 and 424) in the Town of Carmel, New York. The substation transformer is overloaded and pass its thermal rating that is 100% of CNR (22.4MVA). A new 22/26/33/37.3 MVA 46-13.2 LTC is required to address all the needs.

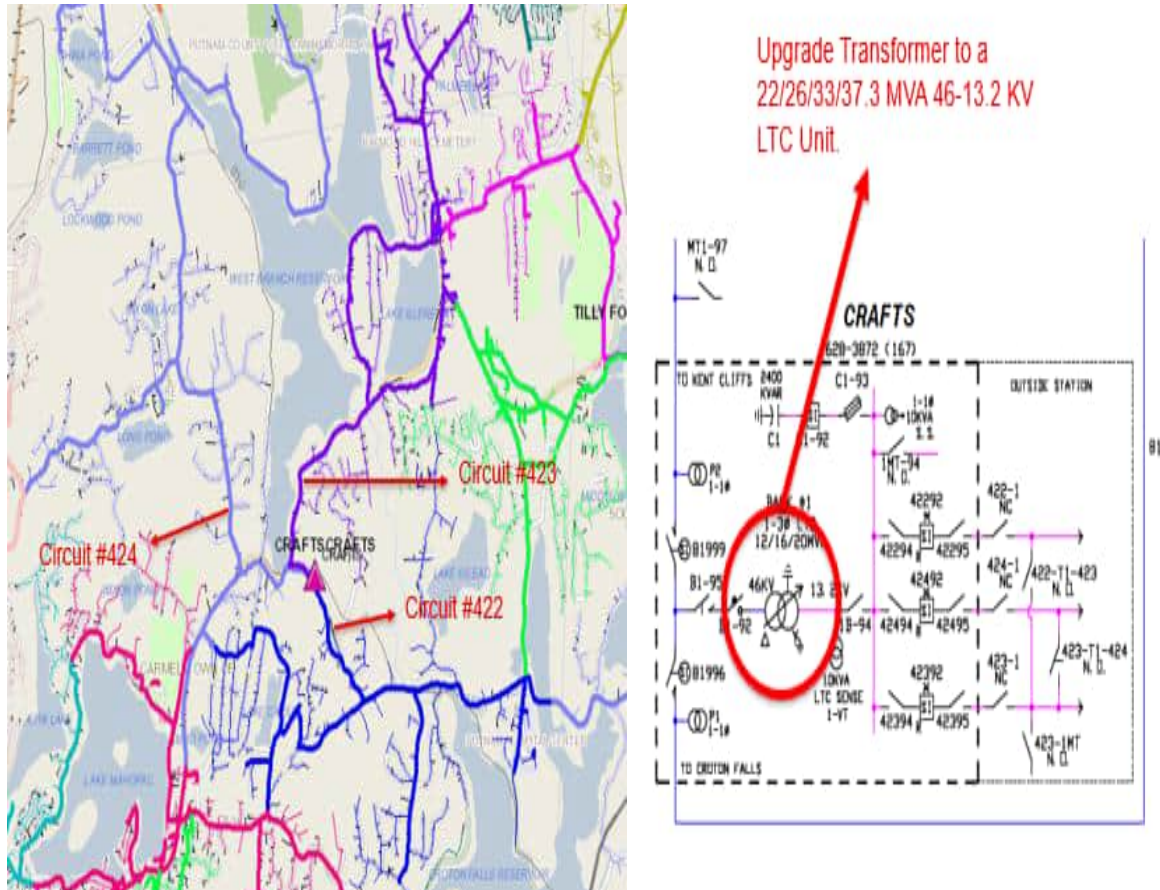


Figure 8: Solution Circuit Overview and Substation (One-Line Diagram)

Reasons and Benefits:

Based on a 5-year average, the substation transformer has been loaded to 99.5% of CNR (22.287MVA). In 2021, the transformer was loaded to 102.2% of its CNR rating and there are existing voltage issues on the circuit. There is no capacity to add the new load and the voltage issues will worsen. The substation has already passed its thermal rating and there is an immediate need to relieve the substation loading. Furthermore, there is no N-1 contingency at the substation.

A substation upgrade to a 1-22/26/33/37.3MVA 46-13.2kV LTC is needed and phase balancing on the distribution circuits are needed to balance the bank loading at the substation. By implementing all the recommendations, permanent load relief through the installation of 22/26/33/37.3 MVA 46-13.2 kV transformer and capacity to add extra load will be obtained. This project is required to address all these needs and all these

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improvements allow for increased reliability on the 13.2 kV system which can have very serious reliability concerns.

Solution Alternatives:

1) Partial (“In-Kind”) Replacement Projects – Projects designed to address identified overload asset condition needs on a component-by-component basis.

- a. Substation P&C replacements/upgrades such as electrotechnical (obsolete) relays, RTUs, batteries, SCADA, etc.
- b. Substation electrical and structural equipment replacements such as power transformers, circuit breakers, switches, insulators, bus, foundations, enclosures, etc.

2) Complete (“Full Rebuild”) Replacement Projects – Projects designed to address a wide variety of asset condition needs, at a single T&S facility, sufficient to justify the complete replacement or rebuild of a substation or transmission line.

- a. Substation rebuild projects.
- b. Distribution line rebuild projects.

Risk of No Action:

Assets will continue to remain overloaded, resulting in damage to equipment and more outages to customers. Field data suggests that a program is needed to address overloaded substation transformers. As the data above indicates, if we “do nothing” the percentage of these overloaded transformers will exceed their PLBN and need immediate replacement and/or create outages.

Division	Substation	Voltage (kV)	CNR (MVA)	2017	2018	2019	2020	2021	5 Year Average	Thermal Loading	Future Load	5 Year Avg + Future Load	10 Year Avg	CNR (MVA)
				Summer Peak Load (MVA)	Summer Peak Load (MVA)	Summer Peak Load (MVA)	Summer Peak Load (MVA)	Summer Peak Load (MVA)					Summer Peak Load (MVA)	
Brewster	Carmel	13.2	22.40	21.79	21.940	22.880	21.926	22.900	22.287	99.50%		22.287	25.235	22.4
Load Growth Factor					1.007	1.043	0.958	1.044	1.012			1.012		

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	500	1,000	8,500	0



NYSEG

North Brewster Reinforcement

Line of Business: Electric
Category: Reliability

Scope:

This project intends to upgrade to a new 46/13.2kV, 20/26/33 (37.3) MVA transformer, low side capacitor bank & accompanying equipment. Also included is the conversion of approximately 9 miles of the existing 4.8 kV circuits 153 and 154 to 13.2 kV.

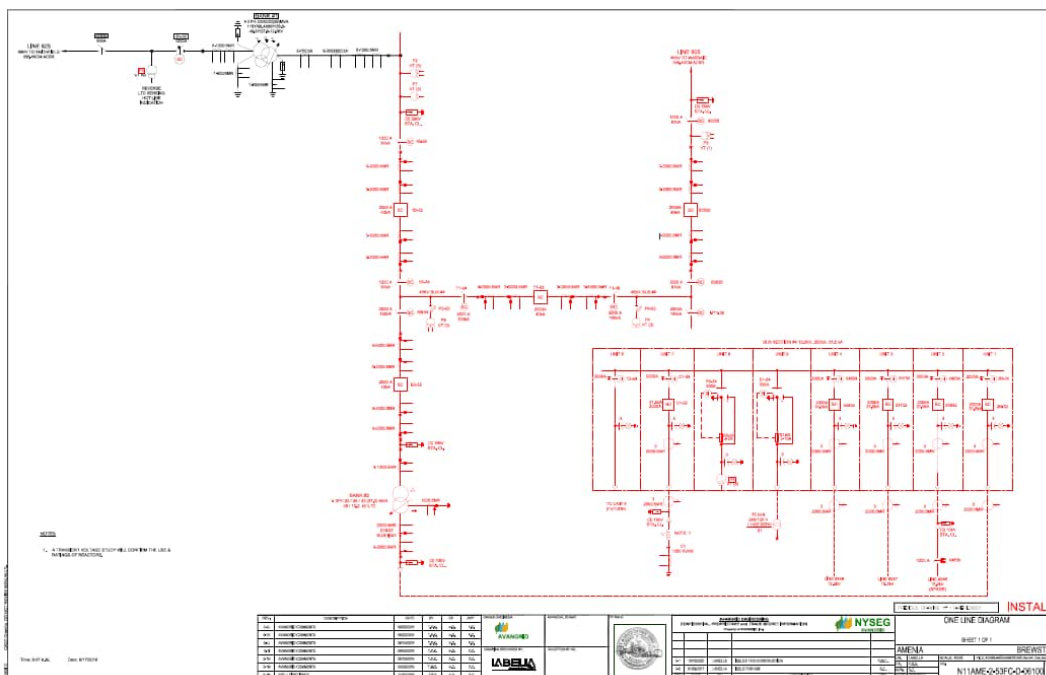


Figure 1: Amenia Substation One Line Diagram

Reasons and Benefits:

Silo Ridge Ventures, LLC is constructing a new housing and golfing development on NYS Route 44, Town of Amenia, NY. A new estimated additional connected load of

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2.5MVA is required to be supplied from Amenia substation located 0.4 miles from the development. This exceeds the load capacity of the existing substation.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,218	7,504	30	0	0

NYSEG

Hillcrest Transformer Replacement -Cap

Line of Business: Electric
Category: Reliability

Scope:

This project will replace the existing 34.5/12.5 kV transformer in poor health with a new (22) MVA 34.5/12.5 kV Transformer as well as the complete rebuild of the substation with 34.5 & 12.5 kV GIS using a compact substation design.

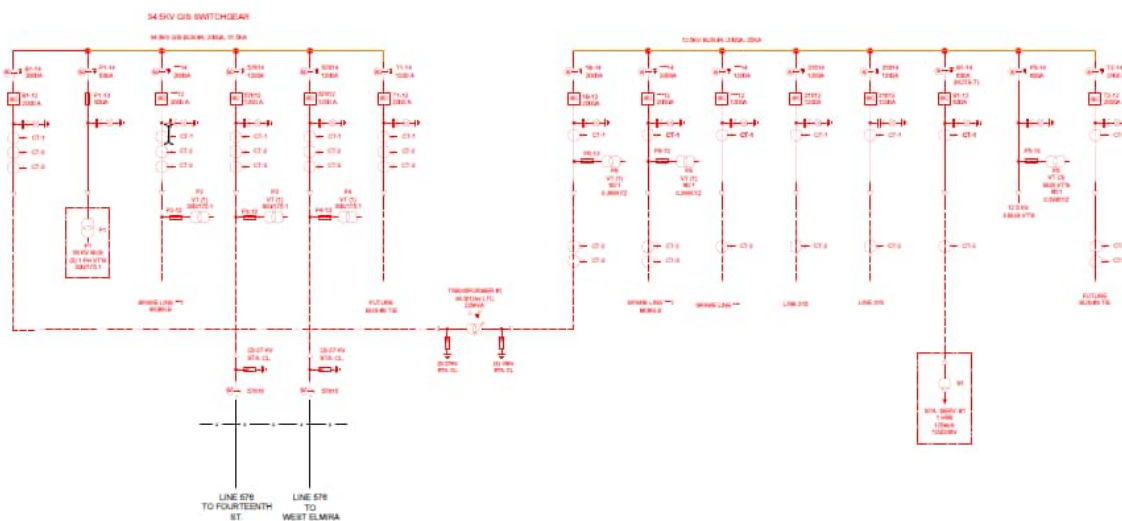


Figure 1: Hillcrest One-Line

Reasons and Benefits:

The transformer tested with an alarming level of combustible gases present and was removed from service after abnormal moisture content was discovered and should be replaced. A portable generator has been installed at the Station which has been on the site for approximately two years. The transformer foundation is a wood/steel beam and tie, is in poor condition and needs to be replaced. 12.5kV Cir #315 and #316 are old (1963) self-contained oil breakers and are scheduled to be replaced on the next major rebuild see latest Health assessment. Insulators in the substation are all old brown glass and need to be replaced. Several foundations are crumbling.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
8,299	1,242	0	0	0

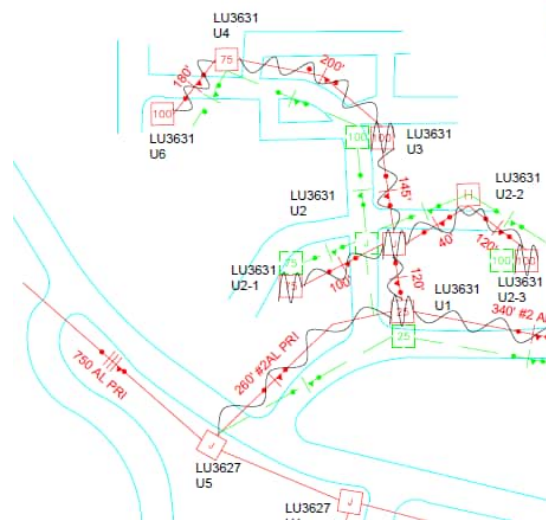
NYSEG

Heritage Hills Upgrade

Line of Business: Electric
Category: Reliability

Scope:

This project includes the replacement of aging underground equipment and cables in an existing condominium subdivision within the Brewster Division. The development was built in the 1970s and 1980s and is made up of 30 condominium blocks. Equipment failures caused by 40-year-old concentric neutral cables corroding resulted in a complaint being filed by the town of Somers in 2018. With the equipment failures in this development having become a growing concern over recent years, a rebuild is required at this time. Proposed in this rebuild is the replacement of all underground primary and secondary cables, switch gear, fuse gear, junction cabinets, transformers, and hand holes.



Example of planned rebuild in Condo Block 11.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

The primary need is to replace the direct buried concentric neutral cable which has begun to corrode which has caused voltage issues with worst case scenario being outages that last multiple hours. The secondary need is to replace other aging infrastructure which includes transformers, junction cabinets, hand holes, etc.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,584	2,619	0	0	0

NYSEG

Line 620 Rebuild - 34.5 kV

Line of Business: Electric
Category: Reliability

Scope:

This project is a 3.3 Mile Rebuild of a 34.5kV Line from West Lebanon Substation to Brainard Tap. During certain N-1 contingency conditions, the line can be closed to provide backup to the Wynantskill area substations. The current conditions of the line have limited its use to provide backup support to the area.

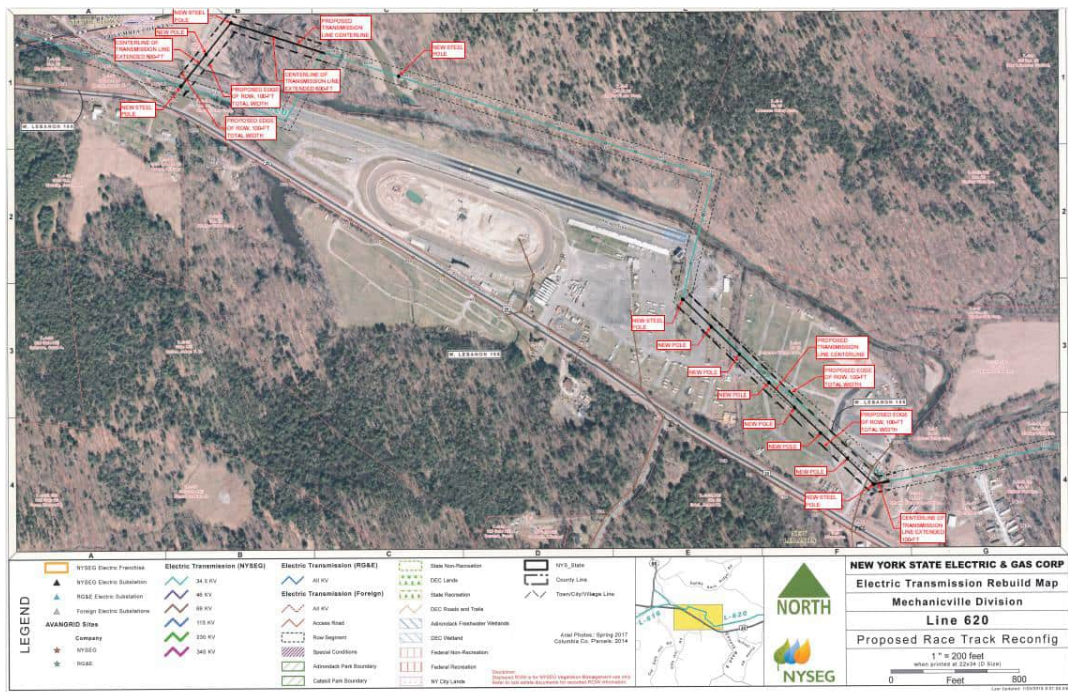


Figure 1: Picture of Work Area, Proposed Relocation.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The current conditions of the line have limited its use to provide backup support to the area. Correcting these problems will allow operations and the division to utilize the West Lebanon to Brainard 620 line during contingency conditions and provide backup and improved contingency voltage profile to the customers supplied from West Sand Lake, Crooked Lake, and Hoag-NM Substations. The problem occurs when the Mechanicville Division load exceeds 107 MW or for 1,450 hours in 2018. The potential load at risk is up to 5.6 MW and the customers at risk are 1918.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
39	1,710	4,086	0	0



NYSEG

BIM

Line of Business: Electric
Category: Reliability

Scope:

The Building Information Modeling (BIM) is the digital methodology for the construction industry, creating additional benefit, as humans, processes, and tools interact throughout the full lifecycle of a building through 3D visualization. For Avangrid, the electrical infrastructure, substations and transmission lines is the central objective of Building information Modeling. The BIM model is a database which includes 3D graphics, geometric equipment and plant models with metadata values and quantities / bills of material. These datasets are available to all those involved in a project. In addition, we can give these objects additional information in the form of properties and attributes. All new features, changes and further developments are integrated into this model and tracked through design, construction, and operation lifecycle. This IT project will deliver the best-in-class solution to achieve 3D modeling with quantities, time, and cost information and to provide an SAP interface for asset data and ongoing operation and maintenance.



Example Figure 1: BIM Concept

Reasons and Benefits:

BIM is the best solution for complex projects because it promotes collaboration and overall project design and management visibility and control including project

NYSEG and RG&E 5-Year Capital Investment Plan

execution and material procurement. BIM platform will enable cost savings through up to 50% reduced design time, change orders, and material staging / timing will be achieved.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	600	615	2,035	0

NYSEG

Sackett Lake Replace Transformer

Line of Business: Electric
Category: Reliability

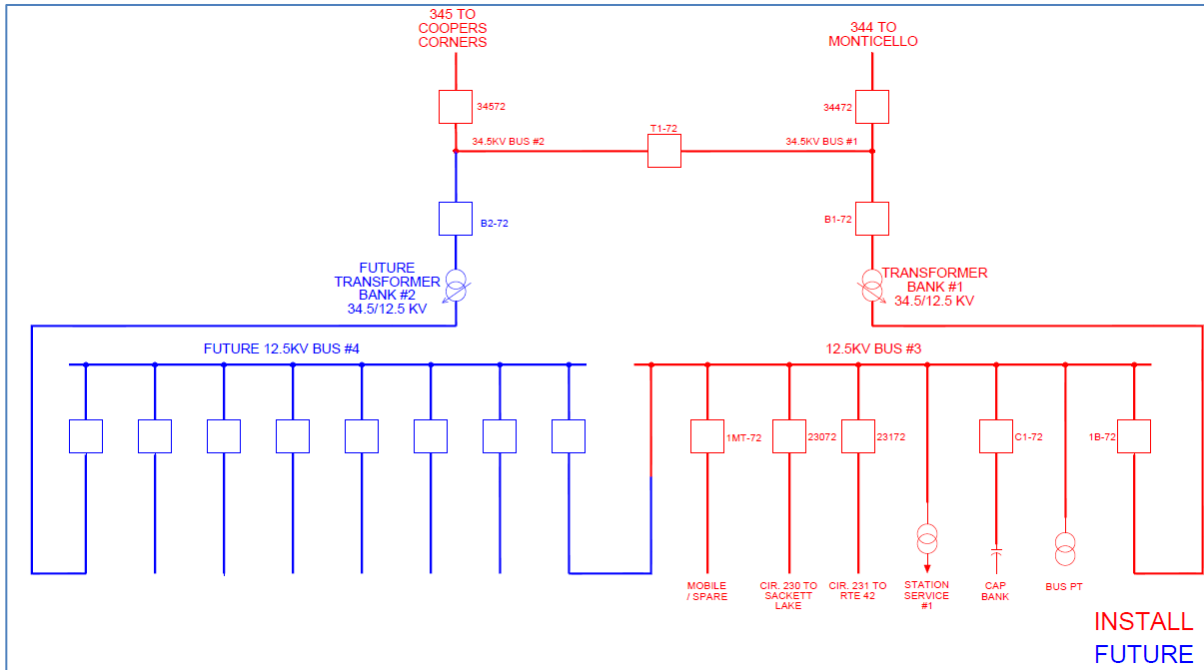
Scope:

The Sackett Lake Substation Rebuild project for the Liberty Division requires N-1 contingency support. The existing Sackett Lake Substation with a bank of three single-phase transformers rated 1667kVA, and 34.5-4.8kV serves as a distribution system step-down transformation from the 34.5kV system to the 4.8kV system.

The Sackett Lake 4.8kV distribution system has been experiencing important load growth and the Sackett Lake Substation Rebuild project proposes to convert the Sackett Lake substation and circuits to 12.5kV to further support load growth in the area.

The project will rebuild the substation in a greenfield area beside the current substation including a new transformer bank and medium voltage Gas Insulated Switchgear (GIS). Two 12.5kV distribution feeder circuits will be supplied from the new 12.5kV Gas Insulated Switchgear (GIS) bus, with provision made for two future 12.5kV distribution feeder circuits. The new transformer maximum ratings will be 36.2kV Delta –13.27kV, 10/12.5(14) MVA with an On-Load Tap Changer (OLTC). The bank will be protected with a new SF6 gas circuit breaker and associated protective relaying. The 34.5kV bus will be an open-air structure, and the 12.5kV bus will be new Gas Insulated Switchgear (GIS) per NYSEG standards. The protective relaying, the RTU, and the AC station service equipment and battery system will be in a powerhouse together with the Gas Insulated Switchgear (GIS) designed in accordance with NYSEG design criteria.

NYSEG and RG&E 5-Year Capital Investment Plan



SACKETT LAKE 34.5/12.5kV SINGLE ONE LINE DIAGRAM

Reasons and Benefits:

This project solution will serve the load growth in the area and provide better reliability through fusing and protection selectivity at a higher 12.5KV primary voltage. The Reduction in the load losses by upgrading the transformer size. Loss reduction on the circuits by converting from 4.8kV to 12.5kV. The Sackett Lake 4.8kV distribution has been experiencing load growth. Birchwood Estate added load on the Sackett Lake 121 4.8kV circuit. Sackett Lake 121 can support Birchwood Estate Phases 1 and 2 for a total of 650KVA. Birchwood Estate Phase 3 totaling 273KVA will require that the Sackett Lake 121 circuit be converted to 12.5kV. The substation requires an urgent rebuild to avoid problems with load, especially in summer peaks and the renovation of the existing substation whose equipment is more than 50 years old.

The project will support load growth and reliability in the area. The future second bank is planned for n-1 contingency support. This project affects 20,000 customers.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,037	0	0	0	0

NYSEG

Substation Modernization - Raquette Lake

Line of Business: Electric
Category: Reliability

Scope:

This project requires a full station rebuild at Raquette Lake with a 72.5 kV circuit breaker. All structural electrical and control equipment require replacement and expansion of the SCADA and control capabilities will be incorporated.

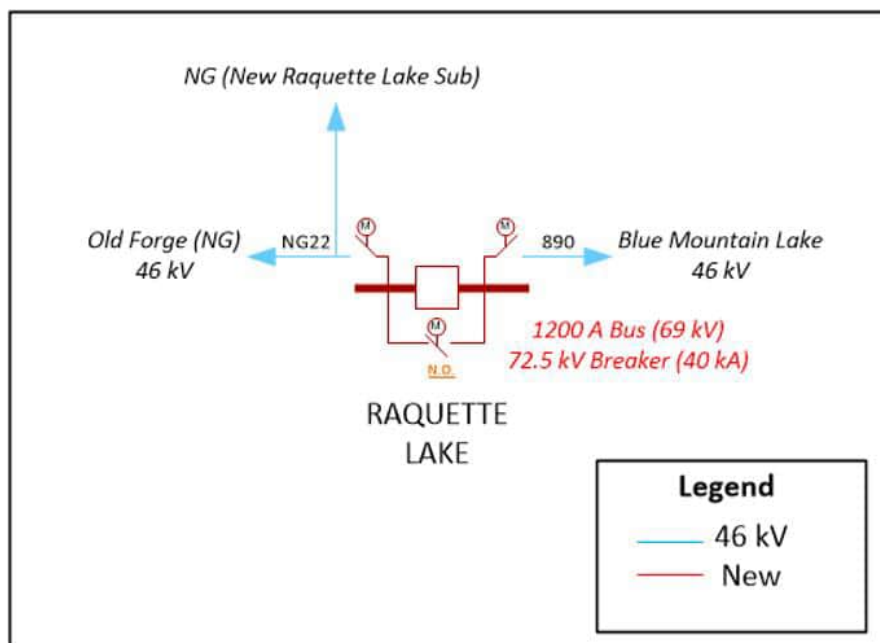


Figure 1: Raquette Lake One Line

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

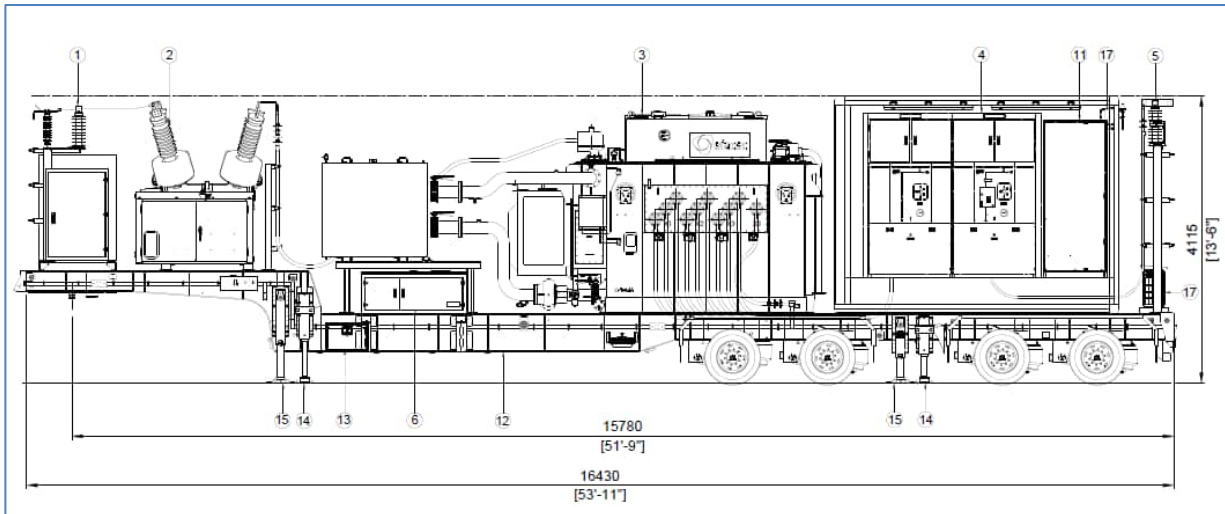
The existing recloser tests have shown it to have high contact resistance - it is aged and oil filled and poses an environmental risk. The wood support structure is at the end of its life and erosion, warping and splitting of the timber has been noted.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,934	11	0	0	0

NYSEG and RG&E 5-Year Capital Investment Plan



Mobile Substation #24 Overview Diagram

Reasons and Benefits:

Replacement of Mobile Substation #4 is necessary to ensure that NYSEG can continue to provide service to its customers during all situations, whether planned or unplanned.

Mobile substations are used to replace existing substation power transformers for routine maintenance, construction activities, or in the event of an emergency equipment failure. Mobile Substation #4 is currently unavailable for service due to several serious maintenance issues. Improve efficiency in responding to planned/unplanned substation maintenance, failures, or system emergencies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,555	922	0	0	0

NYSEG

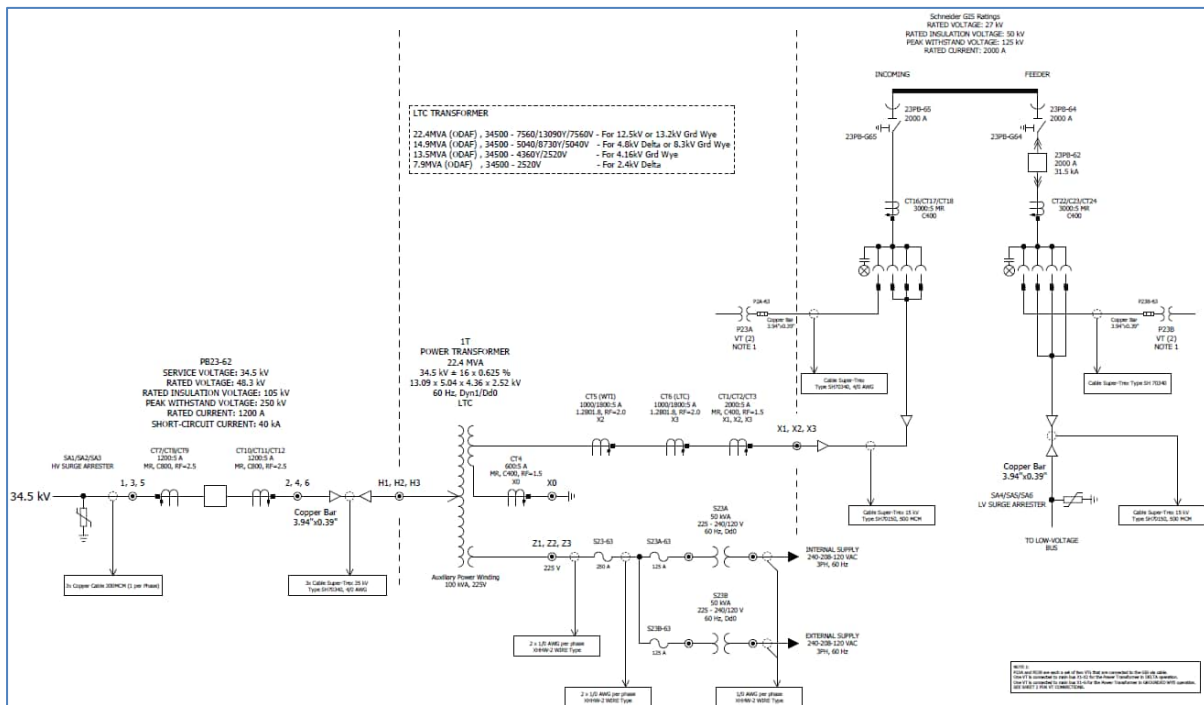
Mobile #2 Replacement

Line of Business: Electric
Category: Reliability

Scope:

The first NYSEG Mobile Substations were purchased in the mid 1960's. Most of them are approaching the end of their life cycle and need to be replaced due to aging of the trailer frame and electrical components. Mobile #2 and #4 are both critical pieces of equipment required to perform planned substation maintenance, respond to unplanned substation failures or system emergencies, and to accommodate substation capital improvements.

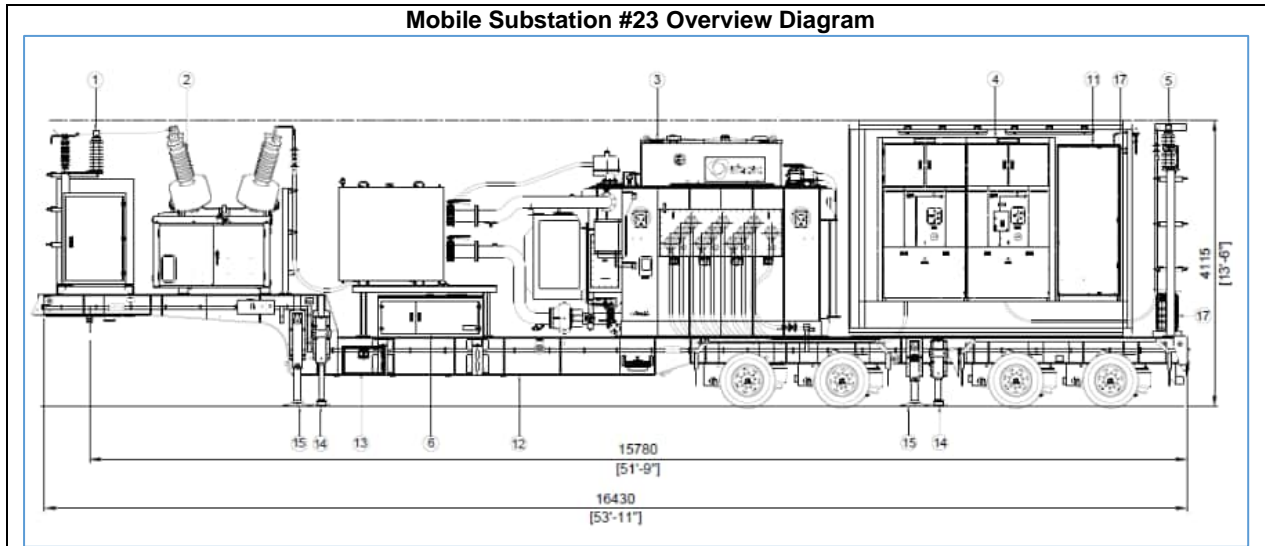
The existing Mobile Substation #2 will be replaced with Mobile Substation #23 at 34.5kV.



Mobile Substation #23 One Line Diagram



NYSEG and RG&E 5-Year Capital Investment Plan



Reasons and Benefits:

Replacement of Mobile Substation #2 is necessary to ensure that NYSEG can continue to provide service to its customers during all situations, whether planned or unplanned. Mobile substations are used to replace existing substation power transformers for routine maintenance, construction activities, or in the event of an emergency equipment failure. Mobile Substation #2 is currently unavailable for service due to several serious maintenance issues.

Improve efficiency in responding to planned/unplanned substation maintenance, failures, or system emergencies

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,792	670	0	0	0

NYSEG

Afton 34.5kV Line Addition

Line of Business: Electric
Category: Reliability

Scope:

This project is intended to upgrade an existing 3,600-foot, 35 kV single circuit line to two circuits out of the Afton substation, splitting the 2,000 customers. The project scope includes the installation of one new circuit breaker and two new group operated switches for the new circuit; installing new small control house to upgrade and relocate all existing relaying, communications, automations in the yard to the new control house. This project is partially completed with work done including new control house assembly, installation of new conduits, and splitting the existing circuit into two circuits utilizing a temporary recloser. However, the breaker installation and SP&C construction scope was not completed. A comprehensive study/assessment is being performed to re-evaluate outstanding project scope and current asset conditions at Afton.

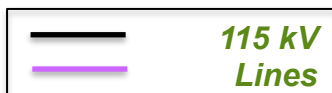
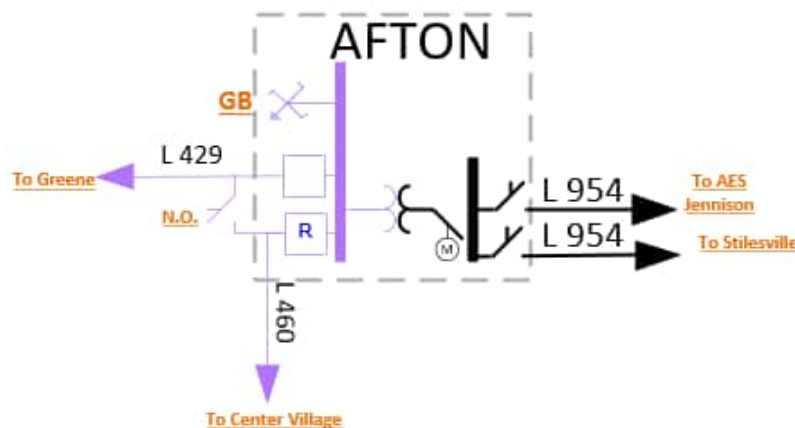


Figure 1: Existing One Line

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

An on-going comprehensive needs assessment has identified asset health issues which include:

- Outdoor Relay cabinet and control building (RTU/SCADA room) both have limited/no room for any major upgrade. This includes additional needs from the Bluestone wind interconnection project between Afton & Stilesville. In addition, the building has several code violations (NESC, IBC & NEC/NFPA 70) due to clearances, ventilation, & fire ratings.
- A newly assembled control house with no asset concerns not in service/remain unused.
- Substation relies mostly on obsolete electromechanical relays and SCADA automation with limited capabilities and are unsupported by their manufacturers.
- The temporary installed 34.5kV oil-filled recloser is obsolete and has limited capabilities. In addition, recloser indicates signs of deterioration due to age and wear and lacks information or maintenance data to properly assess its overall asset health.
- The 50-year-old 34.5kV ground bank is rated as fair according 2021 Substation Transformer Assessment report. However, recent visual inspection shows heavy sign of equipment deterioration including corrosion and rust that can be detrimental to overall health of bank.
- 1 out of 4 foundations for 115kV box structure shows mild deterioration from cracks. Additionally, all 115kV structure base plates and foundations contain standing water which can advance future deteriorations.
- Station fence is visually assessed as poor in condition.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,000	1,000	0	0	0

NYSEG

Sloan Substation Load Relief

Line of Business: Electric
Category: Reliability

Scope:

The Sloan Substation Load Relief project consists of three load transfers from the Sloan substation distribution circuits to neighboring circuits to reduce the expected peak overload on the Sloan substation transformer. In addition to the load transfers, this project includes the installation/relocation of a small, peak-shaving Battery Energy Storage System (BESS). The proposed load transfers and BESS will shed approximately 1.8MVA of peak load off the Sloan substation transformer and delay further and more costly substation upgrades/alternatives by at least 7 years.

- Load Transfers
 - Sloan #230 to Walden Ave #301
 - Sloan #231 to Walden Ave #301
 - Sloan #231 to New Gardenville #536

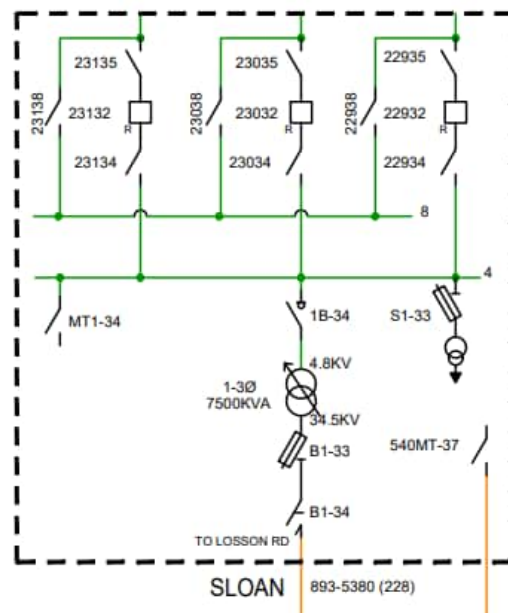


Figure 8: Sloan Substation System Operations Diagram

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	850	550	0	0



NYSEG

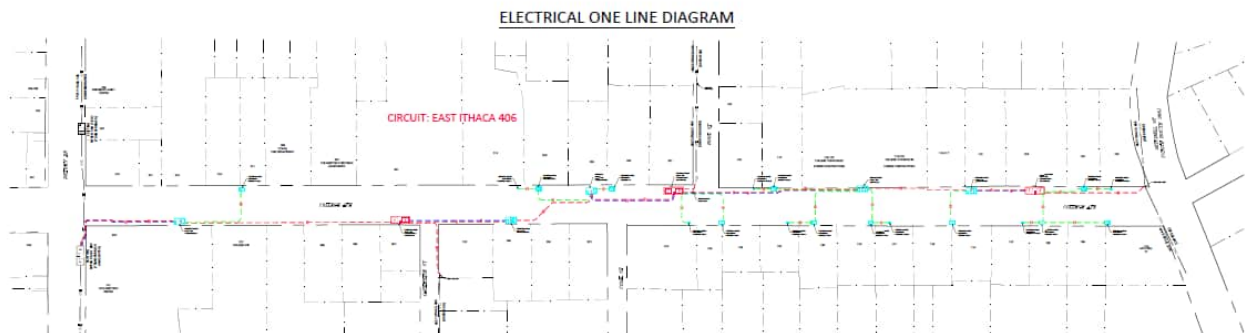
Ithaca - College Ave Underground

Line of Business: Electric
Category: Reliability

Scope:

This project was requested by the City of Ithaca. The project will relocate the 12kV overhead distribution line to underground in support of the Ithaca College Town Municipal Relocation Project. Approximately four blocks, 1,300 feet of new duct bank and 600 feet of spurs will be installed.

Example Figure 1: Circuit Location



Reasons and Benefits:

The project will relocate Overhead Distribution Infrastructure to underground and will include the installation/replacement cable, transformers, switchgear and all associated overhead removals. New switches and one recloser will be installed to facilitate isolation.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,371	0	0	0	0

NYSEG

NY Spectrum HW Refresh Capex

Line of Business: Electric
Category: Reliability

Scope:

Installation of the new hardware to replace all of the current hardware that contains the Spectrum 4.75 system; Installation of the new version of Solaris 11 OS and Oracle 12 DB; Update the newest code including any changes for the new Solaris OS, Oracle and the enhancements included in Appendix B-2; Second migration of data to perform site acceptance test (SAT); A full SAT with all tests including performance will be done

Reasons and Benefits:

Increased resource availability with cross functional resources across Operating Companies; Reductions in Support and Maintenance with a common platform; Increased/updated Security Controls; Improved architecture and infrastructure to support current platform with improved system redundancy and resiliency

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,258	0	0	0	0

NYSEG

Switched Source Tie Controller

Line of Business: Electric
Category: Reliability

Scope:

- Ithaca Division project is between 2 circuits of the same voltage and configuration that will allow dynamic dispatchable load control (up to 10.3 MVA) between South Hill Substation and East Ithaca Substation.
- Elmira Division project is between 2 circuits of the same voltage and configuration, but different phase angles between the Yawger Rd and Philo Rd substation (Yawger is fed from 115 kV transmission and Philo Rd is feed from 34.5 kV sub transmission). The circuits are out by 30° and there are a lot of commercial (malls) and industrial load in this area.

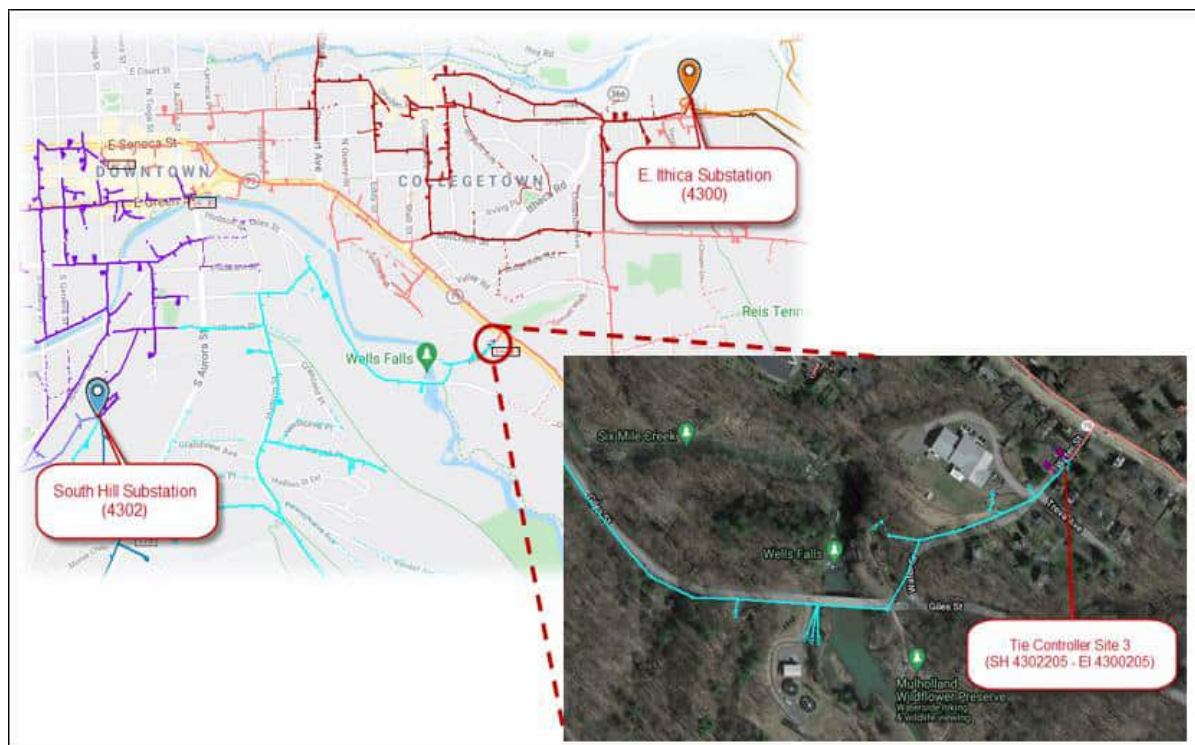


Figure 8: Solution (Ithaca Division)



Figure 2: Solution (Elmira Division)

Reasons and Benefits:

The Tie Controller can interconnect two systems of varying phase angle (30° difference)

Tie Controller can be used to increase DER HC by controlling real and reactive power flows between Yawger Rd Circuit 5208162 and Philo Rd Circuit 5206529

- High voltages that were observed under light load maximum generation conditions were brought within ANSI-A criteria using the Tie Controller
- Pre-Tie Controller only ~15% (1,155 kW) of generation could be brought online without causing a high voltage condition
- Post Tie Controller 100% (7,700 kW) of generation could be brought online without causing a high voltage condition, an increase of approximately 567% (6,545 kW)
 - Tie Controller has 4,700 kVA of additional capacity and may be able to increase DER HC further

Ithaca Project: Interconnect two substations (East Ithaca & South Hill Substation) so power can be exchanged between interconnected circuits on demand. The Ithaca 2030 Reliability Project expects to see demand increases up to 50%-100%.

East Ithaca Distribution Substation serves 8,016 customers (two transformers):

- Bank 2 has a CNR of 28.0 MVA and serves 3,367 customers from two 12.5 kV distribution feeders (circuits #203 and #201)
- Bank 3 has a CNR of 28.0 MVA and serves 4,649 customers from two 12.5 kV distribution feeders (circuits #202 and #205)

South Hill Distribution Substation serves 4,527 customers (two transformers):

- Bank 1 has a CNR of 10.5 MVA and serves 2,887 customers from two 12.5 kV distribution feeders (circuits #203 and #205)
- Bank 2 has a CNR of 14.0 MVA and serves 1,640 customers from two 12.5 kV distribution feeders (circuits #204 and #206)

Tie Controller can **automatically** transfer **dynamic/on demand** real and reactive power (up to 10.3 MVA) onto East Ithaca pending system capacity. The Ithaca 2030 Reliability Project expects load to increase by 50% to 100% by 2030.

Elmira Project: Interconnect two substations (Yawger Rd & Philo Rd) so power can be exchanged between interconnected circuits on demand.

- The Yawger Rd and Philo Rd Substations have similar voltage magnitudes; however, they're out of phase by 30°.
- The Yawger Rd and Philo Rd Substations serve significant commercial and industrial loads.

The Yawger Rd Distribution Substation serves 3,692 customers (one transformer):

- Yawger Rd Transformer 1 has a CNR of 22.4 MVA and serves three 12.5 kV distribution feeders (circuits #161, #162, #163)

The Philo Rd (PR) Distribution Substation serves 1,927 customers (one transformer):

- South Hill Transformer 1 has a CNR of 22.4 MVA and serves 1,927 customers from three 12.5 kV distribution feeders (circuits #528, #529, #530)

Load hosting capacity benefits

- Tie Controller can inject power from Philo Rd Circuit #529 into Yawger Rd Circuit #162 to assist in serving commercial customers

NYSEG and RG&E 5-Year Capital Investment Plan

DER hosting capacity benefits

- Overvoltage conditions were observed on Yawger Rd Substation Circuit #162 with all DER operating at 100% output under light load (25% of peak) conditions
- Tie Controller used to export power from Yawger Rd Circuit #162 to Philo Rd Circuit #529 to assist in Yawger Rd Circuit #162 voltage control and improve performance
- Increased DER hosting capacity from 1,155 kW to 7,700 kW (+567%)

Reliability and resiliency benefits under N-1 condition

Operational benefits—no longer need to dispatch crews for infield switching because of phase angle difference between circuits

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
50	885	272	0	0

NYSEG

Energy Control Center (ECC) Distribution Room Expansion

Line of Business: Electric
Category: Reliability

Scope:

In 2019, the RG&E and NYSEG controls centers were consolidated into the Vestal ECC. A project is underway to have the ECC take jurisdiction and operate the distribution assets, these assets are currently in the control of the individual NYSEG divisions. RG&E distribution has been controlled from the ECC for many years, and this centralized control is much safer and more efficient. The current ECC distribution room is in the basement of Binghamton NY ECC. It was sized for 20 operators and a proportional number of support staff. We need to increase the number of operators to 40 to centralize NYSEG’s distribution operations.

There is a space on the first floor of the ECC that is 30% larger and available. Another 30% is adjacent to this space in case additional expansion is required, but our estimates show that the required desk space can be accommodated in the available room.

Reasons and Benefits:

Automated fault isolation and customer restoration are key components of tomorrow’s Smart Grid. These complex systems require centralized control systems and sophisticated procedures to properly operate the electric grid. To safely centralize the operations, we need additional resources in the Vestal ECC, and these resources require space in the control center.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,100	0	0	0

NYSEG

Willet New 2nd 115-34.5kV Transformer

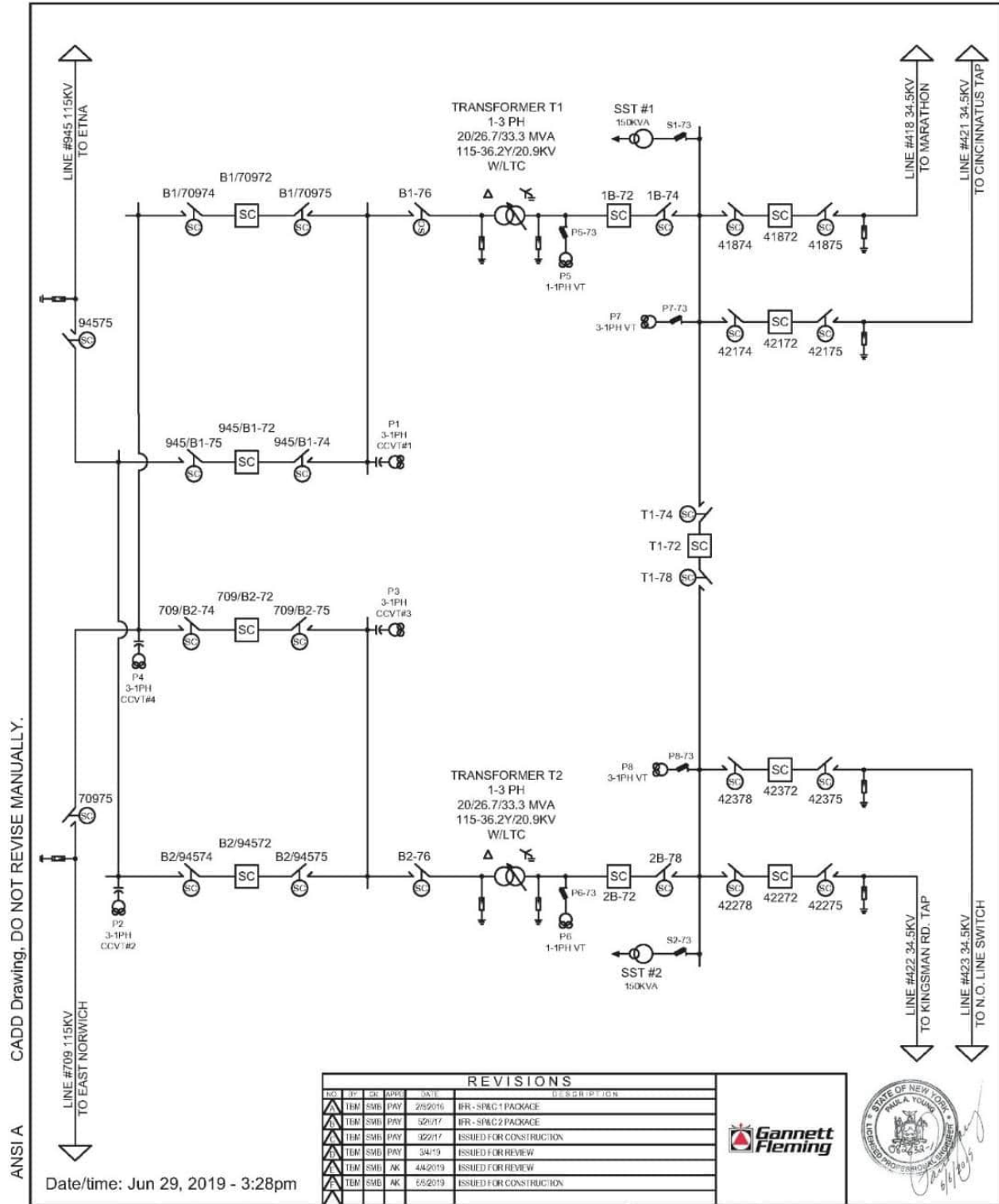
Line of Business: Electric
Category: Reliability

Scope:

A Willet SS rebuild consist on the purchase and installation of a new 115/34.5kV, 20/26/33MVA, LTC transformer to operate in parallel with the existing substation transformer and provide necessary switchyard equipment plus protection and control equipment to bring the substation up to the latest standards.

An adjacent property was procured in order to rebuild the new substation. The old substation will be decommissioned and demolished.

NYSEG and RG&E 5-Year Capital Investment Plan



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Reasons and Benefits:

Presently, sub-marginal voltages appear in the area(s) served from the Marathon, Chenango Forks, Dorchest, Greene, Katelville, Willet, High Street, Tarbell and Whitney Avenue substations upon loss of the Willet 115/34.5kV transformer. Exposure to sub-marginal voltages, given the transformer loss contingency, during the winter season, is 3070 hours/year. This contingency causes 5097 customers (with 16.3 MW of summer load and 20.7 MW of winter load) to be dropped. In summer, the sub-marginal voltage problem will appear in areas served from the same set of substations upon loss of the Willet 115/34.5kV transformer. The installation of a new transformer will increase system reliability by allowing at least one transformer to remain in-service when one of the transformers is out-of-service.

The installation of a second transformer in Willet substation will increase the reliability of the system in the area, especially during the summer peak load periods.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
67	0	0	0	0

Electric Reliability

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RG&E

Webster Area Projects

Line of Business: Electric

Category: Reliability

Scope:

The Webster Area project consists of the full rebuild of three substations i.e. (Station 73, Station 55 and Station 62), brownfield upgrades at three substations (Station 420, 42 and 420) the rebuild of four 34.5 kV lines and the addition of two new 34.5 kV lines (Circuits 813 and 812).

Please refer to the Webster Area Comprehensive needs and solutions assessment for further information about this project.

Reasons and Benefits:

Benefits:

A Comprehensive Area study was conducted to address all reliability, distribution and asset condition needs in this area. A comprehensive reliability study was performed in 2019 which revealed thermal and loss of load violations on numerous lines. The Line 778 had a N-1 and N-0 thermal overloads, Line L735 had N-1 thermal overloads, Line 772 had N-1 thermal overloads, Line 726 had N-1 thermal overloads, Lines 780 and 740 both had N-1 loss of load violations. All these violations were identified when more than 25 MW of could be lost if a thermal overload were identified.

A comprehensive needs and solutions assessment were performed to address these reliability needs while also addressing asset condition needs. The station 62 project requires a full rebuild to allow for the rebuild of the 34.5 kV bus in accordance with the preliminary preferred solution as well as Station 55 and Station 73. Station 73 also includes a voltage conversion of approximately 12.5 miles resolve voltage issues on the existing distribution circuits.

A total of 12 projects are required to address all these needs and all these improvements allow for increased reliability on the 34.5 kV system which was shown to have serious reliability concerns. Please refer to the Webster Area Comprehensive Needs and Solutions Assessment and the 2020 Station 42 (Webster Area) Reliability Study Report for additional details.



NYSEG and RG&E 5-Year Capital Investment Plan**Risks:**

This project resolves the risk of thermal and loss of load in the study area. Risk of No Action includes significant risk of thermal and loss of load would be allowed to remain on the system affecting system reliability.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
22,942	61,789	16,302	2,774	

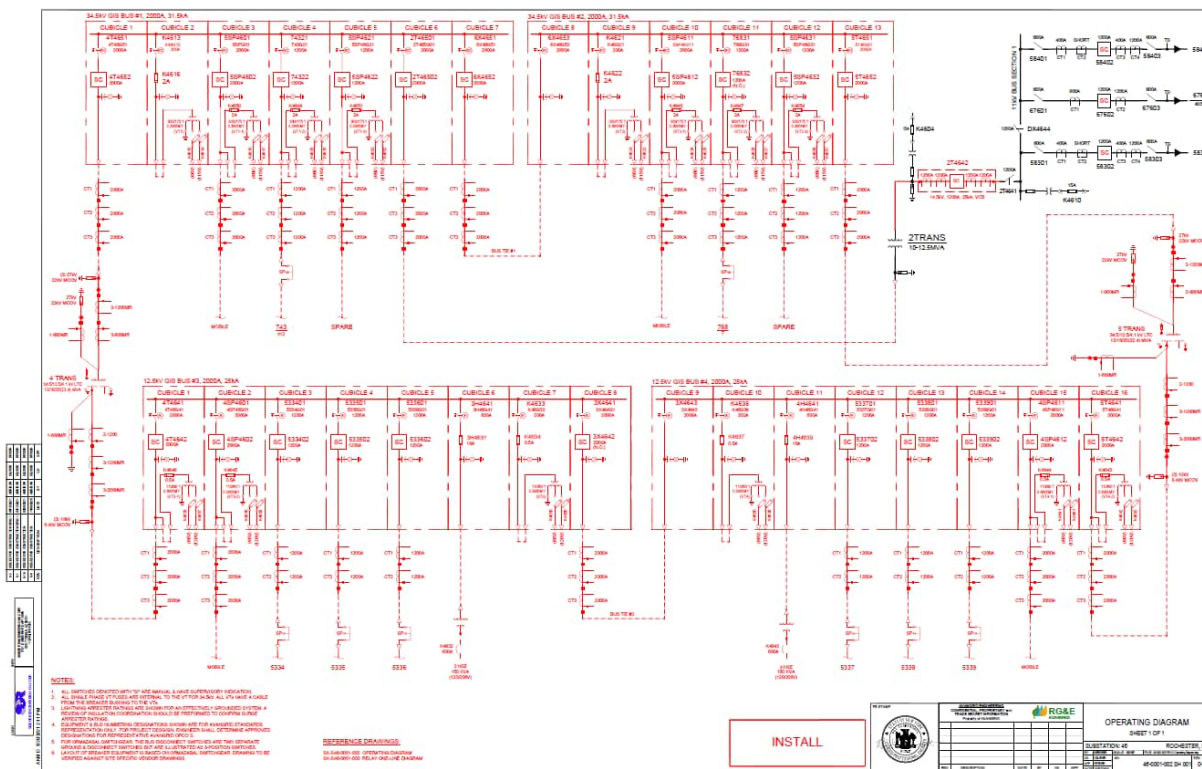
RG&E

Station 46 - Replace #1 #3 Transf. Banks T

Line of Business: Electric
Category: Reliability

Scope:

This project calls for the design and construction of 2 new 22.4MVA LTC 4T & 5T transformers for installation, new station service transformers, new control house with 34&12kV GIS switchgear, RTU, HMI, SCADA/communication panels, AC/DC panels and NiCad battery system. Distribution scope includes the 4kV to 12kV conversion of the station's six (6) distribution circuits which serve approximately 6,356 residential and commercial customers. Convert 4kV distribution equipment, potentially 600 distribution transformers and 57 miles of circuit conductors to be replaced or re-rated to 15kV.



NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- The transformers are aging units, #1T was placed in-service in 1951, 70 years; #3T was placed in service in 1958, 63 years.
- The loading on the existing transformer banks #1 and #3 at Station 46 has reached 99% and 82% of their ratings during the summer peak of 2011.
- The total peak loading at the station was 13+ MVA, for two consecutive years (2012 & 2013).
- Loss of either transformer places the sister unit well above its LTE rating, which conflicts with Distribution Planning Criteria.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,791	11,698	22,533	16,445	2,344



RG&E

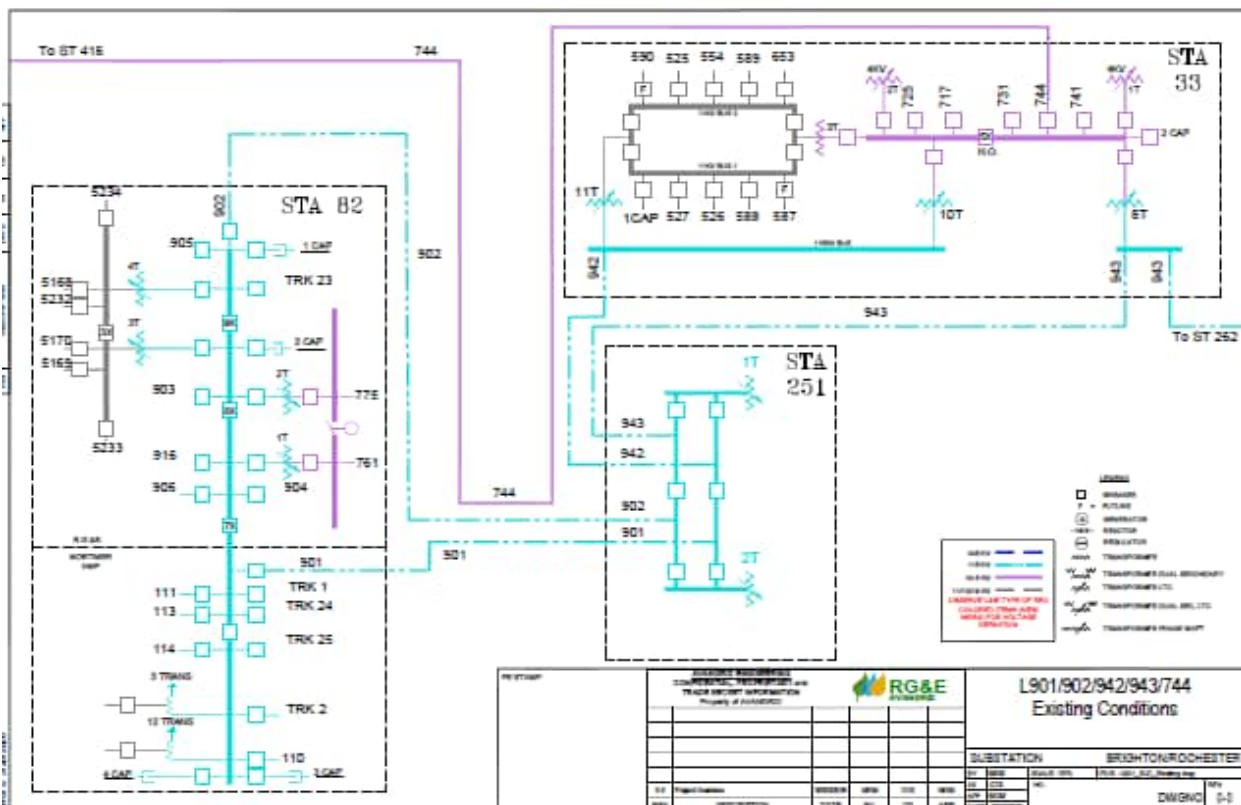
Line 901/902/942/943/744 Replacement

Line of Business: Electric
Category: Reliability

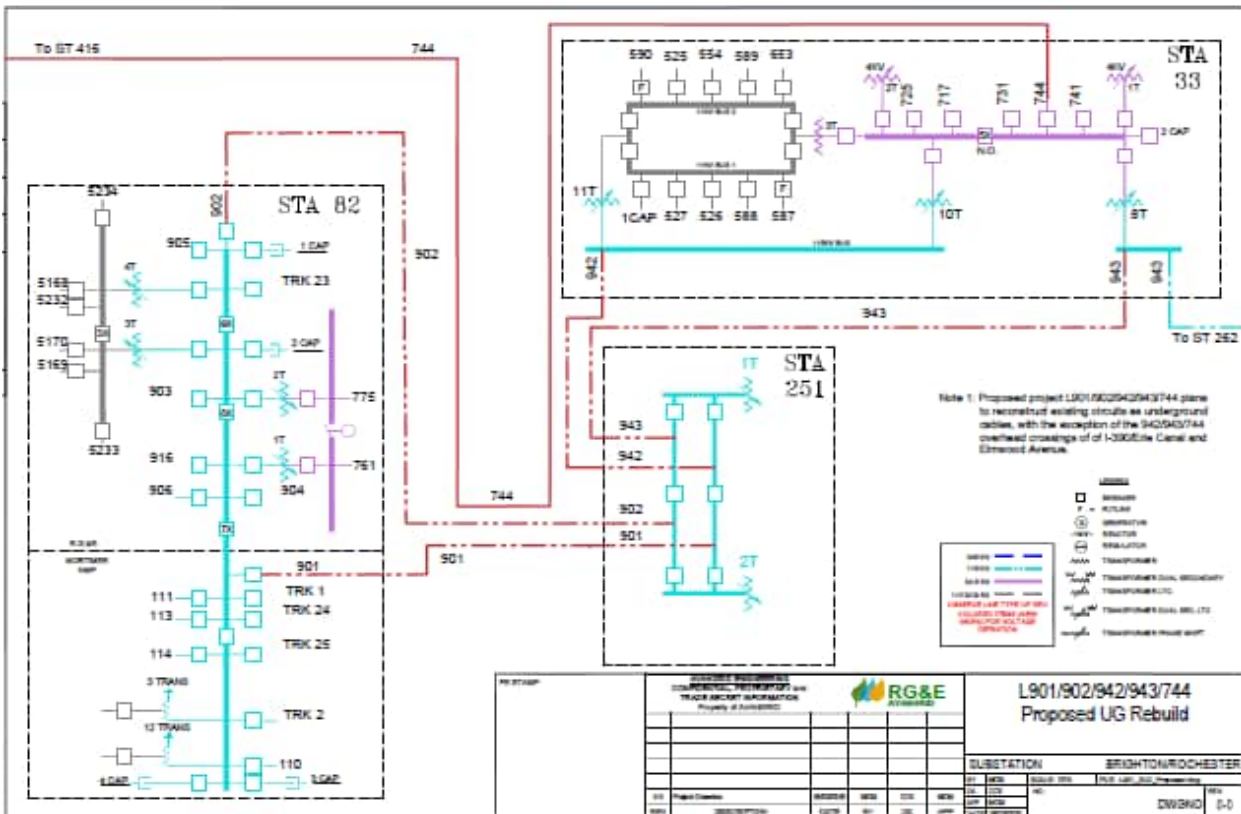
Scope:

The latest TPL Study (2018) resulted in a need to support a 400MVA normal rating on the 901/902/942/943 corridor. Current capacity in the area is 182MVA, resulting in the need to rebuild the circuits. There is also a requirement to meet a 640 MVA Summer LTE for 901 and 594 MVA Summer LTE for 902. The station 23 program constructed Lines 943 and 944 from station 33 to station 262, and 23 respectively and meets these requirements today. Additionally, a 34.5 kV Line 744 runs parallel to the ROW of Lines 901 and 902 and was constructed under a revocable license. In order to reconstruct Lines 901 and 902, line 744 will need to be relocated to optimize the ROW.

The following substations are affected by this scope: 33, 251, 82 and National Grid's Mortimer station.



NYSEG and RG&E 5-Year Capital Investment Plan



Reasons and Benefits:

Comprehensive list of needs used to support the selected solution alternative.

Project (UH-R0000117) proposed by Transmission planning, certain upgrades were required on the Line 901 and 902 circuits along the entire transmission corridor from Station 82/Mortimer to Station 23. The main requirement to be addressed was that Line 901 throughout the entire corridor would require a 400MVA Normal Rating.

This scope was further segmented by a parallel project (UH-R0000612) to construct and energize a new Station 251 between Station 82/Mortimer and Station 33, to provide a source to University of Rochester’s new Station 710 (located on the same site as St 251). The Station 251 project segmented Line 901 into Line 901 (Mortimer – Station 251) and Line 943 (Station 251 – Station 33 – Station 23 (UG)), as well as segmenting Line 902 into Line 902 (Station 82 – Station 251) and Line 942 (Station 251 – Station 33). Despite this change in nomenclature and network topology, the requirements for Lines 901 and 943 to meet the 400MVA summer normal rating remained.

During project engineering, transmission planning supplied additional documentation indicating that there was a change in scope from the original. This change requested a



NYSEG and RG&E 5-Year Capital Investment Plan

higher rating for the circuit during LTE conditions, leading to a new requirement of 640 MVA Summer LTE.

It was also known at this time that a separate project to construct new Station 262 (UH-0000086) would segment Line 943 into Line 943 (Station 251 – Station 33 – Station 262 (UG)) and Line 944 (Station 262 – Station 23).

This request was reviewed over the course of engineering the project and additional studies were performed to determine the feasibility of this request. The Station 23 program assumed these ratings as part of their scope at this time. Both Lines 943 and 944 were able to meet these requirements during the underground reconductoring between Station 33, Station 262, and Station 23, respectively.

For the Line 902 scope of work, this document was provided by Transmission Planning to highlight the overall rating requirements for Line 902. The target rating provided was 594 MVA Summer LTE, which corresponded to similar requirements noted in the previous scoping document for the Line 901 section from Mortimer to Station 251. The Station 23 program assumed these ratings as part of their scope at this time.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	15,072	27,504	16,198	0

RG&E

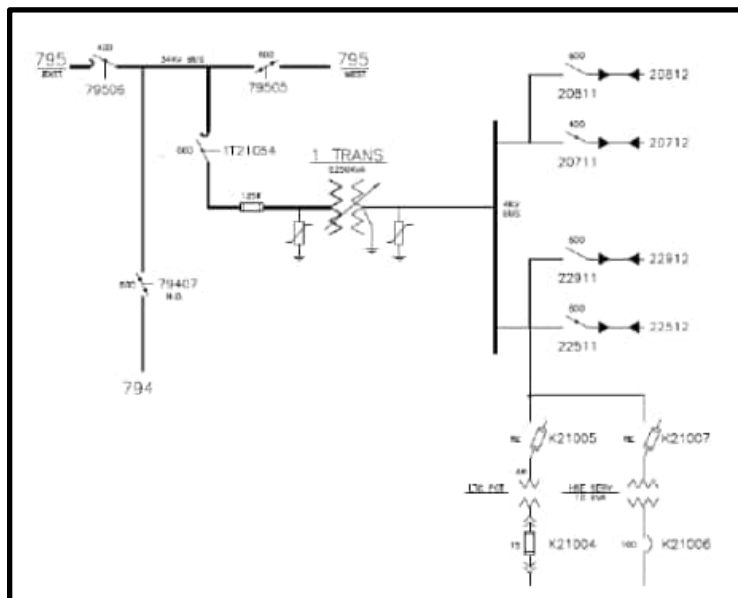
Sta 210 Modernization Prj - Install WO

Line of Business: Electric
Category: Reliability

Scope:

The station 210 project is currently being comprehensively evaluated to address all needs at the station. Currently voltage issues on the existing 4 kV network have been identified as well as asset condition issues on the 4 kV bus i.e. (The 4 kV bus currently has no breakers which were removed as a part of previous project).

The project should restore the station to its original functionality and address all reliability, distribution and asset condition needs.



Existing Station Single Line Diagram

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

4 kV voltage violations have been identified along with the modified station topology. There is also a need as a result of the 208 project which removed field tie capabilities. Refer to the Station 210 Distribution Planning study report.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,175	1,594	4,730	16,598	20,784

RG&E

Breaker Prog

Line of Business: Electric
Category: Reliability

Scope:

The Substation Circuit Breaker Replacement program prioritizes the proactive replacement of substation circuit breakers needing intervention based on the latest health and risk assessment and breakers that have been identified as overduet by Engineering. The assessment lists candidate units to be evaluated for replacement by investigating specific needs including operational and maintenance issues identified for each unit, and coordinating with system operations, maintenance engineering and the projects teams.

The Asset Health and Risk Assessment looks at a health, criticality, and risk index for specific asset class equipment. A Health Index quantifies equipment condition based on numerous condition parameters related to the long-term degradation factors that cumulatively lead to an asset's end of life. The health score is a composite indicator of the asset's overall health, relative to a brand-new asset, and is given in terms of percentage, with 100% representing an asset in "as new" condition. The health index is analogous to the probability of failure of an asset. The Criticality Index is analogous to and quantifies the consequence of a failure of the asset. For circuit breakers, the consequence or severity of a breaker mis-operation or failure is represented by several factors including safety to utility personnel and the public, environmental impact, impact to customers, fiscal impact, impact to other parts of the electric grid, and regulatory compliance issues. A Risk Score quantifies the risk associated with each asset. The risk score is a combination of the Health Index (probability of failure) and the Criticality Index (consequence of failure). Risk scores can be used to show the level of need for intervention for each asset.

Reasons and Benefits:

The latest health assessment identifies 350 substation circuit breakers as in Poor health and 96 substation circuit breakers in Very Poor health as candidate units for replacement. The latest risk assessment scoring identifies 340 substation circuit breakers as High risk and 8 substation circuit breakers as Very High risk as a starting point for prioritizing candidate units. These breakers are included in the list of Poor and Very Poor health.

Candidate circuit breakers typically fall in two categories:



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- Obsolete models are older models that are increasingly difficult to maintain due to lack of vendor support and inability to get parts.
- Older models that have components that need more frequent maintenance to assure proper operation.

Currently, 15% of breakers in RG&E are over 60 years old, if no breakers are replaced that number grows to 26% by 2030. *(Aging is only an indicator for asset replacement. Actual replacement is driven by condition-based analysis)*

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,015	6,268	7,835	8,227	8,639

RG&E

Transmission Reinforcement Program

Line of Business: Electric
Category: Reliability

Scope:

In 2021 AVANGRID Transmission Planning completed a needs assessment on the local transmission system and identified over 170 loss of load, thermal, and voltage criteria violations that can directly affect our customers.

Based on the quantity of identified needs AVANGRID expects that a significant investment is needed to reinforce the local transmission systems so that they meet the AVANGRID Transmission Planning loss of load, thermal, and voltage criteria.

Development of comprehensive solutions for the identified needs, coupled with asset condition assessments will begin in 2022 with many solution designs expected to be finalized by 2024. Solution development and project execution will be prioritized based on several factors such as customer benefit, asset health, and solution complexity.

This Program is to address needs identified on the RG&E Transmission System.

Reasons and Benefits:

The 2021 AVANGRID Transmission Planning local transmission system needs assessment identified criteria violations throughout the RG&E local transmission systems. A high-level summary of local needs is shown below.

Local Transmission Violations (N-1 only)			
OpCo.	Loss of Load	Thermal / Voltage	Total
RG&E	23	22	45

There are at least 20 Loss of Load (LoL) criteria violations. A summary descriptive statistic of single contingency exposure on transmission system that violates loss of load criteria is presented below:



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Descriptive Statistic	MW	Customer Count	Miles
Min	10.3	7	0.1
Max	43.7	10,263	35.1
Mean	19.2	4,170	9.53
Median	17.4	4,140	6.15

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,000	10,000	10,000	10,000	0

RG&E

Comprehensive Area Studies

Line of Business: Electric
Category: Reliability

Scope:

The Distribution Comprehensive Area Improvement Program will consist of several projects that will be identified by the Electric Distribution Planning management team through a process of identifying deficiencies and performance issues both present and future (10 year projection) that will negatively impact the ability to provide reliable and consistent power to our customers.

Comprehensive area studies are performed on substations and distribution feeders, analyzing present and future conditions related to distribution system capacity loading, common operating voltage conditions, load balancing, reliability and resiliency, loss of load, voltage and power factor quality, distributed generation, hosting capacity and distribution automation and SCADA needs.

Reasons and Benefits:

Several projects are under consideration that require intervention to maintain necessary reliability and performance for our customers.

Example projects will include (but not limited to):

- Station 16 evaluation. The station is 11.5kV and serves 5062 customers with two undersized 34.5kV/4.16kV transformers and six (6) 4.16kV feeders all predicted to be overloaded during peak demand in 10 years. Consideration will be given to increasing capacity of transformers and feeders, improve N-1 capability with automation and capacity increase and target asset replacements based on condition and capability to achieve new capacity goals. Consideration will also be given to alternative solutions such as area station consolidation, voltage conversion and NWA.
- Station 127 evaluation. The station is 12.47kV and serves 6356 customers with one 34.5kV/12.47kV transformer that has been overloaded the last several years and three feeders that are also at capacity. The transformer was replaced with a next size larger unit that was spare from another station in 2021 but will require further upgrade in the next 10 years to address capacity issues. Consideration will be given to increasing capacity of transformers and feeders, improve N-1 capability with automation and capacity increase and target asset replacements based on condition and capability to achieve new capacity goals. Consideration

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will also be given to alternative solutions such as area station consolidation, voltage conversion and NWA.

- Station 69 evaluation. The station is 12.47kV and serves 6356 customers with one 34.5kV/12.47kV transformer and three feeders. The station transformer has been overloaded the last several years during peak demand and the feeders are projected to be at or above capacity during peak demand in 10 years. Consideration will be given to increasing capacity of transformers and feeders, improve N-1 capability with automation and capacity increase and target asset replacements based on condition and capability to achieve new capacity goals. Consideration will also be given to alternative solutions such as area station consolidation, voltage conversion and NWA.
- Station 215 evaluation. The station is 4.16kV and serves 465 customers with one 34.5kV/4.16kV transformer and two feeders. The station transformer has been overloaded the last several years during peak demand. Consideration will be given to increasing capacity of transformers and feeders, improve N-1 capability with automation and capacity increase and target asset replacements based on condition and capability to achieve new capacity goals. Consideration will also be given to alternative solutions such as area station consolidation, voltage conversion and NWA.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
500	5,000	5,000	10,000	10,000

RG&E

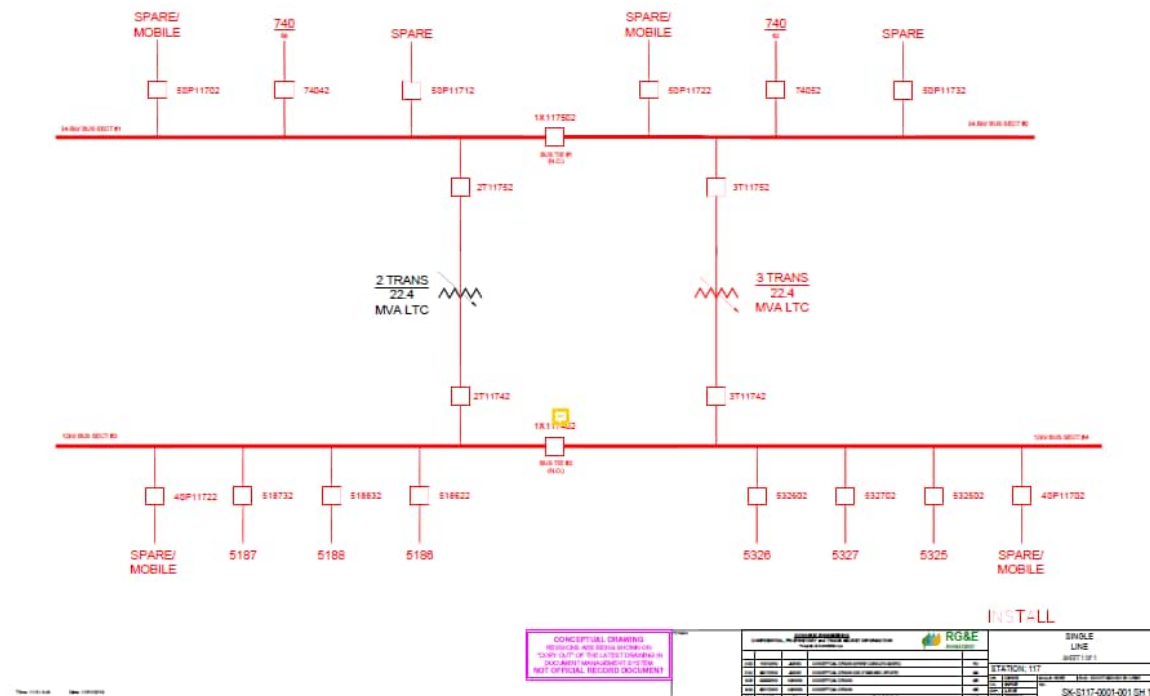
Station 117

Line of Business: Electric
Category: Reliability

Scope:

The existing transformer #1 at Station 117 is overloaded and requires an upgrade to support the needs of the sponsor, distribution planning. This transformer also serves 3 – 4kV distribution circuits which will be upgraded to 12kV. This will improve substation capacity, substation reliability, and overall network enhancement.

- Upgrade existing 1T (5.25MVA) to a new 22.4 MVA transformer
- Installation of new 34.5kV/12kV GIS, control house, protection & control
- Upgrade 3 – 4kV distribution circuits to 12kV



NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

- Station 117’s existing transformer #1, a 5.25MVA, transformer had a peak loading of 103%PBLN in 2013. This transformer feeds 3 distribution circuits that serve a total of 4,100 customers.
- Failure of the transformer will result in an overloaded LTE on the substation thus creating an issue for our customers translating to the need by distribution planning to solve this problem.
- Our proposed upgrades will replace the 5.25MVA with a new 22.4MVA transformer which will match existing transformer #2. This not only improve substation capacity but coupled with the upgrade of the distribution circuits from 4kV to 12kV will enhance the reliability and commitment to our customers.
- In addition, it will strengthen the surrounding 12kV network by enhancing N-1 capacity to adjacent circuits that are currently without adequate circuit ties during high demand periods.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,065	5,296	6,356	9,850	4,553



RG&E

Station 49 4kV to 12kV Upgrade

Line of Business: Electric
Category: Reliability

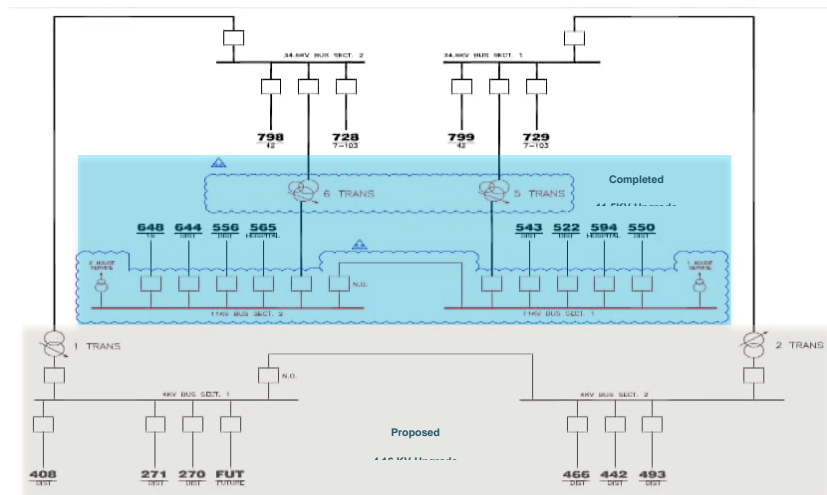


Figure 8: (One-Line Diagram)

Scope:

Heavy demand on the 4kV network at station 49 has led to compromise of N-1 between the station 4kV transformers. Projected demand will increase the transformer load to 70%/81% of transformer capacity respectively in 5 yrs. In addition, five of the six 4kV circuits are projected to be overloaded during summer peak demand by 110%-122%. Five of the six 4kV circuits have performance issues (device overloading, voltage, and circuit balance problems). Substation 4kV transformer and circuit capacities need to be increased to eliminate the risk of overload, restore N-1 redundancy in the station and between the circuits and eliminate circuit performance issues.

Reasons and Benefits:

A Comprehensive Planning study was conducted to address all reliability, distribution and automation needs in this area. The following is required:

- Convert the 4.16kV bus to 12.47kV.
- Replace transformers 1 & 2 each with 22.4MVA dual voltage 34.5kV/12.47kV/4.16kV transformers.
- Convert 6 distribution circuits from 4.16kV to 12.47kV. Reduce/Eliminate exit conductor adjacency and increase conductor size. Mitigate circuit issues

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- Include automation / resiliency improvements.

When complete, the station transformer and circuit capacities will be increased by 215%/240% and 300% respectively. N-1 redundancy will be restored within station and between station 49 circuits. Improvements will be realized in customer restoration with adjacent circuits during contingencies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,000	4,000	8,000	8,000	8,000

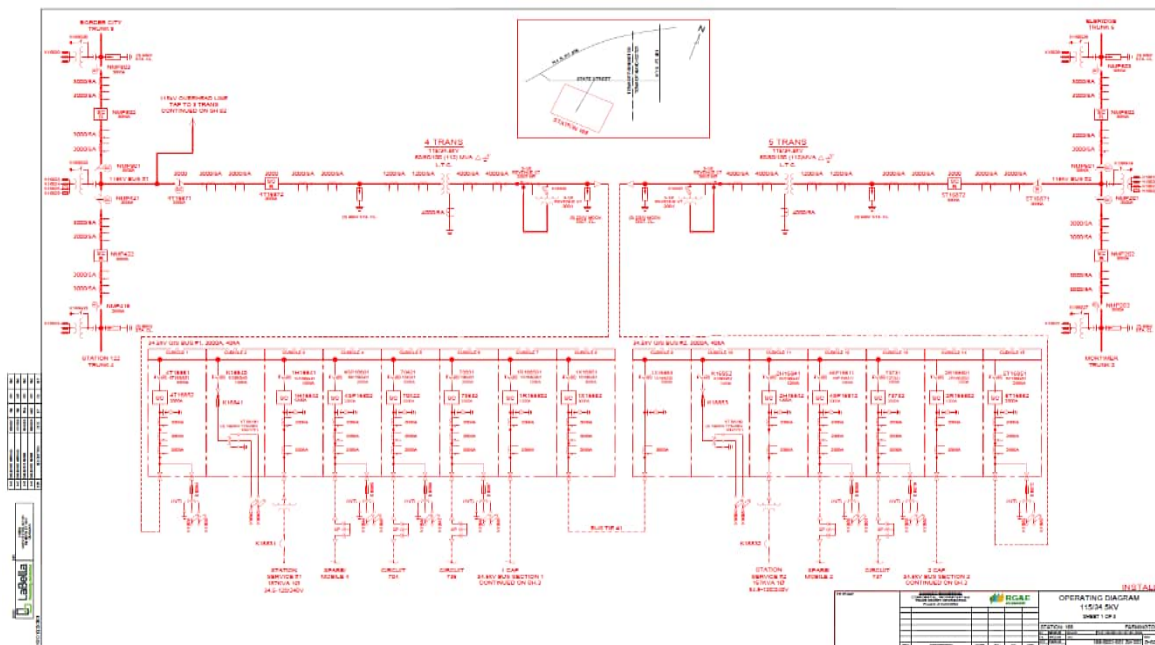
RG&E

GMI-Station 168 Service Area Reinforcements

Line of Business: Electric
Category: Reliability

Scope:

- Sectionalize the 115kV Trunk 2 and 4 by installing new 115kV circuit breakers.
- Replace both 115/34.5kV transformers with larger LTC banks having an LTE rating 100MVA.
- Operate the new transformers in parallel on the 34.5kV side.
- Expansion yard at 34kV side of the substation to locate a new control house building with new GIS equipment.
- Relocation of Circuits C704, C736 and C737 terminals in 34kV to allow space for the new 34kV system.
- Upgrade all necessary protection and control schemes in the remote ends affected by the new configuration in Station 168.



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Reasons and Benefits:

- Station 168 serves about 72MW of load in Canandaigua Division of RG&E. Presently, there are low voltage issues under Normal conditions in the load areas served by Station 168
- Additionally, in the event of a contingency involving the loss of either National Grid Trunk #4 or #7 under summer peak or winter peak load conditions, the remaining 115/34.5 kV Transformer at Station 168 overloads above its thermal capacity necessitating the dropping of either portions or all load served by Station 168. For the same contingency, and at lower levels of transformer loading, the three 34.5 kV circuits (#736, #737, #704) served from Station 168 suffer submarginal voltage problems.
- Furthermore, the contingency loss of one of the 115/34.5kV transformer at Station 168 causes thermal overload of the remaining transformer and poses low voltage concerns along circuit #736, #737, #704.
- For a contingency involving the loss of Trunk #4, the calculated exposure to low voltage is 2628 hours/year (30% of the time), calculated exposure to transformer overload above its Normal Rating is 1139 hours/year (13% of the time), calculated exposure to transformer overload above its LTE Rating is 438 hours/year (5% of the time), and calculated exposure to transformer overload above its STE Rating is 175 hours/year (2% of the time).
- For additional information, please consult the T Planning Study with date 9/8/2017.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,555	7,198	12,512	3	0

RG&E

Replace DC Pilot Wire System

Line of Business: Electric
Category: Reliability

Scope:

The Purpose of this project is to replace the existing Pilot Wire (PW) cables located around the Rochester area (RG&E network) with Fiber Optic (FO) cables and upgrade terminal equipment and associated protective

relays. The existing PW are still in service and all effected relay channels will have to be upgraded and moved to either the RG&E SONET network or to a direct fiber connection. The relay channels to be upgraded are shown in Table 1 In total, 26 substations will be affected by this effort.

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Circuit #	Station A	Station B	Station C	New Relays	Telecom interface	COMMENTS
523	5	95-11KV	-	SEL-411L	850nm IEEE C37.94	
524	5	95-11KV	-	SEL-411L	850nm IEEE C37.94	
542	8	28	-	SEL-411L	850nm IEEE C37.94	
567	7-11 kV	38	-	SEL-411L	850nm IEEE C37.94	
609	18	37	-	SEL-411L	850nm IEEE C37.94	
628	95-11KV	403	-	SEL-411L	850nm IEEE C37.94	
633	95-11KV	403	-	SEL-411L	850nm IEEE C37.94	
642	5	34	-	SEL-411L	850nm IEEE C37.94	
643	5	34	-	SEL-411L	850nm IEEE C37.94	
676	48	403	-	SEL-411L	850nm IEEE C37.94	
680	7-11 kV	38	-	SEL-411L	850nm IEEE C37.94	
706	7-115/34.5kV	95-34KV	-	SEL-411L	850nm IEEE C37.94	
711	29	95-34KV	-	SEL-411L	850nm IEEE C37.94	
713	7-115/34.5kV	29	-	SEL-411L	850nm IEEE C37.94	
714P	7-115/34.5kV	412	-	SEL-411L	850nm IEEE C37.94	
714S	7-115/34.5kV	412	-	GE-L90	Direct Fiber	
715P	48 - 34.5kv	412	-	SEL-411L	850nm IEEE C37.94	
715S	48 - 34.5kv	412	-	GE-L90	Direct Fiber	
716	37	48-34.5kv	-	SEL-411L	850nm IEEE C37.94	
717	22	33	37	SEL-411L	850nm IEEE C37.94	Communication required between S22 and S33 and between S22 and S37
718	1	29	-	SEL-411L	850nm IEEE C37.94	
719	7-115/34.5kV	95-34.5kV	-	SEL-411L	850nm IEEE C37.94	
725P	33	29	-	SEL-411L	850nm IEEE C37.94	
725S	33	29	-	GE-L90	Direct Fiber	
726P	42W	43	-	SEL-411L	850nm IEEE C37.94	
726S	42W	43	-	GE-L90	Direct Fiber	
731P	29	33	-	SEL-411L	850nm IEEE C37.94	
731S	29	33	-	GE-L90	Direct Fiber	
734	7-115/34.5kV	18	-	SEL-411L	850nm IEEE C37.94	
735	7-115/34.5kV	81	-	SEL-411L	850nm IEEE C37.94	
741	26	33	-	SEL-411L	850nm IEEE C37.94	
743P	48	412	-	SEL-411L	850nm IEEE C37.94	
743S	48	412	-	GE-L90	Direct Fiber	
750	43	81	-	SEL-411L	850nm IEEE C37.94	
766	29	95-34.5kV	-	SEL-411L	850nm IEEE C37.94	
768P	7-115/34.5kV	48	-	SEL-411L	850nm IEEE C37.94	
768S	7-115/34.5kV	48	-	GE-L90	Direct Fiber	
770	1	42E	-	SEL-411L	850nm IEEE C37.94	
798	42W	49	-	SEL-411L	850nm IEEE C37.94	
799	42E	49	-	SEL-411L	850nm IEEE C37.94	
903S	67	82	-	SEL-411L	850nm IEEE C37.94	

Table 1: Required Telecom Interfaces by Circuit

Reasons and Benefits:

RG&E’s pilot wire system is 60–70 years old and consists of approximately 100 separate pilot wire routes that interconnect many critical substations. The City of Rochester’s entire downtown electrical network

depends upon the pilot wires to provide safe and reliable energy service. The main purpose of the pilot wire system is to provide reliable, high-speed communications paths to activate pilot wire relays rapidly

clear faults.

The Pilot Wire Replacement Program will be to improve the system reliability by replacing the electro-mechanical pilot wire relays currently connected with copper pilot wires, with microprocessor type relays, and migrating selected tones from the

NYSEG and RG&E 5-Year Capital Investment Plan

existing copper wire pair cables to the RG&E OC-48 SONET JMUX networks. This project will help to alleviate this condition and increase system reliability.

The paper-insulated copper cables have been steadily deteriorating to the point where several of the pilot wire loops have been placed out of service. These pilot wire relays are electromechanical and do not contain event recording that modern microprocessor have so we have no downloadable information from these relays to assist in system event analysis. These relays are also obsolete, so spare parts are not available. Under these conditions, the reliability of these relays is poor, and results in additional O&M expenses.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
320	2,779	9,185	3,734	5,329

RG&E

Distribution Load Relief Program

Line of Business: Electric
Category: Reliability

Scope:

The objective of the Distribution Load Relief Program is to conduct system-wide facility surveys on substations that are overloaded and/or start to exceed 90% capacity to develop a mitigation strategy (projects) to enhance the condition of these assets so they don't exceed Planned Loading Beyond Nameplate (PLBN). These comprehensive surveys will include an electrical and structural assessments which will be scored against individually weighted categories such as age of equipment, resiliency/flooding impacts, substation P&C assessment, substation reliability performance, etc.

For single transformer stations, the transformer loading should not exceed 100% of the Continuous Nameplate Rating (CNR), which is the 65C top nameplate rating. For normal loading conditions, new customer loads shall not exceed facility capabilities from point of interconnection to and including the substation and transmission area (sub-transmission). When the addition of new loads results in overloading of device thermal capacity from POI to substation transformer bank secondary bus, it is recommended by Distribution Planning to start system reinforcements. When the addition of new loads result in circuit capacity or substation bank capacity reaching or exceeding 90%, it is recommended by Distribution Planning to investigate long term strategy (projects) that could involve load shedding or substation upgrades to hold capacity at 90% with the new load.

Reasons and Benefits:

RG&E has identified 6 substation banks in Table 1 that have reached or exceeded 90% capacity with 2 out of 7 of these banks exceeding 100% of the CNR. This program is design to focus on conducting system-wide facility surveys and pending the outcome focus on a strategy that could involve a number of solutions (projects) involving adding fans, retrofitting upgrades, infield switching to load shed, or retiring smaller substation.

NYSEG and RG&E 5-Year Capital Investment Plan

Table 1.0 RG&E Substations at or exceeding 90% CNR Capacity

Division Id	Substation	Bank Name	Voltage (kV)	Number of Customer	Summer CNR Rating (MVA)	Summer 5 Year Avg Loading (MVA)	Available Capacity (MVA)	Summer 5 Year Avg CNR %	Summer 5 Year Avg PLBN OR Circuit Rating %
Sodus	215	0215LS00T1	4.16	465	1.5	1.66	-0.160	111%	101%
Central	69	0069RO00T1	12.47	6356	22.4	22.5	-0.100	100%	87%
Fillmore	174	0174GV00T1	4.16	810	1.5	1.45	0.050	97%	88%
Central	40	0040RO00T5	34.5	0	12.5	12.03	0.470	96%	84%
Central	14	0014RO00T1	4.16	2935	6.25	5.72	0.530	92%	83%
Central	71	0071RO00T2	12.47	3147	10.5	10.012	0.488	95%	83%

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
200	1,000	5,800	6,500	6,500

RG&E

Animal Guards CAP

Line of Business: Electric
Category: Reliability

Scope:

This program will target the worst performing circuits across RG&E for animal guard installation with the goal of increasing service reliability through minimizing animal contact on distribution transformers. Guards are to be installed on distribution transformer bushings, arresters, and LA brackets, if applicable.

Reasons and Benefits:

These installations have shown measurable SAIFI and CAIDI improvements along with decreased animal contact outages, which in turn has resulted in reduced O&M costs. Adequate funding, material, and available field crews are necessary to keep installations moving forward.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,605	3,119	3,201	3,283	3,365

RG&E

Sta-127 115kV System Upgrade D

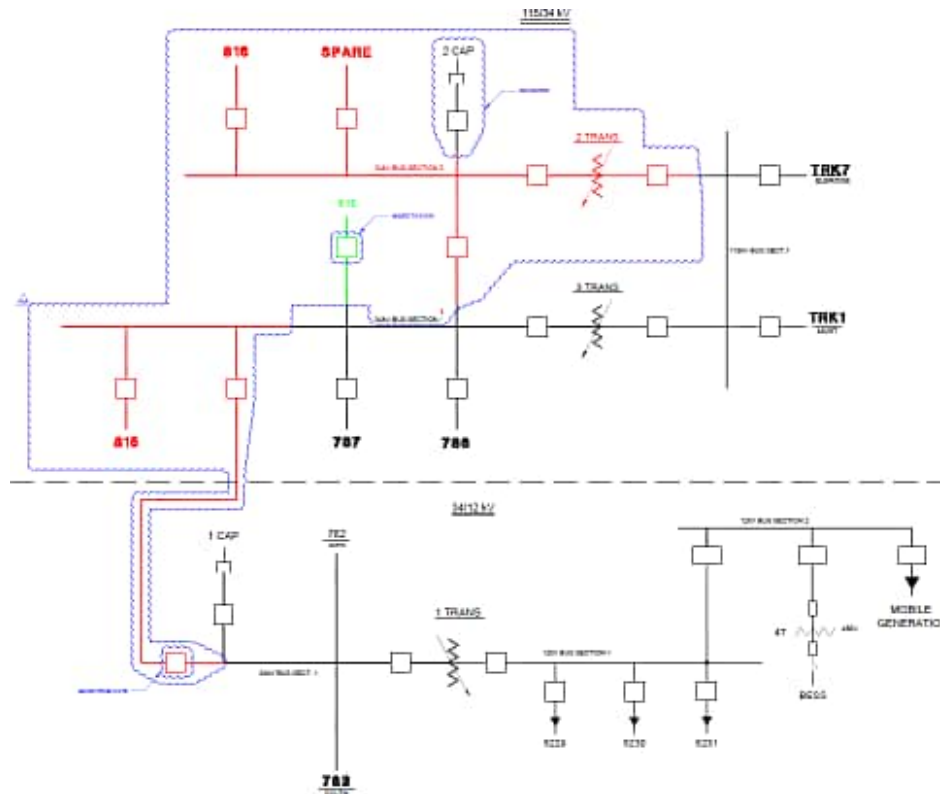
Line of Business: Electric
Category: Reliability

Scope:

Transmission Planning identified the need for a second 115/34.5kV transformer at Station 127B and the cross-connect of 34.5kV buses at Station 127A and Station 127B. Substation modifications include the addition of two new feeder bays on existing 34kV bus section, addition of four new feeder bays downstream from the new 115kV/34kV transformer, and cross ties between the two 115kV buses and the two 34kV buses to provide redundancy to the distribution system.

This project calls for:

- Installing a similar, second 115/34.5kV transformer at Station 127 by expanding 115kV bus and adding a new 115kV tie breaker.
- Separating both 115kV lines and transformers. This configuration will provide additional redundancy.
- Connecting both 34.5kV buses together at Station 127 by adding a 34.5kV tie breaker and placing a transformer at each bus;
- Operating the new transformers in parallel on the 34.5kV side.



Example Figure 1: Picture of Work Area, One Line, Etc.

Reasons and Benefits:

Expansion of Station 127 precludes the need to expand Station 121. Station 121 and Station 127 are both located in Canandaigua Division of RG&E. Both stations are interdependent to each other and are connected via normally open tie points, which are manually closed to transfer the load to the available source. This project will add distribution capacity to Station 127, providing the ability to accommodate an additional 27.0MW load to National Fuel Compressor Station adjacent to the property. The addition of a 115/24kV transformer and new bus section at Station 127 also provides a solution to provide sufficient capacity for an outage at either Station 121 or Station 127 and maintain adequate voltage and thermal conditions across the local distribution system.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
8,597	6,390	0	0	0



RG&E

Circuit Sensor Implementation Plan

Line of Business: Electric
Category: Reliability

Scope:

The Circuit Sensor Implementation program is intended to provide Line Sensors at the head-end of Distribution feeders on overhead conductors up to 35kV. The primary function of these sensors are to detect, monitor, & report electrical quantities on each circuit including watts, current, voltage, power factor, VARs, as well as electrical transients. Load, phase balance, faults, alarms, and events shall be monitored in real time and sent via telecommunications to a SCADA system. The sensors are also intended to detect fault current and location along with the subsequent change of voltage on a line that are reported to SCADA and sent to an analysis software. The data is also used to provide Summer and Winter Load information for forecasting, modeling, enhancing power quality, and making reliability improvements, and during emergency situations when needed to transfer load from adjacent circuits.



Figure 8: Monitoring Sensors for Networks up to 35kV

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

There are 698 circuits at NYSEG with 57% having no interval monitoring devices, 30% have partial internal monitoring, and 13% have full interval monitoring capabilities. This means that most of these circuits (401) have no means to detect, monitor, and report electrical quantities on the distribution system. The increased demand for Distribution Generation with Photo Voltic, Wind, and Battery Storage devices can lead to power quality issues and require constant monitoring for improvements in performance and reliability.

Table 1.0: NYSEG Monitoring Device Types

Type of Monitoring Device	# of Circuits	Percent	25 Substations to be Modernized
No Interval monitoring	401	57%	3 have no interval monitoring
Full Interval monitoring	89	13%	14 already have full interval monitoring
Partial Interval monitoring	208	30%	8 have partial interval monitoring

The project needs are to install 1095 power line sensors at the head end of distribution feeders that don't have interval monitoring devices. Each three-phase circuit would need 3 devices. This program would install line sensors on 365 circuits over the next 3 years (2022 – 2024). 36 out of 401 circuits with no interval monitoring are part of the breaker replacement program which would install RTU's and SCADA devices to monitor substation and circuit load and are not part of the Line Sensor Program. The total cost for each Power line Sensor with Wireless Network is \$2968 + \$2782 for installation, materials, commissioning, and project management = ~\$5,750.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,000	3,000	2,290	0	0

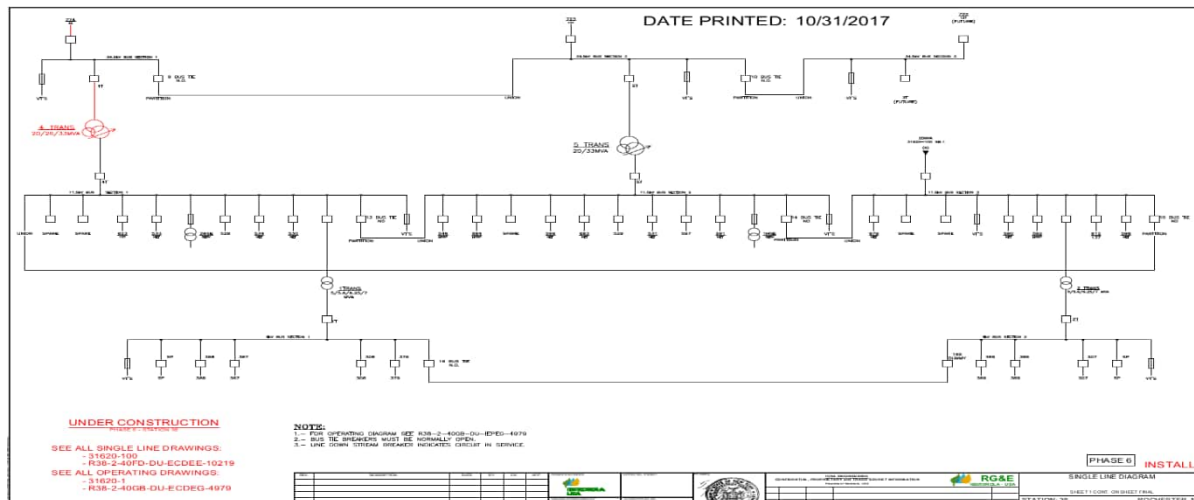
RG&E

Station 38 Total Refurbishment D

Line of Business: Electric
Category: Reliability

Scope:

Upgrade Station 38. This involves the installation of a new 34.5kV GIS switchgear, and replacement of existing 11kV and 4kV AIS switchgear with new SF6 GIS switchgear. The project includes upgrading the existing auxiliary services for the station. New digital protective relays with IEC61850 capabilities will be installed.



Reasons and Benefits:

All existing substation equipment has operated beyond life expectancy. Station 38 is vital to downtown Rochester and availability/reliability could be impacted with obsolete equipment and unavailability of spare parts. Local operator safety will also be improved with the installation of the new gas insulated switchgear.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,033	438	0	0	0

RG&E

RARP Rochester Area Reliability Project

Line of Business: Electric

Category: Reliability

Scope:

A new 345kV BPS (bulk power system) station (Station 255) was constructed and is located approximately 3.8 miles west of the RG&E Station 80. Two NYPA 345kV cross-state transmission lines were brought into the new station. A new 345kV line was constructed between the new substation and Station 80. Two 115kV lines emanate from the new substation; the first line (approximately 10 miles in length) ties into Station 418, the second line (approximately 14 miles in length) ties into the RG&E 115kV system at Station 23.

The work remaining in 2022 consists on the Natural Resource Conservation Service that include planting, wildlife enhancements, and performing invasive species control.

Reasons and Benefits:

Due to increasing load, a fourth source of supply into the RG&E service area was necessary in the event the Ginna nuclear plant experiences a long-term outage. The Project added a fourth source of supply by connecting to the NYPA 345kV cross-state transmission lines. Total import capability increased from 2507MW to 3307MW.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,731	0	0	0	0

RG&E

BIM

Line of Business: Electric
Category: Reliability

Scope:

Building Information Modeling (BIM) is the digital methodology for the construction industry, creating additional benefit, as humans, processes, and tools interact throughout the full lifecycle of a building through 3D visualization. For RG&E, the electrical infrastructure, substations and transmission lines is the central objective of Building information Modeling. The BIM model is a database which includes 3D graphics, geometric equipment and plant models with metadata values and quantities / bills of material. These datasets are available to all those involved in a project. In addition, we can give these objects additional information in the form of properties and attributes. All new features, changes and further developments are integrated into this model and tracked through design, construction and operation lifecycle. This IT project will deliver the best-in-class solution to achieve 3D modeling with quantities, time and cost information and to provide an SAP interface for asset data and ongoing operation and maintenance.



Example Figure 1: BIM Concept

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

BIM is the best solution for complex projects because it promotes collaboration and overall project design and management visibility and control including project execution and material procurement. BIM platform will enable cost savings through up to 50% reduced design time, change orders, and material staging / timing will be achieved.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	305	318	1,036	0

RG&E

NY Spectrum HW Refresh CapEx

Line of Business: Electric
Category: Reliability

Scope:

- Installation of the new hardware to replace all of the current hardware that contains the Spectrum 4.75 system
- Installation of the new version of Solaris 11 OS and Oracle 12 DB.
- Update the newest code including any changes for the new Solaris OS, Oracle and the enhancements included in Appendix B-2.
- Second migration of data to perform site acceptance test (SAT).
- A full SAT with all tests including performance will be done

Reasons and Benefits:

Increased resource availability with cross functional resources across Operating Companies

- Reductions in Support and Maintenance with a common platform
- Increased/updated Security Controls
- Improved architecture and infrastructure to support current platform with improved system redundancy and resiliency

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
360	0	0	0	0

RG&E

Station 49 Transformer Addition

Line of Business: Electric
Category: Reliability

Scope:

Station 49 is in Rochester, NY and serves approximately 22MW of load for about 6,230 customers. Notable customers include Bausch & Lomb and Rochester General Hospital. During high load periods, loss of one of the 34.5kV/11.5kV transformers at Station 49 results in overloading the other 34.5/11.5kV transformer above its Long-Term Emergency Rating (LTE) and resulting voltage levels. This would result in shedding 2MW of load to relieve the overload on the remaining transformer. The period of exposure is approximately 400 hours per year. The criteria used for this project is the single contingency criteria for the transmission system that provides for loss of any element results in the remaining elements being below their long-term emergency rating.

The scope of this project was to remove a capacitor bank, replace existing Transformer 3 (18.75 MVA) and Transformer 4 (18.75 MVA) with larger capacity Transformers 5 and 6 20/26.6/33.3 (37.3) MVA and replace the existing 11kV metal-clad switchgear in the control building with a GIS. The execution of this project was sequenced to utilize two mobile substations during the removals and the duration of construction with the goal to minimize customer impact.

The project was placed in-service in August 2021. The remaining work in 2022 include close out activities.

Reasons and Benefits:

Transformer T3 and T4 were rated as "poor"; citing poor oil quality and power dissipation factors. Also, both transformers were at end of life.

2. All 11kV OCBs (Old Circuit Breakers) were rated as "poor" and were at end of life.
3. During high load periods, loss of one of the 34.5kV/11.5kV transformers at Station 49 would have resulted in overloading the other 34.5/11.5kV transformer above its Long-term Emergency Rating (LTE) and voltages at sub-marginal levels would have resulted in shedding 2MW of load to relieve the overload on the remaining transformer.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
90	0	0	0	0

RG&E

UG Cable Injection

Line of Business: Electric
Category: Reliability

Scope:

This project will treat XLP cable by injecting insulating fluid into existing XLP direct buried primary distribution cables installed between the years of 1970-1985. The RG&E Cable Injection Program was completed as outlined in 2021. Any additional, treatable URD cable loops that are found in 2022 will be addressed.

Reasons and Benefits:

Asset Management completed an Underground XLP Cable Evaluation and Treatment Program Report for RG&E on July 12, 2017. It was recommended to develop and implement a program to treat XLP type cable and replace cable not suitable for injection. Cable failures are one of the equipment failures listed under the underground equipment and pad mounted transformer category and accounts for 33.6% of the RG&E customer interruptions based on notifications from 2008 to 2016. A cable injection program was implemented at RG&E between 2003 and 2013 treating about 2 million feet of XLP type cable. The Underground XLP Cable Evaluation and Treatment Program Reports estimates that reinstating a cable injection program in conjunction with a replacement program will help to reduce RG&E SAIFI and CAIDI. Cable injection is completed in service, with no impact to customers, is performed with contractors and immediately improves reliability of the cable injected.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
61	0	0	0	0

Electric Resiliency

NYSEG

Resiliency Automation, Hardening and Topology	326
DSIP - Grid Automation	329
SCADA/Automation	332
Recloser Automation	334



NYSEG

Resiliency Automation, Hardening and Topology

Line of Business: Electric
Category: Resiliency

Scope:

NYSEG's 2023-2025 Distribution Resiliency Plan ("Resiliency Plan") will enhance resiliency and reliability on 46 Worst Performing Circuits across the NYSEG service territory. These circuits were identified by the Electric Distribution Planning management team as having deficiencies and performance issues that negatively impact service reliability to our customers. The Resiliency Plan is designed to enhance the resiliency of our electric distribution system in response to more intense and more frequent storms. This is driven by a consensus among our Companies, our customers, state policy makers, and regulators, about importance of grid resiliency given the number and severity of storms over the past three years.

NYSEG's resiliency programs sit alongside numerous other capital and O&M programs that our Companies use to ensure the reliable operation of the transmission and distribution systems. These include betterments, major projects, grid modernization programs such as distribution automation and smart grid, and vegetation management. The Resiliency Plan focuses on three critical programs.

1. Enhanced Vegetation Management

Maintaining standard clearances using cycle trimming is effective for keeping trees and branches from getting too close to power lines under most conditions. However, during severe storms, high winds and the increased weight of ice, snow, and even wet leaves, can be enough to cause large branches to break, and trees to topple. The Enhanced Vegetation Management (EVM) program is design to reduce the likelihood that storm-damaged trees will contact power lines. This is done in two ways:

- Enhanced clearances with ground-to-sky trimming; and
- Enhanced tree removal targeting more hazard trees to prevent the damage and outages they can cause during storms.

2. Hardening

A significant portion of NYSEG's outages are caused by trees and large branches falling into lines with enough force to break conductors and wood poles. The Hardening program in the Resiliency Plan targets two improvements on vulnerable circuits:

- Replacement of bare overhead conductor with stronger, contact-resistant tree wire; and

NYSEG and RG&E 5-Year Capital Investment Plan

- Replacement of weakened wood poles with stronger ones that can withstand higher physical loads.

3. Topology, with Automation

NYSEG has many long, radial distribution circuits. One tree can knock out power to for many hours to hundreds of customers until crews can make the repair. The Topology, with Automation, program enables reconfiguration and sectionalizing of circuits so that an outage can be isolated while service is maintained to a portion of customers. This program focuses in two areas:

- Adding feeder ties between distribution circuits to enable load transfers; and
- Replacing manual switches with automated reclosers, SCADA switches, and Trip Savers to enable sectionalizing and faster restoration for customers.

• **Table 1.0** NYSEG 46 Resiliency Circuits 2023-2026

NYSEG	Circuit
Auburn	MARIETTA 511
Binghamton	CHENANGO BRIDGE 428
Binghamton	GENEGANTSLET CORNERS 422
Brewster	ADAMS CORNERS 411
Brewster	ADAMS CORNERS 412
Brewster	ADAMS CORNERS 413
Brewster	AMAWALK 453
Brewster	CANTITOE 497
Brewster	PAWLING 509
Brewster	PUTNAM LAKE 486
Brewster	SYLVAN LAKE 478
Brewster	TILLY FOSTER 442
Brewster	UNION VALLEY 432
Brewster	UNION VALLEY 433
Brewster	W. PATTERSON 475
Elmira	CHEMUNG 318
Elmira	MONTOUR FALLS 511
Elmira	VAN ETTEN 570
Geneva	FLAT ST 597
Hornell	BENNETT 541
Hornell	WARSAW 381
Lancaster	ARMOR 371

NYSEG	Circuit
Lancaster	ARMOR 373
Lancaster	COBBLEHILL 530
Lancaster	DAVIS 531
Lancaster	ERIE ST 515
Lancaster	HOLLAND 520
Lancaster	LANGER RD. 431
Lancaster	LANGER RD. 432
Lancaster	LANGER RD. 433
Lancaster	STOLLE RD. 551
Liberty	CALLICOON 285
Liberty	JEFFERSONVILLE 110
Liberty	MAPLEWOOD 229
Liberty	OLD FALLS 283
Liberty	WALDEN 358
Liberty	WALDEN 359
Liberty	WALDEN 705
Liberty	WALDEN 707
Mechanicville	GRANVILLE-SALEM TAP 625
Mechanicville	KLINE KILL 631
Oneonta	DOWNSVILLE 012
Oneonta	EAST NORWICH 515
Oneonta	EAST NORWICH 516



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG	Circuit
Lancaster	ARMOR 372

NYSEG	Circuit
Oneonta	HANCOCK 216

Selected Solution Rationale:

- 1) Worst Performing Circuits
- 2) N-0 System capacity overloads in less than three years
- 3) Severe reliability violations under N-1 conditions that results in STE violations
- 4) Multiple loss of load violations

Risk of No Action:

Significant risk of loss of load during storms would be allowed to remain on the system affecting system reliability and power quality to customers.

Reasons and Benefits:

This project resolves the risk of loss of load in the study area. Benefits include value for customers from avoided interruptions, and value for the utility in the form of avoided restoration costs and replacement of damaged distribution infrastructure.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
28,236	41,924	48,012	45,912	45,912

NYSEG

DSIP - Grid Automation

Line of Business: Electric
Category: Resiliency

Project Description

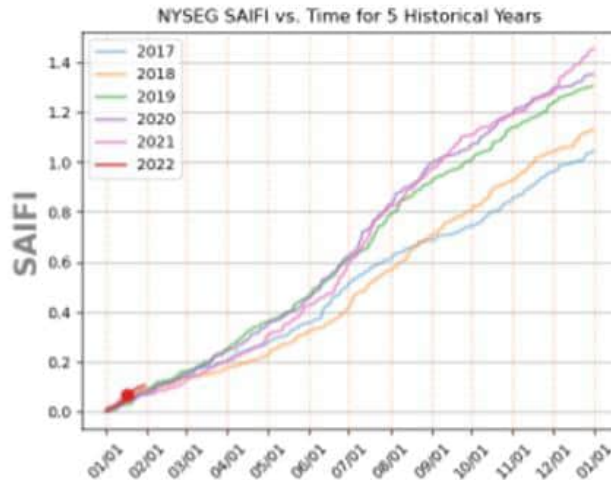
The Distribution Automation program is intended to provide smart devices on all parts of the electric distribution system. A system fully metered, monitored, and controlled provides integrated system operations, access for competing providers, and enhanced customer services that maximize benefits. This program will include only the purchase and installation of devices that have full communications and control capabilities. All new distribution equipment will be “smart.” AVANGRID also has a strategic plan to deploy digital Remote Terminal Units (RTUs) to provide for status and control of smart devices within substations and on the distribution system. In short, AVANGRID will continue to automate its entire system, consistent with all applicable standards and requirements.

The Distribution Network will be fully automated through a deployment of digital devices that will reduce customers to 300 between digital devices per the distribution planning criteria, enabling 100% remote operation & supervision capabilities as well as Automatic Grid Restoration (AGR) functionality implementation.

Project Needs / Justification:

In recent years NYSEG has not accomplished the regulatory targets regarding the reliability index. There is a trend of increasing the SAIFI that needs to be addressed and corrected.

NYSEG and RG&E 5-Year Capital Investment Plan



Without smart devices every outage resolution follows the next steps that affect the reliability due to the manual fault location and isolation (time consuming):

- **FAULT LOCATION:**
 - Fault occurs but there is no information until customer calls.
 - Crews are sent to the site to investigate and isolate the fault. Meanwhile all customers in the affected feeder are affected by outage.
 - Time is affected by crew's location: longer distances mean longer travel time.

- **FAULT ISOLATION:**
 - Once crews have identified the fault, they proceed to manually reconfigure the network.
 - Meanwhile all customers in the affected feeder are still affected by outage.

Currently there is not standard amount of customer between distribution protective devices so an outage in a circuit could create a shutdown of the entire circuit and affect all the customers on that line. Reducing customer counts to 300 between protective devices will reduce the number of customers affected by an unexpected outage in a circuit.

Selected Solution Rationale: Digital devices were select because of the cost saving and benefits of being able to operate smart and remotely, monitoring and detection of faults on a distribution line.

NYSEG and RG&E 5-Year Capital Investment Plan

Risk of No Action: Increase the number of customers interrupted and customer minutes interruption per the degradation of the existing equipment. The reliability will get worst.

Project Benefits: The proposed solution based on digital devices to deploy in the Medium Voltage Distribution Network (Reclosers, SCADA Switches, Sectionalizer) will allow to Improve Medium Voltage network outage management by reducing the impact, duration and cost of outage events across the steps of an outage resolution: fault location, fault isolation and fault repair. This means reduction of customer interrupted and customer minutes interruption, so the reliability will improve (SAIFI).

Reduce total operating expenses as the devices could be operated remotely as well as the implementation of the Automatic Grid Restoration (AGR) are additional benefits of this program.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
28,576	33,782	37,288	37,288	37,288

NYSEG

SCADA/Automation

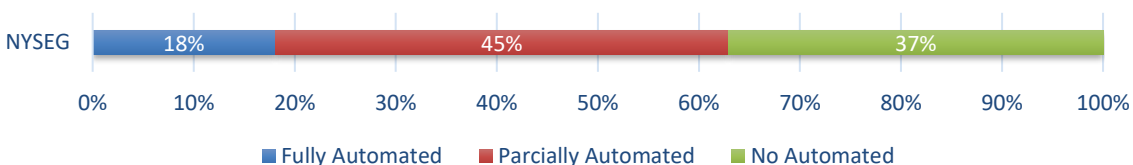
Line of Business: Electric
Category: Resiliency

Scope:

The goal of this program is to install a remote terminal unit (RTU) in all substations that do not currently have an RTU, as well as integrate all the bays into our master supervisory control and data acquisition (SCADA) system of those stations where there is an RTU already in service. This program covers the replacement of electromechanical relays with digital relays to get the bays digitalized. The addition of supervisory control and data acquisition in the substations in conjunction with the installation of digital relays will allow for improved visibility and remote control, proper system protection coordination and outage assessment which in turn will result in quicker response and improved CAIDI and can also improve SAIFI performance over the longer term. Providing remote control capabilities will contribute to increasing the safety of workers while operating the switchgear, preventing them from performing manual commands.

Reasons and Benefits:

- There are ~437 substations at NYSEG. Substations fall into three categories in terms of Automation based on the remote control and indication capabilities of SCADA over the substation's bays.
 - o Fully Automated: A substation will be considered as fully automated if SCADA has control over more than 95 % of the bays.
 - o Partially Automated: A substation will be considered as partially automated if between 10% and 95 % of the bays are integrated into SCADA
 - o No automated: A substation will be considered as no automated if SCADA has control of less than 10 % of the bays. Substations with no RTU installed will fall under this category.
- The following graphic shows the substation automation ratio in NYSEG.



NYSEG and RG&E 5-Year Capital Investment Plan

- If substation automation study is done at the circuit breaker, we can conclude that SCADA has no remote-control capabilities over the ~44 % of the substation circuit breakers in the distribution level.

Circuit Breakers Automation Ratio

Row Labels	Control	Indication Only	None	Grand Total
< 15	24%	39%	37%	100%
34.5	83%	6%	11%	100%
46	91%	5%	4%	100%
69	100%	0%	0%	100%
115	90%	3%	7%	100%
230	98%	2%	0%	100%
345	100%	0%	0%	100%
Grand Total	56%	22%	22%	100%

77 % of the protection relays are electromechanical relays.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
10,503	13,128	16,410	17,231	18,092

NYSEG

Recloser Automation

Line of Business: Electric
Category: Resiliency

Scope:

Trip Saver reclosers prevent temporary faults from becoming sustained outages, and they avoid momentary interruptions on feeders by only blinking the affected branch. By mitigating a significant number of outages, Trip Saver reclosers improve SAIDI and SAIFI indexes. Trip Savers can improve also the distribution system, reducing the zone of protection for reclosing and the risk when the circuit are NRA enable. Also, it can avoid O&M crew truck rolls to replace a blown fuse.

Tree contacts, by far, are the most significant contributor to outages that could be mitigated by the installation of trip savers. Based on the bottom-left plot, a blanket 60% of outages are assumed to be temporary (source: EPRI)

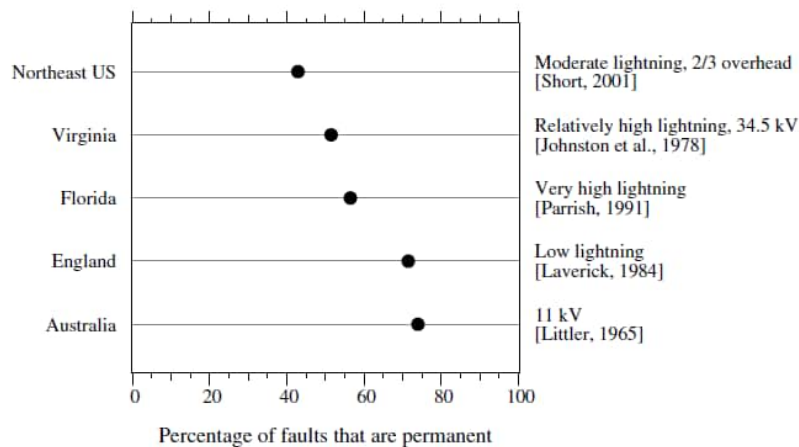


FIGURE 7.4 Percentage of faults that are permanent (on predominantly overhead circuits). (Data from [Johnston et al., 1978; Laverick, 1984; Littler, 1965; Parrish, 1991; Short, 2001].)

Reasons and Benefits:

In recent years, it is possible to see a trend towards an increase in NYSEG's SAIFI. It was also identified that the number of temporary faults in the distribution network is high which this type of occurrence corresponds to around 20% of the company's SAIFI.

A new program is proposed to mitigate this portion of outages, through some actions directed to the worst-performing circuits. The main objective of these actions is to ensure that, for temporary outages, the minimum number of consumers is out, and the restoration

NYSEG and RG&E 5-Year Capital Investment Plan

is as fast as possible through automation schemes and remote controller operations from ECC.

In 2021 a pilot project was done with a goal to install 150 Trip Saver devices in the NYSEG network to prevent temporary faults from becoming sustained outages. The objective now is to deploy these types of devices through a program to mitigate a significant number of outages, improving SAIDI and SAIFI indexes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,736	2,250	2,250	2,250	2,250

Electric Resiliency

RG&E

Resiliency Automation, Hardening and Topology	337
DSIP - Grid Automation	340
SCADA/Automation	343
Recloser Automation	345



RG&E

Resiliency Automation, Hardening and Topology

Line of Business: Electric
Category: Resiliency

Scope:

RG&E's 2023-2026 Distribution Resiliency Plan ("Resiliency Plan") will enhance resiliency and reliability on 19 Worst Performing Circuits across the RG&E service territory. These circuits were identified by the Electric Distribution Planning management team as having deficiencies and performance issues that negatively impact service reliability to our customers. The Resiliency Plan is designed to enhance the resiliency of our electric distribution system in response to more intense and more frequent storms. This is driven by a consensus among our Companies, our customers, state policy makers, and regulators, about the importance of grid resiliency given the number and severity of storms over the past three years.

RG&E's resiliency programs sit alongside numerous other capital and O&M programs that our Companies use to ensure the reliable operation of the transmission and distribution systems. These include betterments, major projects, grid modernization programs such as distribution automation and smart grid, and vegetation management. The Resiliency Plan focuses on three critical programs.

1. Enhanced Vegetation Management

Maintaining standard clearances using cycle trimming is effective for keeping trees and branches from getting too close to power lines under most conditions. However, during severe storms, high winds and the increased weight of ice, snow, and even wet leaves, can be enough to cause large branches to break, and trees to topple. The Enhanced Vegetation Management (EVM) program is designed to reduce the likelihood that storm-damaged trees will contact power lines. This is done in two ways:

- Enhanced clearances with ground-to-sky trimming; and
- Enhanced tree removal targeting more hazard trees to prevent the damage and outages they can cause during storms.

2. Hardening

A significant portion of NYSEG's outages are caused by trees and large branches falling into lines with enough force to break conductors and wood poles. The Hardening program in the Resiliency Plan targets two improvements on vulnerable circuits:

- Replacement of bare overhead conductor with stronger, contact-resistant tree wire; and



NYSEG and RG&E 5-Year Capital Investment Plan

- Replacement of weakened wood poles with stronger ones that can withstand higher physical loads.

3. Topology, with Automation

NYSEG has many long, radial distribution circuits. One tree can knock out power for many hours to hundreds of customers until crews can make the repair. The Topology, with Automation, program enables reconfiguration and sectionalizing of circuits so that an outage can be isolated while service is maintained to a portion of customers. This program focuses in two areas:

- Adding feeder ties between distribution circuits to enable load transfers; and
- Replacing manual switches with automated reclosers, SCADA switches, and Trip Savers to enable sectionalizing and faster restoration for customers.

Table 1.0 RG&E Project Proposals Cost on 19 Circuits 2023-2026

RG&E	Circuit	RG&E	Circuit
Rochester – Central	0070RO5193	Canandaigua	0127CF5230
Rochester – Central	0070RO5236	Rochester – Central	0136RO5296
Rochester – Central	0070RO5237	Lakeshore (Sodus)	0195LS5153
Rochester – Central	0071RO5129	Lakeshore (Sodus)	0202LS5194
Rochester – Central	0071RO5130	Lakeshore (Sodus)	0217LS5238
Rochester – Central	0104RO5156	Rochester – Central	0230RO5163
Rochester – Central	0117RO5187	Genesee Valley (Fillmore)	0247GV1204
Rochester – Central	0117RO5188	Rochester – Central	0418RO5199
Rochester – Central	0126RO5224	Rochester – Central	0419RO5120
Rochester – Central	0126RO5225		

NYSEG and RG&E 5-Year Capital Investment Plan

Selected Solution Rationale:

- Worst Performing Circuits
- N-0 System capacity overloads in less than three years
- Severe reliability violations under N-1 conditions that results in STE violations
- Multiple loss of load violations

Risk of No Action:

Significant risk of loss of load during storms would be allowed to remain on the system affecting system reliability and power quality to customers.

Reasons and Benefits:

This project resolves the risk of loss of load in the study area. Benefits include value for customers from avoided interruptions, and value for the utility in the form of avoided restoration costs and replacement of damaged distribution infrastructure.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
9,425	13,013	14,815	17,984	20,929

RG&E

DSIP - Grid Automation

Line of Business: Electric
Category: Resiliency

Project Description

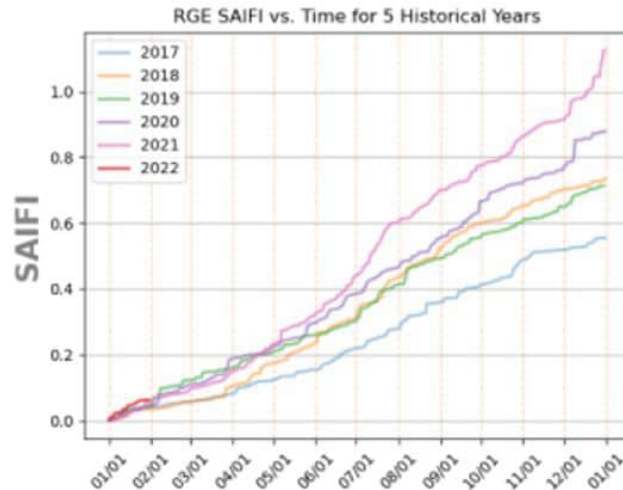
The Distribution Automation program is intended to provide smart devices on all parts of the electric distribution system. A system fully metered, monitored, and controlled provides integrated system operations, access for competing providers, and enhanced customer services that maximize benefits. This program will include only the purchase and installation of devices that have full communications and control capabilities. All new distribution equipment will be “smart.” AVANGRID also has a strategic plan to deploy digital Remote Terminal Units (RTUs) to provide for status and control of smart devices within substations and on the distribution system. In short, AVANGRID will continue to automate its entire system, consistent with all applicable standards and requirements.

The Distribution Network will be fully automated through a deployment of digital devices that will reduce customers to 300 between digital devices per the distribution planning criteria, enabling 100% remote operation and supervision capabilities as well as Automatic Grid Restoration (AGR) functionality implementation.

Project Needs / Justification:

There is a trend of increasing the SAIFI that need to be attended and corrected. Last year, 2021, RG&E has not accomplished the regulatory targets regarding the reliability index.

NYSEG and RG&E 5-Year Capital Investment Plan



Without smart devices every outage resolution follows the next steps that affect the reliability due to the manual fault location and isolation (time consuming):

- **FAULT LOCATION:**
 - Fault occurs but there is no information until customer calls.
 - Crews are sent to the site to investigate and isolate the fault. Meanwhile all customers in the affected feeder are affected by outage.
 - Time is affected by crew's location: longer distances mean longer travel time.
- **FAULT ISOLATION:**
 - Once crews have identified the fault, they proceed to manually reconfigure the network.
 - Meanwhile all customers in the affected feeder are still affected by outage.

Currently there is not standard amount of customer between distribution protective devices so an outage in a circuit could create a shutdown of the entire circuit and affect all the customers on that line. Reducing customer counts to 300 between protective devices will reduce the number of customers affected by an unexpected outage in a circuit.

Selected Solution Rationale: Digital devices were select because of the cost saving and benefits of being able to operate smart and remotely, monitoring and detection of faults on a distribution line.

Risk of No Action: Increase the number of customers interrupted and customer minutes interruption per the degradation of the existing equipment. The reliability will get worst.

NYSEG and RG&E 5-Year Capital Investment Plan

Project Benefits: The proposed solution based on digital devices to deploy in the Medium Voltage Distribution Network (Reclosers, SCADA Switches, Sectionalizer) will allow to Improve Medium Voltage network outage management by reducing the impact, duration and cost of outage events across the steps of an outage resolution: fault location, fault isolation and fault repair. This means reduction of customer interrupted and customer minutes interruption, so the reliability will improve (SAIFI).

Reduce total operating expenses as the devices could be operated remotely as well as the implementation of the Automatic Grid Restoration (AGR) are additional benefits of this program.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,652	4,000	7,000	7,000	7,000



RG&E

SCADA/Automation

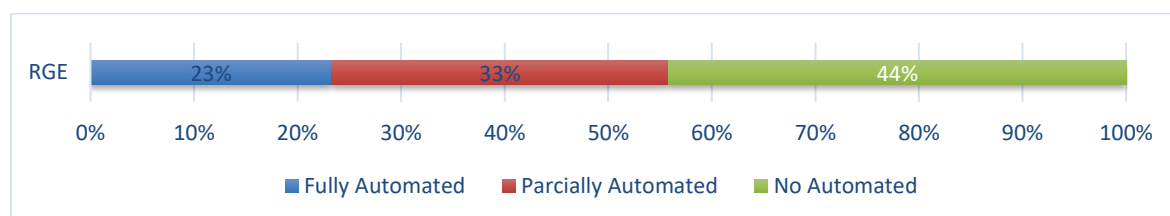
Line of Business: Electric
Category: Resiliency

Scope:

The goal of this program is to install a remote terminal unit (RTU) in all substations that do not currently have an RTU, as well as integrate all the bays into our master supervisory control and data acquisition (SCADA) system of those stations where there is an RTU already in service. The program covers the replacement of electromechanical relays with digital relays to get the bays digitalized. The addition of supervisory control and data acquisition in the substations in conjunction with the installation of digital relays will allow for improved visibility and remote control, proper system protection coordination and outage assessment which in turn will result in quicker response and improved CAIDI and can also improve SAIFI performance over the longer term. Providing remote control capabilities will contribute to increasing the safety of workers while operating the switchgear, preventing them from performing manual commands.

Reasons and Benefits:

- There are ~163 substations at RG&E. Substations fall into three categories in terms of Automation based on the remote control and indication capabilities of SCADA over the substation's bays.
 - o Fully Automated: A substation will be considered as fully automated if SCADA has control over more than 95 % of the bays.
 - o Partially Automated: A substation will be considered as partially automated if between 10% and 95 % of the bays are integrated into SCADA
 - o No automated: A substation will be considered as no automated if SCADA has control of less than 10 % of the bays. Substations with no RTU installed will fall under this category.
- The following graphic shows the substation automation ratio in RG&E.



NYSEG and RG&E 5-Year Capital Investment Plan

- If substation automation study is done at the circuit breaker, we can conclude that SCADA has no remote-control capabilities over the ~45 % of the substation circuit breakers, in the distribution level.

Circuit Breakers Automation Ratio

Row Labels	Control	Indication Only	None	Grand Total
< 15	42%	11%	47%	100%
34.5	75%	7%	18%	100%
115	90%	5%	5%	100%
345	100%	0%	0%	100%
Grand Total	55%	10%	35%	100%

87% of the protection relays are electromechanical relays.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,128	5,233	5,338	5,446	5,555

RG&E

Recloser Automation

Line of Business: Electric
Category: Resiliency

Scope:

Trip Saver reclosers prevent temporary faults from becoming **sustained outages**, and they **avoid momentary interruptions** on feeders by only blinking the affected branch. By mitigating a considerable number of outages, Trip Saver reclosers improve SAIDI and SAIFI indexes. Trip Savers can also improve the distribution system, reducing the zone of protection for reclosing and the risk when the circuit is NRA enable. Also, it can avoid O&M crew truck rolls to replace a blown fuse.

Tree contacts, by far, are the most significant contributor to outages that could be mitigated by the installation of trip savers. Based on the bottom-left plot, a blanket 60% of outages are assumed to be temporary (source: EPRI)

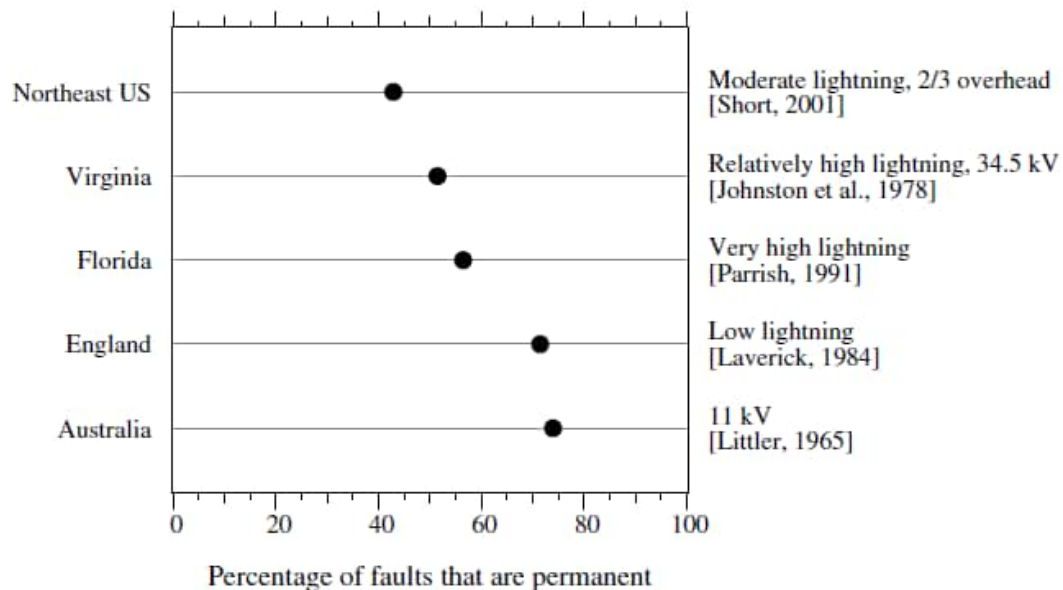


FIGURE 7.4
 Percentage of faults that are permanent (on predominantly overhead circuits). (Data from [Johnston et al., 1978; Laverick, 1984; Littler, 1965; Parrish, 1991; Short, 2001].)

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

In recent years, we see a trend towards an increase in RG&E's SAIFI. It was also identified that the number of temporary faults in the distribution network is high which this type of occurrence corresponds to around 20% of the company's SAIFI.

A new program is proposed to mitigate this portion of outages, through some actions directed to the worst-performing circuits. The main objective of these actions is to ensure that, for temporary outages, the minimum number of consumers is out, and the restoration is as fast as possible through automation schemes and remote controller operations from ECC. In 2021 a pilot project was done with a goal to install 150 Trip Saver devices in the NYSEG network to prevent temporary faults from becoming sustained outages. The objective now is to turn these types of devices a program for the futures years to mitigate a considerable number of outages, improving SAIDI and SAIFI indexes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
868	1,500	1,500	1,500	1,500

Electric Compliance

NYSEG

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NYSEG

BES Program - FERC Compliance

Line of Business: Electric
Category: Compliance

Scope:

The objective of the NYSEG/RG&E Bulk Electric System (BES) program is to identify and address system deficiencies on the portion of the BES owned by AVANGRID in compliance with mandatory reliability standards. The criteria and system performance requirements for the BES are provided in the North American Electric Reliability Corporation's (NERC) standard TPL-0011. Each transmission owner has an obligation to demonstrate through planning studies that its portion of the BES meets all mandatory NERC requirements. In cases where unacceptable reliability performance is detected, a documented Corrective Action Plan showing how these deficiencies will be mitigated must be developed.

In order to achieve compliance with NERC TPL requirements a comprehensive planning assessment was performed, initially in 2014 and then again in 2018 2 to incorporate a number of changes with the most significant being a decline in forecasted load levels. The load levels used in the 2018 study match the forecasts provided in the NYISO's most recent 2018 Load and Capacity Data or "Gold Book" update 3. Since the load forecast reductions were significant, AVANGRID elected to include a full re-assessment of all previously recommended solutions to determine if they were still needed in their original form or if a refined or new solution could more effectively address the system needs.

Subsequently in 2021 a Climate Leadership and Community Protection Act ("CLCPA") needs and solutions assessment study was performed to assess AVANGRID's long term capital plan projects across its New York service territory (i.e. NYSEG and RG&E). The study covered projects that are mature, immediately actionable, and beneficial to the integration of renewable resources in support of New York's year 2030 climate policy objectives.

Conclusions of this study activated further re-assessment of all previously recommended solutions of BES program and transferring of several BES projects to CLCPA program due to similar or equal solution needs.

Although the primary focus of this program is to address BES reliability deficiencies, some of the recommended solutions have also been designed to mitigate asset condition and local reliability deficiencies at the same substation locations where significant BES upgrades are being recommended. This approach ensures that a comprehensive and cost-effective solution is developed.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The 2018 AVANGRID BES study and BES re-assessment with 2021 CLCPA study confirmed the need for a number of system upgrades across the NYSEG and RG&E system. These are shown by the Project Identifiers in the red text on Figure 1 with each of the Project ID's referenced in NY BES program project list in Table 1. An increased risk of customer outages and an increased duration of these outages may be expected should no action is taken.

This program provides a comprehensive assessment of BES reliability deficiencies with mandatory reliability standards and presents the State with an opportunity to simultaneously solve numerous reliability, resiliency, and asset condition issues. Please refer to relevant Exhibits for specific project details.



Figure 1. – NYSEG/RG&E BES Program Project Map

NYSEG and RG&E 5-Year Capital Investment Plan

Project ID	OPCO	Project Name	Project Status	ISD	Project Details
LN-A	NYSEG	Big Tree	IP3	2022	Exhibit __ (CEE-R4)
GN-A	NYSEG	Border City	IP1	2028	Exhibit __ (CEE-R5)
LB-A	NYSEG	Cooper's Corners	IP1	2027	Exhibit __ (CEE-R9)
LN-B	NYSEG	Erie Street	IP3	2023	Exhibit __ (CEE-R12)
ON-D	NYSEG	Fraser / Delhi	IP3	2025	Exhibit __ (CEE-R14)
GW-A	NYSEG	Frog Valley	IP1	2025	Exhibit __ (CEE-R15)
BG-B	NYSEG	Fuller Hollow/ Langdon Road	IP2	2031	Exhibit __ (CEE-R16)
RC-D	RG&E	Station 127	IP3	2024	Exhibit __ (CEE-R17)
BK-A	NYSEG	Klinekill	IP1	2026	Exhibit __ (CEE-R19)
RC-C	RG&E	Line 947	IP2	2027	Exhibit __ (CEE-R20)
RC-B	RG&E	Line 949	IP2	2026	Exhibit __ (CEE-R21)
IT-A	NYSEG	Line 981	IP2	2024	Exhibit __ (CEE-R23)
GN-B	NYSEG	Sleight Rd	IP1	2025	Exhibit __ (CEE-R27)
RC-E	RG&E	Station 56	IP3	2023	Exhibit __ (CEE-R28)
BR-A	NYSEG	Ten Mile River	IP1	2033	Exhibit __ (CEE-R30)
EB-C	NYSEG	West Erie	IP1	2028	Exhibit __ (CEE-R32)

Table 1. – BES Program Projects List

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
76,554	116,487	132,375	98,566	99,546



NYSEG

NERC Alert Priority III

Line of Business: Electric
Category: Compliance

Scope:

The NERC Alert Phase III project scope is to primarily identifies asset(s) that are in critical conditions to ensuring the safety and reliability of the bulk power system mandated by FERC. The program provides concise actionable information to update the delivery system of our service areas; those upgrades includes structure replacements or amend on structures that deem(s) to be in direct violation with the NESC Code or very poor condition and ground clearances that affects the safety & reliability to our customers.

Reasons and Benefits:

Generally, NERC distributes alerts broadly to Transmission Owners and Operators of the bulk power system. All TOs are required to provide reliable assets and maintain up-to-date their network. Non-compliance with these requirements mandated by FERC, make TOs be subjected to actionable observations or penalties by the Main Authorities bodies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,706	20,273	19,969	22,822	20,933

NYSEG

FERC Order 2222 DER Aggregations/Billing/Metering

Line of Business: Electric
Category: Compliance

Scope:

FERC Order 2222 requires that NYISO must modify its tariff to allow for the aggregation of DERs for participation in wholesale markets. The NYISO has made a compliance filing to the FERC. The specific impacts on NYSEG/RG&E’s processes and systems related to the implementation of FERC Order 2222 will remain in flux until the FERC makes a decision, whether to accept the as-filed by NYISO approach or perhaps a modified approach. The Companies expect that there will be impacts to systems and processes and which will likely require investments related to: Metering (Company and third party), DER aggregation registration, customer billing, settlement, DER aggregation studies, telecommunications, cyber security, and other areas.

Reasons and Benefits:

The NYISO has submitted its compliance filing to the FERC in response to FERC Order 2222 to allow for DER aggregations to participate in the wholesale markets. Although the compliance filing has not yet been approved, discussions continue amongst NYISO and the Joint Utilities (including NYSEG and RG&E) regarding the implementation of FERC Order 2222. Details surrounding the implementation of FERC Order 2222 have not been fully vetted nor decided upon, and discussions around sub-metering (Company and third-party), registration of DER aggregations, DER aggregation studies, and other areas have begun. This project is essentially a placeholder for potential investments necessary to make modifications to and/or development of systems and processes to allow for the implementation of the ultimately FERC-approved, with or without modifications, NYISO FERC Order 2222 compliance filing.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	667	4,000	0	0



NYSEG

FERC Order 881

Line of Business: Electric
Category: Compliance

Scope:

Implement FERC Order 881 Dynamic Line ratings in the NY EMS system. This regulatory requirement mandates that all Transmission Providers (TP) to dynamically calculate line ratings on the EMS based on several parameters like forecast ambient information, time of day, season, etc. for a more efficient power transmission. Because it requires to calculate line ratings for every hour for upcoming 10 days, it requires additional processing and archiving infrastructure in the EMS system.

Reasons and Benefits:

This regulatory requirement mandates that all Transmission Providers (TP) to dynamically calculate line ratings on the EMS based on several parameters like forecast ambient information, time of day, season, etc. for a more efficient power transmission. Because it requires to calculate line ratings for every hour for upcoming 10 days, it requires additional processing and archiving infrastructure in the EMS system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	350	500	550	1,400

NYSEG

FERC Order 2222

Line of Business: Electric
Category: Compliance

Scope:

Implement Distributed Energy Resources (DER) - Inter-Control Center Communications Protocol (ICCP) connection to New York Independent System Operator (NYISO) for base point setpoint control through NY Energy Management System (EMS) to comply FERC Order No. 2222.

Reasons and Benefits:

For NYISO to regulate DER installations, it sends a desire energy output through the EMS system. They in return send back their energy output to the NYISO. This data interchange is done through the ICCP protocol, which has a specific polling period.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	35	350	0	0

Electric Compliance

RG&E

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RG&E

BES Program - FERC Compliance

Line of Business: Electric
Category: Compliance]

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NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

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LN-B	NYSEG	Erie Street	IP3	2023	Exhibit __ (CEE-R12)
ON-D	NYSEG	Fraser / Delhi	IP3	2025	Exhibit __ (CEE-R14)
GW-A	NYSEG	Frog Valley	IP1	2025	Exhibit __ (CEE-R15)
BG-B	NYSEG	Fuller Hollow/ Langdon Road	IP2	2031	Exhibit __ (CEE-R16)
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BK-A	NYSEG	Klinekill	IP1	2026	Exhibit __ (CEE-R19)
RC-C	RG&E	Line 947	IP2	2027	Exhibit __ (CEE-R20)
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IT-A	NYSEG	Line 981	IP2	2024	Exhibit __ (CEE-R23)
GN-B	NYSEG	Sleight Rd	IP1	2025	Exhibit __ (CEE-R27)
RC-E	RG&E	Station 56	IP3	2023	Exhibit __ (CEE-R28)
BR-A	NYSEG	Ten Mile River	IP1	2033	Exhibit __ (CEE-R30)
EB-C	NYSEG	West Erie	IP1	2028	Exhibit __ (CEE-R32)

Table 1. – BES Program Projects List

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
20,455	32,392	48,041	63,722	76,963



RG&E

FERC Order 2222 DER Aggregations/Billing/Metering

Line of Business: Electric
Category: Compliance

Scope:

FERC Order 2222 requires that NYISO must modify its tariff to allow for the aggregation of DERs for participation in wholesale markets. The NYISO has made a compliance filing to the FERC. The specific impacts on NYSEG/RG&E’s processes and systems related to the implementation of FERC Order 2222 will remain in flux until the FERC makes a decision, whether to accept the as-filed by NYISO approach or perhaps a modified approach. The Companies expect that there will be impacts to systems and processes and which will likely require investments related to: Metering (Company and third party), DER aggregation registration, customer billing, settlement, DER aggregation studies, telecommunications, cyber security, and other areas.

Reasons and Benefits:

The NYISO has submitted its compliance filing to the FERC in response to FERC Order 2222 to allow for DER aggregations to participate in the wholesale markets. Although the compliance filing has not yet been approved, discussions continue amongst NYISO and the Joint Utilities (including NYSEG and RG&E) regarding the implementation of FERC Order 2222. Details surrounding the implementation of FERC Order 2222 have not been fully vetted nor decided upon, and discussions around sub-metering (Company and third-party), registration of DER aggregations, DER aggregation studies, and other areas have begun. This project is essentially a placeholder for potential investments necessary to make modifications to and/or development of systems and processes to allow for the implementation of the ultimately FERC-approved, with or without modifications, NYISO FERC Order 2222 compliance filing.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	333	2,000	0	0

RG&E

FERC Order 881

Line of Business: Electric
Category: Compliance

Scope:

Implement FERC Order 881 Dynamic Line ratings in the NY EMS system. This regulatory requirement mandates that all Transmission Providers (TP) to dynamically calculate line ratings on the EMS based on several parameters like forecast ambient information, time of day, season, etc. for a more efficient power transmission. Because it requires to calculate line ratings for every hour for upcoming 10 days, it requires additional processing and archiving infrastructure in the EMS system.

Reasons and Benefits:

This regulatory requirement mandates that all Transmission Providers (TP) to dynamically calculate line ratings on the EMS based on several parameters like forecast ambient information, time of day, season, etc. for a more efficient power transmission. Because it requires to calculate line ratings for every hour for upcoming 10 days, it requires additional processing and archiving infrastructure in the EMS system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	150	210	240	600

RG&E

FERC Order 2222

Line of Business: Electric
Category: Compliance

Scope:

Implement Distributed Energy Resources (DER) - Inter-Control Center Communications Protocol (ICCP) connection to New York Independent System Operator (NYISO) for base point setpoint control through NY Energy Management System (EMS) to comply FERC Order No. 2222.

Reasons and Benefits:

For NYISO to regulate DER installations, it sends a desire energy output through the EMS system. They in return send back their energy output to the NYISO. This data interchange is done through the ICCP protocol, which has a specific polling period.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	15	150	0	0

Electric Clean Energy Transformation

NYSEG

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NYSEG

CLCPA Transmission Projects Phase II

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

The CLCPA Transmission Projects Phase II Program consists of the 46 projects. The 46 projects are spread throughout the Elmira, Geneva, Hornell, Lancaster and Rochester areas within NYSEG's and RG&E's territory. Please see the Single Line Diagram at the end of this document. Items shown in red are the proposed project scope.

Reasons and Benefits:

The objective of the study was to determine the system upgrades necessary to satisfy the Near-Term CLCPA Need in the "Z1" Area of Concern (Southern Tier), as defined in the Order filed on September 9th, 2021 (the "Phase 2 Order") by the New York Public Service Commission.

The projects proposed as part of this study are beneficial to the integration of renewable resources in support of New York's year 2030 climate policy objectives. This study found that by addressing the CLCPA deliverability needs, several asset condition needs can be mitigated while also providing significant land-based renewable resource deliverability benefits to the Bulk Electric System ("BES").

Deliverability Needs

Deliverability needs are comprised of constraints or "bottlenecks" identified on the existing "Local Transmission" system (less than 200 kV) under simulated high renewable dispatches that would limit renewable energy deliverability under either normal (N-0) or contingency (N-1) conditions.

A total of eighty-nine (89) unique thermal constraints were identified in all Divisions under study, including both N-0 (system normal or base-case) and N-1 (contingency) bottlenecks.

A total of twenty-seven (27) unique and limiting voltage constraints were identified throughout the Divisions in this study; these included N-0 (system normal or base-case) N-1 (contingency), or N-1-1 (line-out) violations.

Reliability Needs

A reliability study was not required as part of this effort and therefore was not performed.

Asset Condition Needs

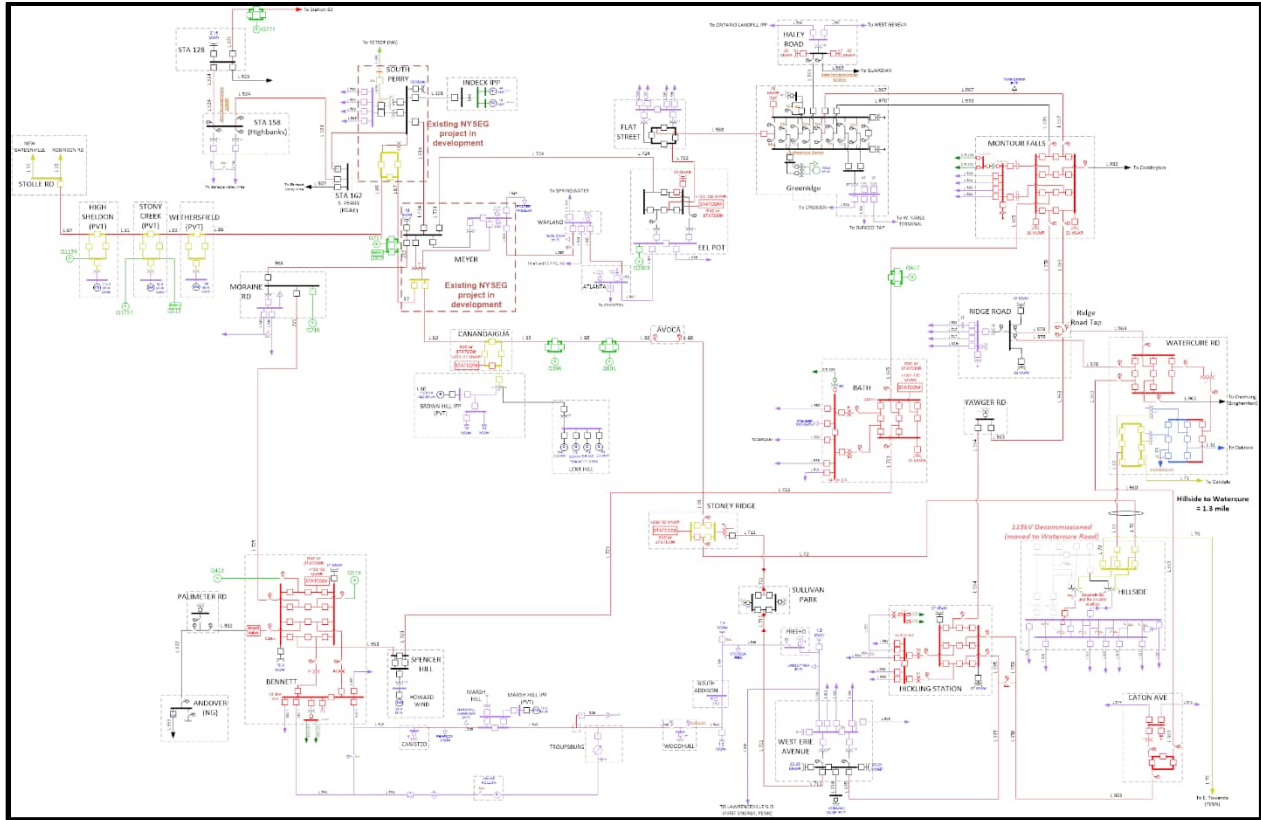
Asset condition deficiencies were identified by an assessment of the physical condition of the transmission and substation (“T&S”) assets related to each of the proposed projects, including visual inspections (where possible) along with a review of operations and maintenance reports. Other available records, including but not limited to, equipment health reports, protection and control records, and flood exposure risks were also considered.

The risk of no action is low voltage, voltage collapse and thermal overloads on transmission lines and substation equipment due to increased renewable generation. There may be an increased risk of customer outages and an increased duration of these outages due to the aforementioned deliverability constraints.

This study provides a comprehensive assessment in response to the State of New York Public Service Commission’s Order on Near-Term CLCPA Need in the “Z1” Area of Concern and presents the State with an opportunity to simultaneously solve numerous reliability, resiliency, and asset condition issues, while also unlocking significant headroom for renewable energy resources via the Company’s transmission system for delivery around the state.

Reinforcement Solution Set - No Curtailment Single Line Diagram

NYSEG and RG&E 5-Year Capital Investment Plan



Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
24,800	310,200	330,200	417,600	545,400



NYSEG

CLCPA Transmission - Projects Phase 1

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

The CLCPA Transmission Projects Phase I Program consists of the 23 projects listed below. The 23 projects are spread throughout the Binghamton, Ithaca, Lancaster, Lockport and Oneonta areas within NYSEG’s territory. The Lancaster and Lockport areas only have one project each. Items shown in red in Figures 1 through 5 are the proposed project scope.

Project Name
Oakdale 345/230/115/34 5/12 kV and Goudey/Westover 115/34 5/4 8 kV Substation Upgrades
115 kV Line 962 Full Rebuild
Lounsberry 115/12 5 kV Substation Full Rebuild
115 kV Line 961 Full Rebuild
Coddington 115/34 5kV Substation Upgrades
Etna 115/34 5/4 8 kV Substation Full Rebuild
Clarks Corners 345/115 kV Substation Upgrades
115 kV Line 982 Full Rebuild
Stolle Road 345/230/115/34 5 kV Substation Upgrades
Robinson Road 230/115/34 5 kV Substation Upgrades
Jennison 115/46 kV Substation Upgrades
New 115 kV Baker Hill Substation
New 46 kV Line from Pierce to Baker Hill
New 46 kV Line from Morris to Baker Hill
New 115 kV Line from Baker Hill to East Norwich
New 115 kV Line from Baker Hill to Colliers
New 115 kV Line from Baker Hill to Fraser
East Norwich 115/46/34 5/4 8 kV Substation Partial Rebuild
Colliers 115/46/4 8/4 16 kV Substation Full Rebuild
Pierce Ave 46/4 8 kV Substation Upgrades
Morris 46/4 8 kV Substation Upgrades
115 kV Line 946 Full Rebuild
115 kV Line 949 Full Rebuild

NYSEG and RG&E 5-Year Capital Investment Plan

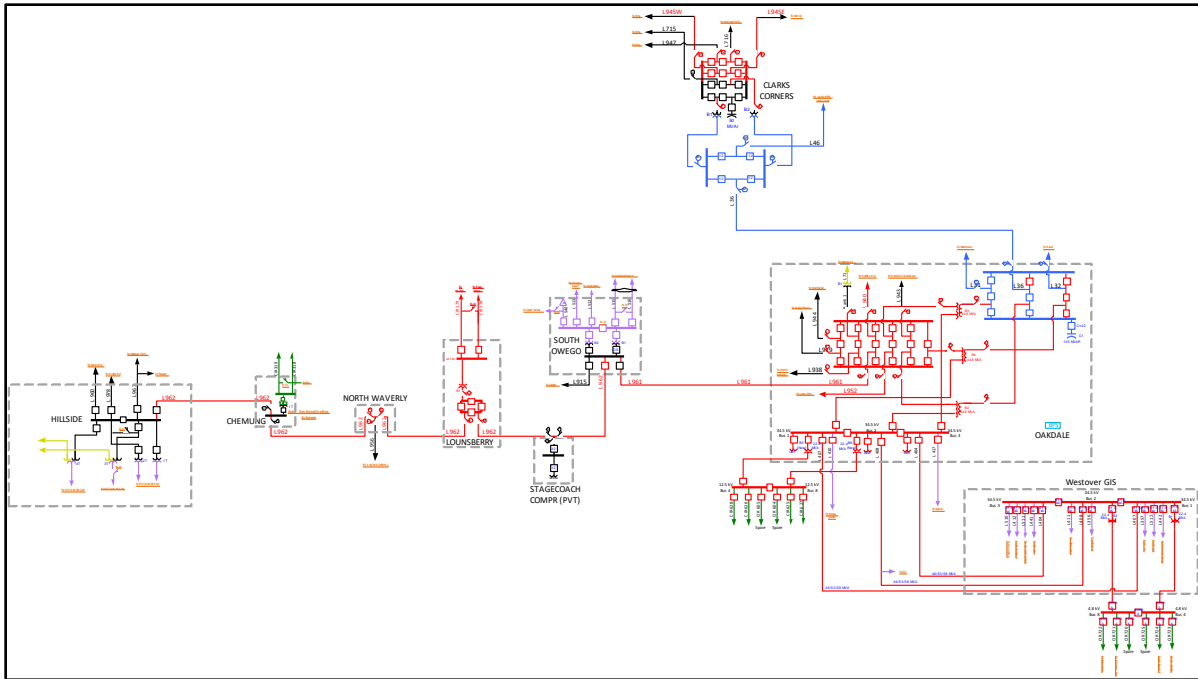


Figure 1 – Electrical One-Line (Binghamton Area - Solutions)

NYSEG and RG&E 5-Year Capital Investment Plan

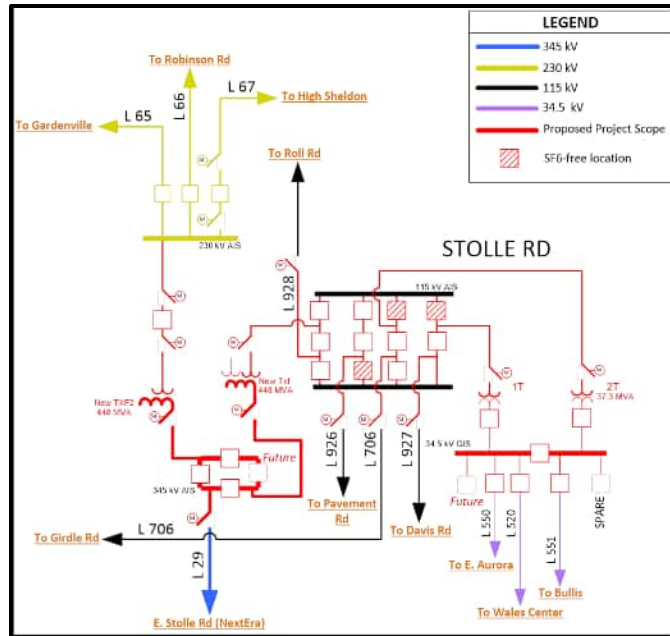


Figure 3 – Electrical One-Line (Lancaster Area - Solutions)

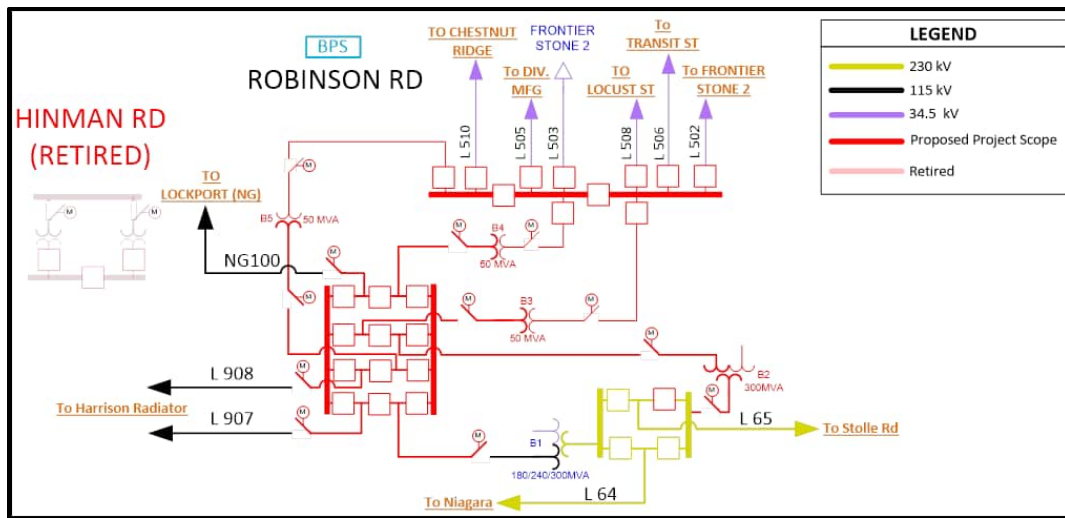


Figure 4 – Electrical One-Line (Lockport Area – Solutions)

NYSEG and RG&E 5-Year Capital Investment Plan

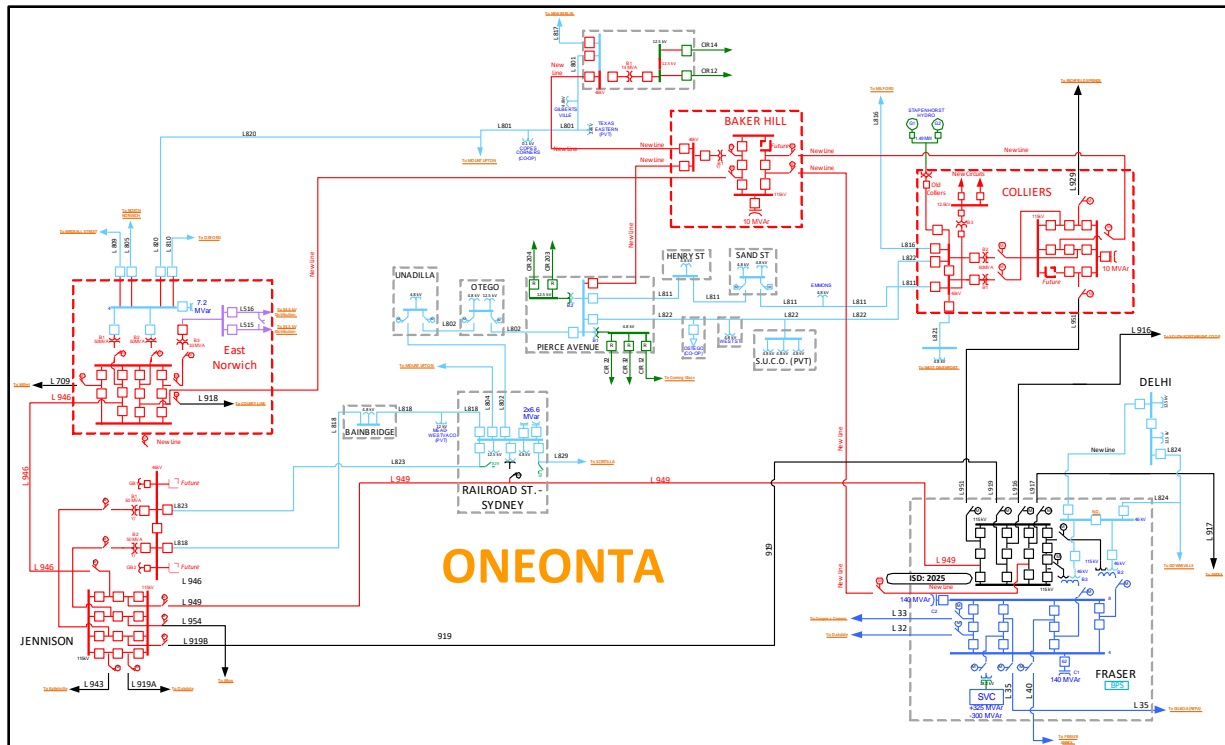


Figure 5 – Electrical One-Line (Oneonta Area - Solutions)

Reasons and Benefits:

The objective of this Climate Leadership and Community Protection Act (“CLCPA”) Phase 1 Needs and Solutions Assessment study was to perform a comprehensive assessment of NYSEG’s long term capital plan projects across its New York service territory (i.e. NYSEG and RG&E) that are mature, immediately actionable, and beneficial to the integration of renewable resources in support of New York’s year 2030 climate policy objectives.

This study found that by accelerating select NYSEG long term capital plan projects, several reliability and asset condition needs can be mitigated while also providing significant land-based renewable resource deliverability benefits to the Bulk Electric System (“BES”).

Deliverability Needs

Deliverability needs are comprised of constraints or “bottlenecks” identified on the existing “Local Transmission” system (less than 200 kV) under simulated high renewable dispatches that would limit renewable energy deliverability under either normal (N-0) or contingency (N-1) conditions.

A total of sixty (60) unique deliverability needs were identified in all the NYSEG Divisions under study, including both N-0 (system normal or base-case) and N-1 (contingency) bottlenecks.

Reliability Needs

The 2018 BES Study and the 2019 Cayuga GDA Study were used as the basis for these needs, however, a re-assessment utilizing updated case assumptions to confirm needs was included in this study.

A total of sixteen (16) unique and limiting reliability needs were identified throughout the NYSEG Divisions in this study; these included N-0 (system normal or base-case), N-1 (contingency), or N-1-1 (line-out) violations.

Asset Condition Needs

Asset condition deficiencies were identified by an assessment of the physical condition of the transmission and substation (“T&S”) assets related to each of the proposed projects, including visual inspections along with a review of operations and maintenance reports. Other available records, including but not limited to, equipment health reports, protection and control records, and flood exposure risks were also considered.

Please refer to the CLCPA Transmission Projects Phase I Needs and Solutions Assessment for additional details.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
125,700	188,200	305,000	310,300	429,100

NYSEG

Ithaca Electrification Projects – Phase 2

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

The load growth projected due to the Ithaca Electrification Project is expected to result in new thermal violations on the transmission and distribution systems, which require mitigation. Five projects (summarized in Figure 1) would be required to support the full extent of load growth projected by 2030. (1) The West Hill 34.5/12.5 kV transformer will be replaced with a larger unit. (2) Both 34.5/12.5 kV transformers at South Hill will be replaced with larger units. (3) A new 12.5 kV distribution circuit will be routed out of East Ithaca. (4) 34.5 kV Line 526 between Coddington and South Hill Substations, 2.7 miles, will be uprated. (5) 34.5 kV Line 532 between Coddington and West Hill Substations, 4.5 miles, will be uprated.

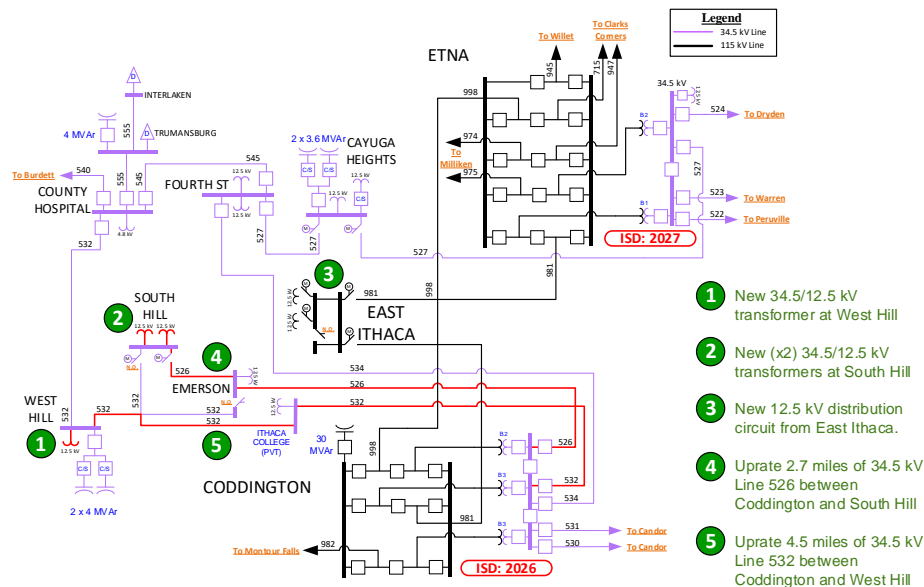


Figure 1: Coddington-Etna One Line with Phase 2 Projects

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The projected load growth from the Ithaca Electrification Project is expected to result in up to a 100% increase in Winter peak (30% increase in Summer peak) load at Fourth St, West East Ithaca, South Hill, and West Hill Substations. This load growth has the potential to result in a series of new thermal violations on the transmission and distribution systems.

The West Hill 34.5/12.5 kV transformer is rated to 10.5 MVA. Based on the rated of expected load growth, the peak load at West Hill is expected to exceed 10.5 MVA in 2027 and increase up to 15.5 MVA by 2030.

South Hill 34.5/12.5 kV transformer Bank #1 is rated to 10.5 MVA, and Bank #2 is rated to 14 MVA. Based on the rated of expected load growth, the peak load at West Hill is expected to exceed the capacity of the Bank #1 transformer in 2027 and exceed the capacity of the Bank #2 transformer in 2028. By 2030 the combined load at South Hill Substation is projected to be up to 35 MVA.

East Ithaca substation supplies four (4) distribution circuits, and two of these circuits (#404 and #406, each rated to 13 MVA) are projected to become overloaded by 2028. Due to the location of these circuits, it is not feasible to offload these circuits onto other existing circuits to the extent that the overload concerns would be fully resolved.

34.5 kV Line 526 supplies the South Hill Substation under normal conditions, and the Winter Normal rating of Line 526 is 31 MVA. The load, under normal Winter peak conditions, is projected to exceed 31 MVA in 2028 and reach up to 37 MVA by 2030.

34.5 kV Line 532 is a source to West Hill Substation under normal conditions and a backup source to South Hill Substation. By 2029, the load growth at South Hill is projected to cause a thermal overload (exceeds Winter LTE rating of 51 MVA by 108%) on Line 532 for any conditions when Line 526 is removed from service.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	10,000	10,000	10,000

NYSEG

Java SS Microgrid BESS

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

The Java Substation Microgrid project meets the NY Rate Case Order, to address a reliability need for loss of a substation transformer by installing a Microgrid utilizing Battery Energy Storage (BESS). This is a very innovative unique solution for the distribution side and one of the first in New York, where energy is not sold back into the market. The Microgrid will be NYSEG owned and provide back up to multiple substation circuits during an outage for 1,700 customers.

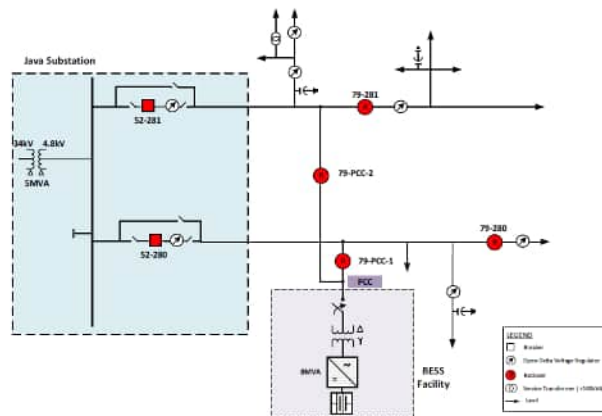


Figure 1: One Line

NYSEG and RG&E 5-Year Capital Investment Plan

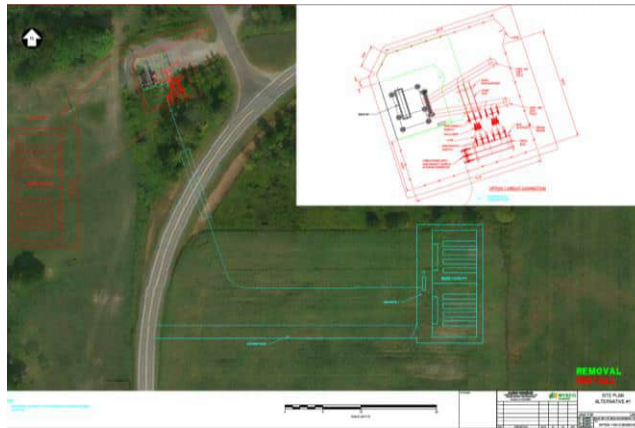


Figure 2: Optional Layouts. (Red Layout selected)

Reasons and Benefits:

The project needs identified for either a traditional wires solution or an NWA solution (in total) were to

- Reduce the peak loading on the individual transformer bank to below its nameplate rating of 5 MVA,
- Address reliability and power quality issues that exist on the Java circuit #280 and
- Address the potential risk of failure of the existing transformer.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,076	20,233	0	0	0

NYSEG

Ithaca Electrification Projects – Phase 1

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

Voltage and thermal violations exist under a range of contingency conditions in the transmission and distribution network between Coddington and Etna Substations in NYSEG’s Ithaca Division. To resolve the voltage violations, three shunt capacitors are proposed at (1) West Hill, (2) Trumansburg, and (3) Cayuga Heights. There is a plan to rebuild Coddington substation, which will resolve the thermal violations in the long term (2026-2027), but in the short term a mobile 115/34.5 kV transformer will be installed at Coddington. Two transformers at Fourth Street will be replaced with larger units, and the 8.3 kV distribution network (which is isolated from the 12.5 kV surrounding network) will be upgraded to 12.5 kV.

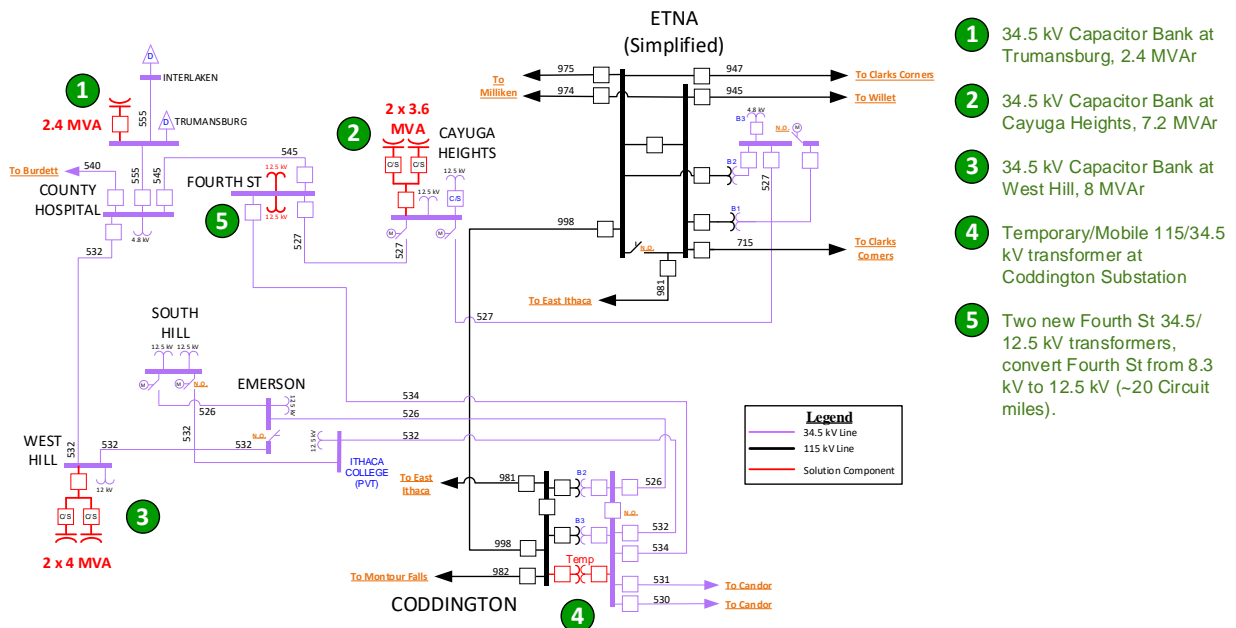


Figure 1: Coddington-Etna One Line with Phase 1 Projects

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The 34.5 kV transmission network between Coddington and Etna Substations is unable to maintain system voltages above Transmission Planning’s minimum criteria of 0.95 per unit under multiple contingency conditions.

The long-term plan to rebuild Coddington Substation does not address the immediate system thermal Needs which impact up to 30,000 customers. For a fault on either of the Coddington 115/34.5 kV transformers, the remaining transformer may exceed its thermal Long-Term and Short-Term Emergency ratings. Installing a temporary transformer at Coddington Substation until construction is complete on the rebuild will improve reliability in the short-term.

The Fourth Bank Substation Bank #1 transformer is projected to have its capacity exceeded by 2026. The distribution circuits out of Fourth Street Substation are 8.3 kV, while all other distribution circuits in this region are 12.5 kV. This negatively impacts reliability for Fourth Street Substation customers (~3,300) as well as customers on the nearby circuits (~1,500) since the redundancy that could be provided by having a uniform voltage level is not available. Load growth opportunities are also restricted due to fewer load balancing options resulting from disparate distribution voltages.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	3,000	6,000	10,000	6,000

NYSEG

Stillwater NWA

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

The Stillwater NWA project consists of installing a 1MW/2.9MWh battery energy storage system on the Stillwater Distribution Substation circuit #225 located in NYSEG’s Mechanicville division to provide peak shaving during overloads and minimize substation transformer degradation.

Reasons and Benefits:

The Stillwater substation of New York State Electric & Gas is a 34.5 - 4.8 kV station located in the Mechanicville Division. The 2.8 MVA substation transformer has an average summer peak load of 105% of its nameplate, exceeding its nameplate rating the past 4 consecutive years. The Stillwater Substation was previously identified as a capital model project to address the increasing load growth and transformer overloads. A traditional solution was proposed, which consisted of a new three-phase 34.5-12.47kV, 14MVA substation transformer and conversion of the entire #215 distribution circuit to 12.47kV. The traditional solution had an estimated cost of approximately \$15.15 million.

Through the NWA evaluation process, Stillwater was identified as a suitable NWA project and will beneficially defer the traditional substation upgrade and circuit conversion by ten (10) years. An RFP was issued in 2017 and a winning bidder was selected with a proposed 1MW/2.9MWh Battery Energy Storage System (BESS) to reduce substation transformer peak loading and minimize transformer degradation.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,827	0	0	0	0

Electric Clean Energy Transformation

RG&E

CLCPA Transmission Projects Phase II 382



RG&E

CLCPA Transmission Projects Phase II

Line of Business: Electric
Category: Clean Energy Transformation

Scope:

The CLCPA Transmission Projects Phase II Program consists of the 46 projects. The 46 projects are spread throughout the Elmira, Geneva, Hornell, Lancaster and Rochester areas within NYSEG's and RG&E's territory. Please see the Single Line Diagram at the end of this document. Items shown in red are the proposed project scope.

Reasons and Benefits:

The objective of the study was to determine the system upgrades necessary to satisfy the Near-Term CLCPA Need in the "Z1" Area of Concern (Southern Tier), as defined in the Order filed on September 9th, 2021 (the "Phase 2 Order") by the New York Public Service Commission.

The projects proposed as part of this study are beneficial to the integration of renewable resources in support of New York's year 2030 climate policy objectives. This study found that by addressing the CLCPA deliverability needs, several asset condition needs can be mitigated while also providing significant land-based renewable resource deliverability benefits to the Bulk Electric System ("BES").

Deliverability Needs

Deliverability needs are comprised of constraints or "bottlenecks" identified on the existing "Local Transmission" system (less than 200 kV) under simulated high renewable dispatches that would limit renewable energy deliverability under either normal (N-0) or contingency (N-1) conditions.

A total of eighty-nine (89) unique thermal constraints were identified in all Divisions under study, including both N-0 (system normal or base-case) and N-1 (contingency) bottlenecks.

A total of twenty-seven (27) unique and limiting voltage constraints were identified throughout the Divisions in this study; these included N-0 (system normal or base-case) N-1 (contingency), or N-1-1 (line-out) violations.

Reliability Needs

A reliability study was not required as part of this effort and therefore was not performed.

Asset Condition Needs

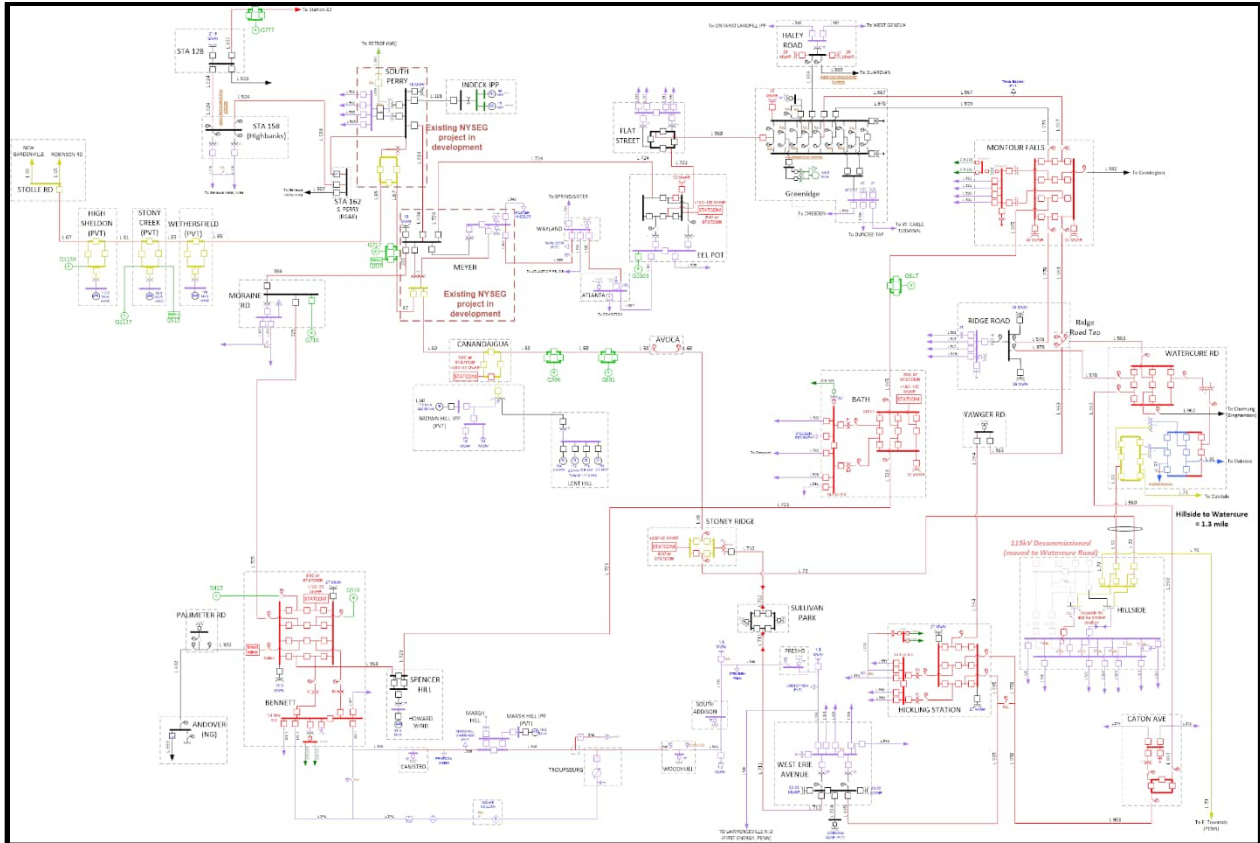
Asset condition deficiencies were identified by an assessment of the physical condition of the transmission and substation (“T&S”) assets related to each of the proposed projects, including visual inspections (where possible) along with a review of operations and maintenance reports. Other available records, including but not limited to, equipment health reports, protection and control records, and flood exposure risks were also considered.

The risk of no action is low voltage, voltage collapse and thermal overloads on transmission lines and substation equipment due to increased renewable generation. There may be an increased risk of customer outages and an increased duration of these outages due to the aforementioned deliverability constraints.

This study provides a comprehensive assessment in response to the State of New York Public Service Commission’s Order on Near-Term CLCPA Need in the “Z1” Area of Concern and presents the State with an opportunity to simultaneously solve numerous reliability, resiliency, and asset condition issues, while also unlocking significant headroom for renewable energy resources via the Company’s transmission system for delivery around the state.

Reinforcement Solution Set - No Curtailment Single Line Diagram

NYSEG and RG&E 5-Year Capital Investment Plan



Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
600	7,100	6,100	10,000	25,300



Electric Customer Focus

NYSEG

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NYSEG

Dist Line

Line of Business: Electric
Category: Customer Focus

Scope:

The Distribution Line program consists of replacing infrastructure due to emergency situations causing interruptions in service. This program is for unplanned, reactive work on the electric distribution system such as car hit poles, damaged conductors, transformers, and poles. This program is budgeted each year based on the cost that has occurred in previous years. It is difficult to predict what may break and or be damaged by others, so a historical estimate is used year after year.

Reasons and Benefits:

Being able to quickly repair damaged assets is paramount in ensuring public safety and maintaining a reliable distribution system. Adequate funding, materials and field crew availability are crucial in expediting our response time.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
22,341	42,430	43,702	45,014	46,364

NYSEG

Make Ready

Line of Business: Electric
Category: Customer Focus

Scope:

The Make Ready program is working to make our infrastructure available to meet the broadband communication needs of our customers. As this work has evolved, we have developed, with input from DPS Staff and other stakeholders, guidelines for the cost treatment of the different situations encountered in the field.

Reasons and Benefits:

Process Applications providing safe access to distribution pole plant for communications/broadband deployment needs in accordance with PSC Law 119a.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
29,467	33,250	33,250	42,750	42,750

NYSEG

Trans line

Line of Business: Electric
Category: Customer Focus

Scope:

The Transmission Line program consists of addressing safety concerns by replacing reject poles, car hit poles, damaged conductors, and similar unplanned, reactive work on the electric transmission system 34.5kv or higher. Work is also performed to replace individual units of property identified as emergent from the transmission line inspection program in addition to addressing CAIDI/SAIFI Hot Spots in the same calendar year.

Reasons and Benefits:

This program helps to maintain a reliable transmission system and addresses transmission line inspection deficiencies that directly impact CAIDI/SAIFI.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
17,981	22,907	23,594	24,302	25,031

NYSEG

Res Line

Line of Business: Electric
Category: Customer Focus

Scope:

This program provides distribution line extensions and necessary facilities (poles, transformers, conductors, conduit, hand holds, manholes, etc.) to provide service to both large scale residential development projects and individual residential units or meters. The requirement for each project is unique based on the requirements of development projects, the project locations, and the existing electric system infrastructure. This program is budgeted based on historical spend and any added increase or decrease from various residential customers if communicated in advance. If a project is greater than \$200K a separate tracking order is created.

Reasons and Benefits:

The extensions completed under this Program are mandatory to serve NYSEG customers. NYSEG needs to provide safe, reliable, and dependable electric service. Often customers require line extensions to connect to the Company's electric facilities, and the Company strives to meet the customers' demands in a timely manner. In certain cases, a portion of the costs of these upgrades may be offset by contributions from the specifically affected customers. Adequate funding, material, and available field crews are necessary to serve our customers in a timely manner.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
10,030	12,774	13,157	13,552	13,958

NYSEG

Serv Conn

Line of Business: Electric
Category: Customer Focus

Scope:

This program installs or upgrades new electric service to individual residential units at the customer’s request. Included within the program is anything required for constructing, expanding, replacing, or relocating electric infrastructure assets to connect residential customers. Meters required as part of customer projects are also included on this line item. The cost of the service is comprised of tariff portions as well as customer payments for the amounts above the tariff required provision.

Reasons and Benefits:

This project is mandatory to serve NYSEG customers. NYSEG needs to provide reliable and dependable electric service to residential customers. The Company strives to fulfill these requests in a timely manner. In certain cases, all, or a portion of the costs of these installations and upgrades may be offset by contributions from the specifically affected customers. Adequate funding, material, and available field crews are necessary to keep up with customer demand.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,400	12,228	12,595	12,973	13,362

NYSEG

Ind/Comm

Line of Business: Electric
Category: Customer Focus

Scope:

This program provides service connections for industrial and commercial customers. Included within the program is anything required for constructing, expanding, replacing, or relocating electric infrastructure assets to connect commercial customers. The cost of the service is comprised of tariff portions as well as customer payments for the amounts above the tariff required provision. This program is budgeted based on historical spend and any added increase or decrease from the various commercial customers if communicated in advance.

Reasons and Benefits:

This project is mandatory to serve NYSEG customers. NYSEG needs to provide reliable and dependable electric service to large commercial and industrial customers. Often large commercial and industrial customers require an upgrade to a Company's electric facilities to meet their needs, and the Company strives to make these upgrades in a timely manner. In certain cases, all, or a portion of the costs of these upgrades may be offset by contributions from the specifically affected customers. Adequate funding, material, and available field crews are necessary to serve our customers in a timely manner.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,987	7,336	7,556	7,783	8,016

NYSEG

Gov't Highway

Line of Business: Electric
Category: Customer Focus

Scope:

This program relocates electric facilities that conflict with highway, road, and street projects being undertaken by municipalities and other government agencies. This program is budgeted based on historical spend while considering any added increase or decrease from various government agencies if communicated in advance. Many of these requests are made in-year by the government agencies and are therefore unplanned.

Reasons and Benefits:

The projects funded under this Program are non-discretionary and must be completed under tariff to serve NYSEG State and Municipal customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,492	4,621	4,759	4,902	5,049

NYSEG

Street Light

Line of Business: Electric
Category: Customer Focus

Scope:

This program provides new overhead street and area lighting and replaces damaged lighting facilities. This program also includes the upgrading and conversion of existing lighting to LED lighting when maintenance occurs. This program is planned based on historical spend and any added projections for LED lighting conversion per request by municipalities in advance.

Reasons and Benefits:

The program keeps NYSEG tariff compliant and improves public safety.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,572	4,592	4,729	4,871	5,017

NYSEG

LED Streetlighting

Line of Business: Electric
Category: Customer Focus

Scope:

The NYS LED Streetlight Conversion Program is a tariff mandated program to provide streetlighting customers with the availability to install energy efficient lighting to meet NY State mandates. This is an on-going Program that is estimated as a 5-year program (2019-2024).

Reasons and Benefits:

Three contractors across NYSEG and RG&E Service territories to remove existing non-LED streetlights and install new LED streetlights. LED lights for the conversion program are purchased directly from the manufacturer. Photo eyes are also purchased directly from the manufacturer. All material contracts have been bid through the Procurement process.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,572	5,000	5,000	0	0

NYSEG

Data Capable

Line of Business: Electric
Category: Customer Focus

Scope:

Data Capable is a municipal dashboard that will allow municipalities to log into a website and obtain outage related data specific to their area as well as provide information such as road closures back to the utility.

Reasons and Benefits:

This webpage would provide the municipality with information such as: municipal liaison points of contact, outages, restoration times, critical facilities, as well as show progress made throughout an event. The municipality could also upload road closure information. This helps build relationships with the municipal leaders and it provides them with real time information they can provide to their constituents.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	2,431	2,431	2,431	2,431

NYSEG

Electric Meters

Line of Business: Electric
Category: Customer Focus

Scope:

This program purchases and installs electric meters to replace existing, aged meters as they are removed from service and for new installations

Reasons and Benefits:

Required by 16 NYCRR Part 92 and Tariff PSC 19- 4 (Metering and Billing) for new meters and replacement programs. The program helps to ensure accurate recording of customers usage and results in accurate customer billing.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,605	1,098	1,098	1,098	1,464

NYSEG

Storms Electric

Line of Business: Electric
Category: Customer Focus

Scope:

The Storm Restoration program is to restore power (distribution and/or transmission) due to impacts from major weather events. This program replaces broken poles, conductor, transformers, and other facilities that are damaged during qualifying storm events.

Reasons and Benefits:

Having the ability to quickly respond to storm events and the customer outages is paramount in maintaining a safe and reliable system. The longer the outage the greater impact to CAIDI metrics and the greater risk that the damaged equipment poses a threat to employee and public safety.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
421	562	573	584	596

NYSEG

LSE Tracker (Life Support Equipment)

Line of Business: Electric
Category: Customer Focus

Scope:

This project will track Life Support Equipment (LSE) customer outages to ensure positive contact within the required 12 and 24 hour periods. The product will contain the LSE customer contact information and it will communicate with the Company’s SAP system to record the contact result.

Reasons and Benefits:

This project will ensure compliance with NYS PSC requirements and scorecard measurements. The current process is manual and requires a disproportionate number of FTEs to maintain. This leaves considerable room for error. The recent omission of a single customer cost Avangrid \$1M in penalty.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,400	200	0	0

Electric Customer Focus

RG&E

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RG&E

Make Ready

Line of Business: Electric
Category: Customer Focus

Scope:

The Make Ready program is working to make our infrastructure available to meet the broadband communication needs of our customers. As this work has evolved, we have developed, with input from DPS Staff and other stakeholders, guidelines for the cost treatment of the different situations encountered in the field.

Reasons and Benefits:

Process Applications provide safe access to distribution pole plant for communications/broadband deployment needs in accordance with PSC Law 119a.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,886	19,000	16,150	20,900	20,900

RG&E

Dist Line

Line of Business: Electric
Category: Customer Focus

Scope:

The Distribution Line program consists of replacing infrastructure due to emergency situations causing interruptions in service. This program is for unplanned, reactive work on the electric distribution system such as car hit poles, damaged conductors, transformers, and poles. This program is budgeted each year based on the cost that has occurred in previous years. It is difficult to predict what may break and or be damaged by others, so a historical estimate is used year after year.

Reasons and Benefits:

Being able to quickly repair damaged assets is paramount in ensuring public safety and maintaining a reliable distribution system. Adequate funding, materials and field crew availability are crucial in expediting our response time.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,057	14,741	15,184	15,639	16,108

RG&E

Gov't HW

Line of Business: Electric
Category: Customer Focus

Scope:

This program relocates electric facilities that conflict with highway, road, and street projects being undertaken by municipalities and other government agencies. This program is budgeted based on historical spend while considering any added increase or decrease from various government agencies if communicated in advance. Many of these requests are made in-year by the government agencies and are therefore unplanned.

Reasons and Benefits:

The projects funded under this Program are non-discretionary and must be completed under tariff to serve RG&E State and Municipal customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
977	9,998	12,057	14,119	14,183

RG&E

Res Line

Line of Business: Electric
Category: Customer Focus

Scope:

This program provides distribution line extensions and necessary facilities (poles, transformers, conductors, conduit, hand holds, manholes, etc.) to provide service to both large scale residential development projects and individual residential units or meters. The requirement for each project is unique based on the requirements of development projects, the project locations, and the existing electric system infrastructure. This program is budgeted based on historical spend and any added increase or decrease from various residential customers if communicated in advance. If a project is greater than \$200K a separate tracking order is created.

Reasons and Benefits:

The extensions completed under this Program are mandatory to serve RG&E customers. RG&E needs to provide safe, reliable, and dependable electric service. Often customers require line extensions to connect to the Company's electric facilities, and the Company strives to meet the customers' demands in a timely manner. In certain cases, a portion of the costs of these upgrades may be offset by contributions from the specifically affected customers. Adequate funding, material, and available field crews are necessary to serve our customers in a timely manner.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,725	4,961	5,110	5,264	5,421

RG&E

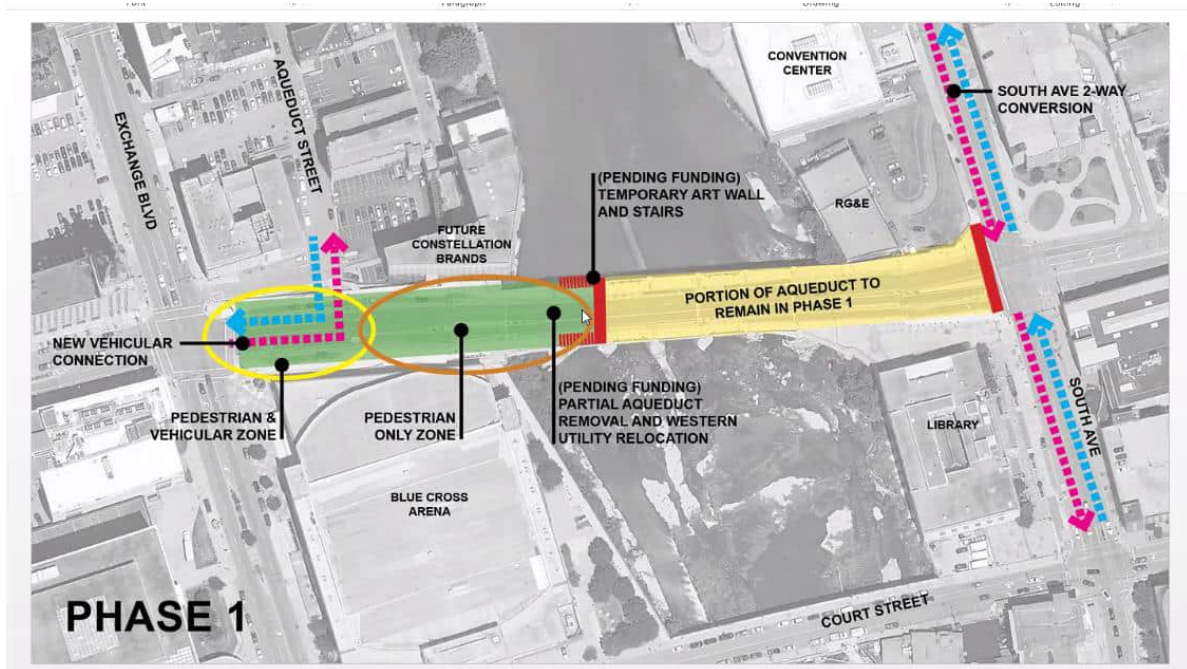
Aqueduct Re-Imagined

Line of Business: Electric

Category: Customer Focus

Scope:

The City of Rochester is executing a program called ROC the Riverway, which includes two dozen transformation projects along the Genesee River. The program is intended to allow Rochester to better leverage the riverfront. Aqueduct Re-Imagined will include the removal of the Street Surface of the Broad Street Bridge to expose the historic Aqueduct. RG&E has approximately 11 Circuits in the raceway that will need some type of relocation to facilitate the city's plans.



Example Figure 1: Aqueduct High Level Concept

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

RG&E has been put on notice by the City of Rochester that we will need to address the circuits in conflict with the City’s plans. The city is currently asking RG&E to be in construction in the summer of 2023. The project needs seed funding to start engineering a solution to the problem.

RG&E would be supporting a betterment initiative while facilitating a mandated relocation within the City right of way.

If this project is not pursued, there is potential for litigation with the City of Rochester as the re-route has the support of New York State with pledged funding, both federal and state.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
350	3,000	10,000	7,000	4,000

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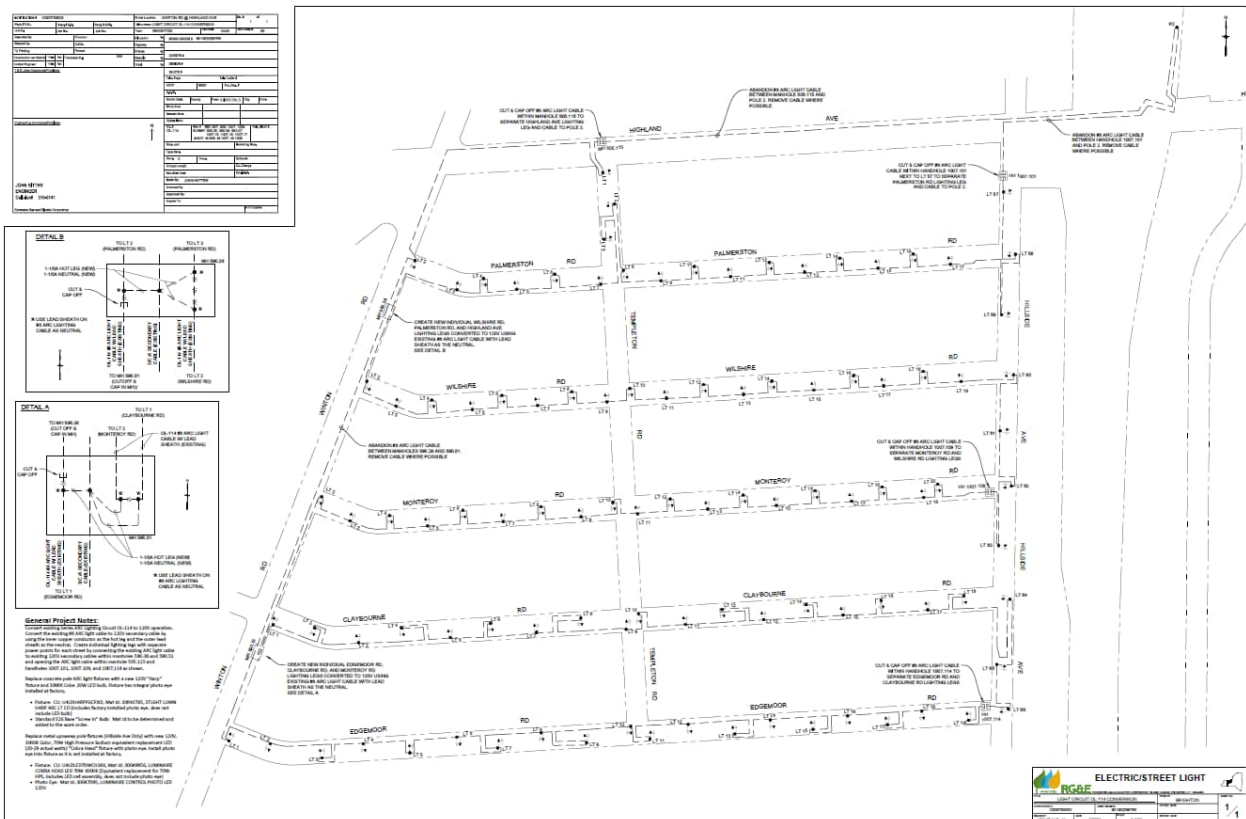
RG&E

Town of Brighton Arc Light Conversion

Line of Business: Electric
Category: Customer Focus

Scope:

The town of Brighton needs light fixtures, cable feeds and bulb replacements. The current concrete pole "harp" arc street lighting system is out of date and RG&E is struggling to find parts for replacement. RG&E's plan is to convert one neighborhood with 93 lights total initially, to verify compatibility and use gained spare parts after the conversion.



Example Figure 1: Construction Sketch

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Failure of the older lighting system results in unsafe conditions for pedestrians and requests from the Town to replace the failing system. Replacement parts are also incredibly challenging to find and are becoming obsolete.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
300	2,500	5,000	5,000	5,000

RG&E

Serv Conn

Line of Business: Electric
Category: Customer Focus

Scope:

This program installs or upgrades new electric service to individual residential units at the customer's request. Included within the program is anything required for constructing, expanding, replacing, or relocating electric infrastructure assets to connect residential customers. Meters required as part of customer projects are also included on this line item. The cost of the service is comprised of tariff portions as well as customer payments for the amounts above the tariff required provision.

Reasons and Benefits:

This project is mandatory to serve RG&E customers. RG&E needs to provide reliable and dependable electric service to residential customers. The Company strives to fulfill these requests in a timely manner. In certain cases, all, or a portion of the costs of these installations and upgrades may be offset by contributions from the specifically affected customers. Adequate funding, material, and available field crews are necessary to keep up with customer demand.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,486	3,200	3,296	3,395	3,497

RG&E

Ind/Comm

Line of Business: Electric
Category: Customer Focus

Scope:

This program provides service connections for industrial and commercial customers. Included within the program is anything required for constructing, expanding, replacing, or relocating electric infrastructure assets to connect commercial customers. The cost of the service is comprised of tariff portions as well as customer payments for the amounts above the tariff required provision. This program is budgeted based on historical spend and any added increase or decrease from the various commercial customers if communicated in advance. If a project is greater than \$200K a separate tracking order is created.

Reasons and Benefits:

This project is mandatory to serve RG&E customers. RG&E needs to provide reliable and dependable electric service to large commercial and industrial customers. Often large commercial and industrial customers require an upgrade to a Company's electric facilities to meet their needs, and the Company strives to make these upgrades in a timely manner. In certain cases, all, or a portion of the costs of these upgrades may be offset by contributions from the specifically affected customers. Adequate funding, material, and available field crews are necessary to serve our customers in a timely manner.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,857	3,027	3,117	3,211	3,307

RG&E

Trans line

Line of Business: Electric
Category: Customer Focus

Scope:

The Transmission Line program consists of addressing safety concerns by replacing reject poles, car hit poles, damaged conductors, and similar unplanned, reactive work on the electric transmission system 34.5kv or higher. Work is also performed to replace individual units of property identified as emergent from the transmission line inspection program in addition to addressing CAIDI/SAIFI Hot Spots in the same calendar year.

Reasons and Benefits:

This program helps to maintain a reliable transmission system and addresses transmission line inspection deficiencies that directly impact CAIDI/SAIFI.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,825	2,929	3,017	3,107	3,200

RG&E

Gov't Highway Majors CAP

Line of Business: Electric
Category: Customer Focus

Scope:

This program relocates electric facilities that conflict with highway, road, and street projects being undertaken by municipalities and other government agencies. The program focuses on large scale government highway projects totaling \$200k or more.

Reasons and Benefits:

The projects funded under this Program are non-discretionary and must be completed under tariff to serve RG&E State and Municipal customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,278	1,998	2,057	2,119	2,183

RG&E

DataCapable

Line of Business: Electric
Category: Customer Focus

Scope:

A municipal dashboard that will allow municipalities to log in and obtain outage related data specific to their area as well as provide information such as road closures back to the utility.

Reasons and Benefits:

This webpage would provide the municipality with information such as: municipal liaison point of contact, outages, restoration times, critical facilities, as well as show progress made throughout an event. The municipality could also upload road closure information. This helps build relationships with the municipal leaders and it provides them with real time information they can provide their constituents.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	1,034	1,034	1,034	1,034

RG&E

Mandated RG&E - East Main St HWY Project

Line of Business: Electric
Category: Customer Focus

Scope:

The East Main Street project is a mandatory municipal relocation project, required of the City of Rochester, to relocate our facilities within their Right of Way. The project will install subway between Goodman St. and Culver Rd. that will house five 4kV distribution circuits and two 11kV sub-transmission circuits. Abandoned cables and duct systems will be removed.

Example Figure 1: Circuit Location



Reasons and Benefits:

The project will replace clay tile duct, transformers, vacuum switches and aged PILC cable with new infrastructure. In addition, Pilot Wire #14 is re-routed to facilitate protections on circuits 735 and 718.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,255	0	0	0	0

RG&E

Electric Meters Program

Line of Business: Electric
Category: Customer Focus

Scope:

This program purchases electric meters to replace existing, aged meters as they are removed from service as well as for new installations, as required by Tariff. Electric meters are exchanged for annual PSC required programs including statistical sampling, remediation programs and for other various reasons including, but not limited to, relocation, load increases, meter damage, and special testing.

Reasons and Benefits:

This program is required by 16 NYCRR Part 92 and Tariff (PSC 19- 4 (Metering and Billing) for new meters and replacement programs. The programs help to ensure accurate recording of customers usage and result in accurate customer billing.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
666	322	322	645	752

RG&E

Street Light

Line of Business: Electric
Category: Customer Focus

Scope:

This program provides new overhead street and area lighting and replaces damaged lighting facilities. This program also includes the upgrading and conversion of existing lighting to LED lighting when maintenance occurs. This program is planned based on historical spend and any added projections for LED lighting conversion per request by municipalities in advance.

Reasons and Benefits:

The program keeps RG&E tariff compliant and improves public safety.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
259	379	391	402	414

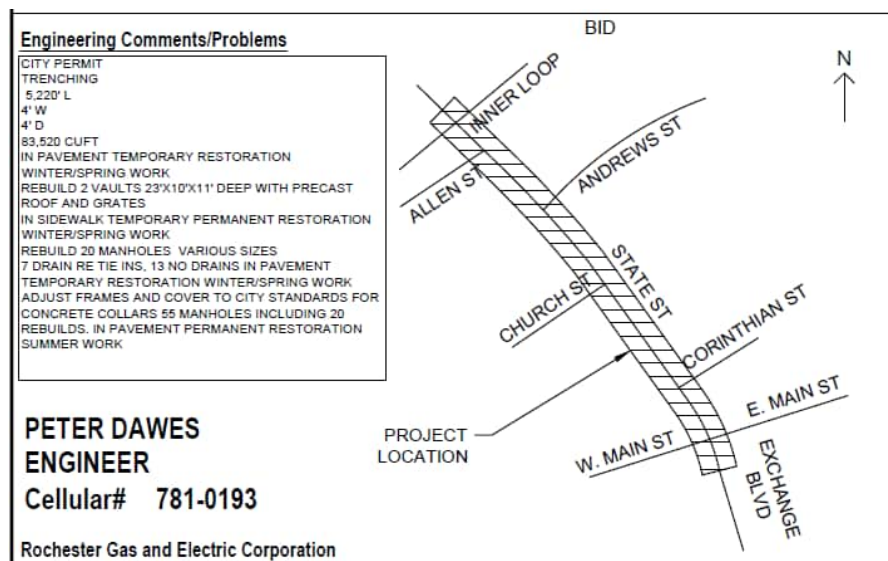
RG&E

Mandated - State St

Line of Business: Electric
Category: Customer Focus

Scope:

The City of Rochester is reconstructing State Street from Basin Street to the Inner Loop, improvements include full reconstruction of the asphalt roadway, drainage rehabilitation, curb and sidewalk replacement and street lighting. RG&E has 11kV and 4kV Circuits in tile duct, Network vaults with transformers, Services, Handholes and Manholes in the vicinity of their project. The scope RG&E will execute is to remove any abandoned pipe cable, rebuild detonating manholes/handholes, rebuild network vaults and add conduits to the exiting tile duct. Additionally, RG&E will have conflict locations with the City of Rochester curb line that will be addressed for the City of Rochester to progress their Project.



Example Figure 1: Sketch of Work Area

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

RG&E Facilities are in the City of Rochester Right of Way and need to be relocated for their work to progress. Additionally, RG&E is taking the opportunity to improve its system reliability and asset condition before the City reconstructs this roadway with critical RG&E facilities underneath.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,426	0	0	0	0

RG&E

LED Streetlighting

Line of Business: Electric
Category: Customer Focus

Scope:

The NY LED Streetlight Conversion Program is a tariff mandated program to provide streetlighting customers the availability to install energy efficient lighting to meet NY State mandates. This is an on-going Program that is estimated as a five-year program (2019-2024).

Reasons and Benefits:

Three contractors across NYSEG and RG&E Service territories to remove existing non-LED streetlights and install new LED streetlights. LED lights for the conversion program are purchased directly from the Manufacture. Photo eyes are also purchased direct from the manufacture. All material contracts have been bid though the Procurement process.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
380	500	500	0	0

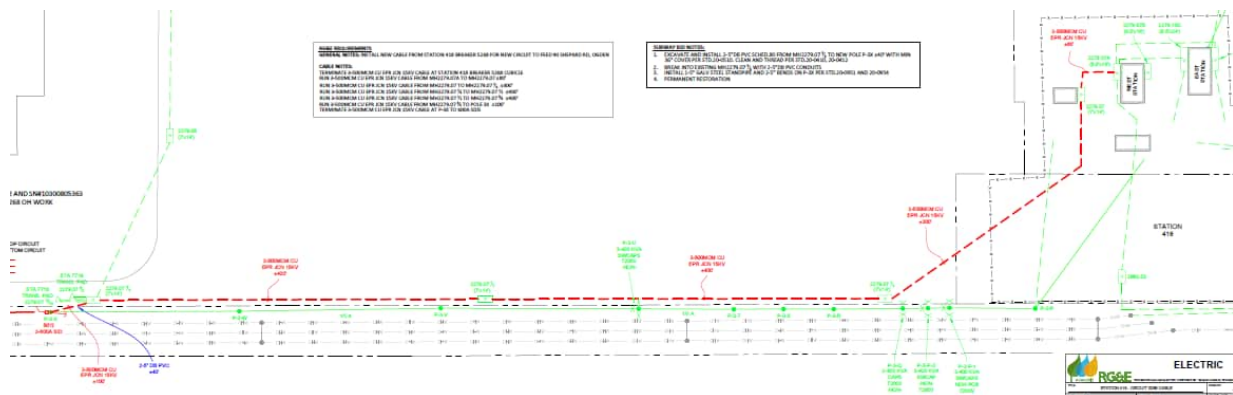
RG&E

ROC 5 Amazon

Line of Business: Electric
Category: Customer Focus

Scope:

The customer is building a large merchandise distribution facility and requires a load of approximately 7.5MW. The solution is to install a new, dedicated circuit from RG&E's Station 418 to the customer's facility. This will require the replacement of approximately 50 poles, installing spacer cable on the new poles, installing 1,500' of underground primary cable, and tapping into an existing breaker at STA 418. Relay settings and commissioning will also be required.



Example Figure 1: Station 418 Cable Sketch

RG&E

STORM ELECTRIC

Line of Business: Electric
Category: Customer Focus

Scope:

The Storm Restoration program is to restore power (distribution and/or transmission) due to impacts from major weather events. This program replaces broken poles, conductor, transformers, and other facilities that are damaged during qualifying storm events.

Reasons and Benefits:

Having the ability to quickly respond to storm events and the customer outages is paramount in maintaining a safe and reliable system. The longer the outage the greater impact to CAIDI metrics and the greater risk that the damaged equipment poses a threat to employee and public safety.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
182	186	189	193	197

RG&E

LSE Tracker (Life Support Equipment)

Line of Business: Electric
Category: Customer Focus

Scope:

This project to track Life Support Equipment (LSE) customer outages to ensure positive contact within the required 12 and 24 hour periods. The product should contain the LSE customer contact information and it should communicate with SAP system to record the contact result.

Reasons and Benefits:

This project will ensure compliance with NYS PSC requirements and scorecard measurements. The current process is manual and requires a disproportionate number of FTEs to maintain. This leaves considerable room for error. The recent omission of a single customer cost Avangrid \$1M in penalty.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	600	85	0	0

Electric Modernization

NYSEG

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NYSEG

AMI Project

Line of Business: Electric
Category: Modernization

Scope:

NY AMI will install smart meters and associated equipment in NYSEG& OPCO territory.

Reasons and Benefits:

NY AMI is an essential foundational system in realizing REV goals to empower customers through new tools and information to effectively manage and reduce usage, establish and animate new markets to promote the implementation of DER's, and minimize environmental impacts of power generation and energy consumption. NYSEG will gain early outage detection to assist with restoration efforts as well as streamline internal business processes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
57,393	57,542	57,542	36,043	5,296

NYSEG

Siemens Spectrum upgrade to V7

Line of Business: Electric
Category: Modernization

Scope:

This project is the NYSEG portion of the upgrade of Siemens Spectrum System to version 7. The Siemens Spectrum System provides EMS/SCADA/ADMS/OMS functionalities to operate the electric transmission and distribution systems in New York State.

Reasons and Benefits:

Spectrum 7 is the latest software version. Moving to the latest version will guarantee that we get the latest operating system, database and applications security patch. In addition, Spectrum 7 works on Linux which will allow the Company to span the hardware options.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	6,000	6,000

#

NYSEG

15 Loop Automation Schemes

Line of Business: Electric
Category: Modernization

Scope:

Therefore, a Task Force is proposed to mitigate this portion, through some actions directed to the worst-performing circuits. The main objective of these actions is to ensure that, for temporary outages, the minimum number of consumers is out, and the restoration is as fast as possible through automation schemes and remote controller operations from ECC.

Given the explanation above, and considering the execution capacity of the areas involved, 15 new Automated Loop Schemes are proposed to explore the existing devices in the circuits involved. The experience with previous Self Healings shows that the activation of these schemes improves the SAIFI of their circuits around 30%. In addition, there will be an increase in the return on Capex already invested in the network, since most of the devices used are already in production.

Reasons and Benefits:

Reduction in SAIFI, as the switching's are carried out in less than 5min. Previous experiences in other companies show a reduction of around 30% in circuits covered by logic. As a result, there is also a reduction in operating costs with travel and service time for crews in the field.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,198	1,929	1,929	1,929	1,929



NYSEG

REV - Electric Vehicles

Line of Business: Electric
Category: Modernization

Scope:

The EV Make-Ready Program (“MRP”) supports the development of electric infrastructure and equipment necessary to accommodate an increased deployment of EVs within the NYSEG service area by reducing the upfront costs of building charging stations for light-duty EVs. Through this EV Make-Ready Program, entities seeking to install or participate in the installation of Level 2 (“L2”) and/or Direct Current Fast Charging (“DCFC”) chargers can earn incentives that will offset a large portion of, or in some cases, all of the infrastructure costs associated with preparing a site for EV charger installation. Incentives are categorized by utility-side make ready and customer-side make ready. Utility-side make ready includes all traditional distribution work for new service lines and/ or service upgrades and incentives are recoverable through capital plant in service. Customer-side make ready includes all electrical infrastructure from the point of utility point of attachment up to but not include EV charging stations themselves. Customer-side incentives are recoverable as regulatory assets amortized over 15 years through a surcharge on customer bills.

Costs associated with this program include infrastructure updates and extensions required to make the system ready to accept a customer's charging infrastructure. Some examples of this work might be installing transformers, setting new poles, and setting new wires which are utility owned. Customers do need to pay a CIAC for some of this work but are eligible for up to 100% of that CIAC to be returned as a rebate by order of the PSC.

Reasons and Benefits:

The NY Public Service Commission originally issued an Order establishing the Electric Vehicle Make-Ready Program, mandating that the expenses associated with implementing EV chargers as well as associated new business expenses be factored into the companies’ Capital Planning process and ultimately factored into utility Rate Case Proceedings. Following that order, the EV Program Order was introduced. The new order mandated costs associated with customer owned infrastructure and incentive payments would be recovered through 15-year Regulatory Assets, five year Regulatory Assets, and Rate surcharges. Utility owned Infrastructure costs associated implementing the program and making EV chargers available for connection are to be factored into the companies’ Capital Planning Process. This Program encompasses those expenses.



NYSEG and RG&E 5-Year Capital Investment Plan

This project supports the creation of an environment that facilitates and supports the adoption of electric vehicles within our service territories. To encourage the growth of the EV Market, sufficient charging infrastructure is necessary. Electrification of transportation is a key solution for de-carbonizing the economy. These infrastructure upgrades are PSC mandated.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
904	1,551	2,132	3,415	0

NYSEG

AMI Integration for ISO

Line of Business: Electric
Category: Modernization

Scope:

NYSEG's current settlement system uses regular scheduled readings from the billing kWh meters applied to static load profiles or for the hourly priced customers with interval meters, the customer's actual hourly usage. This data is used to determine the load serving entities (LSE) hourly loads in accordance with NYISO's billing schedule. The current settlement is performed in SAP-EDM. The use of AMI data for settlement and NYISO reporting will require upgrades to the existing settlement system. This will include purchasing a new system to handle approximately 1.3 million interval meters for settlement. There will be a bid process to select a vendor to provide a system. As part of the system, interfaces will be designed including, but not limited to, SAP-CCS, MV90, ITRON AMI, ESCO files, and NYISO.

The current electric wholesale settlement is performed in SAP-EDM which is not capable of processing the necessary amount (approximately than 1.3M) of new AMI meters in an efficient manner. A bid process will be used to determine the most qualified vendor. The entire project will take 24 months to complete and will start during the first quarter 2023.

The AMI Integration Project involves the following activities:

1. Develop bid documents and a list of potentially qualified bidders list and receive bid responses.
2. Review and score responses and select a vendor.
3. Negotiate and sign a contract with the successful bidder.
4. Engage the successful bidder in Blueprinting/design workshops including detailed project phase planning.
5. Architecture design and initial system build in DEV environment.
6. Functional test and sign-off by the Company
7. System integration test and user acceptance
8. Parallel testing
9. Training and then cut over
10. Post go-live support

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The existing system for NYISO reporting will not handle the forecasted 1.3 million hourly metered accounts. An upgrade to a more robust system is required. In addition, the use of AMI metered data for NYISO reporting was filed with the NYPSC as part of the January 18, 2021 AMI Benefit Implementation Plan. The use of AMI data for settlement will allow NYSEG to provide the NYISO more accurate data in a shorter time frame. By using the actual customer’s hourly data, meter error, unread meters, and load profiling error from the use of static profiles will be reduced. During a recent twelve-month period, the approximate hourly value of the swing in system wide UFE ranged from a positive maximum of \$35,000 to negative maximum of \$(25,000). With these sources of UFE reduced, accuracy of the load settlement data will be increased alleviating these variations in energy costs and provided better load forecasts, and hedging schedules. In addition, the AMI data will improve the accuracy of load profiles used for rate design and cost allocation for future rate cases.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	739	4,144	0	0



NYSEG

IEE Service Mode

Line of Business: Electric
Category: Modernization

Scope:

Currently, MV90 is used to collect data from meters that require interval data. There is an opportunity to exchange the majority of these with AMI meters, but enhancements are required. The Itron Enterprise Edition (IEE) Service Mode implementation project includes the addition of the IEE Service Mode and interval billing determinant calculation. The Service Mode solution will support NYSEG's data collection and management requirements.

NYSEG and RG&E currently have ~2,500 meters that require interval data including MHP, Net Meter Installations, and other accounts. By 2026, Net Meter Installations projected volume is expected to double, adding an additional 350 meters to the system. Existing meters will be exchanged for AMI meters and IEE Service Mode and interval billing determinants will be implemented to replace the functionality of AMI and automate some tasks required for billing.

Reasons and Benefits:

Benefits include more timely and accurate bills to customers, elimination of manual work and more sustainable model to accommodate future growth.

Risks if not implemented: Plain Old Telephone Service (POTS) lines are required to communicate data from meters to the MV90 system. POTS lines are becoming obsolete and are no longer being installed by many telephone companies. Meters with built in cellular service are an option for some but not all meters based on cell service coverage across the state. Many cell meters use 2G service which is also being phased out. When communication with the meters is not possible, data must be downloaded manually by a meter tech (NYSEG twice a month due to 5-minute intervals). Phone line issues result in lost data requiring time-consuming editing to estimate and fill in the usage and generation gaps. Troubleshooting issues currently requires 0.31 FTE. Delayed bills caused by communication failures negatively impact customer satisfaction.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	528	2,112	570	0



NYSEG

DSIP - ADMS

Line of Business: Electric
Category: Modernization

Scope:

The ADMS (Advanced Distribution Management Systems) will provide the ability to test distribution power flow, volt-var optimization, demand response, FLISR (Fault Location, Isolation, and Service Restoration)

Reasons and Benefits:

ADMS will provide additional tools to the Distribution Operators to optimize the distribution network. This project awaits updates to the current data sources, which lack enough specific and detailed data to feed the ADMS. The current Grid Model Enhancement Project (GMEP) is a key to producing consistent and accurate data as input to the ADMS system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	375	1,625	1,000	0

NYSEG

Application Interface Upgrades

Line of Business: Electric
Category: Modernization

Scope:

Includes projects for Energy Management System (EMS), Outage Management System (OMS) and IT related interface programming. The existing OMS – Geographic Information System (GIS) interface is not efficient and requires to be redesigned to meet operational requirements. The current OMS-GIS interface sends raw data to the GIS system, which then performs significant processing before populating customer facing websites and GIS/OMS related tools. Instead, the OMS system will provide more comprehensive summary data to be used verbatim by IT with minimal processing. This will be much more efficient and greatly simplify the process. The EMS interface converts GIS data to update the transmission and distribution model in the EMS. This program requires rework and a redesign to reduce the processing time.

Reasons and Benefits:

Add efficiency and lower risk with changes to the EMS/GIS interface. Today it is complicated and risky to make important changes to this interface. Today's OMS-GIS interface requires significant processing to convert today's OMS data into that of the prior GIS/OMS system. This can cause discrepancies in numbers and long processing times. By utilizing data in the format of the new system to populate outer facing web sites and GIS-related apps is preferable. Damage Assessment interface to SAP was built to fulfill PSC requirements (scheduled to go live 8\2020), but this interface should be direct with OMS. This will allow additional data and functionality to be provided beyond what's possible in SAP

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
39	182	1,541	47	0

NYSEG

Distribution Automation

Line of Business: Electric
Category: Modernization

Scope:

Install reclosers, and other applicable control devices, or add communications to existing control devices to automate the Distribution network, specifically at DG interconnected locations, to enable remote monitoring and control of applicable control devices.

Reasons and Benefits:

Improve grid reliability (frequency, duration and breadth of outages), reduce local intervention (use of crew resources) and increase grid integration (growing DER penetration).

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
206	209	432	445	458

NYSEG

DSIP - Enterprise Analytics

Line of Business: Electric
Category: Modernization

Scope:

For the Enterprise Data Analytics Implementation Project, a qualified industry expert will focus on deploying Use Case related to Asset Management: Circuit breakers using a structured and value driven approach completed this year.

The deployment will move our organization from our current level of analytics maturity to full compliance

Reasons and Benefits:

Data and analytics are foundational to realizing Utility of the Future initiatives. The “smart” revolution is exponentially compounding the amount of grid and customer data utilities generate. The development of the DSP platform will introduce a range of new data in the AVANGRID service territories, including sub-hourly customer consumption data, status information from grid devices, interval measurements of service conditions on distribution feeders, and a growth in DER information. As the volume of data collected increases in magnitude and diversifies through the platform investments, AVANGRID recognizes the importance of leveraging Data Management, Business Intelligence, and Advanced Analytics to extract insights from this data in order to help move the business and the market toward a future of informed, proactive, and agile decision making.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,268	0	0	0	0

NYSEG

Transmission GIS and GIS Interface optimization

Line of Business: Electric
Category: Modernization

Scope:

Implement enhancement on the Transmission Geographic Information System (GIS) model: Transmission Network Applications (TNA) modeling, split conductor, dual representation correction, object naming and relation. GIS-Energy Management System (EMS) interface optimization

Reasons and Benefits:

The changes will allow a better representation of the Transmission model, benefiting TNA, (Distribution Network Applications (DNA) and Supervisory Control and Data Acquisition (SCADA) functions and will reduce the update time in the EMS/ Outage Management System (OMS) system in NY for more accurate data.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	525	225	0	0

NYSEG

SMSI Field Deployment

Line of Business: Electric
Category: Modernization

Scope:

As a follow on to the SMSI NYSERDA PON Project with RIT GIS, this project will take the Smart Meter to Smart Inverter DER Gateway technology developed in a lab environment and deploy it in the field at small DER sites (<50kW). Target of 15 pilot sites (10 NYSEG, 5 RG&E). SMSI Gateway will collect W, V, VARs and other measurement data from the inverter and allow it to be accessed by system operators as well as enabling controlling the inverters and changing settings remotely

Reasons and Benefits:

Deploying the Smart Meter - Smart Inverter DER Gateway technology in the field will allow for evaluation of field performance and provide operational experience. The project provides a needed M&C solution for small, residential scale DER that will be necessary to operate the electrical system as DER penetration increases. This M&C will not only provide the monitoring to make it easier to identify and address system issues caused by DER as they arise but also gives our operators (and our DERMS) the ability to control those DERs to mitigate issues via remote commands or settings changes. Results of the field deployment will inform if the technology is a viable cost-effective technology that can be deployed at scale.

The project also leverages the AMI system infrastructure that will be installed by the NY companies in the coming years.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	207	414	0

NYSEG

Automate SAP CCS Dist Gen Billing

Line of Business: Electric
Category: Modernization

Scope:

Upgrade SAP CCS for automated Distributed Generation Billing.

This is part of a continued multi-year regulatory mandated project effort for the development of SAP system billing automation that started in 2017 in New York for the NYSEG and RG&E companies.

The following NYS Public Service Commission orders result in the need for a continued multi-year system automation effort for billing functionally: 15-E-0082, 15-E-0267, 15-E-0407, 15-E-0751, 15-E-0273, and 19-M-0463.

As a result of these orders, enhancements are required to support the enrollment and billing within NYSEG and RG&E's SAP CCS billing systems. Due to the number of current and future anticipated enrollments, the Companies cannot sustain a manual solution for an extended period of time. The complexity of the enrollment and billing rules coupled with large community projects require an automated solution to ensure accurate and timely billing.

The initial PSC Order for the "DG Project" (Distributed Generation) was issued on 10/16/15. This Order required utilities to implement CDG Projects immediately (NY Case 15-E-0082).

An additional PSC Order was issued in Case 15-E-0751 for all Phase I Value of Distributed Energy Resources (VDER). This Order further specified billing components and cost mitigation for CDG Projects.

There are two types of CDG Billing: Volumetric and Value Stack. Based on these PSC Orders, the Companies have worked to automate the CDG Billing type which had the most customers at the time.

Volumetric Billing was automated in January of 2019, with Volumetric File Automation presently in the development phase.

Currently, the Companies utilize manual processes for Value Stack billing and crediting. The Companies' key CDG priority currently is Value Stack automation given current and forecasted volume. The Companies have been actively developing and testing requirements for CDG Value Stack automation of file validation and exchange, billing, and reporting.

Reasons and Benefits:

The NYS PSC issued an Order effective immediately to implement Community Distributed Generation "CDG" programs in NY (Case 15-E-0082: "Proceeding on Motion of the Commission as to the Policies, Requirements and Conditions for Implementing a Community Net Metering Program.") As a result of this Order, enhancements are required to support the enrollment and billing within NYSEG and RG&E's SAP CCS billing systems. Due to the number of current and future anticipated enrollments, the Companies cannot sustain a manual solution for more than a short period of time. The complexity of the enrollment and billing rules coupled with the anticipation of large Community projects require an automated solution to ensure accurate and timely billing.

New York's REV initiative emphasizing clean energy has resulted in a tremendous growth in solar and other clean energy systems. Since 2012, solar power systems in NYS have grown 750 percent (a little over 78 megawatts to 669 megawatts currently throughout the state). As a result of the tremendous growth and offering of new net energy billing programs (net energy billing, remote net energy billing and now community net energy billing), manual billing solutions are no longer feasible. Automation of the current CDG program offerings will also serve as a platform to automate newer programs that are anticipated to become effective January 2017 (Case 15-E-0751: "In the Matter of the Value of Distributed Energy Resources.")

New York's REV initiative emphasizing clean energy has resulted in a tremendous growth in solar and other clean energy systems; as a result of the tremendous growth and offering of new net energy billing programs (net energy billing, remote net energy billing and community net energy billing).

Currently NYSEG and RG&E have received and accepted over 125 project applications. Additionally, there are approximately 100 projects currently in-queue (projects in various stages of the interconnection process). NYSEG and RG&E have over 30,000 customers participating in CDG as of March 2022.

Risks of not automating include: delayed and erroneous billing, PSC complaints from customers and developers which could result in financial penalties and reduced customer service levels. Also, if this automation is not completed the company would require additional OPEX funds and FTEs to support the manual efforts with added difficulty in meeting regulatory mandates.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
599	0	0	0	0



NYSEG

Spectrum Planned Work Module

Line of Business: Electric
Category: Modernization

Scope:

The purpose of the Planned Work Module is to provide an integrated, automated solution for the creation, approval and execution of planned work in the control system. Currently, planned outages are currently managed locally by the division; but the plan is to centralize this function into the Energy Control Center (ECC) to enable coordination across workstreams, improve planning from a reliability perspective and ensure effective operation of Distribution Generator (DG) connections.

The Planned Work Module will provide an online interface for a local user to create an outage/non-reclose request (location, date, time and equipment). The ECC will review/approve and create the necessary switching order to facilitate the work. These requests will be managed via an automated workflow process. The module will also include a reporting suite to track outage requests by status, circuit, etc.

The product will directly interface to the Energy Management System to enable a “point & click” approach to the creation of switching orders. For customer impacting outages (both load and generation customers) the module will interface with SAP to generate the necessary customer outage notifications to the Customer Service team. The product will also provide a notification to indicate an asset data update is required to complete the job.

Reasons and Benefits:

Reliability, Efficiency, Safety

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	219	176	72	72

NYSEG

Electric Reliability Application (ERA) Integration

Line of Business: Electric
Category: Modernization

Scope:

The Electric Reliability Application is used to house outage-related data and compute reliability metrics. It is currently interfaced with the Outage Management System (OMS) reporting system. The goal is to more tightly integrate it with the OMS system for better reporting. This will involve a redesign and ultimately a rewrite of the application.

Reasons and Benefits:

Efficiency, Reliability, Customer Satisfaction

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
16	165	60	24	0

NYSEG

DSIP - Advanced Planning Tools

Line of Business: Electric
Category: Modernization

Scope:

Pilot Project: Granular Long-Term forecasting of Load and DER by Location and Time. In order to integrate and optimize DER, we need advanced forecasting that examines all locations on the grid (i.e., each substation and feeder) including more granular DER and load forecasts by time of day (8,760 hours per year). Accurate DER and load forecasts will help us identify grid solutions that ensure that all areas of the grid will be able to reliably serve customers at the lowest reasonable cost.

Reasons and Benefits:

Using a load & DER forecasting tool, distribution system planners can address both short-term circuit trends and long-term grid expansion while remaining consistent with the overall corporate load forecasts for energy and peak demand. This tool will enable AVANGRID planners to analyze specific future scenarios such as solar penetration and electric vehicle adoption.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	132	0	0

NYSEG

Purchase Plum Devices

Line of Business: Electric
Category: Modernization

Scope:

Purchase Plum Case to be deployed with the NYSEG Mobile Command Trailer during significant events.

The Mobile Command trailer is a trailer NY can deploy during a weather event. Normally, a division can run restoration crews from the division office, possibly a satellite office or substation depending on where the damages are located. But it is not uncommon for damages to take place not near any of those locations and have poor cellular service. It is advantageous to set up the Mobile Command trailer closer to where the work will take place, particularly in the far reaches of the service territory or a more suitable location. Generally, a foreman or FCC would work out of the trailer assigning and clearing tickets from line crews. A significant event is generally more than 10% of the customer out of power. The project scope includes the purchase of two devices.

All the activities of storm restoration can take place in the mobile command trailer. Assign, clear and close outage, and incident tickets. This activity provides ETR which is reported back to customers, elected officials and state regulators. A delay or inaccurate ETR information can cause a penalty from PSC and has in the past.

Reasons and Benefits:

The Plum Case is a proven device that magnifies cellular signals and provides WiFi to the Mobile Command Trailer occupant's cellular phones and laptops. This allows for more decentralized locations and more remote locations of operations where cellular service is extremely poor. Being able to update Outage Management System (OMS) ticket status will reduce or eliminate radio traffic into the main office.

The Plum case is a portable unit, it can be used in the mobile command trailer or it can be used if running the event out of a pickup truck. The mobile command trailers do not have communication. Especially in NYSEG's service territory there are numerous locations with poor or no cellular service. The Plum case improves poor cellular areas and allows the foreman or FCC to communicate back to the office, update, assign, clear, close outage and incidents tickets and ETRs. The benefit is being able to communicate with crews, other storm personnel and the division office. Working closer to the damage is more efficient. Being able to close tickets on the spot reduces the need to call into the office and causing backups or on hold until the office personnel are available. This is a common and significant problem on large storm events, not to mention updating ETR information.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
15	0	0	0	0



Electric Modernization

RG&E

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RG&E

AMI Project

Line of Business: Electric
Category: Modernization

Scope:

NY AMI will install smart meters and associated equipment in RG&E's territory.

Reasons and Benefits:

NY AMI is an essential foundational system in realizing REV goals to empower customers through new tools and information to effectively manage and reduce usage, establish and animate new markets to promote the implementation of DER's, and minimize environmental impacts of power generation and energy consumption. RG&E will gain early outage detection to assist with restoration efforts as well as streamline internal business processes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
24,314	24,144	24,144	12,958	2,209

RG&E

Siemens Spectrum upgrade to V7

Line of Business: Electric
Category: Modernization

Scope:

This is the RG&E portion of the upgrade of Siemens Spectrum system to version 7. The Siemens Spectrum system provides EMS/SCADA/ADMS/OMS functionalities to operate the electric transmission and distribution systems in New York State.

Reasons and Benefits:

Spectrum 7 is the latest software version. Moving to the latest version will guarantee that we get the latest operating system, database and applications security patch. In addition, Spectrum 7 works on Linux which will allow the Company to span the hardware options.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	2,000	2,000

RG&E

REV - Electric Vehicles

Line of Business: Electric
Category: Modernization

Scope:

The EV Make-Ready Program (“MRP”) supports the development of electric infrastructure and equipment necessary to accommodate an increased deployment of EVs within the RG&E service area by reducing the upfront costs of building charging stations for light-duty EVs. Through this EV Make-Ready Program, entities seeking to install or participate in the installation of Level 2 (“L2”) and/or Direct Current Fast Charging (“DCFC”) chargers can earn incentives that will offset a large portion of, or in some cases, all of the infrastructure costs associated with preparing a site for EV charger installation. Incentives are categorized by utility-side make ready and customer-side make ready. Utility-side make ready includes all traditional distribution work for new service lines and/ or service upgrades and incentives are recoverable through capital plant in service. Customer-side make ready includes all electrical infrastructure from the point of utility point of attachment up to but not include EV charging stations themselves. Customer-side incentives are recoverable as regulatory assets amortized over 15 years through a surcharge on customer bills.

Costs associated with this program include infrastructure updates and extensions required to make the system ready to accept a customer's charging infrastructure. Some examples of this work might be installing transformers, setting new poles, setting new wires which are utility owned. Customers do need to pay a CIAC for some of this work but are eligible for up to 100% of that CIAC to be returned as a rebate by order of the PSC.

Reasons and Benefits:

The NY Public Service Commission originally issued an Order establishing the Electric Vehicle Make-Ready Program, mandating that the expenses associated with implementing EV chargers as well as associated new business expenses be factored into the companies’ Capital Planning process and ultimately factored into utility Rate Case Proceedings. Following that order, the EV Program Order was introduced. The new order mandated costs associated with customer owned infrastructure and incentive payments would be recovered through 15-year Regulatory Assets, five year Regulatory Assets, and Rate surcharges. Utility owned Infrastructure costs associated implementing the program and making EV chargers available for connection are to be factored into the companies’ Capital Planning Process. This Program encompasses those expenses.

This project supports the creation an environment that facilitates and supports the



NYSEG and RG&E 5-Year Capital Investment Plan

adoption of electric vehicles within our service territories. To encourage the growth of the EV Market, sufficient charging infrastructure is necessary. Electrification of transportation is a key solution for de-carbonizing the economy. These infrastructure upgrades are also PSC mandated.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
406	704	972	1,586	0

RG&E

IEE Service Mode

Line of Business: Electric
Category: Modernization

Scope:

Currently, MV90 is used to collect data from meters that require interval data. There is opportunity to exchange a large majority of these for AMI meters, but enhancements are required. Itron Enterprise Edition (IEE) Service Mode implementation project includes addition of the IEE Service Mode and interval billing determinant calculation. The Service Mode solution will support Avangrid's data collection and management requirements in New York.

NYSEG and RG&E currently have ~2,500 meters that require interval data including MHP, Net Meter Installations, and other accounts. By 2026, Net Meter Installations projected volume is expected to double, adding an additional 350 meters to the system. Existing meters will be exchanged for AMI meters and IEE Service Mode and interval billing determinants will be implemented to replace the functionality of AMI and automate some tasks required for billing.

Reasons and Benefits:

Benefits include more timely and accurate bills to customers, elimination of manual work, more sustainable model to accommodate future growth.

Risks if not approved: Plain Old Telephone Service (POTS) lines are required to communicate data from meters to the MV90 system. POTS lines are becoming obsolete and are no longer being installed by many telephone companies. Meters with built in cellular service are an option for some but not all meters based on cell service coverage across the state. Many cell meters use 2G service which is also being phased out. When communication with the meters is not possible, data must be downloaded manually by a meter tech (NYSEG twice a month due to 5-minute intervals as opposed to 15-minute intervals at RG&E). Phone line issues result in lost data requiring time-consuming editing to estimate and fill in the usage and generation gaps. Troubleshooting issues currently requires .31 FTE. Delayed bills caused by communication failures negatively impact customer satisfaction.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	284	1,137	307	0



RG&E

AMI Integration for ISO

Line of Business: Electric
Category: Modernization

Scope:

RG&E's current settlement system uses regular scheduled readings from the billing kWh meters applied to static load profiles or for the hourly priced customers with interval meters, the customer's actual hourly usage. This data is used to determine the load serving entities (LSE) hourly loads in accordance with NYISO's billing schedule. The current settlement is performed in SAP-EDM. The use of AMI data for settlement and NYISO reporting will require upgrades to the settlement system. This will include purchasing a new system to handle approximately 1.3 million interval meters for settlement. There will be an RFP process to select a vendor to provide a system. As part of the system, interfaces will be designed including but not limited to SAP-CCS, MV90, ITRON AMI, ESCO files, and NYISO

The current electric wholesale settlement is performed in SAP-EDM which is not capable of processing the necessary amount (> than 1.3M) of new AMI meters in an efficient manner. A request for proposal (RFP) process will be used to determine the most qualified vendor. The entire project will take 24 months to complete and will start 1st quarter 2023.

AMI Integration Project involves the following activities:

1. Develop RFP and bidder's list and then circulate.
 2. Review and score responses and select a vendor.
 3. Negotiate and sign a contract for the winning bidder.
 4. Blueprinting/design workshops including detailed project phase planning.
 5. Architecture design and initial system build in DEV environment.
 6. Functional test and sign-off
 7. System Integration test and user acceptance
 8. Parallel testing
 9. Training and then cut over
- Post go-live support

Reasons and Benefits:

The existing system for NYISO reporting will not handle 1.3 million hourly metered accounts. An upgrade to a more robust system will be required. In addition, the use of

NYSEG and RG&E 5-Year Capital Investment Plan

AMI metered data for NYISO reporting was filed with the NYPSC as part of the January 18, 2021 AMI Benefit Implementation Plan. The use of AMI data for settlement will allow RG&E to provide the NYISO more accurate data in a shorter time frame. By using the actual customer’s hourly data, meter error, unread meters, and load profiling error from the use of static profiles will be reduced. During a recent twelve-month period, the approximate hourly value of the swing in system wide UFE ranged from a positive maximum of \$25,200 to negative maximum of \$(15,200). With these sources of UFE reduced, accuracy of the load settlement data will be increased alleviating these variations in energy costs and provided better load forecasts, and hedging schedules. In addition, the AMI data will Improved the accuracy of load profiles used for rate design and cost allocation for future rate cases.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	246	1,381	0	0

RG&E

DSIP - ADMS

Line of Business: Electric
Category: Modernization

Scope:

The ADMS (Advanced Distribution Management Systems) will provide the ability to test distribution power flow, volt-var optimization, demand response, FLISR (Fault Location, Isolation, and Service Restoration)

Reasons and Benefits:

ADMS will provide additional tools to the Distribution Operators to optimize the distribution network. This project awaits updates to the current data sources, which lack enough specific and detailed data to feed the ADMS. The current Grid Model Enhancement Project (GMEP) is a key to producing consistent and accurate data as input to the ADMS system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	125	1,275	100	0

RG&E

Distribution Automation

Line of Business: Electric
Category: Modernization

Scope:

Install reclosers, and other applicable control devices, or add communications to existing control devices to automate the Distribution network, specifically at DG interconnected locations, to enable remote monitoring and control of applicable control devices.

Reasons and Benefits:

Improve grid reliability (frequency, duration and breadth of outages), reduce local intervention (use of crew resources) and increase grid integration (growing DER penetration).

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
44	42	238	245	252

RG&E

Automate SAP CCS Dist Gen Billing

Line of Business: Electric
Category: Modernization

Scope:

Upgrade SAP CCS for automated Distributed Generation Billing.

This is part of a continued multi-year regulatory mandated project effort for the development of SAP system billing automation that started in 2017 in New York for the NYSEG and RG&E companies.

The following NYS Public Service Commission orders result in the need for a continued multi-year system automation effort for billing functionally: 15-E-0082, 15-E-0267, 15-E-0407, 15-E-0751, 15-E-0273, and 19-M-0463.

As a result of these orders enhancements are required to support the enrollment and billing within NYSEG and RG&E's SAP CCS billing systems. Due to the number of current and future anticipated enrollments, the Companies cannot sustain a manual solution for an extended period of time. The complexity of the enrollment and billing rules, coupled with large community projects, require an automated solution to ensure accurate and timely billing.

The initial PSC Order for the "DG Project" (Distributed Generation) was issued on 10/16/15. This Order required utilities to implement CDG Projects immediately (NY Case 15-E-0082).

An additional PSC Order was issued in Case 15-E-0751 for all Phase I Value of Distributed Energy Resources (VDER). This Order further specified billing components and cost mitigation for CDG Projects.

There are two types of CDG Billing: Volumetric and Value Stack. Based on these PSC Orders, the Companies have worked to automate the CDG Billing type which had the most customers at the time.

Volumetric Billing was automated in January of 2019; with Volumetric File Automation presently in the development phase.

Currently, the Companies utilize manual processes for Value Stack billing and crediting. The Companies' key CDG priority currently is Value Stack automation given current and forecasted volume. The Companies have been actively developing and testing requirements for CDG Value Stack automation of file validation and exchange, billing, and reporting.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The NYS PSC issued an Order effective immediately to implement Community Distributed Generation "CDG" programs in NY (Case 15-E-0082: "Proceeding on Motion of the Commission as to the Policies, Requirements and Conditions for Implementing a Community Net Metering Program.") As a result of this Order enhancements are required to support the enrollment and billing within NYSEG and RG&E's SAP CCS billing systems. Due to the number of current and future anticipated enrollments, the Companies cannot sustain a manual solution for more than a short period of time. The complexity of the enrollment and billing rules coupled with the anticipation of large Community projects require an automated solution to ensure accurate and timely billing.

New York's REV initiative emphasizing clean energy has resulted in a tremendous growth in solar and other clean energy systems. Since 2012, solar power systems in NYS have grown 750 percent (a little over 78 megawatts to 669 megawatts currently throughout the state). As a result of the tremendous growth and offering of new net energy billing programs (net energy billing, remote net energy billing and now community net energy billing), manual billing solutions are no longer feasible. Automation of the current CDG program offerings will also serve as a platform to automate newer programs that are anticipated to become effective January 2017 (Case 15-E-0751: "In the Matter of the Value of Distributed Energy Resources.")

New York's REV initiative emphasizing clean energy has resulted in a tremendous growth in solar and other clean energy systems; as a result of the tremendous growth and offering of new net energy billing programs (net energy billing, remote net energy billing and community net energy billing).

Currently NYSEG and RG&E have received and accepted over 125 project applications. Additionally, there are approximately 100 projects currently in-queue (projects in various stages of the interconnection process). NYSEG and RG&E have over 30,000 customers participating in CDG as of March 2022.

Risks of not automating include: delayed and erroneous billing, PSC complaints from customers and developers which could result in financial penalties, and reduced customer service levels. Also, if this automation is not completed the company would require additional OPEX funds and FTEs to support the manual efforts with added difficulty in meeting regulatory mandates.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
649	0	0	0	0

RG&E

DSIP - Enterprise Analytics

Line of Business: Electric
Category: Modernization

Scope:

For the Enterprise Data Analytics Implementation Project, a qualified industry expert will focus on deploying Use Case related to Asset Management: Circuit breakers using a structured and value driven approach completed this year.

The deployment will move our organization from our current level of analytics maturity to full compliance

Reasons and Benefits:

Data and analytics are foundational to realizing Utility of the Future initiatives. The “smart” revolution is exponentially compounding the amount of grid and customer data utilities generate. The development of the DSP platform will introduce a range of new data in the AVANGRID service territories, including sub-hourly customer consumption data, status information from grid devices, interval measurements of service conditions on distribution feeders, and a growth in DER information. As the volume of data collected increases in magnitude and diversifies through the platform investments, AVANGRID recognizes the importance of leveraging Data Management, Business Intelligence, and Advanced Analytics to extract insights from this data in order to help move the business and the market toward a future of informed, proactive, and agile decision making.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
640	0	0	0	0

RG&E

SMSI Field Deployment

Line of Business: Electric
Category: Modernization

Scope:

As a follow on to the SMSI NYSERDA PON Project with RIT GIS, this project will take the Smart Meter to Smart Inverter DER Gateway technology and deploy it in the field at small DER sites (<50kW). Target of 15 pilot sites (10 NYSEG, 5 RG&E). SMSI Gateway will collect W, V, VARs and other measurement data from the inverter and allow it to be accessed by system operators as well as enabling controlling the inverters and changing settings remotely

Reasons and Benefits:

The project provides a needed M&C solution for small, residential scale DER that will be necessary to operate the electrical system as DER penetration increases. This M&C will not only provide the monitoring to make it easier to identify and address system issues caused by DER as they arise but also gives our operators (and our DERMS) the ability to control those DERs to mitigate issues via remote commands or settings changes.

The project also leverages the AMI system infrastructure that will be installed by the NY companies in the coming years.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	104	207	0

RG&E

Transmission GIS and GIS Interface optimization

Line of Business: Electric
Category: Modernization

Scope:

Implement enhancement on the Transmission Geographic Information System (GIS) model: Transmission Network Applications (TNA) modeling, split conductor, dual representation correction, object naming and relation. GIS- Energy Management System (EMS) interface optimization

Reasons and Benefits:

The changes will allow a better representation of the Transmission model, benefiting TNA, (Distribution Network Applications (DNA) and Supervisory Control and Data Acquisition (SCADA) functions and will reduce the update time in the EMS/ Outage Management System (OMS) system in NY for more accurate data

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	175	75	0	0

RG&E

Spectrum Planned Work Module

Line of Business: Electric
Category: Modernization

Scope:

The purpose of the Planned Work Module is to provide an integrated, automated solution for the creation, approval and execution of planned work in the control system. Currently, planned outages are currently managed locally by the division; but the plan is to centralize this function into the Energy Control Center (ECC) to enable coordination across workstreams, improve planning from a reliability perspective and ensure effective operation of Distribution Generator (DG) connections.

The Planned Work Module will provide an online interface for a local user to create an outage/non-reclose request (location, date, time and equipment). The ECC will review/approve and create the necessary switching order to facilitate the work. These requests will be managed via an automated workflow process. The module will also include a reporting suite to track outage requests by status, circuit, etc.

The product will directly interface to the Energy Management System to enable a “point & click” approach to the creation of switching orders. For customer impacting outages (both load and generation customers) the module will interface with SAP to generate the necessary customer outage notifications to the Customer Service team. The product will also provide a notification to indicate an asset data update is required to complete the job.

Reasons and Benefits:

Reliability, Efficiency, Safety

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
77	62	54	20	20

RG&E

Application Interface Upgrades

Line of Business: Electric
Category: Modernization

Scope:

Includes projects for Energy Management System (EMS), Outage Management System (OMS) and IT related interface programming. The existing OMS – Geographic Information System (GIS) interface is not efficient and requires to be redesigned to meet operational requirements. The current OMS-GIS interface sends raw data to the GIS system, which then performs significant processing before populating customer facing websites and GIS/OMS related tools. Instead, the OMS system will provide more comprehensive summary data to be used verbatim by IT with minimal processing. This will be much more efficient and greatly simplify the process. The EMS interface converts GIS data to update the transmission and distribution model in the EMS. This program requires rework and a redesign to reduce the processing time.

Reasons and Benefits:

Add efficiency and lower risk with changes to the EMS/GIS interface. Today it is complicated and risky to make important changes to this interface. Today's OMS-GIS interface requires significant processing to convert today's OMS data into that of the prior GIS/OMS system. This can cause discrepancies in numbers and long processing times. By utilizing data in the format of the new system to populate outer facing web sites and GIS-related apps is preferable. Damage Assessment interface to SAP was built to fulfill PSC requirements (scheduled to go live 8\2020), but this interface should be direct with OMS. This will allow additional data and functionality to be provided beyond what's possible in SAP

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
56	52	30	20	0



RG&E

DSIP - Advanced Planning Tools

Line of Business: Electric
Category: Modernization

Scope:

Pilot Project: Granular Long-Term forecasting of Load and DER by Location and Time. In order to integrate and optimize DER, we need advanced forecasting that examines all locations on the grid (i.e., each substation and feeder) including more granular DER and load forecasts by time of day (8,760 hours per year). Accurate DER and load forecasts will help us identify grid solutions that ensure that all areas of the grid will be able to reliably serve customers at the lowest reasonable cost.

Reasons and Benefits:

Using a load & DER forecasting tool, distribution system planners can address both short-term circuit trends and long-term grid expansion while remaining consistent with the overall corporate load forecasts for energy and peak demand. This tool will enable AVANGRID planners to analyze specific future scenarios such as solar penetration and electric vehicle adoption.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	132	0	0

RG&E

Electric Reliability Application (ERA) Integration

Line of Business: Electric
Category: Modernization

Scope:

The Electric Reliability Application is used to house outage-related data and compute reliability metrics. It is currently interfaced with the Outage Management System (OMS) reporting system. The goal is to integrate it more tightly with the OMS system for better reporting. This will involve a redesign and ultimately a rewrite of the application.

Reasons and Benefits:

Efficiency, Reliability, Customer Satisfaction

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
45	42	15	10	0

RG&E

Purchase Plum Devices

Line of Business: Electric
Category: Modernization

Scope:

Purchase Plum Case to be deployed with RG&E Mobile Common Trailer

Reasons and Benefits:

The Plum Case is a proven device that magnifies cellular signals and provides WiFi to occupant's cellular phones and laptops. This allows for more decentralized location and more remote location of operations where cellular service is extremely poor. Being able to update OMS ticket status will reduce or eliminate radio traffic into the main office.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
15	0	0	0	0

Electric Innovation

NYSEG

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NYSEG

Low Income Clean Generation

Line of Business: Electric
Category: Innovation

Scope:

This program will include development of one or more solar PV facilities amounting to 50 MW of installed capacity. Site acquisition, design, engineering, and construction will be procured through a competitive request for proposals. The facility will be included in NYSEG base rates as capital plant. Revenue generated by the facility will be allocated to designated low-income customers for the life of the asset. Inclusion of energy storage will be analyzed and considered to the extent that it will result in increased revenue.

Reasons and Benefits:

New York must significantly increase the proportion of renewable generation in order to meet the requirements of the Climate Leadership and Community Protection Act. Today, there are several programs and policies that are meant to support growth of renewable generation including Remote Crediting and Community Distributed Generation. Through Remote Crediting and Community Distributed Generation participating customers receive credits based on revenues generated through those programs and use those credits to offset their electricity cost. Participants benefit by reducing what they would otherwise pay for electricity. Part of this value is shared with the solar PV developer in order to pay for the facilities. The Low Income Clean Generation program will allocate all market based revenue directly to the customers who will benefit the most.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	27,333	27,333	0

NYSEG

EV Charging Hub

Line of Business: Electric
Category: Innovation

Scope:

An EV charging hub is large scale, purpose-built infrastructure that will serve corridor charging needs for light-duty, medium-duty, and heavy-duty vehicles within the NYSEG service area. The project will include a 3rd party partnership to own and operate the chargers who will also be responsible for all driver amenities. The project will be located in close proximity to a NYSEG substation and will include a dedicated feeder to serve future expected load of 20 MW. Assuming an average charger power level of 250 kW the hub will serve up to 80 vehicles. The exact number of vehicles served will depend on charger specification and the mixture of vehicle types served. The project will have four phases: 1. Site Identification and Evaluation, 2. Site Acquisition, 3. Design & Engineering, and 4. Construction. Each phase will be in concert with the 3rd party partner. The partner will be responsible for site acquisition as well as any non-electrical infrastructure related design, engineering, and construction. NYSEG will be responsible for contributing toward site evaluation and for electrical infrastructure related design, engineering, and construction. The project will utilize existing make-ready program funding where applicable. The project will seek allocation of federal EV infrastructure funding to contribute toward project cost.

Reasons and Benefits:

A key premise of the EV charging hub concept is that the current approach of deploying corridor fast chargers with each site containing roughly four to twelve DC fast chargers works in an environment with only one or two percent EV market penetration, but, the current approach will not scale as market adoption scales. Additionally, the current approach will not be able to accommodate medium and heavy-duty EVs as these sites are not designed for those vehicles. In the next several years significant funding will be allocated toward construction of new EV chargers, including make-ready programs and Federal Infrastructure programs. It is important that to the extent possible funding is used toward charger installations that will scale with the market. EV charging hubs are inevitable when the EV market is at scale and once they exist and are an option for drivers it is possible that the current generation of DC fast charger deployments may be significantly under-utilized or may become stranded assets.

Ultimately the EV Charging Hub project will help support growth of the EV market and support New York's CLCPA goals. The project will showcase a next-generation model that will help the EV market scale.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	6,006	24,026	0



NYSEG

DSIP - GIS Enhancements GMEP

Line of Business: Electric
Category: Innovation

Scope:

1. GMEP - Comprehensive field inventory of physical assets across all electric distribution circuits (1900 approximately) in RG&E and NYSEG service territories employing best available technologies and service providers.

2. GMEP Development, implementation, and validation of streamlined integrated processes covering:

field data acquisition during and after the inventory, data interfaces and exchange across systems and platforms (SAP, GIS, Spectrum, CYME, FWM), sustained data quality assurance and governance plan, cybersecurity, stakeholder engagement, communications, and change management. Provide Lessons Learned Report and Continuous Improvement Plan for Project Closure.

3. GPG Scope - To improve design/project efficiencies through design standardization, automated engineering analysis and sketch development and GPS coordinate based facility spotting in the field to develop SAP work orders with electronic and/or hard copy shop papers. A mobility tool will enable the designer to perform the field functions, engineering analysis and translate the information into an executable SAP Work Order with sketches and other shop papers. The standardize SAP CU work order design will flow into the Pay ID Automation process which will then allow Construction Managers to work with Vendors thru the new Contractor Portal. The tool aligns with the planning/scheduling for contractor work engineering/construction and allows the reconciliation of the Pay id engineering MSAs...also done in the new Contractor Portal. The tool will drive the ability to manage and track productivity of field planning processes and workflow.

Reasons and Benefits:

Significant reduction of current workload dedicated to solve data gaps, and redirect to core and priority activities demanded by stakeholders (backlogs). Examples: Processing of Distribution Energy Resource (DER) interconnection studies,

Quantification and expansion Distributed Generation hosting capacity, review non-wire alternative solutions, identify new projects or potential upgrades to mitigate current reliability concerns. Enhanced Operations Situational Awareness through accurate data

NYSEG and RG&E 5-Year Capital Investment Plan

(e.g. phase assignments), and unlocking optimized grid operation functions, would enable: Load balancing and automation to achieve distribution losses reduction; Improved outage prevention, detection and restoration.

GPG Benefits - Reduction in time spent from field work to work order creation, up to 50% reduction. This drives consistency in the end products; constructable designs, documents & sketches, pay id templates, and faster SAP work orders production.

Mobile design tools and software platform using the AVANGRID GIS are implemented and integrated with SAP to automate work order creation based on standardized CU's designs created within the design tool - manual creation in SAP is eliminated. Field Planners can spend more time and cover more projects using a mobile tool in the field, reducing the office time required to create simple and complex work orders. Also, this will provide consistent sketches and designs across all OPCOs driving standardize material sets to support procurement cost improvement. The tool should include a consistent wo design. Estimated reduction, time savings for field planner, up to 50%. The field tools use an AutoCAD underlay which eliminates and/or minimizes the need for standalone operated AutoCAD for majority of designs. The mobile software platform embeds company and industry standards and design rules. Platforms provide for real-time updates to the tool selectable standards providing & maintaining standardized designs for all OPCOs

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,417	6,548	6,679	6,813	0



NYSEG

IEDR

Line of Business: Electric
Category: Innovation

Scope:

The scope includes implementation of NYSEG's portion of the Integrated Energy Data Resource processes and systems as mandated in the Order of Case 20-M-0082. The order requires the utilities to provide the IEDR statewide platform with the necessary data to support the selected Use Cases. Use Cases will be further defined during the Design Phase of the project but are expected to require the inclusion of the Phase I data elements as defined in Appendix B of the Data Access Framework order.

Scope to include Data assessment in terms of availability and quality, including business glossary, data dictionaries, data catalog, business lineage, data quality reports and data lineage as well, the scope is to integrate all systems and scheduled transports of the data elements to the company's data lake and scheduled transports of the various data sets to the statewide IEDR platform being run by NYSERDA. The scope includes design, development, testing, integration, and maintenance of systems and processes.

Phase 1:

An initial publicly accessible version of the IEDR to be released in Q4 2022 will enable at least three use cases for stakeholder evaluation and comment to inform further development. The completed Phase 1 implementation of the IEDR will be operational on or about August 11, 2023 and will enable at least five of the highest priority stakeholder use cases that can be supported with available data. It's possible that ten or more use cases could be enabled in Phase 1.

Phase 2:

Building on the successful implementation of Phase 1, Phase 2 will expand and enhance the IEDR to enable a total of fifty or more use cases. Phase 2 will be completed 30 to 36 months after the completion of Phase 1, on or about August 11, 2026.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

New York is transforming its electricity system into one that is cleaner, more resilient, and more affordable. Effective access to useful energy data will play a critical role in this transformation, unleashing the power of integrated energy customer data and energy system data to speed the deployment of clean energy solutions. This will attract investment, enable analytics, help identify operational efficiencies, promote innovation, and encourage new business models, which will in-turn create value for customers and the State’s energy system.

Initial use cases that are being considered are: whole building energy consumption, DER site identification, DER customer identification, energy efficiency customer identification, building electrification site identification, electric vehicle charger siting, DER interconnections and DER registry and aggregation.

This project is mandated by the Public Service Commission of NY and funded for NYSEG and RG&E with a total of \$12M for phase I. Phase II funding will occur during phase I execution.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,898	3,898	3,295	3,295	1,647

NYSEG

Medium & Heavy Duty EV Make-Ready Program

Line of Business: Electric
Category: Innovation

Scope:

This program will provide electrical infrastructure incentives for customer installed EV charging infrastructure for medium and heavy-duty (MHD) electric vehicles (EV). The Companies will target 790 L2 chargers and 590 DC fast chargers across the NYSEG Service Territory to support 1625 MHD vehicles.

Similarly structured to the existing Light-Duty (LD) EV Make-Ready Program (MRP), customer-side utility cost incentives for up to \$6000 towards L2 infrastructure and up to \$55,000 for DCFC infrastructure will support fleet electrification for commercial, industrial, and municipal customers. Incentives will cover 100% of the eligible cost for municipal or other public applications, including transit and school bus and 50% of the cost for private applications

The Company invests in the utility side infrastructure for new chargers serving MHD vehicles, where utility owned infrastructure is treated as CAPEX and customer owned infrastructure incentives are treated as a regulatory asset. The CAPEX budget is to cover eligible costs associated with utility-side make-ready infrastructure.

In addition to providing incentives, the Program will include dedicated program staff to market the program, facilitate applications, and track progress.

Reasons and Benefits:

The program supports the growth of beneficial electrification and reduction in transportation related emissions, while increasing equity and access to transportation electrification benefits across the service territory through increased electric mile rides for transit and school bus riders by providing access to lower cost EV charging infrastructure installations in School Bus, Municipal and transit sectors, as well as private fleets, like delivery fleets.

The purpose of the NYSEG MHD EV MRP is to address the following customer needs and federal and state policy goals:

1. The transportation sector is New York's largest source of greenhouse gas and NOx emissions, where MHD vehicles have a disproportionate share compared to other mobile sources. While these vehicles only account for 4% of vehicles on the road, they account for ~25% of total transportation emissions, disproportionately impacting low-income communities and environmental justice areas located near major trucking corridors, ports

NYSEG and RG&E 5-Year Capital Investment Plan

and distributions hubs. Addressing the needs of electrifying this part of the transportation network, is imperative to reaching the State’s CLCPA goals.

2. In 2021, New York and other states signed on to the MHD ZEV (Zero emission vehicle) MOU (memorandum of understanding). This Action Plan develops solutions towards the adoption of zero emission MHDs. The Companies MHD EV MRP is aligned with moving NYS towards achieving the targets set by the MHD ZEV MOU, closely following the LD MRP that works to achieve targets set by the 2014 LD ZEV MOU.

3. In November 2021, the Federal Bipartisan Infrastructure Law in Sec. 71101 provisioned the Clean School Bus Program, which with federal policies like this, are establishing programs towards deploying increased numbers of low and no emission school buses and related infrastructure. The proposed MHD EV MRP supports federal policies and programs, specifically targeting public and municipal MHD fleet vehicles like school buses.

4. The Companies C&I customers focused on goods and services delivery, with MHD domiciled within our service territories, have begun to set corporate goals, as well as acquire MHD EV’s for their delivery fleets. This program will directly support our customer needs for increasing charging infrastructure where vehicles reside.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	785	2,355	4,709	0

NYSEG

Distributed Energy Resource Management System (DERMS)

Line of Business: Electric
Category: Innovation

Scope:

The scope entails the implementation of an enterprise-wide Distributed Energy Resource Management System. The companies plan on leveraging the existing REV FICS demonstration investment by expanding the licensing to cover the enterprise, deployment of a disaster recovery site (hardware and software) which will be integrated with the companies' SCADA system. The companies envision cost recovery of the grid edge investment by DER developers when the DERMS is leveraged to allow for the safe, reliability interconnection of DER.

Reasons and Benefits:

The Company's visibility and control capabilities to accommodate the increasing integration, operation, and optimization capabilities of DER, including storage and demand response, is limited today. Implementation of a DERMS provides the Company real-time visibility into the status of DERs and allows for the heightened level of control and flexibility necessary to optimize DER and distribution grid operation. The initial DERMS use case will be to accommodate constrained, proposed DER interconnections and follow-on use cases will include leverage the DER asset(s) to provide grid support functions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	2,538	0

NYSEG

Stephentown Energy Storage

Line of Business: Electric
Category: Innovation

Scope:

The Stepentown BESS project consists of installing a 1MW/4MWh battery energy storage system at the Stepentown Substation located in NYSEG's Mechanicville division to provide peak shaving to Bank #1 during future overload conditions.

Reasons and Benefits:

The Stepentown Substation Bank #1 of New York State Electric & Gas is a 34.5 - 4.8 kV station located in the Mechanicville Division. The 2.5 MVA substation transformer has an average summer peak load of 97% of its nameplate. However, the load at the station has exceeded its nameplate rating in 2019 and 2021. While the loading is approaching the nameplate rating, these loading values are based on instantaneous reads. By factoring in the average peak 15-minute interval data, it is expected that continuous thermal loads will not occur for the next few years. To avoid these future potential overload issues, it is proposed to install Energy Storage at the substation which will result in Peak Demand Reduction at the station and will increase the Transformer Loading Efficiency. From the below chart, the size of the battery should be at least one MW to provide ten years of peak load support.

Due to the rural location of the station, there is approximately 0.34 MW of interconnected residential DER on the substation transformer. Installing energy storage at the station will enhance this station's ability to host a higher level of proposed DER. As can be seen from the below chart the peak load at the Station occurs during the four (4) hour period between 5:00pm and 9:00pm.

As seen below, the existing residential DER are proving to reduce the transformer peak loading during daylight hours, but overloading concerns are still present in the evening. Sizing the battery to match the existing generation with consideration for the existing transformer loading conditions described above places the optimum battery size at a 4 MWh battery. This will result in a 1 MW peak output for a four (4) hour duration. This project resolves the significant risk of thermal and loss of load on the system affecting system reliability.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	666	1,553	0



NYSEG

Wales Center Energy Storage

Line of Business: Electric
Category: Innovation

Scope:

The Wales Center BESS project consists of installing a 1MW/4MWh battery energy storage system at the Wales Center Substation located in NYSEG's Lancaster division to provide peak shaving during future overload concerns and to increase hosting capacity.

Reasons and Benefits:

The Wales Center substation of New York State Electric & Gas is a 34.5 - 4.8 kV station located in the Lancaster Division. The 5 MVA substation transformer has an average summer peak load of 92% of its nameplate. However, the load at the station has exceeded its nameplate rating in 2011, 2012, 2013 and 2014. To avoid a future potential overload issue, it is proposed to install Energy Storage at the substation which will result in Peak Demand Reduction at the station and will increase the Transformer Loading Efficiency. From the below chart, the size of the battery should be at least one MW to provide ten years of peak load support.

Both distribution circuits served from the Wales Center Substation have very low hosting capacity values. Despite these low HC values, due to the rural location of the station, there is over 2.3 MW of interconnected DER and over 2.5 MW of queued DER on the substation transformer. Installing energy storage at the station will enhance this station's ability to host a higher level of the already existing and proposed DER. As can be seen from the below chart the peak load at the Station occurs during the four (4) hour period between 6:00pm and 10:00pm.

As a secondary use case, the battery system will be used to optimize the use of the existing connected DER by using the peak daylight hours to charge the battery with the solar generation and discharge the battery during the evening hours to offset the peak load of the Station. As seen below, the existing interconnected DER is proving to reduce the transformer peak loading during daylight hours, but overloading concerns are still present in the evening. Sizing the battery to match the existing and queued generation with consideration for the existing transformer loading conditions described above places the optimum battery size at a 4 MWh battery. This will result in a 1 MW peak output for a four (4) hour duration.

NYSEG and RG&E 5-Year Capital Investment Plan

This project resolves the significant risk of thermal and loss of load on the system affecting system reliability.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	666	1,553	0

NYSEG

NY Energy Storage RFP

Line of Business: Electric
Category: Innovation

Scope:

Develop an energy storage Request for Proposal and procure a minimum of 10 MW of energy storage for NYSEG. The capital is to pay for the right to manage and bid the storage assets into the NYISO wholesale markets.

Reasons and Benefits:

This project will provide capital to meet the NY PSC Order to procure a minimum of 10 MW of energy storage for NYSEG Specific benefits include:

- Gaining experience in the NYISO wholesale markets for energy storage
- Meeting the Commission's Order#2 for Case 18-E-0130
- Furthering the states goal of 3,000 MW of energy storage in NY by 2030

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	760	760

NYSEG

Distributed Energy Storage pilot- Load Managed Distribution System Optimization

Line of Business: Electric
Category: Innovation

Scope:

This Demonstration will select distribution feeders identified by the NYSERDA Future Grid Ithaca Electrification Load Impact Study require upgrade either due to lack of capacity as a result of short cycle peak demand, will require upgrade due to electrification under decarbonization initiatives and/or requires upgrade due to economic growth. The demonstration will engage residential and commercial ratepayers (industrial if impacted) through the installation of battery storage system at the ratepayer's location and managed in a manner that seeks to balance the load profile of the distribution feeder.

Reasons and Benefits:

Climate Change focusing on decarbonization and green house gas reduction will increase electric demand as key residential, commercial (and industrial) ratepayers transition from natural gas in heating, appliances and transportation which will raise energy cost, increase resiliency risk and stress the electric distribution system. This demonstration seeks to establish system solutions that entail electric options and battery storage has the ability to level loads on stressed or soon to be stressed distribution systems while providing a distributed resource for utility based distribute

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	576	600	0	0

NYSEG

FICS Scalability Plan

Line of Business: Electric
Category: Innovation

Scope:

Project will acquire three new substation licenses for Flexible Interconnection technology from a known technology provider and apply those licenses to DER Interconnection project identified by the project team. Once sites are identified, the project team will work with the DER developers for each site to sign contracts for Flexible Interconnection that will pass along these substation licensing costs as well as any anticipated installation and support costs to the DER developers

Reasons and Benefits:

Flexible Interconnection allows DERs to be interconnected to the grid while deferring expensive system upgrades by agreeing to be curtailed or take other mitigating control actions to avoid violating any grid constraints (thermal, voltage, etc.). Without the option of pursuing flexible interconnections, expensive interconnection bottlenecks will develop on both the distribution and transmission system as DER penetration increases, hampering NY's ability to meet its clean energy goals and creating increased pressure on the utility to find a way to remove those bottlenecks. Flexible interconnections provide a cost-effective option for DER interconnection that allows for additional DER capacity to be interconnected to the grid while still maintaining grid reliability for all customers

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
300	300	0	0	0

NYSEG

Tompkins County Demand Side LMI HVAC Management Pilot

Line of Business: Electric
Category: Innovation

Scope:

The Demand Side LMI HVAC Management Pilot project will partner with NYSERDA and their award recipient Hub Controls to pilot a HVAC management device (HubController) implementation in the LMI community to enable and evaluate energy and cost savings, carbon reduction, smart control, and energy usage insights. The HubController's innovative Automatic Energy Reduction (AER) algorithms make it the only heating & cooling controls device proven to deliver residential energy use reduction without the need for consumer intervention. Using tailored API's, the HubController will share data and provide a level of control to the Companies to enable identification of beneficial energy efficiency programs for the customers. The device collects 97,000 energy use data points per home per year and can tell if the home is poorly insulated, could use a heating system upgrade, or if the temperature is changed inefficiently. The AER algorithms, data gathering, and energy management capabilities are all wrapped up in a high consumer demand device i.e., a smart thermostat.

Reasons and Benefits:

This pilot supports the City of Ithaca's Green New Deal and Thermal Load Electrification Program goals. The goals for the City of Ithaca's Green New Deal include:

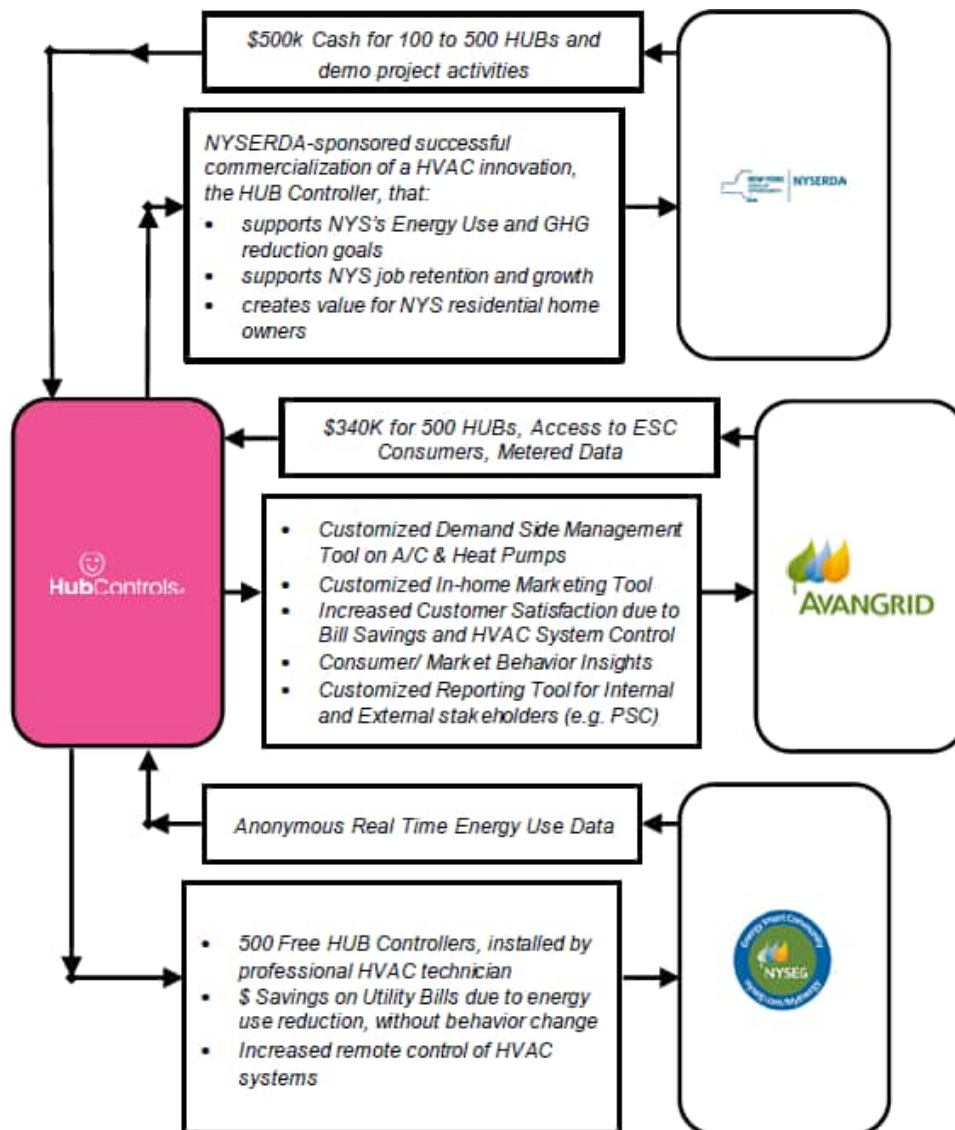
- Achieve carbon neutrality community-wide by 2030.
- Meet the electricity needs of City government operations with 100% renewable energy by 2025.
- Reduce emissions from City vehicle fleet by 50% by 2025.
- Ensure the benefits are shared among all local communities to reduce historical social and economic inequities.
- Facilitate a comprehensive public engagement process.

The objective of the City of Ithaca's Energy Efficiency Retrofit and Thermal Load Electrification Program is to promote energy-efficiency retrofits and elimination of fossil fuel combustion for building energy. Further, the program aims to gradually improve the overall energy performance of the city's building stock, by assessing each individual building and determining potential energy efficiency improvements, through energy retrofitting and the substitution of non-electric thermal loads and air conditioning systems, with air-source and ground-source heat pumps, and the installation of efficient lighting, photovoltaic and solar thermal systems, onsite storage, smart thermostats and smart

NYSEG and RG&E 5-Year Capital Investment Plan

meters.

Example Figure 1: Demand Side LMI HVAC Management Pilot Stakeholder Benefit Framework



NYSEG and RG&E 5-Year Capital Investment Plan

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	340	0	0



NYSEG

Academic Institution Collaboration

Line of Business: Electric
Category: Innovation

Scope:

The Company will continue to work closely with academic institutions including Cornell University, Binghamton University, and others. The Company has shared resources to provide subject matter expertise and energy related data, and as appropriate, the Companies and academic institutions jointly explore and seek financial and institutional support for projects from federal, state, and other sources. The Company intends to advance the program to collaborate with academic institutions in the service territory by providing research grants to the academic institutions to enable faculty and graduate level research focused on exploring and developing new concepts and approaches related to more sustainable generation, distribution, and usage of energy. The Company prioritizes grid and customer needs to ensure the research and demonstration project objectives are tailored to the areas of greatest need and impact.

Reasons and Benefits:

The Company does not have a dedicated utility research and development business area aimed at theoretical development or pre-commercial or pre-prototyped emerging technologies and solving the future challenges that will likely arise as the electric grid transitions to a distributed energy system. The Company's innovation team focuses on well-established emerging technologies, such as energy storage, so the Company relies on collaborating with external entities including academic institutions to ideate, design, and implement pre-development demonstration projects to glean conceptual learnings applicable to the building and operating the clean electric grid of the future. Learnings from these projects are especially important as there are many aspects which the Company will need to inform the very "first" time the Company is implementing a solution. Piloted solutions that demonstrate grid and customer value are scaled to the network and provide benefits including but not limited to improved efficiency, reduced costs, offering new technologies, products, and services, and instituting best practices to better serve utility customers. Additionally, implementing innovative demonstration projects with academic institutions focused on real energy related challenges nurture highly skilled utility workforce development, introduce students to careers in the energy sector, and provide a direct relationship with professors, students, and the Company.

NYSEG and RG&E 5-Year Capital Investment Plan

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	75	75	75	75

NYSEG

CYME Server

Line of Business: Electric
Category: Innovation

Scope:

The scope includes: Procurement & Provisioning of a server; Procurement, Testing, & Commissioning of the CYME Server software; and Training the user community.

Reasons and Benefits:

Implementation of the CYME Server software on a dedicated server will allow automated simulations and future integration with other systems

CYME Server is expected to result in efficiencies related to power flow simulations and analysis which can be leveraged to facilitate interconnection request technical screens, hosting capacity analysis, and automation of engineering analysis related to load and DER capacity planning.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	163	0	0	0

Electric Innovation

RG&E

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RG&E

Low Income Clean Generation

Line of Business: Electric
Category: Innovation

Scope:

This program will include development of one or more solar PV facilities amounting to 20 MW of installed capacity. Site acquisition, design, engineering, and construction will be procured through a competitive request for proposals. The facility will be included in RG&E base rates as capital plant. Revenue generated by the facility will be allocated to designated low-income customers for the life of the asset. Inclusion of energy storage will be analyzed and considered to the extent that it will result in increased revenue.

Reasons and Benefits:

New York must significantly increase the proportion of renewable generation in order to meet the requirements of the Climate Leadership and Community Protection Act. Today, there are several programs and policies that are meant to support growth of renewable generation including Remote Crediting and Community Distributed Generation. Through Remote Crediting and Community Distributed Generation participating customers receive credits based on revenues generated through those programs and use those credits to offset their electricity cost. Participants benefit by reducing what they would otherwise pay for electricity. Part of this value is shared with the solar PV developer in order to pay for the facilities. The Low Income Clean Generation program will allocate all market based revenue directly to the customers who will benefit the most.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	11,606	11,606	0

RG&E

Station 125 Energy Storage

Line of Business: Electric
Category: Innovation

Scope:

The Substation 125 Battery Energy Storage System (BESS) project consists of installing a 7MW/35MWh battery energy storage system at Substation 125 located at 7620 96, Victor, NY 14564 in RG&E's division to provide peak shaving to Bank #2 in the case of future overload conditions. During non-peak shaving periods, RG&E intends to bid the BESS into the NYISO market to derive additional revenue to be credited to LMI customers. The scope of the project includes preliminary and detailed engineering of the site and BESS, a competitive procurement for the BESS and associated equipment, system construction, testing, and commissioning.

Reasons and Benefits:

Substation 125 Bank #2 of Rochester Gas & Electric is a 34.5 – 12.47 kV station located in the RG&E's Canandaigua Division. The 22.4 MVA substation transformer has a 5-year average of 19.94MVA at 89% capacity. However, the load at the station has come close to reaching its nameplate rating in 2020. While the loading is approaching the nameplate rating, these loading values are based on instantaneous reads. By factoring in the average peak 15-minute interval data, it is expected that continuous thermal loads will not occur for the next few years. Based on projections, a growth factor of two percent on a yearly basis and the queued new loads that waiting to be connected Bank #2 will come close to reaching its nameplate rating in year 2022 and exceed the nameplate rating in year of 2023. To avoid these future potential overload issues, it is proposed to install Energy Storage at the substation which will result in Peak Demand Reduction at the station and will increase the Transformer Loading Efficiency. The size of the battery should be at least seven (7) MW to provide ten years of peak load support.

Due to the suburban/urban location of the station, there is approximately 0.853 MW of interconnected residential/commercial DERs on the substation transformer. Installing energy storage at the station will enhance this station's ability to host a higher level of proposed DER.

The forecasted summer peak load in 2031 is expected to exceed the nameplate rating. Sizing the battery to match the existing generation with consideration for the existing transformer loading conditions described above places the optimum battery size at a 35

NYSEG and RG&E 5-Year Capital Investment Plan

MWh battery. This will result in a 7 MW peak output for a five hour duration.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	5,824	13,590	0

RG&E

DSIP - GIS Enhancements GMEP

Line of Business: Electric
Category: Innovation

Scope:

1. GMEP - Comprehensive field inventory of physical assets across all electric distribution circuits (1900 approximately) in RG&E and NYSEG service territories employing best available technologies and service providers.

2. GMEP Development, implementation, and validation of streamlined integrated processes covering:

field data acquisition during and after the inventory, data interfaces and exchange across systems and platforms (SAP, GIS, Spectrum, CYME, FWM), sustained data quality assurance and governance plan, cybersecurity, stakeholder engagement, communications, and change management. Provide Lessons Learned Report and Continuous Improvement Plan for Project Closure.

3. GPG Scope - To improve design/project efficiencies through design standardization, automated engineering analysis and sketch development and GPS coordinate based facility spotting in the field to develop SAP work orders with electronic and/or hard copy shop papers. A mobility tool will enable the designer to perform the field functions, engineering analysis and translate the information into an executable SAP Work Order with sketches and other shop papers. The standardize SAP CU work order design will flow into the Pay ID Automation process which will then allow Construction Managers to work with Vendors thru the new Contractor Portal. The tool aligns with the planning/scheduling for contractor work engineering/construction and allows the reconciliation of the Pay id engineering MSAs...also done in the new Contractor Portal. The tool will drive the ability to manage and track productivity of field planning processes and workflow.

Reasons and Benefits:

Significant reduction of current workload dedicated to solve data gaps, and redirect to core and priority activities demanded by stakeholders (backlogs). Examples: Processing of Distribution Energy Resource (DER) interconnection studies,

Quantification and expansion Distributed Generation hosting capacity, review non-wire alternative solutions, identify new projects or potential upgrades to mitigate current reliability concerns. Enhanced Operations Situational Awareness through accurate data

NYSEG and RG&E 5-Year Capital Investment Plan

(e.g. phase assignments), and unlocking optimized grid operation functions, would enable: Load balancing and automation to achieve distribution losses reduction; Improved outage prevention, detection and restoration.

GPG Benefits - Reduction in time spent from field work to work order creation, up to 50% reduction. This drives consistency in the end products; constructable designs, documents & sketches, pay id templates, and faster SAP work orders production.

Mobile design tools and software platform using the AVANGRID GIS are implemented and integrated with SAP to automate work order creation based on standardized CU's designs created within the design tool - manual creation in SAP is eliminated. Field Planners can spend more time and cover more projects using a mobile tool in the field, reducing the office time required to create simple and complex work orders. Also, this will provide consistent sketches and designs across all OPCOs driving standardize material sets to support procurement cost improvement. The tool should include a consistent wo design. Estimated reduction, time savings for field planner, up to 50%. The field tools use an AutoCAD underlay which eliminates and/or minimizes the need for standalone operated AutoCAD for majority of designs. The mobile software platform embeds company and industry standards and design rules. Platforms provide for real-time updates to the tool selectable standards providing & maintaining standardized designs for all OPCOs

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,870	3,374	3,442	3,510	0

RG&E

IEDR

Line of Business: Electric
Category: Innovation

Scope:

The scope includes implementation of RG&E's portion of the Integrated Energy Data Resource processes and systems as mandated in the Order of Case 20-M-0082. The order requires the utilities to provide the IEDR statewide platform with the necessary data to support the selected Use Cases. Use Cases will be further defined during the Design Phase of the project but are expected to require the inclusion of the Phase I data elements as defined in Appendix B of the Data Access Framework order.

Scope to include Data assessment in terms of availability and quality, including business glossary, data dictionaries, data catalog, business lineage, data quality reports and data lineage as well, the scope is to integrate all systems and scheduled transports of the data elements to the company's data lake and scheduled transports of the various data sets to the statewide IEDR platform being run by NYSERDA. The scope includes design, development, testing, integration, and maintenance of systems and processes.

Phase 1

An initial publicly accessible version of the IEDR to be released in Q4 2022 will enable at least three use cases for stakeholder evaluation and comment to inform further development. The completed Phase 1 implementation of the IEDR will be operational on or about August 11, 2023 and will enable at least five of the highest priority stakeholder use cases that can be supported with available data. It's possible that ten or more use cases could be enabled in Phase 1.

Phase 2

Building on the successful implementation of Phase 1, Phase 2 will expand and enhance the IEDR to enable a total of fifty or more use cases. Phase 2 will be completed 30 to 36 months after the completion of Phase 1, on or about August 11, 2026.

Reasons and Benefits:

New York is transforming its electricity system into one that is cleaner, more resilient, and more affordable. Effective access to useful energy data will play a critical role in this transformation, unleashing the power of integrated energy customer data and energy system data to speed the deployment of clean energy solutions. This will attract

NYSEG and RG&E 5-Year Capital Investment Plan

investment, enable analytics, help identify operational efficiencies, promote innovation, and encourage new business models, which will in-turn create value for customers and the State’s energy system.

Initial use cases that are being considered are: whole building energy consumption, DER site identification, DER customer identification, energy efficiency customer identification, building electrification site identification, electric vehicle charger siting, DER interconnections and DER registry and aggregation.

This project is mandated by the Public Service Commission of NY and funded for NYSEG and RG&E with a total of \$12M for phase I. Phase II funding will occur during phase I execution.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,099	2,099	1,774	1,774	887

RG&E

Station 89 Energy Storage

Line of Business: Electric
Category: Innovation

Scope:

The Substation 89 Battery Energy Storage System (BESS) project consists of installing a 2MW/10MWh battery energy storage system at Substation 89 located at 3901 Winton Rd S in RG&E's division to provide peak shaving to Bank #3 in the case of future overload conditions. During non-peak shaving periods, RG&E intends to bid the BESS into the NYISO market to derive additional revenue to be credited to LMI customers. The scope of the project includes preliminary and detailed engineering of the site and BESS, a competitive procurement for the BESS and associated equipment, system construction, testing, and commissioning.

Reasons and Benefits:

Substation 89 Bank #3 of Rochester Gas & Electric is a 115 – 12.47 kV station located in the Rochester Central Division. The 22.4 MVA substation transformer has a 5-year average summer peak load of 82% of its PLBN rating. However, the load at the station has come close to reaching its nameplate rating in 2019 and 2020. While the loading is approaching the nameplate rating, these loading values are based on chart reads. By dissecting the chart data and factoring in the average peak on a daily interval data, it is expected that continuous thermal loads will not occur for the next few years. Based on projections, a growth factor of two percent on a yearly basis Bank #3 will exceed its' thermal loading in the year of 2029. To avoid these future potential overload issues, it is proposed to install Energy Storage at the substation which will result in Peak Demand Reduction at the station and will increase the Transformer Loading Efficiency. The size of the battery should be at least two MW to provide ten years of peak load support.

Due to the suburban/urban location of the station, there is approximately 1.903 MW of interconnected residential/commercial DERs on the substation transformer. Installing energy storage at the station will enhance this station's ability to host a higher level of proposed DER. The peak load at the Station occurs during the eight (8) hour period between 12:00pm and 8:00 pm.

The forecasted summer peak load in 2031 is expected to exceed the nameplate rating. Sizing the battery to match the existing generation with consideration for the existing transformer loading conditions described above places the optimum battery size at a 10 MWh battery. This will result in a 2 MW peak output for a five hour duration.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	1,664	3,883	0

RG&E

Medium & Heavy Duty EV Make-Ready Program

Line of Business: Electric
Category: Innovation

Scope:

This program will provide electrical infrastructure incentives for customer installed EV charging infrastructure for medium and heavy-duty (MHD) electric vehicles (EV). The Companies will target 338 L2 chargers and 252 DC fast chargers across the RG&E Service Territory to support 617 MHD vehicles.

Similarly structured to the existing Light-Duty (LD) EV Make-Ready Program (MRP), customer-side utility cost incentives for up to \$6000 towards L2 infrastructure and up to \$55,000 for DCFC infrastructure will support fleet electrification for commercial, industrial, and municipal customers. Incentives will cover 100% of the eligible cost for municipal or other public applications, including transit and school bus and 50% of the cost for private applications

The Company invests in the utility side infrastructure for new chargers serving MHD vehicles, where utility owned infrastructure is treated as CAPEX and customer owned infrastructure incentives are treated as a regulatory asset. The CAPEX budget is to cover eligible costs associated with utility-side make-ready infrastructure.

In addition to providing incentives, the Program will include dedicated program staff to market the program, facilitate applications, and track progress.

Reasons and Benefits:

The program supports the growth of beneficial electrification and reduction in transportation related emissions, while increasing equity and access to transportation electrification benefits across the service territory through increased electric mile rides for transit and school bus riders by providing access to lower cost EV charging infrastructure installations in School Bus, Municipal and transit sectors, as well as private fleets, like delivery fleets.

The purpose of the RG&E MHD EV MRP is to address the following customer needs and federal and state policy goals:

1. The transportation sector is New York's largest source of greenhouse gas and NOx



NYSEG and RG&E 5-Year Capital Investment Plan

emissions, where MHD vehicles have a disproportionate share compared to other mobile sources. While these vehicles only account for 4% of vehicles on the road, they account for ~25% of total transportation emissions, disproportionately impacting low-income communities and environmental justice areas located near major trucking corridors, ports and distributions hubs. Addressing the needs of electrifying this part of the transportation network, is imperative to reaching the State’s CLCPA goals.

2. In 2021, New York and other states signed on to the MHD ZEV (Zero emission vehicle) MOU (memorandum of understanding). This Action Plan develops solutions towards the adoption of zero emission MHDs. The Companies MHD EV MRP is aligned with moving NYS towards achieving the targets set by the MHD ZEV MOU, closely following the LD MRP that works to achieve targets set by the 2014 LD ZEV MOU.

3. In November 2021, the Federal Bipartisan Infrastructure Law in Sec. 71101 provisioned the Clean School Bus Program, which with federal policies like this, are establishing programs towards deploying increased numbers of low and no emission school buses and related infrastructure. The proposed MHD EV MRP supports federal policies and programs, specifically targeting public and municipal MHD fleet vehicles like school buses.

4. The Companies C&I customers focused on goods and services delivery, with MHD domiciled within our service territories, have begun to set corporate goals, as well as acquire MHD EV’s for their delivery fleets. This program will directly support our customer needs for increasing charging infrastructure where vehicles reside.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	336	1,009	2,018	0

RG&E

NY Energy Storage RFP

Line of Business: Electric
Category: Innovation

Scope:

Develop and execute on an energy storage Request for Proposal and procure a minimum of 10 MW of energy storage for RG&E. The capital is to pay for the right to manage and bid the storage assets into the NYISO wholesale markets.

Reasons and Benefits:

This project will provide capital to meet the NY PSC Order to procure a minimum of 10 MW of energy storage for RG&E Specific benefits include:

- Gaining experience in the NYISO wholesale markets for energy storage
- Meeting the Commission's Order#2 for Case 18-E-0130
- Furthering the states goal of 3,000 MW of energy storage in NY by 2030

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	760	760

RG&E

Distributed Energy Resource Management System (DERMS)

Line of Business: Electric
Category: Innovation

Scope:

The scope entails the implementation of an enterprise-wide Distributed Energy Resource Management System. The companies plan on leveraging the existing REV FICS demonstration investment by expanding the licensing to cover the enterprise, deployment of a disaster recovery site (hardware and software) which will be integrated with the companies' SCADA system. The companies envision cost recovery of the grid edge investment by DER developers when the DERMS is leveraged to allow for the safe, reliability interconnection of DER.

Reasons and Benefits:

The Company's visibility and control capabilities to accommodate the increasing integration, operation, and optimization capabilities of DER, including storage and demand response, is limited today. Implementation of a DERMS provides the Company real-time visibility into the status of DERs and allows for the heightened level of control and flexibility necessary to optimize DER and distribution grid operation. The initial DERMS use case will be to accommodate constrained, proposed DER interconnections and follow-on use cases will include leverage the DER asset(s) to provide grid support functions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	1,269	0

RG&E

FICS Scalability Plan

Line of Business: Electric
Category: Innovation

Scope:

Project will acquire 3 new substation licenses for Flexible Interconnection technology from a known technology provider and apply those licenses to DER Interconnection project identified by the project team. Once sites are identified, the project team will work with the DER developers for each site to sign contracts for Flexible Interconnection that will pass along these substation licensing costs as well as any anticipated installation and support costs to the DER developers

Reasons and Benefits:

Flexible Interconnection allows DERs to be interconnected to the grid while deferring expensive system upgrades by agreeing to be curtailed or take other mitigating control actions to avoid violating any grid constraints (thermal, voltage, etc). Without the option of pursuing flexible interconnections, expensive interconnection bottlenecks will develop on both the distribution and transmission system as DER penetration increases, hampering NY's ability to meet it's clean energy goals and creating increased pressure on the utility to find a way to remove those bottlenecks. Flexible interconnections provides a cost-effective option for DER interconnection that allows for additional DER capacity to be interconnected to the grid while still maintaining grid reliability for all customers

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
200	200	0	0	0

RG&E

Academic Institution Collaboration

Line of Business: Electric
Category: Innovation

Scope:

The Company will continue to work closely with academic institutions including RIT and others. The Company has shared resources to provide subject matter expertise and energy related data, and as appropriate, the Companies and academic institutions jointly explore and seek financial and institutional support for projects from federal, state, and other sources. The Company intends to advance the program to collaborate with academic institutions in the service territory by providing research grants to the academic institutions to enable faculty and graduate level research focused on exploring and developing new concepts and approaches related to more sustainable generation, distribution, and usage of energy. The Company prioritizes grid and customer needs to ensure the research and demonstration project objectives are tailored to the areas of greatest need and impact.

Reasons and Benefits:

The Company does not have a dedicated utility research and development business area aimed at theoretical development or pre-commercial or pre-prototyped emerging technologies and solving the future challenges that will likely arise as the electric grid transitions to a distributed energy system. The Company's innovation team focuses on well-established emerging technologies, such as energy storage, so the Company relies on collaborating with external entities including academic institutions to ideate, design, and implement pre-development demonstration projects to glean conceptual learnings applicable to the building and operating the clean electric grid of the future. Learnings from these projects are especially important as there are many aspects which the Company will need to inform the very "first" time the Company is implementing a solution. Piloted solutions that demonstrate grid and customer value are scaled to the network and provide benefits including but not limited to improved efficiency, reduced costs, offering new technologies, products, and services, and instituting best practices to better serve utility customers. Additionally, implementing innovative demonstration projects with academic institutions focused on real energy related challenges nurture highly skilled utility workforce development, introduce students to careers in the energy sector, and provide a direct relationship with professors, students, and the Company.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	75	75	75	75



RG&E

CYME Server

Line of Business: Electric
Category: Innovation

Scope:

The scope includes: Procurement & Provisioning of a server; Procurement, Testing, & Commissioning of the CYME Server software; and Training the user community.

Reasons and Benefits:

Implementation of the CYME Server software on a dedicated server will allow automated simulations and future integration with other systems.

CYME Server is expected to result in efficiencies related to power flow simulations and analysis which can be leveraged to facilitate interconnection request technical screens, hosting capacity analysis, and automation of engineering analysis related to load and DER capacity planning.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	163	0	0	0

RG&E

Integrated EV and ES Controller

Line of Business: Electric
Category: Innovation

Scope:

Design, construct and test a site controller to manage the EV charging and building load. Produce reports and present lessons learned to the NY DPS staff on controller results and performance.

Reasons and Benefits:

This project will demonstrate how a predictive controller can help reduce building and EV charger load by optimizing the use of a battery storage system through predictive analytics.

The specific benefits are as follows:

- To demonstrate the capabilities of controller to optimize energy storage to reduce facility and circuit demand, improve load factor, and help minimize electric vehicle (EV) charging cost impacts
- Gain operational experience, inform future applications, technical criteria, and processes essential to the cost-effective integration of an energy storage controller to facilitate EV development.
- Determine the cost effectiveness (today or in the future) of utilizing energy storage as an alternative for system upgrades required to support statewide electric vehicle implementation and deployment.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
121	0	0	0	0

Electric Hydro-Generation

NYSEG

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NYSEG

Mechanicville Intake Upgrades and Downstream Passage Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Upper Mechanicville Hydroelectric Project (FERC Project No. P-2934), is located on the Hudson River in Saratoga and Rensselaer Counties, in the Town of Stillwater, NY. The facility is unstaffed, with two hydroelectric turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 16.53 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

A requirement of the 50-year Federal Energy Regulatory Commission (FERC) license for the facility, which became effective on April 1, 2021, is for NYSEG to replace and upgrade the existing intake trashracks from 5.5-inch clear space opening to 0.75-inch clear space opening for protection of aquatic species, specifically American Eel, and design and install new structures to safely convey entrained aquatic species safely downstream of the facilities intake forebay. Modification, upgrade and installation of the intake structures is required to comply with Section 3.3.1.3 of the Settlement Agreement, as referenced in the FERC License, and as referenced below:

3.3.1 General Agreements

3.3.1.3 American Eel Exclusion and Downstream Passage

By September 30, 2025, the Licensee, in consultation with, and through approval by, the USFWS and the NYSDEC, will reduce the Project's existing trashrack clear spacing of 5.5-inches to trashrack clear spacing of 0.75-inches. In addition, by September 25, 2025, the License, in consultation with, and through approval by, the USFWS and the NYSDEC, will provide an alternative path for downstream passage of American eels, including appropriate attraction flows (e.g., currently estimated at 600 cfs when the Project is operating at maximum hydraulic capacity). The alternative path for downstream passage will be designed to meet the USFWS' Fish Passage Engineering Design Criteria³ at the time of the design effort. When the Project's existing trashrack spacing is reduced, downstream passage will be provided annually following ice out through November 30. Consistent with USFWS Criteria, site-specific design criteria will be applied and considered during the design and approval of the measures."

NYSEG and RG&E 5-Year Capital Investment Plan

The “Upper Mechanicville Hydroelectric Project Offer of Settlement,” dated February 19, 2020 is attached for additional information.

In addition, the project includes the following upgrades:

- Design and installation of a new automated trash rack raker to remove increased river debris accumulation due to reduction in intake trash rack openings from 5.5-inches to 0.75-inches.
- Reconfiguration of the of intake structure to reduce intake flow velocities and new intake trash racks.

Funding identified is for project initiation, conceptual and detailed design along with procurement and implementation of services for the upgrade of the intake structure and structures to safely convey aquatic species safely downstream of the intake forebay. The project is presently forecasted to be complete in 2028.

Reasons and Benefits:

Upon completion of the NYSEG Upper Mechanicville Intake Upgrades and Downstream Passage Project, the intake trashracks clear spacing will be reduced from 5.5-inches to 0.75-inches and an alternative path for downstream passage of American eels will be installed. Upon completion, NYSEG will fulfill its obligation to comply with Section 3.3.1.3 of the Settlement Agreement, as referenced in the FERC License.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
465	919	2,056	6,498	18,919

NYSEG

Kent Falls - CAPITAL Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

The purpose of NYSEG Kent Falls Capital Project is to address the following issues that will extend the life and reliable operation of the facility upon completion:

1. The existing ring girders that support approximately 1,000 feet of penstock are creating pressure points on the steel penstocks resulting in stress cracks and water leakage. Weld repairs and steel overlays are required to address penstock leakage and reinforce areas of the penstock where cracking has occurred. Installation of a new penstock ring girder design will eliminate stress points and penstock cracking.
2. The penstock trifurcation, which conveys water to each of the three turbine-generators is original to the plant (circa 1928), is of riveted construction and is at end-of-life. The trifurcation is leaking and requires weld repairs. Installation of a new penstock trifurcation will significantly reduce the need for further weld repairs.
3. Unit 1 & Unit 2 turbine penstock sections, that start at the outlet of the penstock trifurcation to the inlet of the turbine-generator isolation valves are original to the plant (circa 1928), are of riveted construction and are at end-of-life. The penstock sections require routine inspection and weld repairs to address leakage. Installation of new penstocks will eliminate the need for further weld repairs.

Kent Falls Capital involves the following activities:

1. Detailed inspection to confirm the extent of upgrades to the trifurcation and penstock sections to the turbine isolation valves,
2. Confirm detailed design of new ring girders to replace existing penstock support saddles, new trifurcation and penstock sections,
3. Procurement of services, equipment and material to implement the detailed design,

NYSEG and RG&E 5-Year Capital Investment Plan

which includes.

- a. Removal of steel penstock support saddles (circa 1928), which are at end of life and support approximately 1,000 feet of penstock,
 - b. Installation of new ring girders to eliminate stress cracks and penstock leakage created by the existing penstock support saddles,
 - c. Installation of steel plates to upgrade areas where penstock cracks are present,
 - d. Removal and installation of a new trifurcated penstock section (fabricated circa 1928 and end- of-life),
4. Removal and installation of new penstock sections (fabricated circa 1928 and end-of-life) from the outlet of the trifurcation to the inlet to the turbine-generator isolation valves.

Funding identified is to review and update the current design, project permitting, procurement of construction services and implementation of the design. The project is presently forecasted to be complete in 2027.

Reasons and Benefits:

Kent Falls Capital Project involves upgrading of penstock support saddles with new ringer girders, installation of a new trifurcated penstock and penstock sections. The existing infrastructure is at end-of-life. Upgrades to the Kent Falls infrastructure will allow NYSEG to increase the reliability of the operation, extend the useful life of the infrastructure, continue NYSEG’s responsibility and FERC’s requirement for safe and reliable operation of the facility and support New York State’s Clean Energy Goals.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
210	212	763	5,039	17,952

NYSEG

High Falls Intake Upgrades Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG High Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 15.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

As a part of the current 40-year FERC license for the Facility, which became effective on April 13, 2006, NYSEG is required to upgrade the existing intake trashracks from 2-inch clear space opening to 1-inch openings for fish protection per License Article 404, Section 3.4 of the Settlement Agreement and condition B.10 of the New York State Department of Environmental Conservation (NYSDEC) 401 Water Quality Certification (WQC).

Installation of the new intake trash racks at High Falls is to be completed by no later than January 19, 2026, as outlined in the Settlement Agreement and FERC License. Section 3.4 of the Settlement Agreement states as follows:

3.4 Fish Protection and Downstream Passage

3.4.1 Fish Protection

3.4.1.1 Replacement Trashracks

The existing trashracks at the intakes for each development shall be replaced or modified with 1-inch clear spaced trashracks for fish-protection within the following specified time periods from license issuance: five years for the first development; ten years for the second development; fifteen years for the third development; and, twenty years for the fourth (last) development. Trashrack replacement/modification at all four developments will be completed within twenty years of license issuance. The order in which each development has trashracks replaced/modified - first, second, third and fourth - is at the Licensee's discretion. The Parties agree that the existing approach velocity with current intake structure configuration is acceptable at all four developments.”

The “Saranac River Hydroelectric Project Settlement Agreement,” dated November 2004

NYSEG and RG&E 5-Year Capital Investment Plan

is attached for additional information.

In addition to the intake rack upgrades, the project includes the following upgrades:

- Design and installation of a new automated trash rack raker to remove increased river debris accumulation due to reduction in intake trash rack openings from 2-inch to 1-inch.
- Reconfiguration and expansion of the intake structure to reduce intake flow velocities.
- Provisions adjacent to the new intake structure and rack raker for loading river debris into dump trucks and/or roll-off dumpster(s)
- Associated intake structural steel and concrete improvements to accommodate installation of the new rackraker and intake trashracks during operation of the facility.

Reasons and Benefits:

Upon completion of the NYSEG High Falls Intake Upgrade Project, NYSEG will fulfill its obligation to comply with License Article 404, Section 3.4 of the Settlement Agreement and condition B.10 of the NYSDEC 401 Water Quality Certification, as outlined in the April 13, 2006 FERC license, by reducing the intake trash rack clear space opening from 2-inches to 1-inches.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
724	550	3,747	4,783	0

NYSEG

Minor Capital Program

Line of Business: Electric
Category: Hydro-Generation

Scope:

NYSEG Hydro Minor Capital Program address multiple minor capital expenditures, including but not limited to, equipment upgrades, planned and emergent projects, etc. needed to maintain the operating systems, upgrade safety features, and to address regulatory requirements at NYSEG’s hydroelectric generating facilities.

Reasons and Benefits:

Projects are implemented for a variety of electrical, mechanical, civil/structural and regulatory needs at all NYSEG generating facilities and to improve and address dam safety, personnel safety, public safety and regulatory requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,389	1,500	1,500	1,500	1,500

NYSEG

Kents Falls U2 T-G Major Rebuild

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Kent Falls Unit 2 turbine-generator was originally installed circa 1928 and has a rated capacity of 3.84 MW. Unit 2 turbine-generator has been out-of-service since circa 2015 due to excessive wear of bearing journals and sealing surfaces required for safe, efficient and reliable operation. The purpose of the project is to rebuild Unit 2 turbine-generator and return to service in support of New York State's Clean Energy Goals.

Kent Falls Unit 2 Turbine-Generator Major Rebuild involves the following activities:

- Personnel, equipment and material to disassemble turbine-generator assembly
- Inspection of all turbine components
- Testing of generator field, stator and exciter
- Upgrading of turbine assembly components such as bottom ring, wicket gates and wicket gate bushings
- In-place machining of embedded components
- Installation of new bearing journals and rebabbiting of bearings
- Design and manufacture of new thrust bearing assembly
- Installation of new vibration monitoring system
- Reassembly and alignment of turbine-generator with new mechanical seal
- Commission turbine-generator and return to service

Funding identified is for project initiation, procurement of services, disassembly of the turbine-generator, inspection and testing of turbine-generator components, and overhaul of the turbine-generator. The project is presently forecasted to be complete in 2027.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Kent Falls Unit 2 Turbine-Generator Major Rebuild will restore 3.84MW of available capacity and extend the useful life of the asset. Return of Unit 2 turbine-generator to service supports New York State's Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4	5	473	883	3,756

NYSEG

Cadyville U1 T-G Major Rebuild

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Cadyville Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 5.53 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Cadyville Unit 1 turbine-generator was originally installed circa 1921 and has a rated capacity of 1.2 MW. Unit 1 turbine-generator has been out-of-service since circa 2015 due to excessive wear of bearing journals and sealing surfaces required for safe, efficient and reliable operation. The purpose of the project is to rebuild Unit 1 turbine-generator and return to service in support of New York State's Clean Energy Goals.

Cadyville Unit 1 Turbine-Generator Major Rebuild involves the following activities:

- Personnel, equipment and material to disassemble turbine-generator assembly
- Inspection of all turbine components
- Testing of generator field, stator and exciter
- Upgrading of turbine assembly components such as bottom ring, wicket gates and wicket gate bushings
- In-place machining of embedded components
- Installation of new bearing journals and rebabbitting of bearings
- Design and manufacture of new thrust bearing assembly
- Installation of new vibration monitoring system
- Reassembly and alignment of turbine-generator with new mechanical seal
- Commission turbine-generator and return to service

Funding identified is for project initiation, procurement of services, disassembly of the turbine-generator, inspection and testing of turbine-generator components, and overhaul of the turbine-generator. The project is presently forecasted to be complete in 2027.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Cadyville Unit 1 Turbine-Generator Major Rebuild will restore 1.2MW of available capacity and extend the useful life of the asset. Return of Unit 1 turbine-generator to service supports New York State's Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2	2	478	1,014	2,848

NYSEG

Mechanicville Upstream Eel Ladder Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Upper Mechanicville Hydroelectric Project (FERC Project No. P-2934), is located on the Hudson River in Saratoga and Rensselaer Counties, in the Town of Stillwater, NY. The facility is unstaffed, with two hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 16.53 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

A requirement of the 50-year Federal Energy Regulatory Commission (FERC) license for the facility, which became effective on April 1, 2021, is for NYSEG to design and install an upstream eel ladder per Section 3.3.1.1 of the Settlement Agreement, as referenced in the FERC License. Section 3.3.1.1 of the Settlement Agreement states as follows:

3.3.1 General Agreements

3.3.1.1 Seasonal Upstream American Eel Ladder

By the 2023 upstream migration season for American eel, on a seasonal basis, the Licensee will install a single ladder for the upstream movement of American eel in the Project's tailrace (river right, looking downstream). The seasonal eel ladder will be installed and operated by April 1 of each year and will be removed or closed on or after November 30 of each year. The installation, removal and/or closure of the seasonal ladder will be performed when river flows and conditions allow for the safe execution of such activities. If river flows or safety conditions prevent the installation and operation of the seasonal ladder by April 1st, or require the removal or closure of the ladder prior to November 30th, the Licensee will notify the NYSDEC and the USFWS within five business days, and such information will be documented in the Fishway Operation and Maintenance Report (FOMR) as defined in Section 3.3.3 of this Offer of Settlement.

The design of the seasonal upstream eel ladder will be based on the conceptual design presented in Attachment C to this Offer of Settlement and will be further designed and developed in consultation with the USFWS and the NYSDEC. The ladder will terminate in a trap, and eels will be transported and released (e.g., manually or through an automated

NYSEG and RG&E 5-Year Capital Investment Plan

system) at a site to be determined in consultation with the NYSDEC and the USFWS during the final design phase. The Licensee will provide the USFWS and the NYSDEC with a final design for the upstream eel ladder prior to April 2022 and will file a copy of the design with the Commission within two months of approval by the USFWS and the NYSDEC. The ease of installation to adverse effects from high flows will be considered in the design. The final designs must be approved by the USFWS and the NYSDEC.

This Offer of Settlement does not require the Licensee to perform any monitoring of the upstream passage of American eel or the effectiveness of the upstream eel passage measures included in the Offer of Settlement. However, the Licensee will keep accurate records of the number of eels captured in the trap and include this information in the annual FOMR, as defined in Section 3.3.3 of this Offer of Settlement. In addition, the Licensee, after consultation with the NYSDEC and the USFWS, will make any modifications deemed necessary to ensure effective upstream passage of American eel.”

The “Upper Mechanicville Hydroelectric Project Offer of Settlement,” dated February 19, 2020 is attached for additional information.

The purpose of the Upstream Eel Ladder Project involves the design, fabrication and installation of a ladder system to safely (manually and automatically) convey American Eel that are present in the Hudson River from the hydroelectric facility tailrace (discharge) to a site upstream of the New York State Canal Corporation’s (NYSCC) Lock C-3 dam.

The project work scope involves the following:

1. Design and installation of an eel ladder, and associated infrastructure, to support manual and automated conveyance of American Eels from the tailrace of Upper Mechanicville hydroelectric facility to the impoundment, which is upstream of NYSCC Lock C-3 dam. Associated structures which includes, but is not limited to electrical power, camera(s), walking platforms / stairs, lighting, means to remove during winter months, etc.
2. Collaboration with US Fish and Wildlife Service (USFWS) and NYS Department of Environmental Conservation (NYSDEC) is required as the design progresses and prior to installation.

Reasons and Benefits:

Installation of an upstream eel ladder in the tailrace of NYSEG’s Upper Mechanicville hydroelectric facility is a requirement of the Settlement Agreement with USFWS and NYSDEC. Upon completion and implementation of the design, NYSEG will be compliant with Section 3.3.1.1 of the Settlement Agreement, as referenced in the FERC License.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
714	628	2,522	278	0



NYSEG

Cadyville Upgrade U1 & U2 Cooling water systems

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Cadyville Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 5.53 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Cadyville Unit 1 and 2 turbine-generator were originally installed circa 1921 and have a rated total rated capacity of 2.4 MW. Each turbine-generator uses water from the Saranac River for cooling of lubricating oil and bearing lubrication during generation of electricity. Over the years, river water use has increased in the generation of electricity, which was not foreseen in the original design from 1921. With the addition of a mechanical turbine seal on Unit 2 turbine-generator and planned for Unit 1 turbine-generator, redesign and upgrade of the cooling water system is required to support the additional water demand.

Cadyville Unit 1 and Unit 2 Cooling Water System Upgrade Project involves the following activities:

- Study to review current water requirements and future water requirements
- Conceptual and detailed design of upgraded cooling water system and associated electric and control requirements
- Personnel, equipment and material to disassemble and upgrade cooling water system
- Commissioning of cooling water system upon upgrade completion

Funding identified is for project initiation, conceptual and detailed design, procurement of services and installation of the new cooling water system design. The project is presently forecasted to be complete in 2027.

Reasons and Benefits:

Cadyville Unit 1 and Unit 2 Cooling Water System Upgrade Project will allow for continued and increased use of river water in the generation of electricity. The current cooling water system cannot support the planned increase of water usage after installation of

NYSEG and RG&E 5-Year Capital Investment Plan

mechanical turbine seals on Unit 1 turbine-generator. Upgrades will lead to increased operational reliability and reduce wear on critical components of the turbine assembly such as mechanical seals. Reliable operation of Cadyville turbine-generators will further support New York State's Clean Energy Goals.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	347	406	2,748

NYSEG

KF Dam Left Abutment & Drainage Improvement

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Kent Falls Dam Left Abutment and Drainage Improvement is necessary to address significant voids in the laid-up masonry wall on the left upstream abutment face of the dam. The masonry wall was constructed circa 1912 is in very poor condition and end-of-life. Further inspection of the dam's left abutment identified apparent piping occurring in a small concentrated area parallel to the upstream left abutment wall and upstream of the dam. The purpose of the project is to upgrade and restore the left upstream dam abutment face and install drainage to divert water away from the left abutment. Upon completion of the project, the upgrades will restore and extend the useful life of the dam structure.

Kent Falls Dam Left Abutment and Drainage Improvement Project involves the following activities:

- Analysis of the left upstream abutment upstream face to improve stability and prevent further degradation (complete)
- Conceptual and detailed design to encapsulate the left upstream abutment face with new reinforced concrete
- Conceptual and detailed design to eliminate apparent localized piping parallel to the upstream left abutment wall upstream of the dam
- Procurement of services, equipment and material to implement the detailed designs

Reasons and Benefits:

Kent Falls Dam Left Abutment and Drainage Improvement Project will address and restore the left upstream dam abutment face that is at end-of-life and apparent localized piping

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parallel to the upstream left abutment wall upstream of the dam. The project will extend the useful life of the dam structure, eliminate apparent piping from extending along the left side abutment upstream of the dam, and continue NYSEG’s responsibility and FERC’s requirement for safe operation and maintenance of the high hazard dam and hydroelectric facility.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
387	2,953	0	0	0

NYSEG

Saranac Plant Control Systems Upgrade Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Saranac Hydroelectric Project (FERC Project No. P-2738), which is located on the Saranac River in Clinton County, located west of Plattsburgh, New York. The four hydroelectric generating facilities, which is comprised of High Falls, Cadyville, Mill C and Kent Falls, are unstaffed and are remotely monitored and controlled. The twelve hydroelectric turbine-generating units have a combined generation capacity of 40.26MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

The four hydroelectric facilities and turbine-generating units were constructed between 1921 and 1986. The latest plant control system was commissioned in 1986 after installation of Cadyville Unit 3 turbine-generator. The Saranac plant control systems are starting to fail leading to reduced operational reliability of the facility and turbine-generators. Original Equipment Manufacturer (OEM) replacement components are difficult to locate or require procurement of refurbished components or after-market parts to restore to service.

The purpose of the project is to upgrade the current plant control systems with state-of-the-art hardware and technology that brings the control systems in-line with current standards resulting in increased operational reliability and availability of parts.

The Saranac Plant Control System Upgrade Project involves review and updating of the existing plant control system drawings and operating equipment / systems for each hydroelectric facility, identifying current / state-of-the-art technology to replace, upgrade and standardize the existing plant control and generator protection systems. Upon completion of the design for each facility, the existing infrastructure will be removed and retired from service and new cabinetry with new plant control and generator protection system hardware installed and commissioned.

Funding identified is for project initiation, review of existing turbine-generator control system drawings, conceptual and detailed engineering, procurement of contractor services and initiation of construction to upgrade the control systems. The project is presently forecasted to be complete in 2027.



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Reasons and Benefits:

Due to aging, end-of-life plant control system and generator protection hardware and software, and procurement of refurbished or after-market parts to restore control systems to service, upgrade of the four Saranac plant control and generator protection systems is necessary. Upgrading to state-of-the-art plant control and generator protection systems will support New York State’s Clean Energy Goal by improving operational performance and reliability of NYSEG’s Saranac hydroelectric facilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	763	563	1,912

NYSEG

Keuka/Bradford Concrete Spillway and Toe Resurfacing Repairs/Improvements

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Keuka / Bradford Dam is a low hazard dam as classified by New York State Department of Environmental Conservation (NYSDEC Dam No. 054-0377), and is located in Bradford, New York. The dam, which was installed circa 1928, is unstaffed and locally operated in accordance with NYSDEC approved Bradford Dam Operation Plan for Water Level Management of Waneta and Lamoka Lakes. Outflow from Keuka / Bradford Dam enters into Mud Creek.

Keuka / Bradford Concrete Spillway and Toe Resurfacing Improvement Project is a project to reconstruct and resurface the dam, spillway and dam toe. Recent inspections noted areas of the dam, spillway and dam toe with significant spalling and areas that are at end of life. The project will extend useful life of the dam and continue NYSEG's responsibility for public safety of Waneta and Lamoka Lakes while maintaining safe operation of the dam.

Keuka / Bradford Concrete Spillway and Toe Resurfacing Improvement Project involves the following activities:

- Detailed inspection of the dam structure with identification of area requiring reconstruction
- Detailed design of upgrades to the dam structure
- Personnel, equipment and material to implement the design upgrades

Funding identified is for project initiation, conceptual and detailed design, procurement of services and implementation of the design to reconstruct and resurface the dam, spillway and dam toe. The project is presently forecasted to be complete in 2027.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Keuka / Bradford Concrete Spillway and Toe Resurfacing Improvement Project is a dam safety project that will reconstruct the dam to address degradation identified through inspections and will result in improved dam integrity, extend the useful life of the dam and continue NYSEG's public safety responsibility for management of Waneta and Lamoka Lakes in accordance with Bradford Dam Operation Plan.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	445	360	2,157

NYSEG

High Falls U2 Generator Rewind

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG High Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 15.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

During testing of Unit 2 generator in 2019, both generator stator and generator field revealed grounds / faults. Unit 2 generator has a capacity of 4.0 MW and was installed circa 1949. Based on the grounds identified in the generator stator and field, Unit 2 turbine-generator has been out-of-service since 2019 and is unable to return to service to produce electric energy.

High Falls Unit 2 Generator Rewind Project involves the following activities:

- Generator specialist to remove generator field poles and generator stator windings
- Rewind generator field poles, generator stator windings
- Reinstall generator field into stator along with associated generator structures and bearings
- Realign generator assembly with turbine and recouple
- Commission turbine-generator and return to service

Funding identified is for project initiation, procurement of services, removal of generator field poles and stator windings and rewinding of the associated generator components. The project is presently forecasted to be complete in 2027.

Reasons and Benefits:

High Falls Unit 2 Generator Rewind Project involves rewinding of both generator field and stator. Upon completion, 4.0 MW of capacity will be returned to service and restore full capacity of the hydroelectric facility. Rewind of the generator field and stator, and returning the turbine-generator to service, supports New York State's Clean Energy Goal.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	317	441	1,956



NYSEG

KF Internal Riser Shaft and Tank

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Kent Falls Dam Internal Riser Shaft and Tank Project involves removal and installation of a new riser shaft located internally to the surge tank, seismic upgrades that are compliant with current seismic requirements or installation of a new surge tank to replace the present tank structure. The surge tank is original construction and was installed circa 1928.

In March 2017, the surge tank experienced significant leaks at the riveted construction joints. Further inspection of the tank and internal riser shaft revealed that a portion of construction joints were severely eroded, and a portion of the riser shaft had failed during operation and was at end of life. In 2020, an independent consultant (IC) conducted a safety inspection and analysis based on the FERC's Part 12D engineering guidance. The IC recommended that NYSEG perform a seismic analysis of the surge tank to confirm if the tank structure conforms with the current seismic requirements.

Kent Falls Internal Riser Shaft and Tank Project involves the following activities:

- Detailed inspection and analysis of the existing surge tank structure
- Seismic analysis of the surge tank structure to confirm if the tank conforms with current seismic requirements
- Financial analysis to determine cost effective solution to address tank issues – upgrade existing tank vs. new tank
- Conceptual and detailed design based on most cost-effective solution
Design to include upgrades to electrical, control and pneumatic systems
- Procurement of services, equipment and material to implement the detailed designs

Funding identified is for project initiation, inspection and analysis of the existing surge

NYSEG and RG&E 5-Year Capital Investment Plan

tank, conceptual and detailed design, procurement of services for upgrade or installation of a new tank, and start of construction. The project is presently forecasted to be complete in 2028.

Reasons and Benefits:

Kent Falls Internal Riser Shaft and Tank Project involves upgrading the existing surge tank structure or installation of a new surge tank based on the most economical solution. Upgrade or installation of a new surge tank will allow NYSEG to restore full availability and capacity of the facility, extend the useful life of the structure, continue NYSEG's responsibility and FERC's requirement for safe and reliable operation of the facility and support New York State's Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3	3	3	878	1,586

NYSEG

Keuka/Bradford Dam Automation

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Keuka / Bradford Dam is a low hazard dam as classified by New York State Department of Environmental Conservation (NYSDEC Dam No. 054-0377), and is located in Bradford, New York. The dam, which was installed circa 1928, is unstaffed and local operation is in accordance with NYSDEC approved Bradford Dam Operation Plan for Water Level Management of Waneta and Lamoka Lakes. Outflow from Keuka / Bradford Dam enters into Mud Creek.

Keuka / Bradford Dam Automation Project is to upgrade existing flood / control gates electric and control systems and install necessary infrastructure that allows for remote operation of the dam. Presently, flood / control gates are operated locally requiring NYSEG personnel being dispatch to perform operations.

Project scope will require installation of remote instrumentation, control systems and security cameras to monitor lake elevations and have automatic and remote operation of dam flood / control gates to maintain lake elevations according to NYSDEC's approved Bradford Dam Operation Plan.

Keuka / Bradford Dam Automation Project involves the following activities:

Study to determine communication infrastructure around Bradford Dam and between Waneta and Lamoka Lakes for remote operation and monitoring of the dam,

- Conceptual and detailed design's allowing for remote operation and monitoring of Bradford Dam and lake level instrumentation
- Personnel, equipment and material to implement the design

Funding identified is for project initiation, conceptual and detailed design, procurement of services and implementation of the design to automate NYSEG's Keuka / Bradford Dam. The project is presently forecasted to be complete in 2026.

Reasons and Benefits:

Keuka / Bradford Dam Automation Project is a dam safety project that will allow for automatic and remote monitoring and operation of the dam. Automation will improve

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG's compliance and management of Waneta and Lamoka Lakes according to NYSDEC's approved Water Level Management Plan and reduce the need for personnel to make local adjustments at the dam to maintain lake level compliance.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	393	323	1,658

NYSEG

Kents Falls Upstream Training Wall Extension

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Kent Falls Upstream Training Wall Extension Project is based on on-site observation during high river flow events resulting in the right-side training wall upstream of the dam overtopping and damaging / undermining penstock foundations downstream of the dam leading to compromising of the water retaining structures (upstream training wall and penstock). In 2020, an independent consultant (IC) conducted a safety inspection and analysis based on the FERC's Part 12D engineering guidance. The results of the IC engineering analysis concluded that the height of the right upstream training wall and left upstream dam abutment needs to be increased to prevent overtopping during high flow events.

Kent Falls Upstream Training Wall Extension Project involves the following activities:

- Complete hydraulic analysis of Saranac River
- Geological testing of soils and concrete behind and within existing right-side training wall
- Conceptual and detailed design based on analysis, and testing of soils and concrete of wall height extension on both right-side training wall and left abutment
- Procurement of services, equipment and material to implement the detailed design

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Reasons and Benefits:

Kent Falls Upstream Training Wall Extension Project will address the overtopping that occurs during high flow events, which was concluded by NYSEG’s independent consultant’s safety inspection and engineering review, based on the FERC’s Part 12D engineering guidance. Raising of the right-side training wall and left dam abutment will prevent future overtopping during high river flow events and eliminate potential future damage and undermining of the right-side training wall and penstock foundations. The project will extend the useful life of the dam structure and continue NYSEG’s responsibility and FERC’s requirement for safe operation and maintenance of the high hazard dam and hydroelectric facility.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
199	130	1,904	0	0

NYSEG

Cadyville Right Abutment / Spillway Improvements Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Cadyville Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 5.53 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Cadyville Right Abutment and Spillway Improvement Project is a resurfacing and restoration project necessary to address the several items identified during inspections and operation of equipment at the dam. The areas requiring resurfacing and restoration will address moderate to significant spalling includes concrete loss on the right dam abutment, concrete loss at the base of the dam toe and dam spillway, and overtopping of the retaining wall when the bypass gate is in operation.

The bypass gate is used to convey water, upstream of the dam, into the river bypass reach downstream of the dam during high river flows or when there is an electric disturbance at the Cadyville hydroelectric facility. Overtopping of the retaining wall is leading to material loss around the penstock, which is adjacent to the dam and bypass gate. The project will address upgrades to the water retaining structures for continued safe operation of the dam and penstock

Cadyville Right Abutment and Spillway Improvement Project involves the following activities:

- Study to review current issues identified during inspection and operation of equipment at the dam
- Conceptual and detailed design of upgrades to correct issues leading to concrete loss and overtopping
- Personnel, equipment and material to implement the design upgrades

Reasons and Benefits:



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Cadyville Right Abutment and Spillway Improvement Project will restore areas of moderate to significant concrete loss, eliminate material loss around and supporting the penstock that conveys water to Cadyville hydroelectric facility. Upon completion of the project, the improvements will ensure continued integrity and operation of the Cadyville high hazard dam, as classified by the FERC. Under NYSEG's FERC operating license, NYSEG has a responsibility to safely operate and maintain all hydroelectric facilities and structures.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
307	110	1,726	87	0

NYSEG

Mill C Spillway Concrete Improvements Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Mill C Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 6.05 MW and a significant hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Mill C Spillway Concrete Improvement Project is a project to reconstruct and resurface the ogee section of the dam spillway, localized reconstruction, grouting and sealing of construction joints on the dam spillway along with upgrading the dam drainage system to alleviate hydraulic pressure behind the dam. This resurfacing and restoration project is necessary to address the several items identified during inspections and operation of equipment at the dam resulting in extending the life of the structure.

Mill C Spillway Concrete Improvement Project involves the following activities:

- Inspection and identification of area on the dam spillway requiring reconstruction
- Detailed design of upgrades to spillway surface issues along with design of an upgraded dam drainage system
- Personnel, equipment and material to implement the design upgrades

Reasons and Benefits:

The Mill C Concrete Improvement Project is a dam safety project that will address degradation of the dam ogee section and construction joints that will improve the overall dam spillway surface, structural integrity, and prolong the useful life of the spillway, which is necessary to pass river flows. Upon completion, the project will address concerns observed by the FERC during their annual inspection in 2016 and conveyed to NYSEG.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
9	70	420	1,450	0

NYSEG

Rainbow Falls Powerhouse Entrance / Hill Stabilization

Line of Business: Electric
Category: Hydro-Generation

Scope:

Rainbow Falls Powerhouse Entrance / Hill Stabilization Project involves installation of drainage, regrading of the access road, and stabilization of the existing rock slope to reduce erosion of the driveway and parking area, which is elevated above the powerhouse entrance.

The project scope is for conceptual engineering and an alternative analysis to determine the best option to stabilize the existing rock slope from the elevated driveway down to the NYSEG Rainbow Falls powerhouse. Review and redesign of the powerhouse entrance and access road slope and drainage is also required to reduce the water runoff / ice accumulation during the seasons that affects personnel safety (slippery surfaces, etc.) and stability of the existing rock slope down to the powerhouse. Upon finalizing the design, a contract will be executed to implement (drainage, regrading, rock anchors, fencing, etc.).

Reasons and Benefits:

Regrading of the access road to the powerhouse, installation of drainage that redirects and reduces runoff and ice accumulation away from Rainbow Falls Powerhouse entrance, along with stabilization of the rock slope from the driveway to the powerhouse will significantly improve personnel and facility safety, public safety who access the area for white water rafting, and facility access.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
115	206	1,622	0	0

NYSEG

Mechanicville Bay A, Bay B, Bay C Bag Replacement Program & Inclinometer Upgrade

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Upper Mechanicville Hydroelectric Project (FERC Project No. P-2934), is located on the Hudson River in Saratoga and Rensselaer Counties, in the Town of Stillwater, NY. The facility is unstaffed, with two hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 16.53 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

In October 2019, 1 of the 36 air bladders unexpectedly failed resulting in NYSEG initiating Upper Mechanicville's Emergency Action Plan. The existing gate structures, air bladders and associated gate controls and gate inclinometers were installed circa 2003. As a result of the unexpected failure, NYSEG removed and upgraded 6 air bladders in 2020 that were showing signs of excessive wear and to prevent additional unexpected failures. The purpose for Mechanicville Bay A, B and C Bag Replacement Project and Inclinometer Upgrade Project is to upgrade the remaining 30 air bladders, and upgrade the existing gate inclinometers that measure gate position, to reduce the potential for failure of additional air bladders in the future, and restore reliable indication of gate position.

NYSEG Upper Mechanicville Bay A, Bay B and Bay C Bag Replacement Program and Inclinometer Upgrade involves procurement of material from the original equipment manufacturer (OEM), removal of the Qty. 30 existing pneumatic air bladders (bag) on New York State Canal Corporation's (NYSCC) Lock C-3 dam and installation of new air bladders and associated hardware. NYSEG has an agreement with NYSCC that outlines NYSEG's responsibility for operation and maintenance of the dam operating gates, which are necessary for NYSCC's operation of the dam in support of navigation on the Hudson River. In addition to upgrading the air bladders, inclinometers, which provides operations personnel with position of Bay A, B and C gates, are going to be upgraded.

Reasons and Benefits:

Upgrading of the remaining 30 air bladders and inclinometers will complete upgrading of the remaining air bladders that were not replaced in 2020, restore reliable operation of the

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dam and full operational range of the impoundment, which is necessary for NYSCC's operation during navigation season. As part of FERC's operating license, NYSEG has the responsibility to maintain safe, efficient and reliable operation of the hydroelectric facility.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,530	20	0	0	0

NYSEG

Kents Falls Low Level Floodgate

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Kent Falls Dam Low Level Floodgate Project is the removal and upgrade of two existing low-level flood gate valves, installation of new motor operated valve operators and resurfacing of the upstream side of the right dam abutment to reduce water leakage through the right abutment face. The flood gate valve's and manually operated gear driven valve operators are original to the dam and difficult to operate when called upon / opened for service.

Kent Falls Dam Low Level Floodgate Project involves the following activities:

- Inspection of the right upstream dam abutment face
- Analysis of the existing flood gate valves to determine and specify the new valve size / style required to pass required flows
- Identification and specification of motor operated valve operators consistent with other NYSEG hydroelectric facilities for standardization purposes
- Conceptual and detailed design for removal and installation of new floodgate valves, valve operators and resurfacing of the upstream side of the right dam abutment. Design to include all power and control upgrades to operate floodgates locally and remotely
- Procurement of services, equipment and material to implement the detailed designs

Funding identified is for project initiation, conceptual and detailed design, procurement of construction services and initiation of construction activities to implement the design. The project is presently forecasted to be complete in 2027.

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Reasons and Benefits:

Kent Falls Low Level Floodgate Project will upgrade two low level floodgates and installation of motor operated valve operators to improve opening and closing response time while reducing the potential for personnel injury when compared to current means to open and close. Resurfacing of the upstream right abutment dam face will reduce leakage through the downstream dam face. The project will extend the useful life of the dam structure and continue NYSEG’s responsibility and FERC’s requirement for safe operation and maintenance of the high hazard dam and hydroelectric facility.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	263	228	707

NYSEG

Kents Falls Right Abutment & Toe Scour Upgrades Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Kent Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled with a total rated capacity of 13.68 MW and a high hazard dam used for impoundment water for use in generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Kent Falls Right Abutment and Toe Scour Upgrade Project is based on an inspection conducted by the FERC in 2019. The inspection revealed rock and concrete loss leading to the undermining of the spillway right abutment foundation. Loss of rock and concrete on the spillway directly below the spillway bypass gate was also identified. The purpose of the project is to reinforce and address the right abutment toe scour and spillway concrete loss as identified by the FERC.

Kent Falls Right Abutment and Toe Scour Upgrade Project involves the following activities:

- Detailed inspection of the dam spillway right abutment foundation and spillway area directly below the spillway bypass gate (complete)
- Conceptual and detailed design to address rock and concrete erosion and loss around dam spillway right abutment and on the spillway (complete)
- Installation of a reinforced concrete toe block along the spillway right abutment to address rock and concrete erosion
- Restoration of the spillway (rock and concrete loss) directly below the spillway bypass gate
- Personnel, equipment and material to implement the design

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Reasons and Benefits:

Kent Falls Right Abutment and Toe Scour Upgrade Project will address undermining of the high hazard spillway right abutment foundation and rock and concrete loss on the dam spillway directly below the spillway bypass gate. Upon completion, NYSEG will have fulfilled FERC’s request to address the foundation undermining, extend the useful life of the dam structure and continue NYSEG’s responsibility and FERC’s requirement for safe operation and maintenance of the high hazard dam and hydroelectric facility.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
714	44	0	0	0

NYSEG

Mill C Intake Trash Rack & Raker Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Mill C Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 6.05 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

As a part of the current FERC license for the Facility, which was effective on April 13, 2006, NYSEG is required to replace or modify the existing intake trashracks with 1-inch clear space for fish protection per License Article 404, Section 3.4 of the Settlement Agreement and condition B.10 of the New York State Department of Environmental Conservation (NYSDEC) 401 Water Quality Certification (WQC). The purpose of the project is to upgrade the existing intake structure through installation of new reduced space intake trash racks for the protection of fish. Section 3.4 of the Settlement Agreement states as follows:

3.4 Fish Protection and Downstream Passage

3.4.1 Fish Protection

3.4.1.1 Replacement Trashracks

The existing trashracks at the intakes for each development shall be replaced or modified with 1-inch clear spaced trashracks for fish-protection within the following specified time periods from license issuance: five years for the first development; ten years for the second development; 15 years for the third development; and, 20 years for the fourth (last) development. Trashrack replacement/modification at all four developments will be completed within twenty years of license issuance. The order in which each development has trashracks replaced/modified - first, second, third and fourth - is at the Licensee's discretion. The Parties agree that the existing approach velocity with current intake structure configuration is acceptable at all four developments."

The "Saranac River Hydroelectric Project Settlement Agreement," dated November 2004

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is attached for additional information.

Installation of the new intake trash racks at Mill C were to be completed by April 2021, as outlined in the FERC license. The FERC granted an extension of time to complete the project due to personnel safety requirements and measures due to the COVID-19 virus. The project was completed and the station was returned to service in November 2021. Project punch list items and close out will be completed in 2022.

In addition to the intake rack upgrades, the following upgrades were accomplished as part of the project:

- The approach of the river into the intake structure was realigned such that river debris can more easily pass through a sluiceway
- The existing sluiceway in the left dam abutment was deepened and widened to allow for larger biodegradable debris to pass downstream of the dam; along with new automated steel sluice gates
- Associated intake structural steel and concrete improvements were constructed to accommodate installation of a new mechanical hydraulic rackraker for cleaning of the intake trashracks during operation of the facility

Reasons and Benefits:

NYSEG Mill C Intake Trash Rack and Raker Project is a requirement of the FERC license and involved reducing intake trash rack spacing for the protection of fish and to comply with Article 404, Section 3.4 of the Settlement Agreement and condition B.10 of the NYSDEC 401 Water Quality Certification. Construction was completed and the facility returned to service in November 2021. In 2022, NYSEG plans to complete the construction punch list items for the Project.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
340	0	0	0	0

NYSEG

Upper Mechanicville Plant Control System Upgrade Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Upper Mechanicville Hydroelectric Project (FERC Project No. P-2934), is located on the Hudson River in Saratoga and Rensselaer Counties, in the Town of Stillwater, NY. The facility is unstaffed, with two hydroelectric turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 16.53 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

NYSEG Upper Mechanicville hydroelectric facility was built circa 1981. Over 40 years of operation of the plant, plant control systems and components, which are original to the facility are starting to fail leading to reduced operational reliability of the facility and turbine-generators. Original Equipment Manufacturer (OEM) replacement components are difficult locate, require procurement of refurbished components or after-market parts to restore to service.

The purpose of the project is to upgrade the current plant control systems with state-of-the-art hardware and technology that brings the control systems in-line with current standards resulting in increased operational reliability and availability of parts.

The Upper Mechanicville Plant Control System Upgrade Project involves review and updating of the existing plant control system drawings and operating equipment / systems, identifying current / state-of-the-art technology to replace, upgrade and standardize the existing plant control and generator protection systems. Upon completion of the design, the existing infrastructure will be removed and retired from service and new cabinetry with new plant control and generator protection system hardware installed and commissioned.

Funding identified is for project initiation, review of existing turbine-generator control system drawings, conceptual and detailed engineering, procurement of construction services, and the start of the implementation of the design. The project is presently forecasted to be complete in 2028.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Due to aging, end-of-life plant control system and generator protection hardware and software, and procurement of refurbished or after-market parts to restore control systems to service, upgrade of Upper Mechanicville’s plant control and generator protection systems is necessary. Upgrading to state-of-the-art plant control and generator protection systems will support New York State’s Clean Energy Goal by improving operational performance and reliability of the facility.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	175	141

NYSEG

Rainbow Falls-fish bypass study-Env.Complia

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG Rainbow Falls Hydroelectric Project (FERC Project No. P-2835), is located on the Ausable River in Clinton and Essex Counties, just south of Plattsburgh, NY. The facility is unstaffed, with two hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 2.64 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

As a part of the current FERC license for the Facility, which was issued on August 18, 2004, NYSEG was required to install a fish bypass structure to safely move entrained aquatic species safely downstream of the facility intake structure. Installation of the fish bypass structure was completed in 2011, however performance of the fish bypass structure, through performance of a study could not be completed due to Hurricane Irene significantly damaging the facility in August 2011. The purpose of the fish bypass study is for NYSEG to determine the effectiveness of the fish bypass system that was installed at NYSEG Rainbow Falls hydroelectric facility circa 2010. Installation and monitoring of the fish bypass structure was part of conditions set forth in License Article 407 and License Article 408 of NYSEG's 40 year FERC License and requires NYSEG consult with US Fish and Wildlife Service (USFWS) and NYS Department of Environmental Conservation (NYSDEC).

Paragraph 2 of License Article 408 states as follows:

LICENSE REQUIREMENTS

2. Article 408 requires the licensee, within five years of license issuance, to file, for Commission approval, a plan for post-construction studies to monitor the effectiveness of the downstream fish passage facilities specified in Article 407.1 The monitoring plan is required to include a schedule for: (1) implementation of the plan; (2) the length and frequency of the monitoring program; (3) consultation with the New York Department of Environmental Conservation (DEC) and the U.S. Fish and Wildlife Service (FWS) concerning the results of the monitoring; and (4) filing the results, agency comments, and licensee's response to agency comments with the Commission. The licensee is required to prepare the plan after consultation with the DEC and FWS. The licensee is also required to include with the plan documentation of agency consultation, copies of comments and

NYSEG and RG&E 5-Year Capital Investment Plan

recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies’ comments are accommodated by the plan. If the licensee does not adopt a recommendation, the filing must include the licensee’s reasons, based on site-specific information. The Commission reserved the right to require changes to the plan. Upon Commission approval, the licensee has to implement the plan, including any changes required by the Commission. If the results of the monitoring indicate that changes in project structures or operations, including alternative flow releases, are necessary to protect fish resources, the Commission may direct the licensee to modify project structures or operations.”

The “Order Approving Downstream Fish Passage Monitoring Plan Pursuant to Article 408,” issued October 15, 2010 is attached for reference.

Reasons and Benefits:

As conditions of NYSEG’s 40-year FERC license, License Article 407 and License Article 408, NYSEG is required to install a fish bypass at the intake structure for the protection of fish. Upon completion of installation of the fish bypass structure, NYSEG is responsible to perform a study to confirm the structures effectiveness. Upon completion of the study, NYSEG will fulfilled its regulatory commitments in accordance with the new FERC license.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
242	0	0	0	0

NYSEG

Fossil Hydro Operations

Line of Business: Electric
Category: Hydro-Generation

Scope:

NYSEG Hydro Minor Capital Program addresses multiple minor capital expenditures, including but not limited to, equipment upgrades, planned and emergent projects, etc. needed to maintain the operating systems and to upgrade safety features at NYSEG’s hydroelectric generating facilities.

Reasons and Benefits:

Projects are implemented for a variety of electrical, mechanical, civil/structural and regulatory activities at all NYSEG generating facilities and to improve and address dam safety, personnel safety, public safety and regulatory requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
161	0	0	0	0

NYSEG

High Falls Draft Tube Stop Logs and Gantry Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

The NYSEG High Falls Hydroelectric Project (FERC Project No. P-2738), is located on the Saranac River in Clinton County, west of Plattsburgh, NY. The facility is unstaffed, with three hydropower turbine-generating units that are remotely monitored and controlled and are rated to produce a total of 15.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Since construction of the facility circa 1948, the facility has not had stop logs to isolate the powerhouse tailrace (Saranac River) from the turbine-generator draft tubes. Installation of draft tube stop logs during inspection of turbine-generators is necessary for the safety of personnel performing the inspection and maintenance activities along with protecting the facility from flooding if high water events were to occur.

The purpose of the Draft Tube Stop Log and Gantry Project is to fabricate steel stop logs and associated structures to allow for installation, removal and storage when not installed, along with modifications to the powerhouse draft tube structures to allow for receiving the stop gates at time of installation.

High Falls Draft Tube Stop Logs and Gantry Project includes the following activities: Conceptual and detailed design of steel stop logs, associated steel structures and electrical infrastructure that will facilitate ease of accessibility and safe handling during installation and removal.

- Fabrication of stop logs and associated steel structures to support removal, installation and storage of stop logs
- Installation of cofferdam to isolate each turbine-generator draft tube to support upgrades of turbine-generator discharge structures to receive stop logs when installed
- Installation of steel structures and associated electrical upgrades to facilitate safe installation and removal of stop logs after project completion

Reasons and Benefits:

Design, fabrication and installation of draft tube stop logs and gantry along with associated



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concrete and electrical upgrades will facilitate safe isolation of each turbine-generating unit for personnel performing inspection and maintenance activities. Installation of draft tube stop logs will prevent river water from the tailrace of the powerhouse from entering the draft tube of each turbine-generator.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6	0	0	0	0

NYSEG

HYDRO Regulatory Mandates

Line of Business: Electric
Category: Hydro-Generation

Scope:

NYSEG Hydro Regulatory Mandate Projects are implemented for a variety of electrical, mechanical, civil/structural and regulatory type projects at all NYSEG hydroelectric generating facilities, which includes powerhouses, dams, intake houses, substations and Project lands. The projects address necessary betterments to improve station reliability, equipment and operational efficiency, personnel, public and project safety and site security with a focus on achieving regulatory compliance and to replace end-of-life and obsolete equipment.

Reasons and Benefits:

NYSEG Hydro Regulatory Mandate Projects address regulatory-type projects to maintain compliance with regulatory agencies such as the FERC, US Fish and Wildlife Service and NYS Department of Environmental Conservation. The projects are considered minor capital activities therefore projects will transition under RG&E Minor Capital Program in 2023.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3	0	0	0	0

Electric Hydro Generation

RG&E

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RG&E

Hydro Generation S2 Modernization

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 2 Hydroelectric Project (FERC Project No. P-2582) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of one turbine-generating unit with a total capacity of 8.5 MW and a dam structure (Central Ave. Dam) at High Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy. Station 2 was constructed circa 1960. Sections of the penstock that fed the original Station 2 hydroelectric facility, constructed in early 1900's, were used in the construction of the current Station 2 hydroelectric facility. The penstock requires routine inspection and weld repairs to address cracking.

The purpose of Station 2 Modernization Project is to replace the existing 11-ft diameter penstock, which is at end of life, install a new 14-ft diameter bifurcated penstock that will improve reliable operation of Unit 1 turbine-generator, facilitate future expansion of the hydroelectric facility through the addition of a second turbine-generating unit, and extend the useful life of the hydroelectric facility, upgrade the fish bypass conveyance system, and install Unit 1 turbine isolation valve.

Station 2 Modernization Project involves the following activities:

Detailed design and construction to:

- Remove the existing 11-ft diameter penstock, with portions dating back to early 1900's, which is at end of life
- Upgrade existing fish bypass conveyance system to improve passage of aquatic species downstream of intake structure to comply with FERC License Amendment
- Increase size of penstock to 14-ft diameter and bifurcate to prepare Station 2 hydroelectric facility for future expansion (addition of 2nd generating unit)
- Install 11-ft diameter turbine isolation valve at inlet to Unit 1 turbine-generator
- Procurement and fabrication of 14-ft diameter bifurcated penstock
- Removal of existing and installation of new penstock along with associated structures in addition to Unit 1 turbine isolation valve

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Station 2 Modernization Project includes removal of the existing 11-ft diameter penstock, which is at end of life, installation of a 14-ft diameter bi-furcated penstock, turbine isolation valve for Unit 1 and upgrade the fish bypass conveyance system. As outlined in FERC’s Station 2 License Amendment, Section E.30 and 44.N, upgrades to the existing fish bypass conveyance system are required and will be incorporated with installation of the new penstock to fulfill RG&E’s requirement. Installation of a new penstock, turbine isolation valve and fish bypass conveyance system will extend the useful life of the hydroelectric facility, increase operational reliability and supports New York State’s Clean Energy Goals for use of renewable energy.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,406	9,298	20,895	15,158	1,453

RG&E

Minor Capital Program

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Hydro Minor Capital Program address multiple minor capital expenditures, including but not limited to, equipment upgrades, planned and emergent projects, etc. needed to maintain the operating systems, upgrade safety features, and to address regulatory requirements at the RG&E hydroelectric generating facilities.

Reasons and Benefits:

Projects are implemented for a variety of electrical, mechanical, civil/structural and regulatory needs at all RG&E hydroelectric generating facilities and to improve and address dam safety, personnel safety, public safety, and regulatory requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,137	1,500	1,500	1,500	1,500

RG&E

S5 Intake Stop Log Gantry Upgrade Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Station 5 Headgates intake structure contains 16 intake bays to convey water from the Genesee River into Station 5 water conveyance system (tunnel). The present intake stop log gantry was not designed to allow for installation and removal of the stop logs during plant operation or when there is a differential present across the intake trash racks. Installation of stop logs is necessary to safely and quickly isolate Station 5 water conveyance system. Currently, installation and removal of the stop logs requires mobilization of a barge and crane to perform.

The purpose of the Intake Stop Log Gantry Upgrade Project is to design and install an mobile intake gantry structure that will allow for maintenance of the stop logs, and installation and removal during plant operation or intake trash rack differential without having to mobilize a barge and crane.

Station 5 Intake Stop Log Gantry Upgrade Project includes the following activities:

- Conceptual and detailed design of steel structures and electrical infrastructure that will facilitate ease of accessibility and safe handling of stop logs during installation, removal and for maintenance purposes
- Fabrication of steel structure(s) to support removal, installation and storage of stop logs
- Installation of cofferdam to isolate each intake bay, as needed, to support upgrades of intake structure to receive stop logs when installed
- Installation of steel structures and associated electrical upgrades to facilitate safe installation, removal and maintenance of stop logs after project completion

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Reasons and Benefits:

Design, fabrication and installation of Station 5 Intake Stop Log Gantry along with associated concrete and electrical upgrades will facilitate safe and quick isolation of Station 5 water conveyance system during plant operation or when there is a differential across the intake trash racks without having to mobilize a barge and crane. When stop logs are not in use, the intake stop log gantry will allow for maintenance of the stop logs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
356	188	2,289	150	0

RG&E

Station #5 surge Tank Rock fall Pro

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

The 50-ft diameter x 55-ft high surge tank, which is integral to Station 5 water conveyance (tunnel) system and reduces water hammer in the tunnel system if an electrical disturbance occurs while operating Station 5 hydroelectric facility at full capacity, is located on the side of the Genesee River gorge. The original surge tank was installed circa 1917 and was replaced circa 2004. The east side of the surge tank is surrounded by the gorge wall and continually subjected to rock sloughing and accumulating against the surge tank.

The purpose of the project is to install rock fall protection on the gorge wall to protect personnel and help contain and reduce rock from sloughing, accumulating and damaging the surge tank.

The Station 5 Surge Tank Rock Fall Protection Project includes an assessment of the rock strata followed by conceptual and detailed engineering to minimize, deflect and reduce sloughing rock from damaging and accumulating around the base of the surge tank. The design will be implemented through procurement of material and installation by contractor services.

Reasons and Benefits:

Implementation of Station 5 Surge Tank Rock Fall Protection Project will result in reduced rock accumulation around the base of the surge tank, prevent damage to the tank, and improve safety for personnel conducting inspection and maintenance activities around the tank. Failure of the surge tank, as a result of significant rock fall, could result in personnel injury, damage to Station 5 powerhouse and substation infrastructure and loss of renewable energy production (46.0 MW capacity).

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,485	0	0	0	0

RG&E

S2 Central Ave Dam Superstructure Modernization

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 2 Hydroelectric Project (FERC Project No. P-2582) is located on the Genesee River in Rochester, New York. The hydroelectric generating facility is comprised of one turbine-generating unit with a total capacity of 8.5 MW and a dam structure (Central Ave. Dam) at High Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy. Station 2 and Central Ave. Dam was constructed circa 1960.

Central Ave. Dam is comprised of six 42-ft by 11-ft high cable and winch driven vertical steel gates that impounds water for use in generation of renewable energy at Station 2 through use of Gate 1, allows for aesthetic flows over High Falls (Gates 2 through 6), which is a requirement of RG&E's Station 2 FERC operating license, and is vital in preventing flooding of the City of Rochester during high flow events (all gates).

Recent detailed inspection of the gates, gate sheaves, cable and hoist system identified sheave's used in raising and lowering each gate at end of useful life. An engineering review of the inspection results identified that the current design and equipment in use do not meet current factor of safety margins.

The purpose of the project is upgrade and modernize Central Ave Dam gate operating systems and superstructure to meet current factor of safety margins and improve operational reliability.

Station 2 Central Ave. Dam Superstructure Modernization Project involves the following activities:

- Conceptual design to modernize gate lifting system
- Specification of gate sheave and lifting means that meet current safety standards and margins
- Identify electric and control operating requirements to safely isolate and operate each gate independently
- Detailed design to modernize gate lifting and control system
- Procurement of services, material and personnel to implement design

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Funding identified is for project initiation, conceptual and detailed design, procurement of services and beginning of the implementation of the required control and structural upgrades. The project is presently forecasted to be complete in 2028.

Reasons and Benefits:

Station 2 Central Ave. Dam Superstructure Modernization will improve safety for personnel performing maintenance and inspection activities. In addition, improvements to the superstructure, electric and control systems will result in increased operational reliability of the dam while maintaining public safety and RG&E meeting its regulatory obligations and requirements under the FERC license.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	569	1,211

RG&E

S5 Spillgate #2 Rock Stabilization - 1st priority

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Gate 2 spillway is located directly located downstream of Crest Gate 2 at RG&E Station 5 Headgates Dam and is one of five spillways associated with operation of the Headgate facility. Since installation of Station 5 Headgates circa 1917, rock strata directly downstream of Crest Gate 2 has been naturally eroding as a result of freeze / thaw cycles during the fall / winter seasons and when Gate 2 is open and passing water downstream of Station 5 Headgates. The rock strata is rapidly encroaching and undermining the approximate 55-ft wide by 28-ft long concrete spillway.

The purpose of Gate 2 Rock Stabilization Project is to stabilize and encapsulate the rock strata directly downstream of Crest Gate 2 to prevent further erosion and undermining of the concrete spillway.

Gate 2 Rock Stabilization Project involves conceptual and detailed design to stabilize the rock strata through encapsulation. Funding identified is to perform field studies, conceptual, detailed design, and begin construction. The project is presently forecasted to be complete in 2028. Upon finalizing the design, RG&E will execute the design through procurement of equipment, material and personnel. It is anticipated that the project will be executed in parallel with RG&E Station 5 Gate 2 Hinge Upgrade Project due to the economies and the need to install a temporary cofferdam to isolate both Gate 2 crest gate and Gate 2 spillway to execute the work activities.

Reasons and Benefits:

Stabilization and encapsulation of the rock strata directly downstream of Gate 2 spillway will significantly reduce the on-going erosion and undermining the approximate 55-ft wide

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by 28-ft long concrete spillway. Continued erosion and undermining of the concrete spillway could result in RG&E having to remove Gate 2 from service, which will limit and/or restrict flow through the dam during high flow events and could lead to instability of the dam structure if the gate is left in service. Under RG&E’s operating license issued by the FERC, RG&E has the responsibility to maintain public safety and safely operate and maintain hydroelectric structures and facilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	619	587

RG&E

S5 Gate 2 Hinge Upgrade

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Gate 2 is located at RG&E Station 5 Headgates Dam and is one of five gates (49.5 long by 13.75-ft high) used to impound river water that is used in generation of electric energy. Gate 2 Hinge Upgrade Project is removal of the existing gate hinges, which are anchored into bedrock, and installation of a new hinge design and anchor system. The gate hinges are a critical component in the safe and reliable operation of the crest gates, which is used to pass river flows downstream of the headgate structure.

In January 2018, the hinges of two adjacent crest gates (Gate 4A & 4B) failed during operation as a result of extremely cold temperatures in the region resulting in the need to lower the impoundment and cease generation of energy. Since then, RG&E has been diligently working to redesign the gate hinge design and anchor system. Failure of Gate 2 hinges could result in RG&E not maintaining impoundment elevations required of RG&E's operating license with the FERC and loss of electric generation.

The purpose of the project is to upgrade the two hinges on Gate 2 to bring them current with the upgraded design being implemented on Gate 4A & 4B at Station 5 Headgates.

The project scope will involve necessary equipment, material and personnel for installation of a temporary cofferdam to isolate Gate 2, along with resources necessary for removal of the existing gate and hinges. Taking the new hinge design from Gate 4A & 4B, additional hinge anchorage will be installed along with new gate hinges and reinstallation of the Gate 2. Upon completion of the work, the gate will be recommissioned and returned to service after removal of the cofferdam.

Funding identified is for project initiation, detailed design, procurement of services, and initiation of contract services to implement the gate hinge upgrade. The project is presently forecasted to be complete in 2028.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Upgrading of Gate 2 hinges and anchorage system at Station 5 Headgates is a proactive measure to implement an upgraded design to reduce the potential for future failure during gate operation. Installation of the new hinge and anchorage design will allow RG&E to maintain operational compliance with our FERC license and continue to generate renewable energy in support of New York State’s Clean Energy Goal.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	467	493



RG&E

S5 Unit 3 Turbine-Generator New Runner

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Unit 3 turbine-generator has a generating capacity of 18.0MW and was installed circa 1927. A new Unit 3 turbine runner was installed in late 1980's.

Station 5 Unit 3 Turbine-Generator Runner Project involves design, fabrication and installation of a new turbine runner that will improve operational efficiency and reliability.

During a major rebuild of Unit 3 turbine-generator circa 2010, inspection of the turbine runner revealed significant cracking to approximately 50% of the runner buckets. Cracks in the runner buckets were addressed prior to reassembly.

The project will require disassembly of the turbine-generator assembly to remove the existing runner, installation of the new turbine runner and realignment of the turbine-generator upon reassembly. Funding identified is to initiate the project, review runner designs to identify the most efficient and practical runner upgrade and initiate procurement of a new runner. The project is presently forecasted to be complete in 2028.

Reasons and Benefits:

Fabrication and installation of a new turbine runner for Unit 3 turbine-generator will eliminate the historical cracking issue with the existing runner and the potential for future operational and maintenance issues. Upgrading and installation of a new runner in Unit 3 turbine will improve operational performance and reliability which supports New York State's Clean Energy Goals and initiatives.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	385	443



RG&E

S26 Generator Protection and Controls Upgrade

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 26 Hydroelectric Project (FERC Project No. P-2584), which is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of a single 3.0 MW turbine-generating unit. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

The turbine-generating unit and facility was constructed circa 1952 and has the original generator protection and controls, which are still in service. Original Equipment Manufacturer (OEM) replacement components are difficult to locate and requiring procurement of refurbished components or after-market parts to restore to service.

The purpose of the project is to upgrade the current generator protection and controls hardware with state-of-the-art hardware and technology that brings it in-line with current standards resulting in increased operational reliability and availability of parts.

Station 26 Generator Protection and Controls Upgrade Project involves the following activities:

- Review and updating of the existing generator protection and control system drawings
- Identifying current / state-of-the-art technology to replace, upgrade and standardize the existing generator protection and control systems
- Detailed design of required modifications to implement the new generator protection and control hardware
- Procurement of personnel, material, equipment and hardware to remove the existing infrastructure and install new generator protection, control hardware and cabinetry

Funding identified is for project initiation, review of existing generator protection and control system drawings, conceptual and detailed engineering, and implementation of the design. The project is presently forecasted to be complete in 2027.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Station 26 Generator Protection and Controls Upgrade Project involves the upgrade of the existing generator protection and control system due to aging and difficulty with locating OEM components that are end-of-life. Upgrade of the generator protection and controls system will extend the operational life of the generating facility, increase long-term reliable operation of the facility and continue RG&E's production of renewable energy, which supports New York State's Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	130	121	484

RG&E

Station 2 Generator Protection and Controls Upgrade

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 2 Hydroelectric Project (FERC Project No. P-2582), which is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of a single 8.5 MW turbine-generating unit. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

The Station 2 turbine-generating unit, including the existing generation protection and controls, are original to the plant and was constructed circa 1960. The Station 2 generation protection systems are starting to fail leading to reduced operational reliability of the facility and turbine-generator. Original Equipment Manufacturer (OEM) replacement components are difficult to locate, require procurement of refurbished components or after-market parts to restore to service.

The purpose of the project is to upgrade the current generator protection and controls hardware with state-of-the-art hardware and technology that brings it in-line with current standards resulting in increased operational reliability and availability of parts.

The Station 2 Generator Protection and Controls Upgrade Project involves the following activities:

- Review and updating of the existing generator protection and control system drawings
- Identifying current / state-of-the-art technology to replace, and upgrading and standardizing the existing generator protection systems
- Detailed design of required modifications to implement the new generator protection and control hardware
- Procurement of personnel, material, equipment and hardware to remove the existing infrastructure and install new generator protection, control hardware and cabinetry

Funding identified is for project initiation, review of existing generator protection and control system drawings, conceptual and detailed engineering, and implementation of the design. The project is presently forecasted to be complete in 2027.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

Station 2 Generator Protection and Controls Upgrade Project involves the upgrade of the existing Unit 1 generator protection and control system due to aging and difficulty with locating OEM components that are end-of-life. Upgrade of the generator protection and controls system will extend the operational life of the generating facility, increase long-term reliable operation of the facility and continue RG&E’s production of renewable energy, which supports New York State’s Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	130	121	484

RG&E

S5 Gate 5 Rubplate and Bottom Seal Upgrade Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Gate 5 is located at RG&E Station 5 Headgates Dam and is one of five gates (49.5 long by 13.75-ft high) used to impound river water that is used in generation of electric energy. Gate 5 Rubplate and Bottom Seal Upgrade Project is the removal and upgrading of the existing gate rub plate and bottom seal. The gate seals prevent river water from leaking between the sides and bottom of the gate when the crest gate is raised and downstream of the headgate structure. Inspection of the seals on adjacent crest gates, which were installed circa 2004 to 2006, revealed degradation and cracking due to ultraviolet light and environmental conditions. Failure of or significant leakage through the seals could result in RG&E not maintaining impoundment elevations required of RG&E's operating license with the FERC and loss of electric generation.

The project scope will involve necessary equipment, material and personnel for installation of a temporary cofferdam to isolate Gate 5, along with resources for removal of the existing rubplate and bottom seals and installation of new ultra-violet stable seals. Upon completion of the work, the gate will be recommissioned and returned to service after removal of the cofferdam. Funding identified is to initiate the project and perform conceptual and detailed engineering. The project is presently forecasted to be complete in 2029.

Reasons and Benefits:

Installation of new ultra-violet stable rubplate and bottom seals on Gate 5 at Station 5 Headgates is a proactive measure to upgrade the seals prior to failure. Upgrade of the seals will allow RG&E to maintain operational compliance with our FERC license and continue to generate renewable energy in support of New York State's Clean Energy Goals and initiatives.



NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	610



RG&E

S5 Surge Tank Expansion (Align with tunnel inspection)

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

With relining of the water conveyance tunnel, which was completed in 2012, modeling of the new tunnel profile revealed that the existing surge tank could potentially overtop if an electrical disturbance occurred during operation of the hydroelectric facility at full load. Overtopping of the (50-ft diameter x 55-ft high) surge tank would result in potential harm to personnel around the surge tank along with damage to infrastructure around the facility, such as electrical distribution circuits from Station 5 powerhouse substation and the 13-ft diameter water conveyance penstocks.

The Station 5 Surge Tank Expansion Project involves updating of the water conveyance flow model, determining the height to raise the tank walls to prevent overtopping when operating a full load, design and implementation of the required modification to raise the tank height. Output capacity of Station 5 hydroelectric facility is presently curtailed to prevent overtopping of the tank. Funding identified is for initiation of the project, conducting flow model and start conceptual engineering and detailed engineering. The project is presently forecasted to be complete in 2029.

Reasons and Benefits:

Expansion (raising) of the existing surge tank height is necessary to protect personnel and infrastructure in the event of a load rejection when operating Station 5 hydroelectric facility at full load. Upon completion of the project, Station 5 hydroelectric facility will be restored to safe (full) operating capacity. Restoring operational capacity of Station 5 will increase energy production at the facility, which supports New York State's Clean Energy Goals and initiatives.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	575



RG&E

S5 Tunnel System (Construction Joints, Intake Shaft Transition, Surge Tank Found)

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Station 5 Water Conveyance (Tunnel) System conveys river water impounded upstream of Station 5 Headgates dam to the powerhouse for use in generation of electric energy. Station 5 Tunnel System Project involves design of a new steel reinforced cast-in-place concrete liner to reline and upgrade the existing liner transition from the river bed into the tunnel's intake shaft (20-ft diameter), transition of the surge tank riser shaft (19-ft diameter) to the surge tank foundation and addressing miscellaneous construction joints throughout the 1,400-ft long by 16-ft diameter power tunnel system.

The purpose of the project is to address the areas in the water conveyance system that have been identified to be in poor condition and address prior to failure. Failure of the liner in these areas could lead to concrete being ingested into the turbine-generators during operation and causing damage.

Implementation of the designs require dewatering of the water conveyance tunnel, installation of temporary infrastructure (lighting, compressed air, air monitoring systems, etc.) and equipment inside and outside of the tunnel system to support the work activities. Due to the location of the tunnel system and limited access and egress points, on-site confined space rescue team is required in the event there is a medical and/or rescue emergency. Funding identified is to initiate the project, perform conceptual engineering and start detailed design. The project is presently forecasted to be complete in 2030.

Reasons and Benefits:

Installation of new steel reinforced cast-in-place concrete at the intake shaft transition from the river bed, surge tank riser shaft to surge tank foundation and miscellaneous

NYSEG and RG&E 5-Year Capital Investment Plan

construction joints throughout the power tunnel system will extend the life of the water conveyance system. Proactive measures to address these areas will reduce the potential for potential damage to the turbine-generators during operation and allow for continued reliable operation of Station 5’s three hydroelectric turbine-generators in support of New York State’s Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	557

RG&E

Station 5 Gate 3 Rubplate, Rubplate and Breastwall Seal Upgrade Project

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Sector Gate 3 is located at RG&E Station 5 Headgates Dam and is one of five gates (~100-ft long by 17-ft high) used to impound river water that is used in generation of electric energy. The purpose of the rub plate and upstream breast wall seals is to contain (and seal) water within the Gate 3 structure. The rub plate seals seal against the rub plates that are embedded are integral to the concrete piers.

The purpose of the project is to install new stainless steel rubplates and associated gate seals along with installation of a new breastwall seal to reduce water leakage into and out of the gate that negatively impacts gate performance and operability. Failure of the seals could result in RG&E not maintaining impoundment elevations required of RG&E's operating license with the FERC and reduction in loss of electric generation.

Gate 3 Rubplate, Rubplate and Breastwall Seal Upgrade Project is comprised of the following activities:

- Design and fabrications of two new stainless steel rubplates
- Procurement of new rub plate seals and 100-ft long breastwall seal
- Installation of ~100-ft long temporary cofferdam to isolate Gate 3 for removal and installation of new gate seal components and accessories
- Removal of the existing original steel rubplates (installed circa 1917), which are at end of life and integral to the concrete piers
- Removal of and upgrading of the existing gate rubplate seals, which were installed circa 1975 and at end-of-life
- Removal of the upstream breastwall seal, which is original to the Headgates

NYSEG and RG&E 5-Year Capital Investment Plan

- construction, installed circa 1917, and at end of life
- Personnel, equipment and material for installation of new rubplate, rubplate seals and upstream breastwall seal
 - Removal of the cofferdam upon completion and recommissioning of the gate prior to returning to service
 - Funding identified is to initiate the project and perform conceptual and detailed engineering. The project is presently forecasted to be complete in 2029

Reasons and Benefits:

With the existing rubplates, rubplate seals and upstream breastwall seal at end of life with water leakage into and from the gate when in service, installation of new rubplates and seals is necessary for improved operational reliability of Gate 3. Installation will also allow RG&E to maintain operational compliance with RG&E’s FERC license, and continue to generate renewable energy in support of New York State’s Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	463

RG&E

S5 Unit 3 Turbine-Generator New Turbine Isolation Valve

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Unit 3 turbine-generator has a generating capacity of 18.0MW and was installed circa 1927. The original turbine isolation valve, which is used to isolate river water from entering Unit 3 turbine-generator scroll case, was removed and minor upgrades performed circa 2009. The turbine isolation valve is closed and scroll case dewatered for the safety of personnel performing internal inspection and maintenance on the turbine-generator.

The purpose of Station 5 Unit 3 Turbine-Generator New Turbine Isolation Valve Project is to procure and install a new valve. In 2018 during isolation of Unit 3 turbine-generator, personnel were not able to successfully seal the valve to prevent water from entering the turbine scroll case. Water flows leaking around the existing valve seat and seals are significant enough that prevent safe access of personnel to perform inspection and maintenance on Unit 3 turbine runner in the turbine scroll case.

Station 5 Unit 3 New Turbine Isolation Valve Project involves design and fabrication of a new 11.5-ft diameter valve. Upon delivery of the valve, the Station 5 intake tunnel will be dewatered, the existing valve removed, new valve installed and commissioned. Funding identified is to initiate the project, technical review of valves that could perform to the required operational requirements along with conceptual design for installation of the valve. The project is presently forecasted to be complete in 2029.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Installation of a new turbine isolation valve for Unit 3 turbine-generator will create a safe isolated work area, by preventing water from entering the turbine scroll case, for personnel to safely access the turbine scroll case for inspection and maintenance activities.

Preventive and proactive maintenance and inspection of Unit 3 turbine-generator improves operational performance and reliability supports New York State's Clean Energy Goals and initiatives.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	419

RG&E

S5 Powerhouse T-G Rotating Equipment Guards

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

Station 5 Powerhouse Turbine-Generator Rotating Equipment Guard Project is an initiative to meet compliance with OSHA 1910.212 – machine guarding. Some of the rotating equipment does not have guards that meet current OSHA guidance.

Station 5 was constructed circa 1917 and the rotating equipment guard project is comprised of the following activities:

- Review and identifying rotating equipment requiring new equipment guards or upgrades to meet compliance
- Conceptual and detailed design of equipment guards to protect personnel but facilitate access for operation and maintenance activities
- Fabrication and installation of equipment guards to meet compliance with OSHA 1910.212

Reasons and Benefits:

Station 5 Powerhouse Turbine-Generator Rotating Equipment Guard Project will address equipment manufactured and installed circa 1917 that does not comply with current OSHA 1910.212 guidance. The new and upgraded equipment guards will increase personnel protection during operation and maintenance activities.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
283	0	0	0	0

RG&E

Hydro Upgrade

Line of Business: Electric
Category: Hydro-Generation

Scope:

Replace unsupported Tetragenics control system at 3 of 5 hydroelectric facilities on the Genesee River in downtown Rochester. Route communications and data acquisition from stand-alone SCADA system to current Spectrum system for access and control by ECC.

Reasons and Benefits:

The hydro system generates power using flow from the Genesee River at various locations in downtown Rochester. There are 5 generating locations but only 3 are currently usable. The other two have been out of service for years. The controls are critical not just to power generation but for river level and water flow through the downtown area. The equipment is very much outdated and currently non-supportable with the exception of the minimal inventory we have on hand. The company that installed it no longer does this type of work, used proprietary protocols and the operating system for the Programmable Logic Controller (PLC)'s is no longer supported.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
152	0	0	0	0

RG&E

HYDRO Regulatory Mandates

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Hydro Regulatory Mandate Projects are implemented for a variety of electrical, mechanical, civil/structural and regulatory type projects at all RG&E hydroelectric generating facilities, which includes powerhouses, dams, intake houses, substations and Project lands. The projects address necessary betterments to improve station reliability, equipment and operational efficiency, personnel, public and project safety and site security with a focus on achieving regulatory compliance and to replace end-of-life and obsolete equipment.

Reasons and Benefits:

RG&E Hydro Regulatory Mandate Projects address regulatory-type projects to maintain compliance with regulatory agencies such as the FERC, US Fish and Wildlife Service and NYS Department of Environmental Conservation. The projects are considered minor capital activities therefore will transition under RG&E Minor Capital Program in 2023.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
92	0	0	0	0

RG&E

Fossil HYDRO-General Equipment

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Hydro General Equipment is for the procurement of capital tools used for long-term maintenance of RG&E's hydroelectric facilities, which includes powerhouses, dams, intake houses, substations and Project lands. The tools are necessary to maintain long-term operational reliability of equipment and facilities while improving personnel safety during work activities.

Reasons and Benefits:

RG&E Hydro General Equipment is for procurement of capital tools used for multiple activities within the Hydro business area and in support of long-term maintenance activities. Procurement of tools uses is considered minor capital cost therefore will transition under RG&E Minor Capital Program in 2023.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
17	0	0	0	0

RG&E

Station 5 Headgates/Dam

Line of Business: Electric
Category: Hydro-Generation

Scope:

RG&E Station 5 Hydroelectric Project (FERC Project No. P-2583) is located on the Genesee River in the City of Rochester, New York. The hydroelectric generating facility is comprised of three turbine-generating units with a total plant capacity of 46.0 MW and a Headgate structure at Middle Falls to impound water used for generation of renewable energy. The plant is a Run-of-River operation, which means that a consistent pond level is maintained, while utilizing the natural flow of the river to generate hydroelectric energy.

RG&E Station 5 Headgates / Dam Project involves upgrade to crest gate 4A and 4B , gate hinges and hydraulic operating cylinders used to impound river water that is used in the generation of electric energy.

In January 2018, crest gate 4A and 4B hinges failed during operation as a result of extremely cold temperatures in the region. As a result of the hinge failures, Gate 4A hydraulic operating cylinders failed resulting in having to lower the impoundment, enact the Emergency Action Plan and cease generation of electricity at Station 5. As a result of the Gate 4A and 4B, RG&E initiated an insurance claim for the damage that was incurred. RG&E plans to receive final insurance reimbursement in 2023.

Since 2018, RG&E has been diligently working to redesign the gate hinge design and anchor system, upgrade gate 4A and 4B design to current standards and ordered new operating cylinders (two per gate) to replace the cylinders that failed and were damaged. Presently, three of five gates are operational, which only allows for passing river flows produced from a 100-year flood event.

Station 5 Headgates / Dam Project involves the following activities:

- Installation of cofferdams to isolate Gate 4A and Gate 4B and allow restoration efforts to progress (complete)
- Design and upgrade Gate 4A and 4B hinges and hinge anchor system (in-process)
- Redesign and fabrication of crest gate 4A and 4B (in-process)
- Design and installation of glycol heating system to reduce ice formation in areas around gate hinges (complete)

NYSEG and RG&E 5-Year Capital Investment Plan

- Equipment, material and personnel to perform and execute scope of work
- Removal of damaged crest gates and hydraulic operating cylinders
- Installation of glycol system, new fabricated gates and new hydraulic operating cylinders
- Commissioning of gates and operating systems after installation, prior to and after removal of cofferdam

Reasons and Benefits:

Upon completion of RG&E Station 5 Headgates / Dam (Gate 4A and 4B) Project, full capacity of the dam will be restored. Restoring full capacity of the dam is necessary to maintain public safety and reduce potential for upstream flooding, which is a requirement of RG&E's FERC operating license.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,864	(3,733)	0	0	0

Gas Asset Condition

NYSEG

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NYSEG

Distribution Main Replacement

Line of Business: Gas
Category: Asset Condition

Scope:

This program replaces gas mains as required due to several factors including, but not limited to, poor conditions, conflicts with existing or proposed structures and utilities, other miscellaneous field conditions discovered as part of normal operations or other construction and inspection activities.

Reasons and Benefits:

This is a program to replace gas mains as required due to several factors including, but not limited to, poor asset conditions, conflicts with existing or proposed structures, and other miscellaneous field conditions discovered as part of normal operations or other construction and inspection activities. These main replacements improve operational safety and reliability for the gas distribution system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,736	4,299	4,753	4,613	4,811

NYSEG

Regulator Modernization and Automation Program

Line of Business: Gas
Category: Asset Condition, Reliability

Scope:

This program includes the improvements to regulator and gate stations within the NYSEG gas system. There are several types of typical upgrades, including the removal of: regulators; filters; chart recorders; valves; inlet and outlet piping; and enclosures. The noted equipment is replaced with standardized equipment, piping and associated fittings and includes corrosion protection for both equipment and piping. This program also includes the installation of remote terminal unit's (RTU), other automation improvements and replacement of obsolete equipment for which there are no repair parts available.

Reasons and Benefits:

These improvements enhance system reliability associated with corroded piping, fittings and end-of-life equipment. Additional benefits of this program include: reduction of potential outages due to equipment failures, improvement of equipment standardization and safety. This will also support annual inspections required by 16NYSCRR Part 255 by correcting deficiencies and modernizing to current standards..

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,086	4,265	5,064	5,128	5,127

NYSEG

Vienna Road Regulator Station

Line of Business: Gas
Category: Asset Condition

Scope:

Vienna Road Regulator Station is critical for NYSEG Gas Control to balance daily nominations between National Fuel and DETI. The station has been in operation for over 60 years, with much of the equipment at or beyond its service life. The overpressure protection relief valves and regulators are obsolete and replacement parts are no longer available. The existing heater is experiencing issues multiple times in the coldest points during the heating season, requiring manual restart of the equipment. The flow meter that measures the gas coming from the Arcadia Gate station is located in a vault below grade and prone to flooding which in turn leads to intermittent signal loss. This station serves the majority of gas into the northern part of the NYSEG Geneva franchise and is a critical component of ensuring reliable service to approximately 27,000 customers.

Reasons and Benefits:

This project will upgrade equipment, modernize facilities, increase operational efficiencies, eliminate potential environmental concerns as the primary stations feeding the northern portion of the NYSEG Geneva franchise. These improvements will provide a safe and reliable natural gas supply to existing customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	10,286

NYSEG

Hornby Regulator Station

Line of Business: Gas
Category: Asset Condition

Scope:

The project includes the installation of a new Gate Station near the existing station by acquiring property in the general area. Install new pressure control equipment, over-pressure protection device, piping, inlet and outlet valves, SCADA equipment, odorization, building upgrades, site and security improvements. The project also includes the installation of outlet piping from the stations to the Hornby medium pressure system.

Reasons and Benefits:

This is a system improvement and reliability project. There are a couple reasons to replace the existing gate station. The major station components and equipment are deteriorated and have reached end of useful life. The station will be designed to operate at a higher medium pressure (60 psig) to allow for the future connection to the Post Creek and Chambers pressure system(s). This will increase system reliability by reducing single-feed systems. Improvements, main replacements and system upgrades to the Hornby distribution system will be completed under a separate project.

This project will facilitate more efficient distribution through the medium pressure system, improve reliability and provide adequate endpoint pressures. It will also facilitate the connection of the Post Creek system to the Hornby system, allowing for the retirement of the Post Creek gate station and a reduction in operation and maintenance costs associated with it.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	5,128	0	0	0

NYSEG

Chambers Road Regulator Station

Line of Business: Gas
Category: Asset Condition

Scope:

This project includes the installation of a new Gate Station near the existing station by acquiring property in the general area, installation of new pressure control equipment, over-pressure protection device, piping, inlet and outlet valves, SCADA equipment, odorization, building upgrades, site and security improvements. The station will feed into the existing Chambers medium pressure system.

Reasons and Benefits:

The station and downstream pressure system was contaminated with diesel fuel from the supplier. The gate station and components are deteriorated, at end of life and in need of replacement. The existing main within Chambers has been replaced under a separate project with an increased MAOP from 23 psig to 60 psig. The new gate will be designed for 60 psig MAOP outlet. Operating at the higher medium pressure will improve the performance of downstream systems.

This project will facilitate more efficient distribution through the medium pressure system, improve reliability and provide adequate endpoint pressures. It will also facilitate the connection of the Post Creek system to the Hornby system, allowing for the retirement of the Post Creek gate station and a reduction in operation and maintenance costs associated with it.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,713	0	0	0	0

NYSEG

Gas Operations Departmental

Line of Business: Gas
Category: Asset Condition

Scope:

The Gas Operations Departmental expenditures are related to the purchase of tools and equipment needed and used by gas field employees daily or by special need to inspect, operate, maintain, repair or construct the gas distribution system. Equipment purchases are based on business needs including safety, systematic replacement (end of life or damage), geographic location of equipment and availability in emergency situations or work load, new technology or regulatory requirements, increased workload or scope of responsibility.

Reasons and Benefits:

This program allows the Company to meet safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives. Reasons for replacement are included/ but not limited to; end of life, obsolescence, new technologies, regulatory requirements and broken/damaged tool or equipment.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
809	873	899	899	927

Gas Asset Condition

RG&E

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RG&E

Regulator Modernization and Automation Program

Line of Business: Gas
Category: Asset Condition, Reliability

Scope:

This program includes the improvements to regulator and gate stations within the RG&E gas system. There are several types of typical upgrades, including the removal of: regulators; filters; chart recorders; valves; inlet and outlet piping; and enclosures. The noted equipment is replaced with standardized equipment, piping and associated fittings and includes corrosion protection for both equipment and piping. This program also includes the installation of remote terminal unit's (RTU), other automation improvements and replacement of obsolete equipment for which there are no repair parts available.

Reasons and Benefits:

These improvements enhance system reliability associated with corroded piping, fittings and end-of-life equipment. Additional benefits of this program include: reduction of potential outages due to equipment failures, improvement of equipment standardization and safety. This will also support annual inspections required by 16NYSCRR Part 255 by correcting deficiencies and modernizing to current standards.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,717	5,009	6,849	7,305	7,546

RG&E

Caledonia Station Rebuild

Line of Business: Gas
Category: Asset Condition

Scope:

This project will rebuild the Caledonia Gate Station. Anticipated work will involve a new building, equipment, valves, and associated pipe and fittings for flow and pressure control functions, odorization, and RTU monitoring. Work will also include electrical upgrades: a back-up generator, and exterior lighting on the property. Site and security work will also involve a new driveway extension and updated fencing and gates to meet current RG&E security requirements.

Reasons and Benefits:

The Caledonia Gate Station is the primary gas supply source into the RG&E system, and supplies gas to the western and eastern portion of the franchise. The RG&E franchise requires upgrades to this gate station for safe, continuous and efficient operation and to address aging facilities and equipment. The upgrades and replacements associated with this project are necessary to avoid potentially significant future maintenance and to prepare for the future 330 psig loop configuration of existing CM pipelines.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,008	18,697	0	0

RG&E

CM-1 Pipeline Section 4 Chili GS to Ballantyne Road

Line of Business: Gas
Category: Asset Condition

Scope:

This project will replace existing 22 1/2-inch gas main parallel with CM-5 pipeline (Chili Gate Station to Ballantyne Road) with 23,400 linear feet of 16-inch WRST, to be built with a 124 psig maximum allowable operating pressure (MAOP).

Reasons and Benefits:

This project addresses asset condition by replacing transmission pipe installed in the 1950s that has leak potential as identified by RG&E’s IMP. The new pipeline will be designed to operate at less than 20% SMYS (Specified Minimum Yield Strength). This project is part of the long-term plan to maintain gas supply to the Rochester area and improve transmission system and distribution system reliability. This pipeline replacement will also be designed as high-pressure distribution and operate at 120-psig MAOP. This project will be tied in to the MF120 Western Monroe pressure system at Ballantyne Road.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	18,025

RG&E

Mendon Gate Station

Line of Business: Gas
Category: Asset Condition

Scope:

This project will upgrade existing equipment and update facilities, including: replacement of heaters; heater building HVAC and monitoring equipment upgrades; Regulation building HVAC and monitoring equipment upgrades; replacement of odorant tank and odorant injection lines; replacement of odorizer building; RTU building upgrades; generator replacement; upgrades to site security; additional Gas Control/ECC remote controls.

Reasons and Benefits:

The Mendon Gate Station 5 was installed and activated in 1995. This station feeds the CM2, CM2BCM3, and CM3 system operating at a MAOP of 250 PSIG. Mendon Station is fed from the Empire Pipeline (National Fuel) operating at 1440 PSIG MAOP and has a minimum inlet pressure of 570 PSIG. Mendon station is a major feed to the eastern portion of the RGE Rochester franchise along with the recent rebuild and activation of RS 424 Middle Rd Station (DTI). The Tyre Gate Station (DTI) provides minor support during winter peak loads.

Mendon Station has operated over 27 years and the existing equipment and property is in need of replacement/upgrades or will require significant future maintenance.

These Mendon Gate Station improvements will help to continue to provide a safe and reliable natural gas supply to approximately 150,000 existing customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	2,200	11,511	0

RG&E

Distribution Main Replacement

Line of Business: Gas
Category: Asset Condition

Scope:

This program replaces gas mains as required due to several factors including, but not limited to, poor conditions, conflicts with existing or proposed structures and utilities, other miscellaneous field conditions discovered as part of normal operations or other construction and inspection activities.

Reasons and Benefits:

This is a program to replace gas mains as required due to several factors including, but not limited to, poor asset conditions, conflicts with existing or proposed structures, and other miscellaneous field conditions discovered as part of normal operations or other construction and inspection activities. These main replacements improve operational safety and reliability for the gas distribution system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,175	2,044	2,016	1,972	2,060

RG&E

Mt Read SF115 psi, Replace Gas Mains

Line of Business: Gas
Category: Asset Condition

Scope:

This project will replace approximately 5,000 linear feet of 20-inch 1950's steel pipe along the commercial/industrial corridor of Mount Read Boulevard and Driving Park.

Reasons and Benefits:

The Mount Read Blvd corridor in the City of Rochester and Town of Greece has experienced variable pressures in recent years on the SF115 Mount Read Blvd, MF60 Northwest and MF14 Greece systems. This project is necessary to distribute pressure efficiently on the SF115 system, and adequately supply the district regulator stations that feed the MF60 Northwest and MF14 Greece systems.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
122	0	543	2,005	0

RG&E

Gas Operations Departmental

Line of Business: Gas
Category: Asset Condition

Scope:

The Gas Operations Departmental expenditures are related to the purchase of tools and equipment needed and used by gas field employees daily or by special need to inspect, operate, maintain, repair or construct the gas distribution system. Equipment purchases are based on business need including safety, systematic replacement (end of life or damage), geographic location of equipment and availability in emergency situations or work load, new technology or regulatory requirements, increased workload or scope of responsibility.

Reasons and Benefits:

This program allows the Company to meet safety and OSHA requirements through replacement of tools and equipment at the end of their useful lives. Reasons for replacement are included/ but not limited to; end of life, obsolescence, new technologies, regulatory requirements and broken/damaged tool or equipment.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
301	290	299	308	317

RG&E

CM-1 (CM-6) Transmission Gas Main Replacement

Line of Business: Gas
Category: Asset Condition

Scope:

This project will replace approximately 44,000 feet of the existing CM-1 20-inch steel gas transmission main from Caledonia Gate Station to Empire West Chili Gate Station. The new pipe will be 24-inch steel gas pipe, which is to operate at a maximum allowable operating pressure of 330 psig. This is a key component to creating a new dual supply 330 psig operating system from the Caledonia Gate Station to the New Empire West Chili Gate Station.

Reasons and Benefits:

The project addresses asset condition by replacing transmission pipe installed in the 1950s, which has leak potential as identified by RG&E's IMP. It is part of the plan to improve system reliability. The new pipeline will be designed to operate at less than 20% SMYS (Specified Minimum Yield Strength), which reduces the pipeline classification and regulatory requirements, increases safety and allows for inspection and cleaning by a typical pipeline inspection gauges. The increase in gas main size to 24-inch steel will improve the efficiency by which gas can flow from the Caledonia Gate Station north to the Buffalo Road regulator stations, a central hub for gas distribution. Additionally, the 24-inch steel main will increase flexibility when managing peak gas flow conditions in winter months, and while handling repair and emergency procedures. The new pipeline will also be a key component to creating a new dual supply 330 psig operating system from the Caledonia Gate Station to the New Empire West Chili Gate Station, which will increase the safety and reliability of the RG&E Rochester Gas Transmission System.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
203	0	0	0	0

Gas Mandatory

NYSEG

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NYSEG

New Services

Line of Business: Gas
Category: Mandatory

Scope:

This program installs new gas services to new customers (residential or business customers) in accordance with tariff. This program extends new gas service lines to new customers to comply with our obligation to serve.

Reasons and Benefits:

This program is necessary to connect businesses and residence that request gas service in accordance with tariffs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,904	4,264	4,514	4,796	4,974

NYSEG

Distribution Mains - New Business

Line of Business: Gas
Category: Mandatory

Scope:

This program installs new gas mains to customers in accordance with tariff. This program is required to extend new gas mains to new customers to comply with our obligation to provide service.

Reasons and Benefits:

This program is necessary to remain in compliance with tariffs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,167	4,320	4,683	5,095	5,313

NYSEG

Non-Leak Prone Service Replacement Program

Line of Business: Gas
Category: Mandatory

Scope:

This program replaces or ties-over any service associated with a gas main replacement project that does not qualify as a leak prone service in accordance with DIMP.

Reasons and Benefits:

The replacement of non-leak prone is completed in accordance with the Company's Distribution Integrity Management Program. Replacement of facilities is a recognized practice to effectively mitigate risk and address threats to pipeline systems. Infrastructure replacement affords relocation of Company assets to locations that can minimize future O&M expenses and ensure safe, reliable service to customers in accordance with regulatory requirements. Replacement of non-state of the art facilities is an industry recognized means to reduce methane emissions from leakage and serves to support Federal methane emission reduction initiatives and NY CLCPA requirements.

The work replaces gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public rights-of-way, leak prone gas main replacements per rate cases and tariff or code requirements, actively leaking services etc.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,333	3,846	4,253	4,127	4,304

NYSEG

Gas Meters

Line of Business: Gas
Category: Mandatory

Scope:

This program is for the purchase and installation of gas meters to replace existing, aged meters as they are removed from service as well as for new installations.

Reasons and Benefits:

Gas meters are exchanged for annual PSC required programs including statistical sampling and remediation programs and for other various reasons including relocation, load increases, meter damage, special testing and replacing non-tc meters. The programs help to ensure accurate recording of customers usage and results in accurate customer billing.

This program is applicable to all communities and is implemented for all customers regardless of location.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,131	1,689	2,027	2,702	2,972

NYSEG

Government Jobs

Line of Business: Gas
Category: Mandatory

Scope:

This program is required by regulation to replace gas mains in conflict with municipal street and highway reconstruction projects in accordance with terms and conditions to occupy public right-of-way and where the costs of project will exceed \$500K.

Reasons and Benefits:

This is a program for work mandated by government entities and is necessary to comply with the terms and conditions to occupy public right-of-way.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,713	1,750	1,887	2,044	2,129

NYSEG

Large Government Jobs

Line of Business: Gas
Category: Mandatory

Scope:

This program replaces gas mains in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way.

Reasons and Benefits:

This is a program for work mandated by government entities and is necessary to comply with the terms and conditions to occupy public right-of-way.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	2,337	2,560	2,674

NYSEG

Regulators

Line of Business: Gas
Category: Mandatory

Scope:

This program is for the purchase and installation of gas regulators for new installations and some replacements. This equipment is used for both residential and industrial installations.

Reasons and Benefits:

A gas regulator is necessary equipment that is used to maintain the pressure on the system and at the customers' location so that the gas services operates within specific ranges so their appliances and equipment operate correctly and safely.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
330	350	400	425	450

Gas Mandatory

RG&E

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RG&E

Distribution Mains New Business

Line of Business: Gas
Category: Mandatory

Scope:

This program installs new gas mains to customers in accordance with tariff. This program is required to extend new gas mains to new customers to comply with our obligation to provide service.

Reasons and Benefits:

This program is necessary to remain in compliance with tariffs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,402	2,710	2,964	3,254	3,399

RG&E

Gas Meters

Line of Business: Gas
Category: Mandatory

Scope:

This program is for the purchase and installation of gas meters to replace existing, aged meters as they are removed from service as well as for new installations.

Reasons and Benefits:

Gas meters are exchanged for annual PSC required programs including statistical sampling and remediation programs and for other various reasons including relocation, load increases, meter damage, special testing and replacing non-tc meters. The programs help to ensure accurate recording of customers usage and results in accurate customer billing.

This program is applicable to all communities and is implemented for all customers regardless of location.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,577	1,921	2,172	3,341	3,508

RG&E

New Services

Line of Business: Gas
Category: Mandatory

Scope:

This program installs new gas services to new customers (residential or business customers) in accordance with tariff. This program extends new gas service lines to new customers to comply with our obligation to serve.

Reasons and Benefits:

This program is necessary to connect businesses and residence that request gas service in accordance with tariffs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,034	2,313	2,529	2,777	2,901

RG&E

Large Government Jobs

Line of Business: Gas
Category: Mandatory

Scope:

This program replaces gas mains in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way.

Reasons and Benefits:

This is a program for work mandated by government entities and is necessary to comply with the terms and conditions to occupy public right-of-way.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	3,991	3,911	4,030

RG&E

Non-Leak Prone Service Replacement Program

Line of Business: Gas
Category: Mandatory

Scope:

This program replaces or ties-over any service associated with a gas main replacement project that does not qualify as a leak prone service in accordance with DIMP.

Reasons and Benefits:

The replacement of non-leak prone is completed in accordance with the Company's Distribution Integrity Management Program. Replacement of facilities is a recognized practice to effectively mitigate risk and address threats to pipeline systems. Infrastructure replacement affords relocation of Company assets to locations that can minimize future O&M expenses and ensure safe, reliable service to customers in accordance with regulatory requirements. Replacement of non-state of the art facilities is an industry recognized means to reduce methane emissions from leakage and serves to support Federal methane emission reduction initiatives and NY CLCPA requirements.

The work replaces gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public rights-of-way, leak prone gas main replacements per rate cases and tariff or code requirements, actively leaking services etc..

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,580	2,086	2,057	2,012	2,102

RG&E

Incremental Customer Growth

Line of Business: Gas
Category: Mandatory

Scope:

Infrastructure related to serving new, emergent customers beyond typical tariff driven residential customer work. This could include any Pilot programs required by PSC order and new large commercial or industrial customers in accordance with tariff, after consideration of Non-Pipe Alternatives.

Reasons and Benefits:

To be in accordance with tariffs and PSC Orders.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	2,934	2,596	2,675

RG&E

Government Jobs

Line of Business: Gas
Category: Mandatory

Scope:

This program is required by regulation to replace gas mains in conflict with municipal street and highway reconstruction projects in accordance with terms and conditions to occupy public right-of-way and where the costs of project will exceed \$500K.

Reasons and Benefits:

This is a program for work mandated by government entities and is necessary to comply with the terms and conditions to occupy public right-of-way.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,264	1,349	1,470	1,607	1,678

RG&E

Regulators

Line of Business: Gas
Category: Mandatory

Scope:

This program is for the purchase and installation of gas regulators for new installations and some replacements. This equipment is used for both residential and industrial installations.

Reasons and Benefits:

A gas regulator is necessary equipment that is used to maintain the pressure on the system and at the customers' location so that the gas services operates within specific ranges, so their appliances and equipment operate correctly and safely.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
90	130	140	150	160

Gas Modernization

NYSEG

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NYSEG

AMI Project

Line of Business: Gas
Category: Modernization

Scope:

NY AMI will install smart meters and associated equipment in NYSEG& OPCO territory.

Reasons and Benefits:

NY AMI is an essential foundational system in realizing REV goals to empower customers through new tools and information to effectively manage and reduce usage, establish and animate new markets to promote the implementation of DER's, and minimize environmental impacts of power generation and energy consumption. NYSEG will gain early outage detection to assist with restoration efforts as well as streamline internal business processes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
14,696	14,735	14,735	9,229	1,632

NYSEG

Gas RTU/Telemetry Upgrade

Line of Business: Gas
Category: Modernization

Scope:

This project replaces the remaining Fisher ROC 300s (approximately 130-140 units) not replaced with the Zeck 9000 odorizers (combined replacement program). Currently, NYSEG utilizes the Fisher ROC 300 series Remote Terminal Unit (RTU) at all remote operated regulator stations and terminal pressure monitoring locations. The Fisher ROC allows Gas Control to remotely operate and monitor regulator stations and terminal endpoint pressures throughout the NYSEG franchise.

The current equipment being used is obsolete. Replacement parts must be custom manufactured, which was costly and resulted in long lead times. As of the end of 2019, the manufacturer no longer custom manufactures replacement parts. This project will replace this obsolete equipment with current technology. Planned work is to be done in such a way to minimize impact to field operations and installation costs.

These upgrades are planned at multiple site locations through all NYSEG divisions. Construction will consist of facility upgrades, electrical service modifications to support new devices, SCADA modifications, communications, site development, and building upgrades.

Reasons and Benefits:

The Fisher ROC 300 series is obsolete. This project proposes to replace this equipment with the current Fisher FloBoss FB107 technology. Currently NYSEG utilizes the ROC link for communications with the Fisher ROC 300 series and is compatible with the new FloBoss FB107 technology which will minimize impact to field operations. Installation of the FloBoss FB107 comes with a backplane that allows it to fit exactly where the existing Fisher ROC 300 series is mounted which will minimize installation costs. This program covers the 130-140 units not included in the combined RTU and Zeck 9000 odorizer replacement project.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,477	2,661	0	0	0



NYSEG

Click-Gas Inspections and Scheduling

Line of Business: Gas
Category: Modernization

Scope:

Implement a fully integrated Field Workforce Mobility Solution at NYSEG for the Field workforce in Gas Operations. This solution will provide support for all Gas field processes, provide the field technician with work order details and allow completion of the administration work for the work order directly on the device in the field. It will also provide support for all the field survey/form captured and integrated to the back-end system of electronic record (SAP). As part of this project we anticipate transitioning to a ruggedized tablet in the field for the field users.

Reasons and Benefits:

Providing an integrated solution will reduce the administrative burden in completing field work orders electronically rather than manually.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,160	0	0	0	0

NYSEG

Common Gas SCADA Platform

Line of Business: Gas
Category: Modernization

Scope:

Upgrade/migrate all Avangrid Gas Companies to a common software platform (OASyS 2018 SP3) to standardize and meet regulatory ECC Control Room Management (CRM) and Security requirements; Including PI Historian Go-Live

Reasons and Benefits:

New common system provides consistent platform for all OpCos; allows for collaboration between OpCos and use of shared resources between OpCos; updates Displays to be Abnormal Situation Management (ASM) compliant for regulatory requirements. PI Historian provides Gas operations & control company-wide analytics and reporting capabilities

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
180	0	0	0	0

Gas Modernization

RG&E

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RG&E

AMI Project G

Line of Business: Gas
Category: Modernization

Scope:

NY AMI will install smart meters and associated equipment in RG&E's territory.

Reasons and Benefits:

NY AMI is an essential foundational system in realizing REV goals to empower customers through new tools and information to effectively manage and reduce usage, establish and animate new markets to promote the implementation of DER's, and minimize environmental impacts of power generation and energy consumption. RG&E will gain early outage detection to assist with restoration efforts as well as streamline internal business processes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
13,970	13,872	13,872	7,445	1,851

RG&E

Click-Gas Inspections and Scheduling

Line of Business: Gas
Category: Modernization

Scope:

Implement a fully integrated Field Workforce Mobility Solution at RG&E for the Field workforce in Gas Operations. This solution will provide support for all Gas field processes, provide the field technician with work order details and allow completion of the administration work for the work order directly on the device in the field. It will also provide support for all the field survey/form captured and integrated to the back-end system of electronic record (SAP). As part of this project we anticipate transitioning to a ruggedized tablet in the field for the field users.

Reasons and Benefits:

Providing an integrated solution will reduce the administrative burden in completing field work orders

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
579	0	0	0	0

RG&E

Common Gas SCADA Platform

Line of Business: Gas
Category: Modernization

Scope:

Upgrade/migrate all Avangrid Gas Companies to a common software platform (OASyS 2018 SP3) to standardize and meet regulatory ECC Control Room Management (CRM) and Security requirements; Including PI Historian Go-Live

Reasons and Benefits:

New common system provides consistent platform for all OpCos; allows for collaboration between OpCos and use of shared resources between OpCos; updates Displays to be Abnormal Situation Management (ASM) compliant for regulatory requirements. PI Historian provides Gas operations & control company-wide analytics and reporting capabilities

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
210	0	0	0	0

Gas Reliability

NYSEG

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NYSEG

Leak Prone Main Replacement Program

Line of Business: Gas
Category: Reliability

Scope:

This compliance program replaces gas mains identified as leak prone in accordance with the Company’s Leak Prone Main Criteria and Distribution Integrity Management Program (DIMP). The Leak Prone Main Criteria includes mains prioritized to replace due to conditions such as leaks, manufacturing and construction defects, type of materials (I.E. bare steel, wrought iron, etc). This work includes, but is not limited to, replacing gas mains and services that meet the leak prone criteria that are in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way; leak prone gas main replacements; tariff or code requirements; and actively leaking mains.

Reasons and Benefits:

The leak prone main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management Plan (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer and more reliable. The replacement of leak prone main is completed in accordance with the Company’s Distribution Integrity Management Program. Replacement of facilities is a recognized practice to effectively mitigate risk and address threats to pipeline systems. Infrastructure replacement affords relocation of Company assets to locations that can minimize future O&M expenses and ensure safe, reliable service to customers in accordance with regulatory requirements. Replacement of leak prone main is an industry recognized means to reduce methane emissions from leakage and serves to support Federal methane emission reduction initiatives and NY CLCPA requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
28,331	28,659	31,687	30,751	32,072



NYSEG

Leak Prone Service Replacement Program

Line of Business: Gas
Category: Reliability

Scope:

This program replaces services that are classified as leak prone in accordance with the Company’s Leak Prone Main Criteria and Distribution Integrity Management Program (DIMP). The Leak Prone Service Criteria includes services to replace based upon conditions such as leaks, manufacturing and construction defects, type of materials (I.E. bare steel, wrought iron, etc). This work includes, but is not limited to, replacing gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way, leak prone gas main replacements, tariff or code requirements and actively leaking services.

Reasons and Benefits:

Leak prone gas services are required to be replaced by various regulations to keep customers and their properties safe from potential gas leaks. The replacement of leak prone services is completed in accordance with the Company’s Distribution Integrity Management Program. Replacement of facilities is a recognized practice to effectively mitigate risk and address threats to pipeline systems. Infrastructure replacement affords relocation of Company assets to locations that can minimize future O&M expenses and ensure safe, reliable service to customers in accordance with regulatory requirements. Replacement of vintage facilities is an industry recognized means to reduce methane emissions from leakage and serves to support Federal methane emission reduction initiatives and NY CLCPA requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,317	6,878	7,605	7,380	7,697

NYSEG

Boswell Hill 124 Psig Bare Steel Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The Boswell Hill 124-psig MAOP Bare Steel leak prone main project includes the replacement of approximately 6,179 linear feet of leak prone main (c. 1947) with new 12-inch pipe. The existing gas main is unprotected steel and undersized for system reliability and pressures. This project will replace sections over a three year period with the tie-in and abandonment of the unprotected steel to take place in the third year.

The replacement is to be executed in four sections:

- Section A From Leon Dr 3,021 linear feet south to (near) Day Hollow Rd
- Section B Nanticoke Creek 817 linear feet directional drill bore south from Meadowbrook St to June St. Includes bore under the creek and US Army Corps of Engineers flood control dike
- Section C Susquehanna River 1,758 linear feet directional drill bore from E. Valley St south to the Southern Tier Expressway
- Section D NYS Rt 434 Vestal Parkway 583 linear feet directional drill bore south from the westbound side to the eastbound side.

The retirement and replacement work is critical to maintaining reliability to the existing customers in the Village of Endicott and the Town of Vestal.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	232	3,214	3,450	0



NYSEG

Hebron Station/Line J Retirement

Line of Business: Gas
Category: Reliability

Scope:

This project will retire the existing Hebron Station and rebuild it at a new location, retire a portion of the aging 250 psig and 85 psig feeder mains and install a new 85 psig main to tie the proposed Hebron Station to the existing 85 psig main feeding Pepsi regulation station (85 psig/59 psig).

Reasons and Benefits:

This project will address the end-of-life infrastructure and maintain safe and reliable service throughout the Olean gas system. Approximately 7,500 existing customers will benefit from this project. Replacement of the Hebron station and retiring leak prone main will provide a safe and reliable natural gas supply to existing customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	6,336	0

NYSEG

Pendleton - SW System and Regulator Station Upgrade

Line of Business: Gas
Category: Reliability

Scope:

This project will install a new District Regulator Station and approximately 13,000 linear feet of 8-inch PE main at 51-psig MAOP.

Reasons and Benefits:

The existing 51-psig pressure system has a greater than 50% drop in MAOP at the endpoints on Design Day conditions. The proposed district regulator station and main extension will improve system pressures and reliability for the customers on the 51-psig pressure system. Endpoint pressures will increase from approximately 24 psig (47% MAOP) to 40 psig (80%) at Design Day conditions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	5,070

NYSEG

West Genesee Street Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The West Genesee Street leak prone main project includes the installation of approximately 40,127 linear feet of 8-inch HDPE main to replace approximately 67,500 linear feet of 10-inch steel main (c. 1940-1953). The replacement will occur in phases over multiple years. The project extends from the river crossing downstream of the Auburn first stage station southwest to Cayuga stations on Wheat Street and Cemetery Lane. This replacement is critical to maintaining reliability to existing customers in Cayuga, Union Springs and the Auburn industrial park.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,506	2,526	0	0	0

NYSEG

Broad St Norwich Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The Broad St. Norwich leak prone main project includes the retirement and/or replacement of approximately 7,618 linear feet of low-pressure leak prone main (c. 1955-1961) with new 8-inch, 6-inch and 4-inch main. The scope of work extends from Cortland St. south to Eaton Ave., encompassing mains on both the east and west sides of Broad St. There are substantial side street intersection footages at: Mechanic St., E. Park Pl., W. Park Pl., E. Main St., Lackawanna Ave., American Ave. and Colonial Pl. The retirement and replacement work is critical to maintaining reliability to the existing customers in the city of Norwich. All portions of main replacement are related to a planned municipal paving project.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,478	2,351	0	0	0

NYSEG

Winney Hill Regulator Station

Line of Business: Gas
Category: Reliability

Scope:

This project will install new upstream, in-line heater and filtration, remove existing intermediary pressure cut, rebuild both the 45-psig and 60-psig district regulator stations, install site and security improvements in accordance with Company Standards.

Reasons and Benefits:

This project improves reliability for the two medium pressure systems, 45-psig and 60-psig, that are the sole feeds of gas into Norwich. The project replaces obsolete over-pressure protection devices and modernizes the pressure control equipment. An inline heater will be installed to address freeze-off concerns and increase station reliability. Currently, due to the pressure cut from 300 psig to 45/60 psig, ice buildup on the regulators, piping and ground occurs. This poses a safety risk to field personnel servicing the station as well as increased operational risk to the station equipment.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	4,308	0	0

NYSEG

Canandaigua Feeder Main Reinforcement Project

Line of Business: Gas
Category: Reliability

Scope:

This project will install approximately 8,700 linear feet of 8-inch high density polyethylene (HDPE) gas main, from the intersection of Rte. 21 and Schutt Road to the existing pipeline crossing at North Road (approximately 1,200 linear feet southwest of Andrews Road).

Reasons and Benefits:

The project will alleviate the flow and resultant pressure drop through the existing 124-psig feeder main from the Hopewell Gate Station to Canandaigua. The endpoint pressure (at the inlet to the Brickyard Road district regulator station) will increase from approximately 73-psig (59% MAOP) to 94-psig (76% MAOP) at Design Day conditions. The project will reinforce and improve system reliability.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	2,889	0	0

NYSEG

Gardner Regulator Station

Line of Business: Gas
Category: Reliability

Scope:

This project will rebuild the existing Old Gardner Rd Station on the existing property. The project entails the installation of new pressure control equipment, over-pressure protection device, piping, inlet and outlet valves, SCADA equipment, odorization, building upgrades, site and security improvements.

Reasons and Benefits:

This project improves reliability of the NYSEG Elmira Division as well as addresses the asset condition of the existing Old Gardner Rd Station. This gate station is one of the primary feeds to the NYSEG Elmira Division supplied by Eastern Gas Transmission & Storage (EGTS). Old Gardner Rd provides approximately 50% of the gas supply during the winter peak conditions and slightly higher in the summer months. The regulation and control are deteriorated and experiencing increasing equipment maintenance contributing to reduced reliability of this station.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	2,168	0	0	0

NYSEG

Winney Hill Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The Winney Hill leak prone main project includes the replacement of approximately 6,550 linear feet of medium-pressure leak prone main (c. 1953-1954) with new 12-inch main. The pipeline extends from the Winney Hill Regulator Station, east and south, to the city of Oneonta and is critical to maintaining reliability to the existing customers in the Town and City of Oneonta. The portion of main replacement along West Main Street is related to a planned municipal paving-related project.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	1,843	0	0

NYSEG

Limestone Regulator Station

Line of Business: Gas
Category: Reliability

Scope:

The Limestone Regulator Station project includes the installation of a new odorization unit, remote telemetry equipment and additional overpressure protection equipment at the point of delivery where gas enters the NYSEG Limestone gas system.

Reasons and Benefits:

To ensure the natural gas received from the supplier is odorized to NYS code requirements for the safety of downstream customers, Company and contractor personnel, NYSEG will install, operate and maintain odorization equipment at the custody transfer location (i.e. the Limestone Regulator Station). The additional controls and overpressure protection will further enhance the safety to the downstream system and customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,285	0	0	0	0

NYSEG

North Main Cortland Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The North Main St. Cortland leak prone main project includes the replacement and/or retirement of approximately 5,000 linear feet of low-pressure leak prone main (c. 1958-1962) with new 8-inch, 6-inch and 4-inch main. The scope of work extends from Lincoln Ave south, to Port Watson St., encompassing mains on both the east and west sides of N. Main St. There are substantial side street intersection footages at: Lincoln Ave., Court St., W. Court St., Port Watson St. and Central Ave. The retirement and replacement work is critical to maintaining reliability to the existing customers in the city of Cortland. The gas main replacement along N. Main Street is related to a planned municipal paving project.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,198	0	0	0	0

NYSEG

Low Pressure Relief Valve Program

Line of Business: Gas
Category: Reliability

Scope:

This project will add relief valves at low pressure regulator stations that currently only have monitor regulators for over pressure protection (approximately 30 stations). The scope of work varies based on station needs, from the addition of relief valves to the full rebuild of the station. These stations are located in the Elmira, Olean and Binghamton divisions on gas systems previously owned by Columbia Gas..

Reasons and Benefits:

The additional over-pressure protection equipment provides additional safety under an emergency condition that would affect both worker-monitor in series.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
198	215	231	250	261

NYSEG

Critical Valve Installations, Binghamton

Line of Business: Gas
Category: Reliability

Scope:

This project will strategically install gas valves throughout portions of the Binghamton medium-pressure system(s) that were upgraded from low-pressure from previous projects. The valves will be located at locations based on customer counts for sectionalizing the system for emergency response and in accordance with Company Operation & Maintenance (O&M) Procedures.

Reasons and Benefits:

This project will bring the Binghamton gas distribution system into compliance with O&M Section 7.500 in regards to isolation of pre-determined numbers of customers in emergency situations. Due to past pressure upratings from low to medium pressure in areas previously owned by Columbia Gas that were constructed prior to current regulatory requirements (grandfathered) these areas have insufficient valves to section off customers for emergency operations per Section 7.500.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
302	168	180	195	203

NYSEG

Spruce Haven Farm RNG

Line of Business: Gas
Category: Reliability

Scope:

This project will install approximately 17,400 linear feet of 4-inch MDPE main from the intersection of Dunning Ave and Willow Brook Rd southwest to Spruce Haven Farms along White Road in the town of Fleming, NY. Additionally, the project will include the construction of a meter and regulator facility which will include remote SCADA controls, overpressure protection and odorization equipment. The project will allow for the injection of Renewable Natural Gas (RNG), that will be produced at Spruce Haven Farms, into NYSEG’s distribution system.

Reasons and Benefits:

This project will extend the NYSEG natural gas facilities to the Spruce Haven Farm in Fleming, NY to receive locally produced RNG. Completion of this project will enable NYSEG to contribute to meeting long-term decarbonization goals.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
623	0	0	0	0

Gas Reliability

RG&E

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RG&E

Leak Prone Main Replacement Program

Line of Business: Gas
Category: Reliability

Scope:

This compliance program replaces gas mains identified as leak prone in accordance with the Company’s Leak Prone Main Criteria and Distribution Integrity Management Program (DIMP). The Leak Prone Main Criteria includes mains prioritized to replace due to conditions such as leaks, manufacturing and construction defects, type of materials (I.E. bare steel, wrought iron, etc). This work includes, but is not limited to, replacing gas mains and services that meet the leak prone criteria that are in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way; leak prone gas main replacements; tariff or code requirements; and actively leaking mains.

Reasons and Benefits:

The leak prone main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer and more reliable. The replacement of leak prone main is completed in accordance with the Company’s Distribution Integrity Management Program. Replacement of facilities is a recognized practice to effectively mitigate risk and address threats to pipeline systems. Infrastructure replacement affords relocation of Company assets to locations that can minimize future O&M expenses and ensure safe, reliable service to customers in accordance with regulatory requirements. Replacement of leak prone main is an industry recognized means to reduce methane emissions from leakage and serves to support Federal methane emission reduction initiatives and NY CLCPA requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
18,954	20,864	20,573	20,125	21,023



NYSEG and RG&E 5-Year Capital Investment Plan



RG&E

Leak Prone Service Replacement Program

Line of Business: Gas
Category: Reliability

Scope:

This program replaces services that are classified as leak prone in accordance with the Company’s Leak Prone Main Criteria and Distribution Integrity Management Program (DIMP). The Leak Prone Service Criteria includes services to replace based upon conditions such as leaks, manufacturing and construction defects, type of materials (I.E. bare steel, wrought iron, etc). This work includes, but is not limited to, replacing gas services in conflict with street reconstruction projects in accordance with terms and conditions to occupy public right-of-way, leak prone gas main replacements, tariff or code requirements and actively leaking services.

Reasons and Benefits:

Leak prone gas services are required to be replaced by various regulations to keep customers and their properties safe from potential gas leaks. The replacement of leak prone services is completed in accordance with the Company’s Distribution Integrity Management Program. Replacement of facilities is a recognized practice to effectively mitigate risk and address threats to pipeline systems. Infrastructure replacement affords relocation of Company assets to locations that can minimize future O&M expenses and ensure safe, reliable service to customers in accordance with regulatory requirements. Replacement of vintage facilities is an industry recognized means to reduce methane emissions from leakage and serves to support Federal methane emission reduction initiatives and NY CLCPA requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,522	4,089	4,031	3,944	4,120

RG&E

Ridgeway Ave Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The Ridgeway Ave. leak prone main project includes the replacement of approximately 11,500 linear feet of medium-pressure leak prone main (c. 1951-1959) with new 2,4,6,12, and 16-inch pipe. This project extends along Ridgeway Ave. (from Mount Read Blvd., east to Ramona St.), and specifically at intersections with Mount Read Blvd. and Hollywood St. These pipes are essentially for maintaining reliability to existing customers in the City of Rochester. The extent of this project is also associated with a potential highway improvement project.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,776	4,777	0	0	0

RG&E

MF120 Eastern Monroe, State Road, Install Gas Main

Line of Business: Gas
Category: Reliability

Scope:

This project includes the replacement of approximately 22,000 linear feet of 8-inch, 120 psig feeder main (FM-3) with 12-inch wrapped steel main on the MF120 Eastern Monroe System, along State Road from Five Mile Line Road/Plank Road to Salt Road. The existing 8-inch, 120 psig main along the route will be de-rated and tied over to the MF60 psig Northeast System. The existing 4-inch and 6-inch main (MF60 Northeast System) will be cut-dead.

Reasons and Benefits:

On design day, the endpoint pressure (which is the inlet to regulator stations 468-Browncroft and 470-Blossom) is at 61% MAOP. These two regulator stations directly feed, and account for approximately 25% of all the gas that travels through the MF60 Northwest Pressure System. The current 12-inch, 16-inch and 20-inch MF120 Eastern Monroe mains located along Whalen Road, Browncroft Road and Blossom Road are operationally at their capacity. This project will increase the MF120 Eastern Monroe endpoints to approximately 71% MAOP on design day conditions. This will increase reliability and safety on the feeder main and downstream distribution systems. The project will also address asset condition with the cut-dead of approximately 15,730 linear feet of 8-inch WRST leak prone main.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
122	108	4,399	3,453	0

RG&E

Winton Road South Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The Winton Road South leak prone main project includes the replacement of approximately 5,790 linear feet of medium-pressure leak prone main (c. 1945-2006) with new 16-inch pipe. The pipeline extends from Palmerston Road, south to #1150 Winton Road S. This project specifically will maintain reliability and increase operating pressure to existing customers in the town of Brighton.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,028	0	0	0	0

RG&E

CM-1A Regulator Station

Line of Business: Gas
Category: Reliability

Scope:

This project will install a district regulator station to reduce pressure from the CM6 transmission pipeline (330-psig MAOP) to the CM1A transmission pipeline (250-psig MAOP). This station supports the long-range transmission plans to operate a portion of the RG&E transmission system at 330-psig to increase system reliability.

Reasons and Benefits:

This regulator station is one of the final steps to complete the long-range plans of operating a portion, namely CM6, CM2, CM4 and CM2-B-CM1 at 330-psig MAOP. This creates a loop within the transmission system that increases system reliability. This configuration allows RG&E to support higher delivery pressure for the largest customers, as well as provide operational flexibility for RG&E to continue safe service to the existing customer base. This source of 250-psig at the outlet of this new regulator station would decrease the required diameter of anticipated replacement gas mains for the CM1A, when needed, and would result in cost savings for future construction of said gas mains.

The resultant increase in pressure on the CM1A would improve reliability for existing regulators along this pipeline and give the opportunity for larger stations to be installed to maintain safe pressures for downstream pressure systems. There would also be increased capacity available to balance system pressure due to changing customer load distribution.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	5,317	0	0	0

RG&E

Transmission Short Segments, Install Gas Mains

Line of Business: Gas
Category: Reliability

Scope:

This project will replace six (6) short segments of Transmission pipeline for regulatory compliance, risk reduction and increased safety. Each segment is approximately less than 50 linear feet in length.

Reasons and Benefits:

RG&E is requesting funding for replacement of short segments of transmission pipelines that are missing hydrotest records to certify them to their current MAOP. In 2021 PHMSA incorporated new requirements to 49 CFR Part 192 for operators to re-certify MAOP and verify Traceable, Verifiable, Complete (TVC) material records for their transmission pipelines. As part of an initial study required by PHMSA Bulletin 2012-10866 to verify the RG&E Transmission system MAOP, RG&E determined six (6) segments were missing these records. By replacing these short sections, RG&E will meet the new requirements of the PHMSA Mega-Rule, reduce system risk, and improve public safety.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	3,006	0	0	0

RG&E

MF60 Southeast Phase 4 (County Rd 9), Install Gas Main, Rebuild Station 449

Line of Business: Gas
Category: Reliability

Scope:

This project will install approximately 18,200 linear feet of 8-inch Polyethylene (PE) main from Valentown Road to just north of East Main Street (Route 96) along County Road 9. This project will also include the rebuild of Regulator Station 449 to increase system reliability. Crossing the NYS Thruway (I-90) is not required for this phase.

Reasons and Benefits:

This project provides increased pressure and system reliability due to increased growth in the Farmington area. The benefits are a more reliable, hardened system that is resilient to emergency situations without interruptions. Approximately 28,000 existing customers will benefit from this increase in ability to safely serve natural gas and reduction in reliability risk.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	2,557

RG&E

MF60 Southeast Phase 3 (Malone Rd), Install Gas Main

Line of Business: Gas
Category: Reliability

Scope:

This project will install approximately 19,000 linear feet of 6-inch MDPE main along Dryer Road, Malone Road and Boughton Hill Road, from Willis Hill Road to NYS Route. 441.

Reasons and Benefits:

The south easterly portion of the MF60 Southeast System, particularly the Towns of Victor and Farmington, is operating between 50-70% MAOP during peak conditions. The project is part of the long-term plan to increase the MF60 Southeast 60-psig pressure to improve system reliability.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
122	2,193	0	0	0

RG&E

MF60 Southeast Phase 1 (Mendon Gate - Route 64), Install Gas Main

Line of Business: Gas
Category: Reliability

Scope:

This project will install approximately 13,100 linear feet of 12-inch WRST main from the outlet of Regulator Station 428 (at the Mendon Gate Station), along NYS Route 64 to the intersection of NYS Route 251. The project will include the rebuild of Regulator Station 428 to address lowering pressures on the system. The project will also include crossing the NYS Thruway (I-90).

Reasons and Benefits:

The south easterly portion of the MF60 Southeast System, particularly the Towns of Victor and Farmington, is operating between 50-70% MAOP during peak conditions. The project is part of the long-term plan to increase the MF60 Southeast 60-psig pressure to improve system reliability.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
122	1,662	0	0	0

RG&E

Chambers St. Reinforcement Leak Prone Main

Line of Business: Gas
Category: Reliability

Scope:

The Chambers St. Reinforcement project includes the replacement of approximately 13,350 linear feet of medium-pressure leak prone main (c. 1960) with 2,3, and 8-inch pipe along Chambers St. (from Washington St. to South Union St.). This project will maintain reliability and safe operating pressure for existing customers in the towns of Ogden, Gates, and Chili, by redistributing natural gas through the Chambers St. pipe. This project increases system reliability by reinforcing the link between previously constructed regulator stations.

Reasons and Benefits:

The project is being separated from the NYSEG LPM program due to the cost and complexity of the project. The Leak Prone Main replacement program improves distribution safety and reliability by replacing gas mains in poor asset condition and/or at high risk for failure. The gas mains are prioritized for replacement in accordance with Distribution Integrity Management (DIMP) regulations and leak information. The gas main replacements result in a distribution system that is safer, more reliable and decreases emissions.

Currently the MF60 Northwest System is operating between 40-60% MAOP during peak conditions. This project is part of the long-term plan to increase system pressures and reliability.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
40	0	0	0	0

Gas Innovation

NYSEG

Geothermal District Energy System Pilot Project..... 676



NYSEG

Geothermal District Energy System Pilot Project

Line of Business: Gas
Category: Innovation

Scope:

The purpose of this project is to deploy a geothermal district energy system pilot project in NYSEG’s service territory in the Ithaca division. The preliminary proposed loop configuration is a single-pipe ambient temperature loop with 12” main piping. Small pumping buildings are located throughout the district to house circulation pumps above-ground. The proposed thermal sources include vertical boreholes drilled to depths of approximately 125 feet beneath the surface, wastewater heat recovery, and surface water heat recovery from the Cayuga Inlet.

Reasons and Benefits:

This pilot project is a significant opportunity to advance geothermal district energy system technology which will provide customers with a cost-effective clean energy heating and cooling solution and support advancement towards New York’s energy and climate goals including progressing the CLCPA. Per the 2019 Joint Proposal, NYSEG and RG&E retained a vendor with experience in geothermal district energy systems and heat pump heating and cooling solutions to assist in developing a study to examine the feasibility of deploying geothermal district energy systems in its respective service territory, and to develop plans for subsequent pilot projects where feasible. The geothermal district energy feasibility study was completed in Q1 2022 and, as required in the Joint Proposal, NYSEG is proposing this pilot project which will be located in the Ithaca division.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	4,000	12,000	890	890

Common Building and Facilities

NYSEG

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NYSEG

Binghamton Service Center

Line of Business: Common
Category: Buildings and Facilities

Scope:

Develop new service center location for Binghamton Service Center, consolidating from approximately 205k sf into 165k sf of space in one location and sell existing Binghamton Service Center location and Noyes Island Garage & Storage Building.

Reasons and Benefits:

The current Binghamton Service Center buildings, with the Noyes Island garage and storage buildings are aged, with systems at the end of their useful life and functional obsolescence, requiring significant investment to renovate. Renovations would be required to the interior, exterior, buildings systems and equipment.

Both locations were built under building codes of that time and any significant renovations will require bringing it up to current code compliance. The current location is located in a flood zone, which has been prone to flooding in the past and also does not allow for covered/interior parking for our fleet vehicles, which creates delays when responding in the winter months.

A new location creates a modernized networks service center, to meet the needs of our customers and faster response times. The efficiency of the project is created by combining the Binghamton Service Center and the Noyes Island buildings into one new location, strategically located further north for quick customer response times. This would improve CAIDI (duration) responses.

A new location would be built with a developer, reducing costs and leasing the location on a long-term basis. An evaluation of the area was conducted and found this location to be the most viable option in the best available location, to suit the needs of the entire service center networks team.

With a new service center, we will save approximately \$210,000 annually on reduced Opex, along with \$13.5m in Capex required to be invested over the next 15 years. In addition, the sales of the current BSC and Noyes Island are estimated to bring in roughly \$7m in revenue to rate payers.



NYSEG and RG&E 5-Year Capital Investment Plan

Our recommendation is to invest funds into a new location with increased benefits, then into an existing location that is aged, located in a flood zone and less than ideal location.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,500	40,000	9,000	0

NYSEG

Minor Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The Minor capital projects are improvements to upgrade systems in each facility due to: end of life, failures associated with mechanical, electrical, building structures, control systems etc., improve the efficiency, reducing energy consumption, reducing greenhouse emissions etc. or addressing security and safety issues.

These minor projects are in a range of \$1k to \$99k per project.

Reasons and Benefits:

Reasons: Minor project needs are necessary on an annual basis based on end of life assets, failures, employee changes, storms, and a multitude of emergency needs that can occur.

Benefits: These projects create saving in the OPEX maintenance costs for the building, creates reliability, extends end of life usage, avoids disruption to Line and Gas Operations, supports green and sustainable initiatives, and creates and overall safer building.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,000	3,750	3,750	3,750	3,750

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG

Solar Panels

Line of Business: Common
Category: Buildings and Facilities

Scope:

Install solar panel arrays throughout NYSEG locations, focusing on locations with the largest electrical usage, maximization of solar array installations and prioritize with EV charger demand. Current estimates show the ability to generate 5,700,000 Kw a year in locations that meet these criteria.

Reasons and Benefits:

This is to offset electric usage and requirements, align with sustainability goals and with fleet vehicle electrification/EV charger installation for constant power requirements and reliability. Solar panel installs will reduce our electric usage, reduce emissions and help meet our (ESG) Environmental Social and Governance commitments.

SITE #	STATE	CITY	STREET	OPCO	DIVISION	number of 430 W modules	production, yearly, kWh
1	NY	Horseheads	1 Electric Pkwy	NYSEG	Elmira	2065	929,103
2	NY	Kirkwood	18 Link Dr	NYSEG	Binghamton	1864	850,130
3	NY	Ithaca	1387 Dryden Rd	NYSEG	Ithaca	1825	822,280
4	NY	Clifton Park	6 Werner Rd	NYSEG	Mechanicville	1033	477,810
5	NY	Hornell	7760 Industrial Park Rd	NYSEG	Hornell	1132	515,006
6	NY	Brewster	35 Milan Rd	NYSEG	Brewster	647	314,511
7	NY	Chatham	31 Dardess Dr	NYSEG	Mechanicville	703	324,573
8	NY	Lancaster	150 Erie St	NYSEG	Lancaster	1208	551,226
9	NY	Lockport	6544 Lincoln Ave	NYSEG	Lockport	738	346,322
10	NY	Vestal	101 Murray Hill Rd	NYSEG	Binghamton	679	308,009
11	NY	Oneonta	65 Country Club Rd	NYSEG	Oneonta	495	226,786

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	2,750	3,000	3,250	3,500



NYSEG

EV Chargers

Line of Business: Common
Category: Buildings and Facilities

Scope:

Comprehensive program to install approximately 450 EV Charges across all NYSEG locations to support electrification of fleet and employee vehicles. The comprehensive project will include location assessment for capacity, solar usage and battery storage for generation/reliability to maintain power 24/7.

Reasons and Benefits:

Project benefits include supporting electrification of our fleet vehicles to reduce emissions, reliance on fossil fuels, maintenance costs and align with the companies (ESG) Environmental Social and Governance strategies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	2,250	4,250	4,250	1,250

NYSEG

Consolidation KGO

Line of Business: Common
Category: Buildings and Facilities

Scope:

Consolidation of office space from entire building of 215k sf into approximately 110k sf into a progressive office model in the East wing. Consolidation of space will include design, construction, moving, IT and furniture costs, to move approximately 160 people.

Our progressive office model includes hoteling work areas where not every employee is assigned a work location, collaboration and quiet work areas, including conference rooms, huddles rooms, reduced number of offices and Agora space.

Reasons and Benefits:

Benefits would be space optimization and utilization of required office space, under our progressive office model. Vacated space in the West wing would be rented. Reduced maintenance costs from additional leased space and upgrade equipment to support the space requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	5,000	6,500	0	0

NYSEG

Consolidation Ithaca

Line of Business: Common
Category: Buildings and Facilities

Scope:

Consolidation of existing Ithaca office, service center and Trumansburg service center into one strategically located service center. All locations would be sold as part of the consolidation.

Reasons and Benefits:

The office building is the former NYSEG HQ and has been vacant, sitting unused. There is a significant amount of capital that needs to be invested into these locations and investments are better suited in a new modern location, with less environmental issues. Current locations would be sold, offsetting revenue requirements as part of the rate case.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	750	4,500	4,500	0

NYSEG

Auburn Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Auburn projects consist of new HVAC above the fleet garage, new exterior storage for fleet and equipment, new interior lighting, new roof and interior renovations to align with our Progressive Office Model, which will allow us to consolidate office locations.

Reasons and Benefits:

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to further consolidate office locations with an interior renovation of the second floor to our progressive office standard

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	750	1,050	0	3,275

NYSEG

BMS System

Line of Business: Common
Category: Buildings and Facilities

Scope:

The scope of this project is to design and install a new Building Management System (BMS) system throughout all high and medium priority facilities. These priority ratings are based on a representation of risk based on the number of employees and functions managed within the facility across multiple occupied facilities. The BMS system will provide local / remote access to control and monitor all building system including, but not limited to: heating equipment, cooling equipment, temperature balancing, electrical switchgear, electrical loads, uninterruptible power supply (UPS), generators, lighting, overhead doors, elevators, sumps, oil water separators, fuel levels, fire panel monitoring and utility monitoring. The system will allow for automatic alarm monitoring and alerting to maintenance technicians. The system will be based on the latest technology available and be based on an open protocol interface allowing for non-proprietary maintenance and support.

Reasons and Benefits:

Reasons: The current systems are end of life and not supported by IT anymore. The systems are only throughout a small portion of our facilities. They are proprietary and require sole source contracts.

Benefits: The new system will consolidate multiple systems into one thus creating reliability and efficiency. A new system allows for monitoring of air quality, air flow, and utility management. It will reduction OPEX by minimizing maintenance and eliminating current Service contracts. Installation of the new systems allows for data collection and real time monitoring that can be used for benchmarking and KPIs. The new system / technology will be expandable to allow for the installation in future sites as NYSEG portfolio changes and its expandable allowing interface with: security systems, fire and life safety systems, and certain aspects of IT systems.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,000	1,657	750	750	750



NYSEG

Liberty Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Liberty projects consist of major interior and exterior upgrades to the facility, with upgrades to HVAC systems, lighting, electrical panels, generator replacement, storage for fleet and equipment and exterior site upgrades

Reasons and Benefits:

The current site needs substantial renovations with many deteriorating areas. Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, and increase safety of employees with a more reliable building and systems.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,900	3,000	0	0

NYSEG

Geneva Service Center East Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Complete overhaul (design, removal, installation, and resources) of the buildings on the East Side including space consolidation, interior renovations, HVAC, electrical, controls, civil, structural, doors, windows, and facades.

Reasons and Benefits:

All components/systems require upgrades throughout the facility based on equipment failures, end of life assets, increased maintenance expenses, and reliability risks.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	150	2,000	2,000	0

NYSEG

Brewster Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Brewster projects consist of new HVAC Chillers, new exterior storage for fleet and equipment, new interior lighting and interior renovations to align with our new progressive office model, which will allow us to maximize our space utilization.

Reasons and Benefits:

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absurd growth projections from Network Departments

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	100	2,945	500	530

NYSEG

Walton Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: The building supports the Electric and Gas Operations Groups and supports a large customer base.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	250	3,800	0	0

NYSEG

Oneonta Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: NYSEG Oneonta is a NYSEG critical infrastructure building. The building supports the Electric and Gas Operations Groups and supports a large customer base.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	100	2,170	1,725	0

NYSEG

Mechanicville Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: NYSEG Mechanicville is a NYSEG critical infrastructure building. The building supports the Electric and Gas Operations Groups and supports a large customer base.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,200	1,497	600	300

NYSEG

Tablet Project

Line of Business: Common
Category: Buildings and Facilities

Scope:

The 1SingleDevice project replaces toughbooks with tablets for field workforce. (line workers, Disconnect/Reconnect crews, etc.).

This project will replace roughly 1925 various outdated devices that our Field Crews use (such as laptops and tablets) with a single device (Samsung Active Tab Pro-10), to allow a single device to be utilize throughout the Company.

Reasons and Benefits:

Ability to operate more efficiently in the field due to having a lighter, all-encompassing tablet for communications. Expands ability to schedule, communicate, and input data for employees.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,704	0	0	1,478

NYSEG

Hamburg Operations Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Complete overhaul (design, removal, installation, and resources) of the buildings on the West Side including space consolidation, interior renovations, HVAC, electrical, controls, elevator, civil, structural, and Facades.

Reasons and Benefits:

All components/systems require upgrades throughout the facility based on equipment failures, end of life assets, increased maintenance expenses, and reliability risks.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	150	2,000	1,000	0

NYSEG

ECC Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

ECC projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, new UPS system, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new VAVs (variable air units). This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: NYSEG ECC is a NYSEG critical infrastructure building. The building supports the Energy Control Center, Transmission and Distribution Operations groups and functions for NYSEG and RG&E.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	2,225	570	325	0

NYSEG

Brewster HVAC

Line of Business: Common
Category: Buildings and Facilities

Scope:

This project will design, remove and upgrade the HVAC system including boilers, chillers, cooling towers, air handling units, pumps, piping, power, and controls at the Brewster Service Center.

Reasons and Benefits:

Reason: NYSEG Brewster Service Center is a high priority location for Network Operations supporting the needs of a large customer base. The Service Center staffing requires safe and reliable heating and cooling systems during all potential events: storms, outages, and blue-sky events.. The current HVAC system is end of life and undersized for the capacity needed to support the load of the site. An HVAC system is critical to maintain COVID requirements (filtration and air exchanges), building temperatures, condition IT infrastructure and maintain building reliability during multi-day storm restoration efforts. The new systems will be energy efficient and integrated with the BMS system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
150	1,500	1,000	0	0

NYSEG

KGO Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The Kirkwood General Office projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, new UPS system, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: NYSEG KGO is a NYSEG critical infrastructure building. The building supports the backup Energy Control Center, Customer Call Center, Transmission and Distribution Management groups and NYSEG Senior Management.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	750	1,610	100	50

NYSEG

Lancaster Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

This owned property of approximately 68,611sf will require a replacement roof, interior renovations including new windows, office space planning, furniture, and flooring. Replacement of 3 boilers, 3 chillers with upgrades to electrical to support new units and building systems.

Reasons and Benefits:

To assure the building reliability in support of all departments, improve safety, increase efficiency and the management of the space. Building systems are end of life and interior requires a substantial investment for upgrades, repairs and code compliance enhancements

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	75	150	2,075	0

NYSEG

Progressive Style

Line of Business: Common
Category: Buildings and Facilities

Scope:

Interior office renovations of existing locations into progressive office programming. This will include reduced offices for only VP's and above, unassigned hotel workstations that can be booked in advance, open workspace, conference rooms, collaboration and quiet work areas

Our progressive office model includes hoteling work areas where not every employee is assigned a work location, collaboration and quiet work areas, including conference rooms, huddles rooms, reduced number of offices and Agora space. The progressive office supports dynamic rather than static ways of working. This is a more innovative way to engage in the workplace and a new set of space standards that we are striving to adopt at each location.

Reasons and Benefits:

Most NYSEG office, service center and training center locations are aged, approaching 40-50 years with strategic updates throughout their useful life, with outdated with obsolete space programming. A new progressive office model will allow us to renovate interior spaces, maximize space utilization and optimize floor plans, further allowing us to consolidate departments and locations working in a hybrid model.

What is The Progressive Office

The AVANGRID Progressive Office provides many types of working environments for individuals to choose from each day.

These include **quiet space**, **collaboration space** and **hoteling desk space**, and **conference room space**. The progressive office supports dynamic rather than static ways of working. This is a more innovative way to engage in the workplace and a new set of space standards that we are striving to adopt at each location over the coming years.

Key Changes for Individuals

- Unless you are full-time in office, you'll use a hoteling (unassigned) desk on the days you come in
- Each workstation will have at least 1 monitor and connection for a laptop, plus a keyboard and mouse
- Workstations will no longer have a desk phone – softphones or mobiles will be the standard
- Hoteling desks and quiet areas can be reserved in advance
- Private offices for VPs and above, and available for common use when the VP isn't in

WORK AREA TYPES AND USES



QUIET

Quiet Space
No Phones
No Conversations
Reservation Required

COLLABORATION

Phones Allowed
Conversations Preferred
No Reservation Required

HOTELING

Phones Allowed
Reservation Required



NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
120	750	750	530	0

NYSEG

Low Risk Buildings Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Mechanical and Electrical upgrades throughout the facility based on equipment failures, end of life assets, increased maintenance expenses, and reliability risks.

Reasons and Benefits:

Mechanical and Electrical upgrades throughout the facility based on equipment failures, end of life assets, increased maintenance expenses, and reliability risks. Upgrades will increase building life span, reduce costs, CO₂ emission and create efficiencies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	500	500	500	500

NYSEG

Elmira Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Elmira projects consist of new HVAC & Electrical upgrades, new roof, new interior lighting and interior renovations to align with our new progressive office model, which will allow us to further consolidate office locations.

Reasons and Benefits:

Benefits of these renovations would be to increase the building and systems life, HVAC, Electrical Panels and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,210	425	250	50

NYSEG

Long Lake Building Expansion

Line of Business: Common
Category: Buildings and Facilities

Scope:

Increase the square footage of NYSEG Long Lake facility based on an increase of employees by four people and the size/quantities of vehicles are longer by 2-3' based on current vehicle purchases supporting Line Operations. This would include an extension on the line bays, an addition bay, new overhead doors, new man doors, lighting, HVAC, and all civil structural requirements.

Reasons and Benefits:

NYSEG Long Lake facility is too small based on the number of employees working at this site and the size/quantities of vehicles. It currently poses operational and safety concerns to the employees and customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	250	1,500	0	0

NYSEG

KGO UPS/Battery Upgrades

Line of Business: Common
Category: Buildings and Facilities

Scope:

Provide and install a new Lithium Battery UPS system (Train A and Train B) to replace existing UPS/batteries that are at end of life and failing. Also included is the upgrade of the electric distribution system to include new ATs to operate system needs and provide a greater level of redundancy.

Reasons and Benefits:

NYSEG KGO is a critical infrastructure building. The building supports the Transmission and Distribution Operations groups and functions for NYSEG. The UPS systems provide stable and uninterruptible power to the servers, computers and monitors for the Transmission and Distribution Operation groups use to maintain NY substations, transmission and distribution systems. This system also supports a backup Data Ctr and Customer Call Ctr.

The existing system are end of life and batteries are currently in need of a replacement. New systems will be integrated into the BMS system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
500	750	0	0	0

NYSEG

Plattsburgh Service Center

Line of Business: Common
Category: Buildings and Facilities

Scope:

The projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: NYSEG Plattsburgh is a NYSEG critical infrastructure building. The building supports the Electric and Gas Operations Groups and supports a large customer base.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	390	450	0	410

NYSEG

Binghamton Service Center Underground Tank Removal

Line of Business: Common
Category: Buildings and Facilities

Scope:

This project consists of the removal of two underground fuel tanks, fuel islands, associated piping, electrical and controls and the installation of a new 6000 gallon above ground tank/dispensing system along with power, controls, fire protection and all associated site upgrades. .

Reasons and Benefits:

The existing system is end of life and has failed many New York State Department of Environmental Conservation (NYSDEC) requirements, forcing additional maintenance expenses each year. These types of systems require securitized federal mandates that must be adhered to or penalties/fines will be applied.

The system is necessary for fueling our fleet vehicles.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	900	0	0	0

NYSEG

Ithaca Underground Tank Removal/Replacement

Line of Business: Common
Category: Buildings and Facilities

Scope:

Project includes: Design, Permits, Construction Documents, Project Management, and Construction Management to support removal of two underground fuel tanks, fuel islands, associated piping, electrical, controls, etc., and the installation of a new 6,000g above ground tank/dispensing system along with power, controls, Fire Protection, and all associated civil upgrades. Does not include the removal and disposal of potential containments if found.

Reasons and Benefits:

The existing system is end of life and has failed many New York State Department of Environmental Conservation (NYSDEC) requirements, forcing additional maintenance expenses to pass each year. These types of system require scrutinized federal mandates that must be adhered to or penalties/fines will be applied. The system is necessary for our fleet vehicles

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	900	0	0	0

NYSEG

Stamford Operations Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy.

Reasons and Benefits:

Reasons: The building supports the Electric and Gas Operations Groups and supports a large customer base.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	230	455	150	0

NYSEG

KGO Cooling Tower Replacement

Line of Business: Common
Category: Buildings and Facilities

Scope:

Design, Remove, and Upgrade the cooling system including chillers, towers, pumps, piping, power, and controls. Price to include PM and CM services

Reasons and Benefits:

The existing system is end of life, inefficient, and full of maintenance needs. HVAC systems are needed for temperature control and IT needs. This location has a data center and backup ECC.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	750	0	0	0

NYSEG

KGO House Power/Transformer Upgrade

Line of Business: Common
Category: Buildings and Facilities

Scope:

Design, Remove, and Upgrade the house power supply to the building from the service at the road through the transformer and into the switchgear. Price to include PM and CM services

Reasons and Benefits:

The existing system was found to be poorly designed, not per current code/standards, and compromised due to its age and voltage. A failure will result in full loss of power to the building with a potential for a long duration due to equipment lead times.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	750	0	0	0

NYSEG

Brewster Generator

Line of Business: Common
Category: Buildings and Facilities

Scope:

This project will undertake the design, removal, and installation of an upgraded backup generator for the site and will include the installation of the associated new distribution panels, a new automatic transfer switch and electrical recircuiting.

Reasons and Benefits:

Reason and : The NYSEG Brewster Service Center is a high priority location for Network Operations supporting the needs of a large customer base. The Service Center staffing requires safe and reliable power supply during all potential events: storms, outages and blue-sky events. A new generator for the service center is needed for back-up emergency power, redundancy for staff needs and continuity of life safety equipment.. The existing generator is end of life and undersized for the capacity needed to support the load of the site.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	450	150	0	0

NYSEG

Lockport Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Installation of new Storm and Sanitary System through the facility, including a new Oil Water Separator system and lateral tie ins to municipal systems. Design, Remove, and Upgrade the existing system with associated new underground mains, catch basins, interior laterals, BMS tie-ins for alarms, and all necessary permitting. Project to include PM and CM services

Reasons and Benefits:

Current system is non-compliant with state and local environmental requirements. Storm systems cannot be tied into the same systems as sewer system if two separate municipal systems exist in the township. Also, oil water separator systems need to be functional, inspected annually, and tied into the approved municipal system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	500	0	0	0

NYSEG

Norwich Operations Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The projects consist of new HVAC & Electrical upgrades: new exterior lighting, new interior lighting, new backup generator, recircuiting, new communication cabling, wireless communication devices, new roof top unit, new heat pump units. This will also support interior renovations to align with our new progressive office model which will allow us to further consolidate office locations and increase building occupancy

Reasons and Benefits:

Reasons: The building supports the Electric and Gas Operations Groups and supports a large customer base.

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	500	0	50	0

NYSEG

Lancaster Service Center Garage Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Lancaster garage of approximately 19,206sf updates include replacement of the Exterior Finish Insulation System (EFIS), roof replacement and replacement of two Air Handling Units (AHU).

Reasons and Benefits:

Exterior shell needs a substantial number of repairs and replacement is needed to insure a tight building envelope with no leaks. AHUs are 30 years old, end of life and increased repairs have occurred over the last several years.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	350	75

NYSEG

Video Conferencing

Line of Business: Common
Category: Buildings and Facilities

Scope:

This project will install additional and upgrade existing video conferencing equipment as needed. Existing and future conference rooms with (and without) AV/VC equipment. This includes building out of brand new VC rooms, retrofitting older rooms with new equipment, and decommissioning of telepresence system and smart boards.

Reasons and Benefits:

This program allows the NYSEG to meet needs related to video conferencing and moderate travel expenses. Increased ability to communicate efficiently and share content.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	90	110	110	110

NYSEG

Hornell Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Hornell projects include replacement of building’s boiler and backup generator. Project to include: Design, Remove, and Upgrade the backup generator for the site with associated new distribution panels, new Automatic Transfer Switch, and electrical recircuiting plus the upgrades of the current boiler and associated circulation pumps. Project to include PM and CM services

Reasons and Benefits:

Reason: The current HVAC system is end of life and undersized for the capacity needed to support the load of the site.

Benefit: This site is a high priority service center for Network Operations supporting the needs of a large customer base. The Service Center staffing requires safe and reliable systems during all potential events: storms, outages, and blue-sky events. A HVAC and generator system is critical to maintain COVID requirements (filtration and air exchanges), building temperatures, condition IT infrastructure, and maintain building reliability during multi-day storm restoration efforts.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	300	0

NYSEG

Mobile Phones Project

Line of Business: Common
Category: Buildings and Facilities

Scope:

Purchase of mobile phones for employees to use for communications

Roughly 60 Smartphones will be purchased annually (various iPhone models). Some mobile phones will replace a landline, but the amount of replacements is unsure at this time.

Reasons and Benefits:

Independent purchase of devices outside of the carrier contracts (separate from data plan) to take advantage of lower monthly data plan costs, have spare phones available, and upgrade/replace as needed due to wear and tear of devices due to a 2-year average lifecycle.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
40	44	48	53	59

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG

SPCC West

Line of Business: Common
Category: Buildings and Facilities

Scope:

Create and install new SPCC (Spill Prevention, Control and Countermeasure) spill prevention measures and systems in NY West locations.

Reasons and Benefits:

This program regulates, prevents, controls, and handles potential spills from aboveground containers of oil. Need for environmental compliance and safety precautions

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
200	0	0	0	0

NYSEG

Mailroom Digitization

Line of Business: Common
Category: Buildings and Facilities

Scope:

Move from a full time staffed mailroom and courier service to a digital mailroom solution.

A digital mailroom concept is in the beginning stages of being investigated. Equipment at a minimum would include computers, screens, scanners, cameras, and printers. Onsite Staff would still be needed for maintenance and oversight daily, to collect mail, scan it into the system, and to coordinate the retrieval of non-digital mail packages. The locations we are looking to implement this service at the Kirkwood General Office (KGO), located in the Binghamton, NY area.

Reasons and Benefits:

Digital mailrooms eliminate the need for a large onsite mailroom staff and daily courier service. Reduction of carbon footprint, reduction of paper consumption, and overall potential reduction in labor costs (estimate from EDM white paper states 20% cost savings could be anticipated) <https://www.edmamericas.com/blog/how-much-money-save-outsource-my-mailroom>

Annual mailroom cost is \$149,000. Assumes a startup cost of \$119,200 for analysis, equipment, and software based on using one year annual operation cost with a 20% savings.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	119	0	0

NYSEG

Plattsburgh Site Upgrades

Line of Business: Common
Category: Buildings and Facilities

Scope:

Carryover project to upgrade all exterior lighting from sodium vapor fixtures heads to LED lighting. Included is new poles, new circuitry, new fixtures, and disposal of the old.

Reasons and Benefits:

The existing fixtures are end of life and poles have actually fallen down due to deterioration. The upgrades maximize the assets life span, LED Lighting is energy efficient, reduces OPEX to replace bulbs, and creates additional safety and security of employees/materials in and around building.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	0	0	0	0

Common Building and Facilities

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RG&E

Minor Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

The Minor capital projects are improvements to upgrade systems in each facility due to: end of life, failures associated with mechanical, electrical, building structures, control systems etc., improve the efficiency, reducing energy consumption, reducing greenhouse emissions etc. or addressing security and safety issues.

These minor projects are in a range of \$1k to \$99k per project.

Reasons and Benefits:

Reasons: Minor project needs are necessary on an annual basis based on end of life assets, failures, employee changes, storms, and a multitude of emergency needs that can occur.

Benefits: These projects create saving in the OPEX maintenance costs for the building, creates reliability, extends end of life usage, avoids disruption to Line and Gas Operations, supports green and sustainable initiatives, and creates an overall safer building.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
600	1,500	1,500	1,500	1,500

RG&E

EV Chargers

Line of Business: Common
Category: Buildings and Facilities

Scope:

Comprehensive program to install approximately 150 EV Charges across all RG&E locations to support electrification of fleet and employee vehicles. The comprehensive project will include location assessment for capacity, solar usage and battery storage for generation/reliability to maintain power 24/7.

Reasons and Benefits:

Project benefits include supporting electrification of our fleet vehicles to reduce emissions, reliance on fossil fuels, maintenance costs and align with the companies (ESG) Environmental Social and Governance strategies

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
100	1,500	1,7500	1,750	0

RG&E

Solar Panels

Line of Business: Common
Category: Buildings and Facilities

Scope:

Install solar panel arrays throughout RG&E locations focusing on locations with the largest electrical usage, maximization of solar array installations and prioritize with EV charger demand.

Current estimates show the ability to generate 2,500,000 Kw a year in locations that meet these criteria, with our prioritization of Scottsville Road, 3CC, Mushroom Blvd and Atlantic Ave.

Reasons and Benefits:

This is to offset electric usage and requirements, align with sustainability goals and with fleet vehicle electrification/EV charger installation for constant power requirements and reliability. Solar panel installs will reduce our electric usage, reduce emissions and help meet our (ESG) Environmental Social and Governance commitments.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	750	1,500	1,500	500

RG&E

Tablet Project

Line of Business: Common
Category: Buildings and Facilities

Scope:

The 1SingleDevice project replaces Toughbooks with tablets for field workforce (line workers, Disconnect/Reconnect crews, etc.).

This project will replace roughly 1925 various outdated devices that our Field Crews use (such as laptops and tablets) with a single device (Samsung Active Tab Pro-10), to allow a single device to be utilize throughout the Company.

Reasons and Benefits:

Ability to operate more efficiently in the field due to having a lighter, all-encompassing tablet for communications. Expands ability to schedule, communicate, and input data for employees.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
692	138	996	199	1,435

RG&E

Scottsville Rd Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Scottsville Road projects consist of exterior site improvements including added employee parking, redesign and replacement of existing parking lot and driveway. New exterior storage and covered garages for fleet and equipment, new interior lighting, and interior renovations to meet space plans for incoming staff from our East Ave and West Ave office buildings. These interior renovations will include newly constructed walls, rework of existing ductwork and replacement of old and worn roof top units and heat pumps to properly heat and cool the building.

Reasons and Benefits:

Benefits of these renovations would be to increase the building and systems life, HVAC and LED upgrades increase efficiency, reduce maintenance and utility usage, increase safety of employees and will allow us to maximize our space utilization within the building to absorb growth projections from Network Departments. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,575	535	1,000	200	0

RG&E

Scottsville Road Consolidation Proj.

Line of Business: Common
Category: Buildings and Facilities

Scope:

Renovation of the Operations Center of RG&E in Rochester, as a part of the Rochester Consolidation Project initiative. Increase needed for funds not completed in 2021 for project.

Reasons and Benefits:

Renovation of the Operations Center of RG&E in Rochester, as a part of the Rochester Consolidation Project initiative. Consolidating additional departments into this location to create efficiencies, reduce costs and increase customer response.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,258	1,500	0	0	0

RG&E

BMS System

Line of Business: Common
Category: Buildings and Facilities

Scope:

The scope of this project is to design and install a new Building Management System (BMS) system throughout all high and medium priority facilities. These priority ratings are based on a representation of risk based on the number of employees and functions managed within the facility across multiple occupied facilities. The BMS system will provide local / remote access to control and monitor all building system including, but not limited to: heating equipment, cooling equipment, temperature balancing, electrical switchgear, electrical loads, Uninterrupted Power Supply (UPS), generators, lighting, overhead doors, elevators, sumps, oil water separators, fuel levels, fire panel monitoring and utility monitoring. The system will allow for automatic alarm monitoring and alerting to maintenance technicians. The system will be based on the latest technology available and be based on an open protocol interface allowing for non-proprietary maintenance and support.

Reasons and Benefits:

Reasons: The current systems are end of life and not supported by IT anymore. The systems are only throughout a small portion of our facilities. They are Proprietary and require sole source contracts.

Benefits: The new system would consolidate multiple systems into one thus creating reliability and efficiency. A new system allows for monitoring of air quality, air flow, and utility management. It will reduction OPEX by minimizing Maintenance and eliminating current Service contracts. Installation of the new systems allows for data collection and real time monitoring that can be used for benchmarking and KPIs. The new system / technology is expandable allow for the installation in future sites as AVANGRID portfolio increases and its expandable allowing interface with: Security Systems, Fire and Life Safety Systems, and future IT systems.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan***All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
404	0	300	300	300

RG&E

Scottsville Rd HVAC Phase I

Line of Business: Common
Category: Buildings and Facilities

Scope:

Provide study, air and water survey, and focused effort to replace aged heat pumps and other HVAC equipment.

Reasons and Benefits:

The benefits of this project include reduced maintenance and down time, improved air quality, and system efficiency improvements. Units are end of life and required a large amount of investment to repair.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
54	1,250	0	0	0

RG&E

Low Risk Building Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Provide new layouts, building systems and equipment in our facilities.

Reasons and Benefits:

To assure building reliability in support of all departments, improved safety, increased efficiency and the management of the office space. Reduce costs, CO₂ emissions, and create efficiencies

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	250	250	250	250

RG&E

Progressive Office

Line of Business: Common
Category: Buildings and Facilities

Scope:

Interior office renovations of existing locations into progressive office programming. This will include reduced offices for only VP's and above, unassigned hotel workstations that can be booked in advance, open workspace, conference rooms, collaboration and quiet work areas

Our progressive office model includes hoteling work areas where not every employee is assigned a work location, collaboration and quiet work areas, including conference rooms, huddles rooms, reduced number of offices and Agora space. The progressive office supports dynamic rather than static ways of working.

This is a more innovative way to engage in the workplace and a new set of space standards that we are striving to adopt at each location.

Reasons and Benefits:

Most RG&E service center and training center locations are aged, approaching 40-50 years with strategic updates throughout their useful life, with outdated with obsolete space programming. A new progressive office model will allow us to renovate interior spaces, maximize space utilization and optimize floor plans, further allowing us to consolidate departments and locations working in a hybrid model

What is The Progressive Office

The AVANGRID Progressive Office provides many types of working environments for individuals to choose from each day.

These include **quiet space**, **collaboration space** and **hoteling desk space**, and **conference room space**. The progressive office supports dynamic rather than static ways of working. This is a more innovative way to engage in the workplace and a new set of space standards that we are striving to adopt at each location over the coming years.

Key Changes for Individuals

- Unless you are full-time in office, you'll use a hoteling (unassigned) desk on the days you come in
- Each workstation will have at least 1 monitor and connection for a laptop, plus a keyboard and mouse
- Workstations will no longer have a desk phone – softphones or mobiles will be the standard
- Hoteling desks and quiet areas can be reserved in advance
- Private offices for VPs and above, and available for common use when the VP isn't in

WORK AREA TYPES AND USES



QUIET

Quiet Space
No Phones
No Conversations
Reservation Required

COLLABORATION

Phones Allowed
Conversations Preferred
No Reservation Required

HOTELING

Phones Allowed
Reservation Required



NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	500	250	250	0

RG&E

Mushroom Blvd Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Upgrade the Mechanical and Electrical systems throughout the facility.

Reasons and Benefits:

Mechanical and Electrical upgrades throughout the facility based on equipment failures, end of life assets, increased maintenance expenses, and reliability risks. Upgrades will reduce maintenance costs, extend building life cycle, create efficiencies and reduce CO2 emissions.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	750

RG&E

Video Conferencing

Line of Business: Common
Category: Buildings and Facilities

Scope:

This project will install additional and upgrade existing video conferencing equipment as needed. Existing and future conference rooms with (and without) AV/VC equipment. This includes building out of brand new VC rooms, retrofitting older rooms with new equipment, and decommissioning of telepresence system and smart boards.

Reasons and Benefits:

This program allows the Companies to meet needs related to video conferencing and moderate travel expenses. Increased ability to communicate efficiently and share content.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	75	110	110	110

RG&E

3 City Center

Line of Business: Common
Category: Buildings and Facilities

Scope:

Renovate 107,000sf of a multi-tenant office space to accommodate RG&E employees from our East Ave, West Ave, and Scottsville Rd RG&E buildings in Rochester area.

The scope includes fully renovating floors 1-5 and the lower level including installation of new HVAC systems, ceilings, LED lights, flooring, furniture, and network. This newly renovated space will accommodate approximately 600 staff and will represent the main office building in the Rochester area.

Reasons and Benefits:

This renovation will provide a first class building with quality, safety and replace an underutilized old building reducing the maintenance and operating cost along with poor building efficiencies. It will also provide space from our West Ave facility which we currently have safety issues based on the location of this facility and high operating costs. Additional staff from West Ave will be consolidated into other properties in the Rochester Area. These renovations also align with our new progressive office model encouraging a culture of open conversation among staff and providing flexible working space which will allow us to maximize our space utilization

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
101	50	50	50	50

RG&E

Mobile Phones Project

Line of Business: Common
Category: Buildings and Facilities

Scope:

Purchase of mobile phones for employees to use for communications.

Roughly 60 Smartphones will be purchased annually (various iPhone models). Some mobile phones will replace a landline, but the amount of replacements is unsure at this time.

Reasons and Benefits:

Independent purchase of devices outside of the carrier contracts (separate from data plan) to take advantage of lower monthly data plan costs, have spare phones available, and upgrade/replace as needed due to wear and tear of devices due to a 2-year average lifecycle.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
40	44	48	53	59

RG&E

Canandaigua Truck Garage Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

This owned location is 11,585 sf and is utilized by the Electric T&D and Gas Operations departments. The existing 31-year-old 10KW generator and electrical panels will need to be upgraded due to aging of the generator and maintenance expense.

Reasons and Benefits:

This upgrade will allow for continuous reliable service, reduce the equipment failure, and decrease maintenance expenses. Replacement is imperative to provide the garage constant power during a storm or outage to meet the needs of our customers.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	75	0	0	100

RG&E

Mailroom Digitization

Line of Business: Common
Category: Buildings and Facilities

Scope:

Move from a full time staffed mailroom and courier service to a digital mailroom solution.

A digital mailroom concept is in the beginning stages of being investigated. Equipment at a minimum would include computers, screens, scanners, cameras, and printers.

Onsite Staff would still be needed for maintenance and oversight daily, to collect mail, scan it into the system, and to coordinate the retrieval of non-digital mail packages.

The locations we are looking to implement this service are the current locations that have mailrooms:

- Rochester, NY (3CC)

Reasons and Benefits:

Digital mailrooms eliminate the need for a large onsite mailroom staff and daily courier service. Reduction of carbon footprint, reduction of paper consumption, and overall potential reduction in labor costs (estimate from EDM white paper states 20% cost savings could be anticipated) <https://www.edmamericas.com/blog/how-much-money-save-outsourcing-my-mailroom>

Annual mailroom cost is \$149,000. Assumes a startup cost of \$119,200 for analysis, equipment, and software based on using 1 year annual operation cost with a 20% savings.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	119	0	0

RG&E

Sodus Service Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Replacement of onsite 20Kw generator and HVAC split systems

Reasons and Benefits:

Generator and HVAC split systems are end of life and replacement is planned for 2025. This will increase reliability, safety and efficiency of systems

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	110	0

RG&E

Eastern Monroe Operations Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

This owned location is 27,316 sf and is utilized by the Electric T&D, Gas Engineering and Gas Operations departments. One hot water tank and 8-unit heaters will need to be replaced as they are at the end of their life cycle.

Reasons and Benefits:

These are aged end of life assets currently increasing maintenance expense and equipment failures. The hot water tank is 40+ years old and all unit heaters are 25+ years old. Replacement is necessary to reduce the increased maintenance expenses and repairs to provide consistent reliability during various storm events.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	105	0

RG&E

Fillmore Operations Center Projects

Line of Business: Common
Category: Buildings and Facilities

Scope:

Replacement of onsite 100Kw generator.

Reasons and Benefits:

Generator is end of life and replacement is planned for 2025. This will increase reliability, safety and efficiency of systems.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	75	0

Common Customer Service

NYSEG

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Orchestration Platform - Customer Journey	760
Kiosk Upgrade	762

NYSEG

Regulatory Driven Efforts

Line of Business: Common
Category: Customer Focus

Scope:

This program covers SAP and other software system upgrades and enhancements that are required by New York regulatory mandates and rate case initiatives that will be funded by the business.

On an annual basis, there are anticipated regulatory requests which require business, internal and external resources to develop and implement the necessary system changes.

Forecasted work is planned for system impacts to the areas of Billing, Retail Access and FICA/Credit & Collection based on current and expected mandates.

Specific Retail Access initiatives: Price to Compare, Guarantee Savings for Mass Market Customers, Net Metering/EDI indicator, CCA/CDG Opt-Out programs, Mass Market Reject EDI Enrollment, Mass Market Indicator, CCA Phase 3 and Phase 4, Automate Net Credit Payments to CDG projects, system functions not working properly for regulatory required, DER flag and blocking process.

Specific Billing initiatives: CDG Automation Staggered Conversion and Post Go-Live Support, CDG Value Stack Banking Rule Changes, CDG Volumetric System Changes, Volumetric Alternate ESCO Billing Methodology, Volumetric Net Crediting, Volumetric File Automation, Volumetric Banking Rule Changes, Remote Crediting, Remote Crediting Net Crediting, Host Community Benefit Program, Standby & Buyback Rates, Value Stack Calculation Unbilled, Onsite Value Stack, Grandfathered Net Energy Metering, Time Varying Price, MV90 AMI Upgrade for Volumetric and Value Stack.

Specific FICA initiatives: COVID-19 low income credits, COVID-19 late payment charges and Arrears Management.

The forecasted estimates for the LTO are based on the expected development required along with historical hours/costs of similar complexity for system changes.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Regulatory and rate case compliance requirement.

Risks of not doing this work include penalties and non-compliance.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
425	1,379	886	912	764

NYSEG

Customer Journey Redesign

Line of Business: Common
Category: Customer Focus

Scope:

The NYSEG Customer Journey Redesign Project will reimagine how customers interact with NYSEG across the company's most critical touchpoints. 2021 JD Power and Associates residential satisfaction studies and the NYSEG Voice of the Customer (VOC) program have highlighted the need to further develop key customer journeys. Through the development of a matrix, key journeys for redesign have been identified and prioritized based on the following criteria: customer satisfaction, cost reduction, strategic value, and complexity.

Those journeys will include (in order of priority):

- Redesign the Outage end to end journey
- Redesign the Energy Usage end to end journey
- Redesign the High Bill/Bill Issues end to end journey
- Redesign the Payments end to end journey
- Redesign the Service Appointments end to end journey
- Redesign the Account Updates end to end journey

The Customer Journey Redesign Program is rooted in an iterative process called Design Thinking. Design Thinking is used by some of the world's largest brands, including Bank of America, T-Mobile, Airbnb, and Apple. Through this process, NYSEG will go through five phases per journey to understand the end user and identify solutions that will result in new end-to-end journey maps and customer-tested prototypes for IT production and implementation.

The purpose of the NYSEG Customer Journey Redesign Program is to address key customer pain points identified as part of 2021 JD Power findings.

1. **Simplicity:** How NYSEG guides customers through their energy lifestyle should be intuitive for the customer – transferring service should be a 2-minute process that can easily take place from a mobile device. Requesting a service appointment should include a receipt confirmation with follow up steps, and energy usage reports should be clear and easy to read. The NYSEG Customer Journey Redesign Program will address all current

NYSEG and RG&E 5-Year Capital Investment Plan

processes and steps, and layer those against customer research to uncover the clearest journeys for implementation.

2. **Reliability:** Regardless of the journey, customers should be able to expect real-time communications about changes to their account, service status, and outages. Even if there is a situation, such as an outage, that is out of the company's control, swift messages and updates should become the expectation so there is no ambiguity or doubt about NYSEG's ability to handle any given situation.

3. **Making Our Company Easy to do Business With:** Whether a customer wants to contact NYSEG by phone, email, or within the app, the company has a responsibility to make that journey easy from end-to-end. In order to ensure real-time accuracy and monitor customer sentiment associated with journey redesigns, the company will implement Net Promoter Scoring (NPS) along different customer journey interactions. NPS will allow for quick surveying, as well as immediate cross-industry comparison and benchmarking. It will also allow us to monitor what journeys are running seamlessly and which sections are causing customers pain.

The Design Thinking Process for the Customer Journey Redesign Program involves the following steps and activities:

1. **Empathize – Research your users' needs**
 - a. This is the research portion of the process where the company works to gain an empathetic understanding of the issues at hand, through user research. This step allows NYSEG to set aside assumptions about energy journeys and gain real insight into customer needs.
2. **Define – State your users' needs**
 - a. Here is where information is analyzed and observed to synthesize core problems and trends amongst customers. These problem statements help to draft personas before moving on to the next phase.
3. **Ideate – Challenge assumptions and create ideas**
 - a. This is where the company first begins to brainstorm and look for alternative ways to view the journey problems and identify innovative solutions.
4. **Prototype – Start to create solutions**
 - a. The aim in this phase is to identify the best possible solution for each problem found. NYSEG will produce scaled-down, prototype versions of the journeys (or specific features found within the journeys) to investigate.
5. **Test – Try your solutions out**
 - a. Rigorous testing of concepts and prototypes will ensue with a customer set for feedback and additional iterations. Pending additional updates and testing, the concepts are ready to hand over to IT and development teams.

NYSEG and RG&E 5-Year Capital Investment Plan

Reasons and Benefits:

The NYSEG Customer Journey Redesign Program will ultimately drive down the cost to serve customers because customers will become more empowered to act on new and improved self-service actions and will be able to rely less on the call center for support. The improved UX and designs will translate to a simpler journey for the customer, which lends to improved Customer Satisfaction and better operational efficiencies on the back end. With new journeys in place, digital adoption will be integrated from end to end, providing more automated steps that help customers and call agents. For example, if more customers are enrolled in Outage Alerts, more customers can feel reassured about the status of their home electricity.

Risks: Without the NYSEG Customer Journey Redesign Program, we will continue to have one of the highest cost-to-serve amounts for our customers out of all the other utility companies benchmarked by JD Power. We will be unable to fully drive digital adoption and increase customer

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
688	688	701	715	730

NYSEG

Energy Manager Enhancements

Line of Business: Common
Category: Customer Focus

Scope:

This project will help to inform the customer about their energy usage, will include tools to view usage, bill comparisons, view real time data and have the same experience on a mobile device as they do on the website.

The project will take the AMI metering data and be able to digest it into the Energy Manager platform so that we can send mid-cycle bill alerts to our customers who we forecast to be potentially experiencing a higher-than-expected bill during the period.

The alert will empower the customer with insights specifically designed to help them reduce their energy usage or help to inform them as to what tools/services the Company can offer to help the customer stay on track and not overspend on their energy.

These tools/services will be a mixture of home energy efficiency recommendations along with CLM programs or rebates that may be available to the customer.

The project includes the build, setup and configuration of this system and alerts.

Mobile capability and widgets will allow our customers in our mobile app to have the same full, rich energy manager and usage experience they experience on the website.

These widgets and integrations will include usage and comparison graphs, home surveys, energy efficiency advice, usage alerts, bill comparisons, near real-time interval data, and rates comparisons.

The project includes the integration, implementation and configuration of this system.

Reasons and Benefits:

This project will help to improve our customer experience and satisfaction as well as digital adoption across all our customer touch points. It will help to reduce high bill complaints, increase customer satisfaction and enhance our proactive notifications to our customers to help them make informed decisions about their energy usage. The project will help to improve the gap in the JD Power CSAT scores for

- Easy to do Business With - simple tools for managing my usage and utility costs.
- Reliability - application is evergreen, doesn't go out of support.
- Value - available 24x7.

The project will also decrease contact center call volumes for high bill complaints and

NYSEG and RG&E 5-Year Capital Investment Plan

complaint reduction, will increase in app downloads and will increase in app logins. This will naturally increase overall enrollment in many programs due to the ability to link a customer’s energy usage more effectively to CLM programs and efficiency advice on their mobile devices.

Risks if not approved:

Customers who receive high bills will continue to raise complaints and have zero context given as to why their energy usage or bill amount has increased. They will fail to be educated about how to proactively and efficiently manage the energy usage in their home.

Customers will only be able to have an energy usage experience on their responsive My Account portal and not via their mobile app.

Customers may rank us lower in JD Power metrics for not having key digital functionality as this drastically affects the user experience for our mobile app customers.

Platform becomes outdated, customers are not provided with the latest in technology to support functionality for easier and most relevant solutions, system becomes unreliable with frequent outages. Decreased customer satisfaction and NPS scores increased call volumes and increased customer complaints.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
501	552	100	100	1,370

NYSEG

Lab Equipment

Line of Business: Common
Category: Customer Focus

Scope:

Various types of Lab and Field Measurement Equipment for gas and electric measurement operations support.

Reasons and Benefits:

Equipment used by field personnel is required by PSC, ASTM, ANSI and other entities to be calibrated and maintained to operate correctly when field personnel need to use it. The lab performs calibrations and repairs on this equipment. The Company needs to purchase and upgrade lab equipment such as pressure calibration equipment, electric calibration equipment, and meter testing equipment for PSC and safety regulations as well as measurement/metering regulations.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
150	150	250	250	250

NYSEG

Contact Center Knowledge Database

Line of Business: Common
Category: Customer Focus

Scope:

Source and implement a tool that will deliver a full array of knowledge database functions for real time referencing by all contact center representatives, vendors (IQor) and associated staff to enable accurate advice to customers for a best in class customer experience. Additional functionality of the tool will identify opportunity for integration between the core database and features that would provide the backbone for automated and live representative chat while also delivering seamless email responses to customer requests/questions. The Knowledge Database should afford:

- Easy access from SAP
- Reuse existing content - NYSEG & RG&E (2023)
- Type Ahead Search
- Partial phrase and tag search
- Informative search results
- User friendly navigation
- Mobile Friendly
- Use of key info callouts
- Trending content
- Quick links
- Bookmark content
- Quick (speed to open)
- Nested content
- CSR feedback on content
- Usage Reports/Dashboards by page/CSR
- Article version control & process
- Multiple document types
- Supports videos
- Decision trees/troubleshooting
- Display real time schedule info

- Push content to users
- Automatic email to users of updated content
- Customized notifications of content changes by user
- Notification page with all important items
- (Optional) Manage customer inquiry emails
- Ease of Content editing
- Ease of Article Creation
- Templates for presentation and content consistency
- Optional content expire date
- Admin Dashboard (content searched), and will also:
- Facilitate consistent creation and display of easily scannable and quotable content (i.e., quick hits)
- Enable consistency in content authoring and administration
- Enable creation of strategic templates library for displaying content in alignment with industry standards

Reasons and Benefits:

Benefits:

A robust core knowledge database that enables several customer channels will have these impacts:

- More Accurate Information, which affords:
- Improved First Call/Email Resolution and/or Reduced call backs
- Decreased escalation
- Informed Web Content
- Reduced CSR error
- Better understanding of customer information needs, which affords:
- Informed customer communications for all channels
- Informed process improvements
- Quicker Access to Content
- Less – or no - hold time
- Improved Average Handling Time
- Reduced CSR training time
- Diversified employee experience
- Knowledge preservation
- Minimize CSR process gaps
- Facilitates meeting regulatory requirements

NYSEG and RG&E 5-Year Capital Investment Plan

This will foster resource planning and provide data that drives placing the best resources against the greatest customer need

Risks:

The current situation with separate, make-shift knowledge databases does not address the following:

- CSRs work is complex
- CSRs lack efficient tool to quickly find succinct answers to respond to customers
- Search function and need to download documents extend search times for desired content that extends average handle time, impacts customer experience•
- Our current outsourcing strategy requires additional coordinated support related to knowledge sharing and consistency
- Fragmented day-to-day administration

Meeting customer satisfaction expectations and internal/regulatory service level requirements, while providing representatives with the tools/knowledge they need, are both Customer Service and Networks goals. If an integrated tool that is implemented across all the companies is not pursued, Customer Service will continue to struggle with:

- Non-compliance to regulatory mandates that result in penalties
- Reduced customer satisfaction
- Increased average handling time
- Increased number of repeat customer contacts
- Increased backlogs of email work
-

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	769	0	0	0

NYSEG

Orchestration Platform - Customer Journey

Line of Business: Common
Category: Customer Focus

Scope:

This platform will digest data from all of our customer touch points across digital, call center, billing and offline channels to allow the Company to easily segment and develop individual rules and campaigns that create personalized engagements and experiences with the Company.

These personalized experiences will be tailored towards the individual customer's current journey, situation or account state and will enable the Company to proactively communicate and display relevant content to the customers regarding next best actions and recommendations.

This will allow us to truly get a 360-degree view of our customers and how they engage with us so we can provide a proactive and personalized experience.

Reasons and Benefits:

The project allows the business to truly understand and segment our customer base to give them personalized experiences. No more will we only be able to segment our customers geographically, or by payment types. We will be able to segment our customers based on how they engage with us digitally, or if they choose to do one action on one platform and another action on a different platform, or if they are having an issue and are displaying certain behaviors, and really stitch together a journey for them to make dealing with the Company seamless and empowering.

Once segmented we will be able to communicate with these customers via chosen contact channels. For example, set up rules that if we know they haven't logged into the mobile app in the past six months, then don't send a push notification, try and send an email or SMS instead to relay important account information.

We will also be able to set up real time rules so when customers are engaging with us digitally, we can change the messaging and content on our website so that it is tailored to them and their current needs. Such as a customer who has recently called the contact center and then logged in, we could pre-populate their next best action on the website or app so that it is a natural follow on from the conversation they just had with us via the

NYSEG and RG&E 5-Year Capital Investment Plan

contact center. Bringing our customer touch points together is key to increasing customer satisfaction across all our engagements.

We will also be able to track successes or errors in our end-to-end journeys to address them before the customer experiences an issue. This will in turn reduce complaints, improve customer satisfaction and improve the analytics of our offline and online journeys. This also allows us to optimize our journeys to ensure we are always meeting the needs of our customers and their changing behaviors before it's too late.

Risks if not approved: We will not be able to fully understand how our customers engage with us since data and touch points will continue to be spread across multiple backend systems that do not communicate to each other. We will be unable to segment and personalize journeys for any of our customers so they will not receive a digital experience that they should expect from a modern utility company. We will fail to improve the customer satisfaction and continue to have a low JD Power ranking for utility companies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	500	0	0	0

NYSEG

Kiosk Upgrade

Line of Business: Common
Category: Customer Focus

Scope:

NCR is the existing vendor for NYSEG and RG&E customer walk-in office self-serve payment kiosks. The current kiosk functionality is very outdated - software, hardware and operating systems are nearing end of life cycle. Microsoft support (for Windows 7 Professional operating system) ended January 2020. The hardware is the original to the machines which were installed in 2012.

NCR is the existing vendor for NYSEG and RG&E for the kiosks.

Current functionality experiences regular performance issues due to outdated software and hardware. Service calls often require replacement parts which can only be found as refurbished due to the age of the hardware.

Based on Avangrid environment, operational model, and backend systems, a new customer implementation would be approximately 35-40% higher (around \$415,000-\$430,000 total), due to the need to perform a far more in-depth discovery engagement to document those aspects of our business of which NCR is already familiar. Some of this would also impact the Design phase, as many of the workflows for the new solution, NCR is familiar with. This increased cost would also take into account some additional risk, due to the unknowns associated with a new customer implementation.

The Kiosks process a large volume of payments, volumes for 2017 and 2018 are noted below.

NYSEG

2017 - 176,958 payments (\$25M)

2018 - 173,717 payments (\$26M)

RG&E

2017 - 206,445 payments (\$31M)

2018 - 192,534 payments (\$31M)



Reasons and Benefits:

Benefits:

NCR has rich experience in automated cash acceptance and management given their expertise in ATMs and self-service and has the capabilities to deliver a proven bill payment solution.

The NCR solution will leverage Avangrid's existing backend systems, such as NYSEG's payments provider and other infrastructure components (e.g. Netweaver), minimizing changes to the environment outside of the kiosk solution. This reduces the cost and complexity of the project and allows more rapid implementation of the solution in accordance with the proposed project timeline.

The NCR team has deep knowledge of the existing Avangrid solution and business processes as the current incumbent provider. This knowledge base makes NCR uniquely qualified to complete the project on time and budget, as NCR will be replicating current workflows to the greatest extent possible to minimize the level of effort for development.

The NCR team is well-versed in all aspects of PCI compliance and is willing to support NYSEG in those discussions to develop a cost-effect and compliant card-based payments solution.

The NCR kiosk hardware is designed for use with the NCR bill payment solution and will allow NCR to rapidly migrate the bill payment application to a more modern architecture running on the latest Operating System.

The NCR kiosk hardware possesses specific features of great benefit for ADA compliance, such as the Universal Navigator (uNav).

The NCR kiosk hardware allows for the option of NYSEG self-installing, which can further reduce costs associated with the upgrade project

Risks:

Risks of not implementing the necessary upgrades include revenue impacts due to limitations on how customers make payments and customer dissatisfaction. Internal resources would also need to be used if manual customer payments had to be processed. Kiosk's also have rate case implications due to the topic of walk in office locations and the ability for customers to use Kiosks as documented in the rate case.

NYSEG and RG&E 5-Year Capital Investment Plan

PCI compliance risks:

- Cost of reissuing new payment cards
- Fraud losses
- Higher subsequent costs of compliance
- Legal costs, settlements and judgements
- Fines and penalties
- Termination of ability to accept payment cards

Five Year Capital Plan*All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
302	0	0	0	0

Common Customer Service

RG&E

Regulatory Driven Efforts	766
Energy Manager Enhancements	768
Customer Journey Redesign	770
Lab Equipment	773
Contact Center Knowledge Database	774
Kiosk Upgrade	777
Orchestration Platform - Customer Journey	780



RG&E

Regulatory Driven Efforts

Line of Business: Common
Category: Customer Focus

Scope:

This program covers SAP and other software system upgrades and enhancements that are required by New York regulatory mandates and rate case initiatives that will be funded by the business.

On an annual basis, there are anticipated regulatory requests which require business, internal IT, and external SWF resources to develop and implement the system changes necessary.

Forecasted work is planned for system impacts to the areas of Billing, Retail Access and FICA/Credit & Collection based on current and expected mandates.

Specific Retail Access initiatives: Price to Compare, Guarantee Savings for Mass Market Customers, Net Metering/EDI indicator, CCA/CDG Opt-Out programs, Mass Market Reject EDI Enrollment, Mass Market Indicator, CCA Phase 3 and Phase 4, Automate Net Credit Payments to CDG projects, system functions not working properly for regulatory required, DER flag and blocking process.

Specific Billing initiatives: CDG Automation Staggered Conversion and Post Go-Live Support, CDG Value Stack Banking Rule Changes, CDG Volumetric System Changes, Volumetric Alternate ESCO Billing Methodology, Volumetric Net Crediting, Volumetric File Automation, Volumetric Banking Rule Changes, Remote Crediting, Remote Crediting Net Crediting, Host Community Benefit Program, Standby & Buyback Rates, Value Stack Calculation Unbilled, Onsite Value Stack, Grandfathered Net Energy Metering, Time Varying Price, MV90 AMI Upgrade for Volumetric and Value Stack.

Specific FICA initiatives: COVID-19 low income credits, COVID-19 late payment charges and Arrears Management.

The forecasted estimates for the LTO are based on the expected development required along with historical hours/costs of similar complexity for system changes.

NYSEG and RG&E 5-Year Capital Investment Plan**Reasons and Benefits:**

Regulatory and Rate Case Compliance Requirement.

Risks of not doing this work are penalties and non-compliance.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
425	1,379	886	912	764

RG&E

Energy Manager Enhancements

Line of Business: Common
Category: Customer Focus

Scope:

1) To take the AMI metering data from our customers and be able to digest it into the Energy Manager platform so that we can send mid bill cycle alerts to our customers who we forecast to be potentially experiencing a higher-than-expected bill period.

This alert will empower the customer with insights specifically designed to help them reduce their energy usage or what tools/services we can offer to help the customer stay on track and not overspend on their energy.

These tools/services will be a mixture of home energy efficiency recommendations along with CLM programs or rebates that may be available to the customer.

The scope will be for the build, setup and configuration of this system and alerts.

2) Mobile capability and widgets to allow our customers in our mobile app to have the same full rich energy manager and usage experience that they would experience on the website.

These widget and integrations will include usage and comparison graphs, home surveys, energy efficiency advice, usage alerts, bill comparisons, near real-time interval data, and rates comparisons.

The scope will be for the integration implementation and configuration.

Reasons and Benefits:

Required to help us improve our customer experience and satisfaction as well as digital adoption across all our customer touch points.

Reduce high bill complaints, increase customer satisfaction and enhance our proactive notifications for our customers to help them make informed decisions about their energy usage.

Improve gap in JD Power CSAT scores for Easy to Business With - simple tools for managing my usage and utility costs.

Improve gap in JD Power CSAT scores for Reliability - application is evergreen, doesn't go out of support.

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Improve gap in JD Power CSAT scores for Value - available 24x7.

Decrease contact center call volumes for high bill complaints- complaint reduction.

Increase in app downloads.

Increase in app logins.

This will naturally increase overall enrollment in many programs due to being able to link a customer's energy usage more effectively to CLM programs and efficiency advice on their mobile devices.

Risks if not approved:

Customers who receive high bills will continue to raise complaints and have zero context given as to why their energy usage or bill amount has increased. Customers will fail to be educated into how to efficiently manage the energy in their home proactively.

Customers will only be able to have an energy usage experience on their responsive My Account portal and not via their mobile app.

Customers may rank us lower in JD Power metrics for not having key digital functionality as this drastically affects the UX for our mobile app customers.

Platform becomes outdated, customers are not provided with the latest in technology to support functionality for easier and most relevant solutions, system becomes unreliable with frequent outages. Decreased customer satisfaction and NPS scores increased call volumes and increased customer complaints.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
105	707	500	500	1,162

RG&E

Customer Journey Redesign

Line of Business: Common
Category: Customer Focus

Scope:

The RG&E Customer Journey Redesign Project will reimagine how customers interact with RG&E across the company's most critical touchpoints. 2021 JD Power and Associates residential satisfaction studies and the RG&E Voice of the Customer (VOC) program have highlighted the need to further develop key customer journeys. Through the development of a matrix, key journeys for redesign have been identified and prioritized based on the following criteria: customer satisfaction, cost reduction, strategic value and complexity.

Those journeys will include (in order of priority):

- Redesign the Outage end to end journey
- Redesign the Energy Usage end to end journey
- Redesign the High Bill/Bill Issues end to end journey
- Redesign the Payments end to end journey
- Redesign the Service Appointments end to end journey
- Redesign the Account Updates end to end journey

The Customer Journey Redesign Program is rooted in an iterative process called Design Thinking. Design Thinking is used by some of the world's largest brands, including Bank of America, T-Mobile, Airbnb and Apple. Through this process, RG&E will go through five phases per journey to understand the end user and identify solutions that will result in new end-to-end journey maps and customer-tested prototypes for IT production and implementation.

The purpose of the RG&E Customer Journey Redesign Program is to address key customer pain points identified as part of 2021 JD Power findings.

1. **Simplicity:** How RG&E guides customers through their energy lifestyle should be intuitive for the customer – transferring service should be a 2-minute process that can easily take place from a mobile device. Requesting a service appointment should include a receipt confirmation with follow up steps and energy usage reports should be clear and easy to read. The RG&E Customer Journey Redesign Program will

NYSEG and RG&E 5-Year Capital Investment Plan

address all current processes and steps and layer those against customer research to uncover the clearest journeys for implementation.

2. **Reliability:** Regardless of the journey, customers should be able to expect real-time communications about changes to their account, service status and outages. Even if there is a situation, such as an outage, that is out of the company's control, swift messages and updates should become the expectation so there is no ambiguity or doubt about RG&E's ability to handle any given situation.
3. **Making Our Company Easy to do Business With:** Whether a customer wants to contact RG&E by phone, email, or within the app, the company has a responsibility to make that journey easy from end-to-end. In order to ensure real-time accuracy and monitor customer sentiment associated with journey redesigns, the company will implement Net Promoter Scoring (NPS) along different customer journey interactions. NPS will allow for quick surveying, as well as immediate cross-industry comparison and benchmarking. It will also allow us to monitor what journeys are running seamlessly and which sections are causing customers pain.

The Design Thinking Process for the Customer Journey Redesign Program involves the following steps and activities:

1. **Empathize – Research your users' needs**
 - a. This is the research portion of the process where the company works to gain an empathetic understanding of the issues at hand, through user research. This step allows RG&E to set aside assumptions about energy journeys and gain real insight into customer needs.
2. **Define – State your users' needs**
 - a. Here is where information is analyzed and observed to synthesize core problems and trends amongst customers. These problem statements help to draft personas before moving on to the next phase.
3. **Ideate – Challenge assumptions and create ideas**
 - a. This is where the company first begins to brainstorm and look for alternative ways to view the journey problems and identify innovative solutions.
4. **Prototype – Start to create solutions**
 - a. The aim in this phase is to identify the best possible solution for each problem found. RG&E will produce scaled-down, prototype versions of the journeys (or specific features found within the journeys) to investigate.
5. **Test – Try your solutions out**
 - a. Rigorous testing of concepts and prototypes will ensue with a customer set for feedback and additional iterations. Pending additional updates and testing, the concepts are ready to hand over to IT and development teams.

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Reasons and Benefits:

The RG&E Customer Journey Redesign Program will ultimately drive down the cost to serve customers because customers will become more empowered to act on new and improved self-service actions and will be able to rely less on the call center for support. The improved UX and designs will translate to a simpler journey for the customer, which lends to improved Customer Satisfaction and better operational efficiencies on the back end. With new journeys in place, digital adoption will be integrated from end to end, providing more automated steps that help customers and call agents. For example, if more customers are enrolled in Outage Alerts, more customers can feel reassured about the status of their home electricity.

Risks: Without the RG&E Customer Journey Redesign Program, we will continue to have one of the highest cost-to-serve amounts for our customers out of all the other utility companies benchmarked by JD Power. We will be unable to fully drive digital adoption and increase customer satisfaction from being the bottom of JD Power.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
308	308	315	321	328

RG&E

Lab Equipment

Line of Business: Common
Category: Customer Focus

Scope:

Various types of Lab and Field Measurement Equipment for gas and electric measurement operations support.

Currently RG&E only has the capability to test up to 14.4 kV transformers. The 2023 plan includes purchasing and installation of test equipment to allow transformer voltage testing up to 36 kV. The Company will purchase and install a Knopp Precision Multirange Voltage Transformer Standard (KVTS-2J6-3) from TESCO. Project costs also include support for the device for a period of five years from the date of receipt of the equipment at RG&E.

Reasons and Benefits:

Equipment used by field personnel is required by PSC, ASTM, ANSI, and other entities to be calibrated and maintained to operate correctly when field personnel need to use it. The lab performs calibrations and repairs on this equipment. The Company needs to purchase and upgrade lab equipment such as pressure calibration equipment, electric calibration equipment, and meter testing equipment for PSC and safety regulations as well as measurement/metering regulations.

The ability to test 34.5 kV transformers in accordance with ANSI C12.1 is necessary as RG&E has begun installation of 34.5 kV metering transformers throughout its territory. Under PSC requirements, ANSI C12.1 sample testing procedures on revenue metering equipment must be followed. The current testing equipment is not rated for this voltage.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
150	336	250	250	250

RG&E

Contact Center Knowledge Database

Line of Business: Common
Category: Customer Focus

Scope:

Source and implement a tool that will deliver a full array of knowledge database functions for real time referencing by all contact center representatives, vendors (IQor) and associated staff to enable accurate advice to customers for a best in class customer experience. Additional functionality of the tool will identify opportunity for integration between the core database and features that would provide the backbone for automated and live representative chat while also delivering seamless email responses to customer requests/questions. The Knowledge Database should afford:

- Easy access from SAP
- Reuse existing content NYSEG & RG&E (2023)
- Type Ahead Search
- Partial phrase and tag search
- Informative search results
- User friendly navigation
- Mobile Friendly
- Use of key info callouts
- Trending content
- Quick links
- Bookmark content
- Quick (speed to open)
- Nested content
- CSR feedback on content
- Usage Reports/Dashboards by page/CSR
- Article version control & process
- Multiple document types
- Supports videos
- Decision trees/troubleshooting
- Display real time schedule info

- Push content to users
- Automatic email to users of updated content
- Customized notifications of content changes by user
- Notification page with all important items
- (Optional) Manage customer inquiry emails
- Ease of Content editing
- Ease of Article Creation
- Templates for presentation and content consistency
- Optional content expire date
- Admin Dashboard (content searched), and will also:
- Facilitate consistent creation and display of easily scannable and quotable content (i.e., quick hits)
- Enable consistency in content authoring and administration
- Enable creation of strategic templates library for displaying content in alignment with industry standards

Reasons and Benefits:

Benefits:

A robust core knowledge database that enables several customer channels will have these impacts:

- More Accurate Information, which affords:
- Improved First Call/Email Resolution and/or Reduced call backs
- Decreased escalation
- Informed Web Content
- Reduced CSR error
- Better understanding of customer information needs, which affords:
- Informed customer communications for all channels
- Informed process improvements
- Quicker Access to Content
- Less – or no - hold time
- Improved Average Handling Time
- Reduced CSR training time
- Diversified employee experience
- Knowledge preservation
- Minimize CSR process gaps
- Facilitates meeting regulatory requirements

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This will foster resource planning and provide data that drives placing the best resources against the greatest customer need

Risks:

The current situation with separate, make-shift knowledge databases does not address the following:

- CSRs work is complex
- CSRs lack efficient tool to quickly find succinct answers to respond to customers
- Search function and need to download documents extends search times for desired content that extends average handle time, impacts customer experience
-
- Our current outsourcing strategy requires additional coordinated support related to knowledge sharing & consistency
- Fragmented day-to-day administration

Meeting customer satisfaction expectations and internal/regulatory service level requirements, while providing representatives with the tools/knowledge they need, are both Customer Service and Networks goals. If an integrated tool that is implemented across all the companies is not pursued, Customer Service will continue to struggle with:

- Non-compliance to regulatory mandates that result in penalties
- Reduced customer satisfaction
- Increased Average Handling Time
- Increased number of repeat customer contacts
- Increased backlogs of email work
-

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	384	0	0	0

RG&E

Kiosk Upgrade

Line of Business: Common
Category: Customer Focus

Scope:

NCR is the existing vendor for NYSEG and RG&E customer walk-in office self-serve payment kiosks. Current kiosk functionality is very outdated - software, hardware and operating systems are nearing end of life cycle. Microsoft support (for windows 7 Professional operating system) ended 01/2020. Hardware is the original machines which were installed in 2012. A PDD was submitted and approved for 2020 for necessary hardware and software upgrades.

NCR is the existing vendor for NYSEG and RG&E customer walk-in office self-serve payment kiosks.

Currently functionality experiences regular performance issues due to outdated software and hardware. Service calls often require replacement parts which can only be found as refurbished due to age of hardware.

Based on Avangrid environment, operational model, and backend systems, a new customer implementation would be approximately 35-40% higher (around \$415,000-\$430,000 total), due to the need to perform a far more in-depth discovery engagement to document those aspects of our business of which NCR is already familiar. Some of this would also impact the Design phase, as many of the workflows for the new solution, NCR is familiar with. This increased cost would also take into account some additional risk, due to the unknowns associated with a new customer implementation.

The Kiosks process a large volume of payments, volumes for 2017 and 2018 are noted below.

NYSEG

2017 - 176,958 payments (\$25M)

2018 - 173,717 payments (\$26M)



RG&E

2017 - 206,445 payments (\$31M)

2018 - 192,534 payments (\$31M)

Reasons and Benefits:

Benefits:

NCR has rich experience in automated cash acceptance and management given our expertise in ATMs and self-service and has the capabilities to deliver a proven bill payment solution.

The NCR solution will leverage Avangrid's existing backend systems, such as Avangrid's payments provider and other infrastructure components (e.g. Netweaver), minimizing changes to the environment outside of the kiosk solution. This reduces the cost and complexity of the project and allows more rapid implementation of the solution in accordance with the proposed project timeline.

The NCR team has deep knowledge of the existing Avangrid solution and business processes as the current incumbent provider. This knowledge base makes NCR uniquely qualified to complete the project on time and budget, as NCR will be replicating current workflows to the greatest extent possible to minimize the level of effort for development.

The NCR team is well-versed in all aspects of PCI compliance, and is willing to support Avangrid in those discussions to develop a cost-effect and compliant card-based payments solution.

The NCR kiosk hardware is designed for use with the NCR bill payment solution and will allow NCR to rapidly migrate the bill payment application to a more modern architecture running on the latest Operating System.

The NCR kiosk hardware possesses specific features of great benefit for ADA compliance, such as the Universal Navigator (uNav).

The NCR kiosk hardware allows for the option of Avangrid self-installing, which can further reduce costs associated with the upgrade project

Risks:

Risks of not implementing the necessary upgrades include revenue impacts due to limitations on how customers make payments and customer dissatisfaction. Internal resources would also need to be used if manual customer payments had to be processed. Kiosk's also have rate case implications due to the topic of walk in office locations and the



NYSEG and RG&E 5-Year Capital Investment Plan

ability for customers to use Kiosks as documented in the rate case.

PCI compliance risks:

- > Lost confidence, so customers go to other merchants
- > Diminished sales
- > Cost of reissuing new payment cards
- > Fraud losses
- > Higher subsequent costs of compliance
- > Legal costs, settlements, and judgements
- > Fines and penalties
- > Termination of ability to accept payment cards
- > Lost jobs (CISO, CIO, CEO, and dependent professional positions)
- > Going out of business

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
201	0	0	0	0

RG&E

Orchestration Platform - Customer Journey

Line of Business: Common
Category: Customer Focus

Scope:

A platform to digest data from all of our customer touch points across digital, call center, billing, and offline channels to allow us to easily segment and develop individual rules and campaigns that create personalized engagements and experiences with us.

These personalized experiences will be tailored towards the individual customer's current journey, situation or account state, and they will enable us to proactively communicate and display relevant content to the customers regarding next best actions and recommendations.

This will allow us to truly get a 360-degree view of our all customers and how they engage with us so we can provide a proactive and personalized experience.

Reasons and Benefits:

Benefits: Allows the business to truly understand and segment our customer base to give them personalized experiences. No more will we only be able to segment our customers geographically, or by payment types. We will be able to segment our customers based on how they engage with us digitally, or if they choose to do one action on one platform and another action on a different platform, or if they are having an issue and are displaying certain behaviors, and really stitch together a journey for them to make dealing with their energy company seamless and empowering.

Once segmented we will be able to communicate with these customers via chosen contact channels. For example, set up rules that if we know they haven't logged into the mobile app in the past 6 months, then don't send a push notification, try and send an email or SMS instead to relay important account information.

We will also be able to set up real time rules so when customers are engaging with us digitally, we can change the messaging and content on our website so that it is tailored to them and their current needs. Such as a customer who has recently called the contact center and then logged in, we could pre-populate their next best action on the website or app so that it is a natural follow on from the conversation they just had with us via the contact center. Bringing our customer touch points together is key to increasing customer

NYSEG and RG&E 5-Year Capital Investment Plan

satisfaction across all our engagements.

We will also be able to track successes or errors in our end-to-end journeys to address them before the customer experiences an issue. This will in turn reduce complaints, improve customer satisfaction and improve the analytics of our offline and online journeys. This also allows us to optimize our journeys to ensure we are always meeting the needs of our customers and their changing behaviors before it's too late.

Risks if not approved: We will not be able to fully understand how our customers engage with us since data and touch points will continue to sit spread across multiple different backend systems that do not talk to each other. We will be unable to segment and personalize journeys for any of our customers so they will not receive a digital experience that they should expect from a global utility company. We will fail to overall improve the customer satisfaction and still be bottom of the JD Power ranking for utility companies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	130	0	0	0



Common Fleet

NYSEG

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NYSEG

Fleet Replacement Program

Line of Business: Common
Category: Fleet

Scope:

This is a program to replace light-, medium- and heavy-duty fleet vehicles and vehicular construction equipment. Light-duty vehicles consist of passenger cars, light trucks, minivans, passenger vans, pickup trucks, and sport utility vehicles. These vehicles have a gross vehicle weight rating (GVWR) of under 10,000 pounds. Medium-duty equipment includes vehicles such as dump trucks, stake trucks, step vans and other vehicles with a gross vehicular mass rating (GVMR) between 10,000 and 26,000 pounds. Heavy-duty equipment includes vehicles such as bucket trucks, digger derricks, semi-tractors, large dump trucks and other vehicles with a GVMR greater than 26,000 pounds. Vehicular construction equipment includes equipment such as back hoes, excavators, all-terrain vehicles, forklifts, tracked digger, cargo trailers, flatbed trailer and pole dollies.

Reasons and Benefits:

The program replaces vehicles to maintain a reliable and safe fleet.

The Fleet Replacement Program will provide a safe, reliable, regulatory compliant and cost-effective fleet of vehicles and equipment to NYSEG, enabling the Company to deliver optimum network performance and customer service.

Fleet Services strives to achieve economies of scale that result in cost reduction opportunities by utilizing national contracts, standardized or “Off the Shelf” specifications and, wherever feasible, to take advantage of preferential purchasing terms in accordance with procurement guidelines.

The annual Fleet Replacement Program is based on unit age and/or usage (Miles/Hours). Understanding that units achieving the replacement criteria based on age and/or mileage are proposed for replacement and the results checked and collated to form the Fleet Replacement Matrix. This criterion ensures that the optimum combination of age and mileage is attained, while also taking into consideration the total cost of ownership.

Model year advancements by the vehicle and equipment manufacturers are factored into the acquisition process to ensure that the latest technical and safety features are included when applicable. Changes in operational requirements are also considered, based on feedback from the end-users of the fleet.



NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
29,000	20,000	20,000	20,000	20,000



NYSEG

Global Telematics Solution

Line of Business: Common
Category: Fleet

Scope:

Upgrade and equip all NYSEG light, medium, and heavy duty fleet vehicles with Telematics devices; in 2022 1,160 NYSEG vehicles will be equipped with telematics. This will replace the old and outdated telematics technology with new technology. Project includes hardware and installation cost.

Reasons and Benefits:

Telematics captures real time data from the vehicles including but not limited to mileage, fuel, GPS location, Speed, and engine diagnostics to name a few. This data can be used to optimize vehicle use and assignment, reduce idling, locate vehicles in real time, monitor driving behavior and identify coaching opportunities and compliment the fleet maintenance program. Benefits include:

- 1) Increase health and safety for our drivers
- 2) Reduce fuel consumption and CO2 emissions
- 3) Maximize vehicle utilization and productivity
- 4) Improve vehicle maintenance monitoring
- 5) Determine feasibility of alternate fuel vehicles such as electric vehicles
- 6) Improve/enhance real time vehicle tracking

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
420	0	0	0	0

Common Fleet

RG&E

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RG&E

Fleet Replacement Program

Line of Business: Common
Category: Fleet

Scope:

This is a program to replace light-, medium- and heavy-duty fleet vehicles and vehicular construction equipment. Light-duty vehicles consist of passenger cars, light trucks, minivans, passenger vans, pickup trucks, and sport utility vehicles. These vehicles have a gross vehicle weight rating (GVWR) of under 10,000 pounds. Medium-duty equipment includes vehicles such as dump trucks, stake trucks, step vans and other vehicles with a gross vehicular mass rating (GVMR) between 10,000 and 26,000 pounds. Heavy-duty equipment includes vehicles such as bucket trucks, digger derricks, semi-tractors, large dump trucks and other vehicles with a GVMR greater than 26,000 pounds. Vehicular construction equipment includes equipment such as back hoes, excavators, all-terrain vehicles, forklifts, tracked digger, cargo trailers, flatbed trailer and pole dollies.

Reasons and Benefits:

The program replaces vehicles to maintain a reliable and safe fleet.

The Fleet Replacement Program will provide a safe, reliable, regulatory compliant and cost-effective fleet of vehicles and equipment to RG&E, enabling the Company to deliver optimum network performance and customer service.

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Model year advancements by the vehicle and equipment manufacturers are factored into the acquisition process to ensure that the latest technical and safety features are included when applicable. Changes in operational requirements are also considered, based on feedback from the end-users of the fleet.



NYSEG and RG&E 5-Year Capital Investment Plan***Five Year Capital Plan****All amounts shown below in thousands (\$000's)*

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,700	5,689	9,208	6,111	6,214

RG&E

Global Telematics Solution

Line of Business: Common
Category: Fleet

Scope:

Upgrade and equip all RG&E light, medium, and heavy duty fleet vehicles with Telematics devices; late 2021 and January 2022 400 RG&E vehicles were equipped with telematics. This replaced the old and outdated telematics technology with new technology. Project includes hardware and installation cost.

Reasons and Benefits:

Telematics captures real time data from the vehicles including but not limited to mileage, fuel, GPS location, Speed, and engine diagnostics to name a few. This data can be used to optimize vehicle use and assignment, reduce idling, locate vehicles in real time, monitor driving behavior and identify coaching opportunities and compliment the fleet maintenance program. Benefits include:

- 1) Increase health and safety for our drivers
- 2) Reduce fuel consumption and CO2 emissions
- 3) Maximize vehicle utilization and productivity
- 4) Improve vehicle maintenance monitoring
- 5) Determine feasibility of alternate fuel vehicles such as electric vehicles
- 6) Improve/enhance real time vehicle tracking

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
17	0	0	0	0

Common Information Technology

NYSEG

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NYSEG

Client Project Requests and Integration Projects

Line of Business: Common
Category: Information Technology

Scope:

The program is for business initiatives identified by the Networks business areas for future efficiency projects. NYSEG has a rigorous process of identifying the technology needs of the business, gathering information, vetting the project list and prioritizing based on need, business value and resource availability. The Project Demand Planning cycle runs annually and involves collating the requirements across all business areas for projects requiring IT expenditure. Projects are prioritized by the Vice Presidents in each business area before completing the estimation and capacity planning process. This process runs from the beginning of May through the end of August each year. The final portfolio is then presented back to senior management at the end of August for acceptance. Given the above timetable the final project list for 2023 and beyond does not exist at the time of this filing.

Examples of projects identified and delivered/in delivery as part of the client project request process include the below

NET-RPA Electric & Gas Operations
NET-OP-13-Contractor Portal
NET-IT-Click-Gas inspections and scheduling
NET-CS-06-N14-N17-N18-Digital Projects
NET-CS-Customer Insights-AGR
NET-CS-03-Regulatory Driven Efforts-NY
NET-CS10-RL1 WORKLOAD MANAGEMENT AND OPTIMIZATION
NET-Metering & Billing systems upgrade project
NET-ACD ROUTING AND TECHNOLOGY
NET-SG-17-Enterprise GIS Upgrade and Modernization

This list includes projects delivering efficiencies, such as Robotic Process Automation (delivered through RL1 Workload Management and Optimization and RPA Electric and Gas Operations) which automates low value transactions to free up resources to work on other tasks.

There are projects included to manage technological obsolescence by upgrading systems

NYSEG and RG&E 5-Year Capital Investment Plan

onto the latest vendor supported versions, with Metering & Billing systems upgrades, ACD routing project updating call center technologies, and GIS upgrade moving to supported HW and SW platforms.

Digitization and Customer experience is included in our Digital Projects program, enhancing our websites and mobile application, and introducing new functionality for customers to self service and access information regarding their account and outages. Customer insights is providing data analytics information to better understand our customers and allow for development of improved processes based on these insights.

Reasons and Benefits:

This program allows for process improvements within the different business areas for NYSEG.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	8,177	9,767	9,284	9,312

NYSEG

END USER Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

The overall goal of this project is to refresh NYSEG’s computing devices following the refresh lifecycle defined for the company (4 years) for users in scope. This project also provides personal computers (PC) in support of new hires and refresh demand requirements enterprise wide.

Reasons and Benefits:

Replace aged equipment with new PCs to avoid service disruptions due to PCs not working properly due to their age. New computers will provide higher computing capabilities. This project also provides PCs in support of new hires and refresh demand requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,927	1,070	1,095	1,100	1,116

NYSEG

Microsoft Deployment Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This project captures the work associated with Microsoft Enterprise Agreements and all the services provided to the Company end user. These services include business collaboration (email, messaging, and virtual meetings), operating system, applications, and security protection.

Reasons and Benefits:

Ensures that all users at NYSEG are provided with the correct Microsoft products to perform their business operations, run applications, and ensure effective collaboration. The project provides Microsoft software and licenses to new employees and new server infrastructure.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	2,645	0	0	2,700

NYSEG

WINTEL Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing NYSEG’s Wintel infrastructure following the four-year refresh lifecycle defined for NYSEG. Wintel infrastructure includes primarily servers, chassis, and server blades. This infrastructure is primarily hosting NYSEG applications and SQL databases. This will provide Wintel Infrastructure that supports the company’s organic growth.

Reasons and Benefits:

Hardware running beyond four years is more likely to provide performance issues that may affect the applications hosted on it. Replace aged equipment with new Wintel equipment to avoid application performance issues or service disruptions due hardware not working properly. New devices also provide higher performance and capabilities for a better application and data management performance.

This project provides server computing growth for company application and database organic growth.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,396	806	835	839	853

NYSEG

UNIX Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing NYSEG’s Unix equipment following the five-year refresh lifecycle defined for NYSEG. Unix equipment include primarily IBM AIX Frames and HMC controllers. This project also provides UNIX equipment in support to company data growth

Reasons and Benefits:

Hardware running beyond five years is more likely to provide performance issues that affect the applications hosted on it. Replacing aged equipment with new Unix equipment avoids application performance issues or service disruptions due hardware not working properly. New devices also provide higher performance and capabilities for a better data management performance

One of the main technologies hosted on Unix equipment are high performance databases. Another benefit from this program is the capacity to provide database growth following company data growth

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
327	386	916	925	1,140

NYSEG

STORAGE Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing all data storage equipment following the four year refresh lifecycle defined for NYSEG. Storage equipment includes primarily storage virtual switches, SAN directors and switches, storage arrays, file storage, and backup units.

This storage will be used to provide data storage capabilities to the company applications, and company data network shared drivers. It also includes the hardware required to ensure company data is correctly backed up allowing data recovery when necessary. This will provide storage equipment to support company data growth.

Reasons and Benefits:

Replacing aged equipment with new storage equipment to avoid service disruptions due to aged hardware not working properly. New devices will provide higher storage performance and capabilities for a better data management performance; and provide data growth to new applications, user's data and company data storage needs.

Another benefit of this project is the capacity to refresh and the growth in company data backup infrastructure, ensuring data protection. This allows data to be restored from an earlier point in time to help the business recover from an unplanned event. Storing the copy of the data on separate mediums is critical to protect against primary data loss or corruption

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
341	695	709	724	739

NYSEG

SAP Enhancements

Line of Business: Common
Category: Information Technology

Scope:

This project will deliver a suite of changes following SAP ECC technical upgrades and the introduction of CRM 7.0 into NYSEG which is needed to support AMI metering.

Following a large scale implementation such as the NY AMI project it is anticipated that a program of changes will need to be delivered post go live, as users use the new system and enhancements are identified to improve the effectiveness of the new processes. The exact process changes at this stage are unknown, but following a large transformation project like AMI, with significant system changes (technical upgrade of SAP ECC, moving to SAP Hana Databases, implementing SAP CRM) it is anticipated that a number of process changes and/or improvements will be identified as users begin to use the new processes. This project will be scoped in the months following the NY AMI go live in Q3 2022.

Reasons and Benefits:

This project will support the NY AMI project and any changes needed to business processes in the system(s) following implementation.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	828	1,332	828	0

NYSEG

NETENG Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

The objective of the Network Engineering Lifecycle program is to plan and implement a continuous improvement and refresh process every seven years, such that NYSEG’s network infrastructure meets or exceeds established availability requirements. The lifecycle plan is also the Company’s mechanism for ensuring that the network infrastructure is scalable, meeting the increasing demands of our business users.

Reasons and Benefits:

Infrastructure replaced under this program company equipment and devices that are at end of life and include: Cisco Switches, routers, switches, WiFi access points and WiFi controllers to avoid service disruptions due to hardware not properly working. New devices and equipment provide higher network capabilities and support company growth.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
469	565	591	588	600

NYSEG

GIS Utility Network Model Implementation

Line of Business: Common
Category: Information Technology

Scope:

This is Phase 2 of the ESRI UN Deployment project to transition NYSEG to the geometric Utility Network Model for our geospatial solutions (see Page 805 for information regarding Phase 1). These solutions provide map based master data to field and office workers and enable business process execution through map based user interfaces. The geospatial data model is integrated with many of our systems and processes within NYSEG. Examples of these are

Asset Management Systems (SAP): SAP and GIS equipment are integrated as SAP owns the equipment information and the technical information is programmatically passed to the GIS database for viewing. The Circuit ID is owned by GIS and is passed programmatically to SAP to update the equipment Functional Location which includes the Circuit.

Outage Management Systems (OMS): The GIS provides OMS with the electric data model and circuit connectivity which is used for outage management predictions and processes.

CYME simulation and forecasting models: CYME performs load forecasting and grid modeling analysis for planning purposes. It relies on the GIS data model, circuit connectivity and attributes to do its analysis. Extracts from GIS are performed and fed into this software suite.

Field Workforce Mobility for long cycle construction work: FWM is used to show GIS network equipment data on the map within this mobility application. The integration between GIS and SAP is also needed here as the functionality within FWM allows for SAP functions within the map by clicking on the GIS equipment data. An automated process runs to send FWM the latest GIS data.

Transmission for substations: The transmission GIS data is used with RTU communications for status/control of devices. We also use the data for transmission network analysis, allowing the operators to conduct what if scenario planning, system load capacity forecasting in the event of failures and customer outage impacts.

NYSEG and RG&E 5-Year Capital Investment Plan

Outage map views on website utilizes data from the OMS platform modelled using the GIS Data Model: OMS sends the GIS unique equipment ID's. This allows for the creation of a GIS file showing outage locations which ends up as points on the customer facing outage map.

The existing Data Model is to be retired by the vendor in the coming years. This will change the data model used by the Company and move to a more modern utility specific model.

Reasons and Benefits:

The current data model within the ESRI solution is to be retired by and no longer supported by the vendor. If this upgrade is not completed, a failure in the existing system could result in complete loss of functionality.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	801	801	801	0

NYSEG

Digital Journey EDB Transformation

Line of Business: Common
Category: Information Technology

Scope:

This project will deploy new functionalities to increase the self-service experience of the NYSEG Digital Customer by promoting the existing options and implementing new functionalities like online Move-In/Move-Out experience, preferences and alerts, enhance outage management, improvements on Billing and Payment process, Web Chat and online service appointments. These new functionalities will allow the customers to enroll into different services through website or mobile app.

NYSEG will be able to review customer issues, find and address pain points/barriers, ideate solutions, and evaluate feasibility of each solution for addition to digital initiatives/roadmap.

Reasons and Benefits:

The benefits of this project include the following:

- Drive Customers to more self-service options to lower call wait time and increase customer service.
- Improve customer communication about online services, outages, and safety.
- Clarity of info on billing and provide different methods to pay bills.
- Provide energy usage and efficient information.
- Simplify key processes more easily accessible and enhance customer digital experience (websites and mobile app).

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
901	819	0	0	0

NYSEG

NETSEC Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing NYSEG’s network security devices following the seven year refresh lifecycle defined for the company. Network security devices include primarily Firewalls, Proxies, IPS, AntiDDos or SSL decryption devices. This project also provides network equipment to support new offices or company assets that require secure corporate connectivity.

Reasons and Benefits:

Replace aged equipment with new network devices to avoid service disruptions due hardware malfunction or failure. New devices also provide higher network security capabilities and provides network equipment to support company growth.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
345	236	278	280	283

NYSEG

Click Upgrade and Long Cycle Work

Line of Business: Common
Category: Information Technology

Scope:

Our current scheduling tool for our networks operation, Click Scheduler, was set to be discontinued in 2023 after the purchase of the vendor ClickSoftware by SalesForce in 2019. In 2020, we began the process of reviewing replacement options for our scheduling tool. After capturing our business requirements, a Request for Proposal was sent to inquiring vendors to showcase their solution based on these requirements. Responses were received from Microsoft, SalesForce, IFS and Oracle. After analyzing both the RFI and RFP responses, and attending more than 50 hours of demonstrations of the solutions tailored to Avangrid Networks Business requirements and needs, IFS was the chosen vendor to offer the best solution both to Avangrid as well as our rate payers. IFS was the strongest candidate in Automatic Scheduling and Optimization, Reporting, Collaboration, Workflow Management as well as rating highly in Route Optimization, Map Integration and Master Data & Schedule Configuration. IFS will offer Avangrid great value to our rate payers and operations teams.

The scheduling tool is used to create work schedules based on priority, route optimization, job length and crew capabilities. This provides the operations teams with the ability to manage the work delivery while optimizing the travel time and resources to complete the work.

Reasons and Benefits:

This project will prevent obsolescence and provide a supported system to end users.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,366	0	0	0	0



NYSEG

ESRI UN Deployment

Line of Business: Common
Category: Information Technology

Scope:

This project will replace the Company's current GIS system to the Utility Network Model (UNM). This is a two phase project. Phase one will focus on the Gas line of business and will take 12-18 months long to complete. The existing data model is to be retired by the vendor in 2026. This will change the data model used by the Gas line of business and move to a more modern, utility specific model. Phase 2 will include the Electric line of business and will be a three year project (see Page 800 for Phase 2 information)

Reasons and Benefits:

Migration of the current GIS geometric data models to the Utility Network model will prevent obsolescence as the old data model is being retired and replaced by the vendor in 2026. Upgrading will address the end of life and provide NYSEG with a fully supported solution.

Additional benefits of moving to the UNM include; a rule based engine that supports and enforces higher quality data entry, reduced data latency between enterprise systems due to native service oriented architecture, new branch versioning structure reduces performance impacts of long-running designs and this addresses current GIS software's end-of-life timeline. For Asset Management, a higher fidelity data model enables more granular tracking of real-world assets, such as substation internals, SCADA, and AMI equipment and controllers as well as Gas devices and network assets. Enhanced capabilities for modeling network data with greater detail and real-world representation of connectivity via use of associations. ArcGIS Pro is the new generation professional desktop application from Esri used to manage the GIS gas network with Utility Network Model. This application provides exponential performance improvements in startup, saving, edits and redrawing compared to traditional ArcMap. Enhanced Operations and Field Work through platform-integrated mobile applications supporting common GIS workflows. Inherent information security, with single user identity authorizes platform access across desktop, web, and mobile use cases. The solution has an improved data exchange, with flexible schema and standard export functions by feeder/pressure zone are designed to better support OMS, ADMS and planning solutions. The Utility Network model allows for a programmatically created schematic view of the network.

NYSEG and RG&E 5-Year Capital Investment Plan

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
955	0	0	0	0

NYSEG

Liferay WCM Implementation

Line of Business: Common
Category: Information Technology

Scope:

The NYSEG web site is currently hosted on WebSphere Portal platform which was initially supported by IBM. IBM has divested the Portal product to HCL(an IT services company). NYSEG is implementing the new strategy to migrate all web servers to Microsoft Azure cloud infrastructure, web applications to a containerized platform AKS and Web content to Liferay DXM (Digital Experience Manager).

Implementation of Microsoft AKS environment will enable us to install container platform that makes it easier to install and scale up the customer web site to handle the load during storm situation. This new technology will make the implementation of Customer Digital Journey projects simpler and faster because we are migrating to cloud infrastructure as a service. The modular development will not require the complexity of the entire portal but a subset of the functionality can be developed and deployed as a service. We can deploy a Liferay Pod that will support one specific Website/service and not be constrained by the configuration of a big environment. This strategy will allow the scale up of individual sites that are under significant load during storms and minimize the resources for the sites that are not significantly accessed. The integration with the application such as MyAccount will be smoother since there is a significant IT effort to implement the applications using Microservices and containers.

Reasons and Benefits:

This new Liferay DXM implementation and Microsoft Azure cloud infrastructure would be reliable and scalable quickly and ensure that our web sites and mobile apps are accessible for all customers during the storm situations. The new cloud infrastructure and Liferay DXM platform is positioned as a state of the art, reliable and scalable platform, providing services adapted to current needs and flexible to accommodate future Business and Customer requirements, with enriched features and capabilities. The new technical architecture based in a SW Containerization Solution, will enable the creation of independent sites, components, deployed on containers that will optimize the use of virtual infrastructure, automate scalation and will provide simplified access through APIs.

The Liferay migration will offer improved look and feel, mobile responsive design, with a simplified content structure and better navigation experience.



NYSEG and RG&E 5-Year Capital Investment Plan

This project will be a key factor for the successful achievement of the different goals, technology harmonization and reduce time to market in launching services/features in customer digital channels (Web and Mobile) but also enable future digital channels through a standardized API's and Microservices layer.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
875	0	0	0	0

NYSEG

Pure Engage to Pure Connect Migration

Line of Business: Common
Category: Information Technology

Scope:

This project will standardize our telephony technology across the NYSEG for call centers and deliver Opex savings of \$240,000 per annum in reduced support and maintenance. The project includes the transition from IVRs from the Pure Engage platform to Pure Connect platform.

NYSEG call centers currently use Genesys Pure Connect software for the call routing and call recording, but are using Pure Engage IVRs for the self-service applications and menu selections. Moving to the Pure Connect software will provide a consistent platform for NYSEG, provide some configuration capabilities for internal resources to make small changes to IVR menus, and realize Opex savings through standardization of support vendors.

Reasons and Benefits:

Increase autonomy in the business team to enable future small changes to IVR menus to be completed internally using configuration rather than through an external vendor.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
841	0	0	0	0

NYSEG

RPA Electric and Gas Operation

Line of Business: Common
Category: Information Technology

Scope:

Robotic Process Automation (RPA) is to identify processes that are repetitive, time-consuming and use multiple applications/systems across Customer Service and Networks operations areas. After this initial discovery of use cases, a roadmap of processes to be automated will be defined and the bots identified will be created.

As data and regulatory compliance increases, Networks Operations employees have to handle greater workloads, which are susceptible to human errors and problems with the data accuracy. The execution of repeated tasks impacts directly in the employees' motivation, reducing their productivity and wellbeing.

These repetitive processes can be automated using a robotic process automation tool (RPA). RPA refers to a type of automation which interacts with a computer-centric process through the existing User Interface. This type of user is referred to as a 'robot' or 'bot'

Reasons and Benefits:

Using robots to automate repetitive Networks Operations processes it will be possible to reduce human errors, to improve accuracy in the processes, to increase employees' wellbeing as the automation will enable them to perform more interesting tasks and to be more creative and innovative.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
460	294	0	0	0

NYSEG

Contractor Portal

Line of Business: Common
Category: Information Technology

Scope:

This project will deliver a web based external platform for use by NYSEG contractors working on construction projects to allow them to manage the invoicing through the use of compatible units and Pay IDs to complete work and receive payments administered through this tool. This platform will reduce low value administration by integrating the front-end platform to the system of record (SAP) to achieve this automation.

Reasons and Benefits:

Implementation of a portal will provide efficiencies to end users by automatically processing work items based on standard processes and reducing the administrative work. Reduces administration type work to allow field workers to focus on core tasks.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
664	0	0	0	0

NYSEG

Customer Insights

Line of Business: Common
Category: Information Technology

Scope:

Advanced Analytics is becoming increasingly vital to NYSEG's business operations and customer service in the Utilities industry. Analytics Solutions are the enabler to use one of the key assets of the Company, the data, to improve decision making and increase value from our network's assets and customers' base.

The Customer Insights project will allow Customer Service to better understand their customers, their preferences and pain points, optimizing Marketing and Customer Intelligence areas performance through available customer information such as energy consumption profiles obtained from Advance Metering Infrastructure (AMI).

To better serve our customers we must understand customer's energy usage patterns, demographics, solar usage and ability to pay. The scope of the project is to define and create a data lake with the customer information and to deliver initial use cases.

Reasons and Benefits:

The use cases that are being implemented will provide a 360° view of a customer from different perspectives, along with Customer portfolio understanding and overview. The usage of the analytics capability developed as part of these projects will allow to make decisions based on data and convert the customer service organization into a data driven organization. Some of these use cases encompass improvements in Average Handle Time (AHT), First Contact Resolution (FCR), Customer Time in Queue, and Rep Productivity.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
636	0	0	0	0

NYSEG

Damage Assessment

Line of Business: Common
Category: Information Technology

Scope:

This project is to review and update the current Damage assessment processes for NYSEG. We will Blueprint and document the current NYSEG damage assessment solutions including but not limited to IT and business processes, mobile software, mobile devices, user management and security from an internal (employee) and external (mutual aid) standpoint, data management and architecture as well as IT hardware architecture. From this analysis we will design, build and deploy an end to end common solution that meets business requirements and encompasses not only internal employees but external mutual aid crews, utilizing more modern and integrated software now available following the implementation of the GIS Upgrade project.

Reasons and Benefits:

This project will provide the business with an end to end, fully supported damage assessment solution and process for NYSEG. Better user interface and integration will allow for more accurate damage assessment collation following major storms.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
600	0	0	0	0

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG

Regulatory Driven Efforts

Line of Business: Common
Category: Information Technology

Scope:

Implement Rate Case items including Surcharges, Energy Efficiency Tracker, Interruptible Gas changes and Retail Access changes. Changes to SAP to accommodate these regulatory process changes.

Surcharges

As part of the Surcharge project, we have incorporated charts below as an example of the surcharges in SAP billing engine applicable for NYSEG. These surcharges are bundled with several other surcharges and are shown in invoice as *Transition charge*.

Electricity Delivery Charges				
Basic service charge				15.11
Delivery charge	2280	kwh	@ 0.0403	91.88
Transition charge	2280	kwh	@ 0.00658734	15.02
Revenue decoupling mech	2280	kwh	@ 0.001782	4.06
SBC charge	2280	kwh	@ 0.005782	13.18
Subtotal Electricity Delivery				\$139.25

Surcharge
Electric Share the Savings
Heat Pump Share the Savings
Beneficial Electrification
Distributed Energy Resources ("DER") Utilization
Electric Peak Reduction
covid 19 RAM
Electric Vehicle Make Ready Recovery Surcharge 1
Energy Storage
Non-Wire Alternatives Cost Recovery
Electric Vehicle Price Guarantee Cost Recovery
Gas Share the Savings
Gas Heating Load Peak Reduction
covid 19 RAM
Non-Pipe Alternatives Cost Recovery
Firm Gas Revenue Adjustment From Interruptible Customers

NYSEG and RG&E 5-Year Capital Investment Plan

Energy Efficiency Tracker (EET)

EE Tracker is another surcharge which was bundled under System Benefit charge is required to be moved and we were ordered to include it under “Delivery Charge as part of the NYSEG 2020 Rate Case. SAP Billing configuration changes were performed to post a credit for the Energy Efficiency Tracker in the Delivery Charges for Customers enrolled in the New York Power Authority (NYPA) incentives: “New NYPA Expansion” (WNY), “Recharge New York” (RNY). A NYSEG Special Contract customer is also exempt (IE-NO-SBC operand). The new credit is applied to their bills for their EET Exempt Load.

Interruptible Gas (IG)

As part of the 2020 New York Rate Case, changes were proposed for Interruptible Gas service classifications that will redesign the delivery rates and minimal use requirements at NYSEG. The changes include supply charge redesign for NYSEG and include new penalty provisions.

SAP Billing Master data configuration was done by changing four existing rate categories and also developed an interface to upload the price provided by GTS.

Reasons and Benefits:

Mandatory changes to maintain regulatory compliance

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
140	0	0	0	0

Common Information Technology

RG&E

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RG&E

Client Project Requests and Integration Projects

Line of Business: Common
Category: Information Technology

Scope:

The program is for business initiatives identified by the Networks business areas for future efficiency projects. RG&E have a rigorous process of identifying the technology needs of the business, gathering information, vetting the project list and prioritizing based on need, business value and resource availability. The Project Demand Planning cycle runs annually and involves collating the requirements across all business areas for projects requiring IT expenditure. Projects are prioritized by the Vice Presidents in each business area before completing the estimation and capacity planning process. This process runs from the beginning of May through the end of August each year. The final portfolio is then presented back to senior management at the end of August for acceptance. Given the above timetable the final project list for 2023 and beyond does not exist at the time of this filing.

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Examples of projects identified and delivered/in delivery as part of the client project request process include the below:

NET-RPA Electric & Gas Operations
NET-OP-13-Contractor Portal
NET-IT-Click-Gas inspections and scheduling
NET-CS-06-N14-N17-N18-Digital Projects
NET-CS-Customer Insights-AGR



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NET-CS-03-Regulatory Driven Efforts-NY
NET-CS10-RL1 WORKLOAD MANAGEMENT AND OPTIMIZATION
NET-Metering & Billing systems upgrade project
NET-ACD ROUTING AND TECHNOLOGY
NET-SG-17-Enterprise GIS Upgrade and Modernization

This list includes projects delivering efficiencies, such as Robotic Process Automation (delivered through RL1 Workload Management and Optimization and RPA Electric and Gas Operations) which automates low value transactions to free up resources to work on other tasks.

There are projects included to manage technological obsolescence by upgrading systems onto the latest vendor supported versions, with Metering & Billing systems upgrades, ACD routing project updating call center technologies, and GIS upgrade moving to supported HW and SW platforms.

Digitization and Customer experience is included in our Digital Projects program, enhancing our websites and mobile application, and introducing new functionality for customers to self service and access information regarding their account and outages. Customer insights is providing data analytics information to better understand our customers and allow for development of improved processes based on these insights.

Reasons and Benefits:

This program allows for process improvements within the different business areas for RG&E.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	4,249	5,124	4,888	5,759

RG&E

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Line of Business: Common
Category: Information Technology

Scope:

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NYSEG and RG&E 5-Year Capital Investment Plan

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Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,822	1,822	1,822	0

RG&E

END USER Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

The overall goal of this project is to refresh RG&E’s computing devices following the refresh lifecycle defined for the company (4 years) for users in scope. This project also provides personal computers (PC) in support of new hires and refresh demand requirements enterprise wide.

Reasons and Benefits:

Replace aged equipment with new PCs to avoid service disruptions due to PCs not working properly due to their age. New computers also provide higher computing capabilities. This project also provides PCs in support of new hires and refresh demand requirements.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
830	545	613	561	569

RG&E

WINTEL Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing RG&E’s Wintel infrastructure following the four-year refresh lifecycle defined for RG&E. Wintel infrastructure includes primarily servers, chassis, and server blades. This infrastructure is primarily hosting RG&E applications and SQL databases. This will provide Wintel Infrastructure that supports the company’s organic growth.

Reasons and Benefits:

Hardware running beyond four years is more likely to provide performance issues that may affect the applications hosted on it. Replace aged equipment with new Wintel equipment to avoid application performance issues or service disruptions due hardware not working properly. New devices also provide higher performance and capabilities for a better application and data management performance.

This project provides server computing growth for company application and database organic growth.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
897	438	459	456	464

RG&E

Microsoft Deployment Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This project captures the work associated with Microsoft Enterprise Agreements and all the services provided to the Company end user. These services include business collaboration (email, messaging, and virtual meetings), operating system, applications, and security protection.

Reasons and Benefits:

Ensure all users at RG&E are provided with the correct Microsoft products to perform their business operations, run applications, and ensure effective collaboration.
 Provide Microsoft software and licenses to new employees and new server infrastructure.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,322	0	0	1,350

RG&E

STORAGE Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

The overall goal of this project is to refresh all data storage equipment following the four year refresh lifecycle defined for the RG&E. Storage equipment include primarily storage virtual switches, SAN directors and switches, Storage arrays, file storage, and backup units.

This storage will be used to provide data storage capabilities to the company applications, and company data network shared drivers. It is also included the hardware required to ensure company data is correctly backed up allowing data recovery when necessary. This will provide storage equipment to support data company growth.

Reasons and Benefits:

Replace aged equipment with new storage equipment to avoid service disruptions due hardware not working properly due to their age. New devices also provide higher storage performance and capabilities for a better data management performance

This project will also allow to provide data growth to new applications, users data and company data storage needs

Other benefit of this project is the capacity to refresh and growth the company data backup infrastructure, ensuring data protection. This allows data to be restored from an earlier point in time to help the business recover from an unplanned event. Storing the copy of the data on separate medium is critical to protect against primary data loss or corruption

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
392	376	383	392	400



RG&E

UNIX Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing all data storage equipment following the four year refresh lifecycle defined for RG&E. Storage equipment includes primarily storage virtual switches, SAN directors and switches, storage arrays, file storage, and backup units.

This storage will be used to provide data storage capabilities to the company applications, and company data network shared drivers. It also includes the hardware required to ensure company data is correctly backed up allowing data recovery when necessary. This will provide storage equipment to support company data growth.

Reasons and Benefits:

Replacing aged equipment with new storage equipment to avoid service disruptions due to aged hardware not working properly. New devices will provide higher storage performance and capabilities for a better data management performance; and provide data growth to new applications, user’s data and company data storage needs.

Another benefit of this project is the capacity to refresh and the growth in company data backup infrastructure, ensuring data protection. This allows data to be restored from an earlier point in time to help the business recover from an unplanned event. Storing the copy of the data on separate mediums is critical to protect against primary data loss or corruption.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
167	196	466	471	569

RG&E

NETSEC Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

This program entails refreshing NYSEG’s network security devices following the seven year refresh lifecycle defined for the company. Network security devices include primarily Firewalls, Proxies, IPS, AntiDDos or SSL decryption devices. This project also provides network equipment to support new offices or company assets that require secure corporate connectivity.

Reasons and Benefits:

Replace aged equipment with new network devices to avoid service disruptions due hardware malfunction or failure. New devices also provide higher network security capabilities and provides network equipment to support company growth.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
176	299	344	347	363

RG&E

SAP Enhancements

Line of Business: Common
Category: Information Technology

Scope:

This project will deliver a suite of changes following SAP ECC technical upgrades and the introduction of CRM 7.0 into RG&E which is needed to support AMI metering.

Following a large scale implementation such as the NY AMI project it is anticipated that a program of changes will need to be delivered post go live, as users use the new system and enhancements are identified to improve the effectiveness of the new processes. The exact process changes at this stage are unknown, but following a large transformation project like AMI, with significant system changes (technical upgrade of SAP ECC, moving to SAP Hana Databases, implementing SAP CRM) it is anticipated that a number of process changes and/or improvements will be identified as users begin to use the new processes. This project will be scoped in the months following the NY AMI go live in Q3 2022

Reasons and Benefits:

This project will support the NY AMI project and any changes needed to business processes in the system(s) following implementation.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	419	671	419	0

RG&E

Digital Journey EDB Transformation

Line of Business: Common
Category: Information Technology

Scope:

This project will deploy new functionalities to increase the self-service experience of the RG&E Digital Customer by promoting the existing options and implementing new functionalities like online Move-In/Move-Out experience, preferences and alerts, enhance outage management, improvements on Billing and Payment process, Web Chat and online service appointments. These new functionalities will allow the customers to enroll into different services through website or mobile app.

RG&E will be able to review customer issues, find and address pain points/barriers, ideate solutions, and evaluate feasibility of each solution for addition to digital initiatives/roadmap.

Reasons and Benefits:

The benefits of this project include the following:

- Drive Customers to more self-service options to lower call wait time and increase customer service.
- Improve customer communication about online services, outages, and safety.
- Clarity of info on billing and provide different methods to pay bills.
- Provide energy usage and efficient information.
- Simplify key processes more easily accessible and enhance customer digital experience (websites and mobile app).

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
458	417	0	0	0

RG&E

Click Upgrade & Long Cycle Work

Line of Business: Common
Category: Information Technology

Scope:

Our current scheduling tool for our networks operation, Click Scheduler, was set to be discontinued in 2023 after the purchase of the vendor ClickSoftware by SalesForce in 2019. In 2020, we began the process of reviewing replacement options for our scheduling tool. After capturing our business requirements, a Request for Proposal was sent to inquiring vendors to showcase their solution based on these requirements. Responses were received from Microsoft, SalesForce, IFS and Oracle. After analyzing both the RFI and RFP responses, and attending more than 50 hours of demonstrations of the solutions tailored to Avangrid Networks Business requirements and needs, IFS was the chosen vendor to offer the best solution both to Avangrid as well as our rate payers. IFS was the strongest candidate in Automatic Scheduling and Optimization, Reporting, Collaboration, Workflow Management as well as rating highly in Route Optimization, Map Integration and Master Data & Schedule Configuration. IFS will offer Avangrid great value to our rate payers and operations teams.

The scheduling tool is used to create work schedules based on priority, route optimization, job length and crew capabilities. This provides the operations teams with the ability to manage the work delivery while optimizing the travel time and resources to complete the work.

Reasons and Benefits:

This project will prevent obsolescence and provide a supported system to end users.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
837	0	0	0	0



RG&E

NETENG Life Cycle

Line of Business: Common
Category: Information Technology

Scope:

The objective of the Network Engineering Lifecycle program is to plan and implement a continuous improvement and refresh process every seven years, such that RG&E’s network infrastructure meets or exceeds established availability requirements. The lifecycle plan is also the Company’s mechanism for ensuring that the network infrastructure is scalable, meeting the increasing demands of our business users.

Reasons and Benefits:

Infrastructure replaced under this program company equipment and devices that are at end of life and include: Cisco Switches, routers, switches, WiFi access points and WiFi controllers to avoid service disruptions due to hardware not properly working. New devices and equipment provide higher network capabilities and support company growth.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
63	125	146	220	225

RG&E

ESRI UN Deployment

Line of Business: Common
Category: Information Technology

Scope:

This project will replace the Company's current GIS system to the Utility Network Model (UNM). This is a two phase project. Phase one will focus on the Gas line of business and will take 12-18 months long to complete. The existing data model is to be retired by the vendor in 2026. This will change the data model used by the Gas line of business and move to a more modern, utility specific model. Phase 2 will include the Electric line of business and will be a three year project (see Page 820 for Phase 2 information).

Reasons and Benefits:

Migration of the current GIS geometric data models to the Utility Network model will prevent obsolescence as the old data model is being retired and replaced by the vendor in 2026. Upgrading will address the end of life and provide NYSEG with a fully supported solution.

Additional benefits of moving to the UNM include; a rule based engine that supports and enforces higher quality data entry, reduced data latency between enterprise systems due to native service oriented architecture, new branch versioning structure reduces performance impacts of long-running designs and this addresses current GIS software's end-of-life timeline. For Asset Management, a higher fidelity data model enables more granular tracking of real-world assets, such as substation internals, SCADA, and AMI equipment and controllers as well as Gas devices and network assets. Enhanced capabilities for modeling network data with greater detail and real-world representation of connectivity via use of associations. ArcGIS Pro is the new generation professional desktop application from Esri used to manage the GIS gas network with Utility Network Model. This application provides exponential performance improvements in startup, saving, edits and redrawing compared to traditional ArcMap. Enhanced Operations and Field Work through platform-integrated mobile applications supporting common GIS workflows.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
485	0	0	0	0



RG&E

Liferay WCM Implementation

Line of Business: Common
Category: Information Technology

Scope:

The RG&E web site is currently hosted on WebSphere Portal platform which was initially supported by IBM. IBM has divested the Portal product to HCL(a IT services company). RG&E is implementing the new strategy to migrate all web servers to Microsoft Azure cloud infrastructure, web applications to a containerized platform AKS and Web content to Liferay DXM (Digital Experience Manager).

Implementation of Microsoft AKS environment will enable us to install container platform that makes it easier to install and scale up the customer web site to handle the load during storm situation. This new technology will make the implementation of Customer Digital Journey projects simpler and faster because we are migrating to cloud infrastructure as a service. The modular development will not require the complexity of the entire portal, but a subset of the functionality can be developed and deployed as a service. We can deploy a Liferay Pod that will support one specific Website/service and not be constrained by the configuration of a big environment. This strategy will allow the scale up of individual sites that are under significant load during storms and minimize the resources for the sites that are not significantly accessed. The integration with the application such as MyAccount will be smoother since there is a significant IT effort to implement the applications using Microservices and containers.

Reasons and Benefits:

This new Liferay DXM implementation and Microsoft Azure cloud infrastructure would be reliable and scalable quickly and ensure that our web sites and mobile apps are accessible for all customers during the storm situations. The new cloud infrastructure and Liferay DXM platform is positioned as a state of the art, reliable and scalable platform, providing services adapted to current needs and flexible to accommodate future Business and Customer requirements, with enriched features and capabilities. The new technical architecture based in a SW Containerization Solution, will enable the creation of independent sites, components, deployed on containers that will optimize the use of virtual infrastructure, automate scalation and will provide simplified access through APIs.

The Liferay migration will offer improved look and feel, mobile responsive design, with a simplified content structure and better navigation experience.



NYSEG and RG&E 5-Year Capital Investment Plan

This project will be a key factor for the successful achievement of the different goals, technology harmonization and reduce time to market in launching services/features in customer digital channels (Web and Mobile) but also enable future digital channels through a standardized API's and Microservices layer.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
444	0	0	0	0

RG&E

Pure Engage to Pure Connect Migration

Line of Business: Common
Category: Information Technology

Scope:

This project will standardize our telephony technology across the RG&E for call centers and deliver Opex savings of \$240 thousand per annum in reduced support and maintenance. These projects include the transition from IVRs from the Pure Engage platform to Pure Connect platform.

RG&E call centers currently use Genesys Pure Connect software for the call routing and call recording, but are using Pure Engage IVRs for the self-service applications and menu selections. Moving to the Pure Connect software will provide a consistent platform for RG&E, provide some configuration capabilities for internal resources to make small changes to IVR menus, and realize Opex savings through standardization of support vendors.

Reasons and Benefits:

Increase autonomy in the business team to enable future small changes to IVR menus to be completed internally using configuration rather than through an external vendor. Saving approximately \$120 thousand per year in support and maintenance expenses.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
420	0	0	0	0

RG&E

RPA Electric and Gas Operation

Line of Business: Common
Category: Information Technology

Scope:

Robotic Process Automation (RPA) is to identify processes that are repetitive, time-consuming and use multiple applications/systems across Customer Service and Networks operations areas. After this initial discovery of use cases, a roadmap of processes to be automated will be defined and the bots identified will be created.

As data and regulatory compliance increases, Networks Operations employees have to handle greater workloads, which are susceptible to human errors and problems with the data accuracy. The execution of repeated tasks impacts directly in the employees' motivation, reducing their productivity and wellbeing.

These repetitive processes can be automated using a robotic process automation tool (RPA). RPA refers to a type of automation which interacts with a computer-centric process through the existing User Interface. This type of user is referred to as a 'robot' or 'bot'.

Reasons and Benefits:

Using robots to automate repetitive Networks Operations processes it will be possible to reduce human errors, to improve accuracy in the processes, to increase employees' wellbeing as the automation will enable them to perform more interesting tasks and to be more creative and innovative.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
234	149	0	0	0

RG&E

Contractor Portal

Line of Business: Common
Category: Information Technology

Scope:

This project will deliver a web based external platform for use by RG&E contractors working on construction projects to allow them to manage the invoicing through the use of compatible units and Pay IDs to complete work and receive payments administered through this tool. This platform will reduce low value administration by integrating the front-end platform to the system of record (SAP) to achieve this automation.

Reasons and Benefits:

Implementation of a portal will provides efficiencies to end users by automatically processing work items based on standard processes and reducing the administrative work. Reduces administration type work to allow field workers to focus on core tasks.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
331	0	0	0	0

RG&E

Customer Insights

Line of Business: Common
Category: Information Technology

Scope:

Advanced Analytics is becoming increasingly vital to RG&E's business operations and customer service in the Utilities industry. Analytics Solutions are the enabler to use one of the key assets of the Company, the Data, in order to improve decision making and increase value from our network's assets and customers' base.

This Customer Insights project will allow Customer Service to better understand their customers, their preferences and pain points, optimizing Marketing and Customer Intelligence areas performance through available customer information such as energy consumption profiles obtained from Advance Metering Infrastructure (AMI), ...

To better serve our customers we must understand customer's energy usage patterns, demographics, solar usage and ability to pay.

The scope of the project is to define and create a data lake with the customer information and to deliver initial use cases.

Reasons and Benefits:

The use cases implemented will provide 360° view of a customer from different perspectives along with Customer portfolio understanding and overview. The usage of the analytics capability developed as part of these project will allow to make decisions base on data and convert the customer service organization into a data driven organization. Some of these use cases encompass improvements in Average Handle Time (AHT), First Contact Resolution (FCR), Customer Time in Queue, and Rep Productivity.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
323	0	0	0	0

RG&E

Damage Assessment

Line of Business: Common
Category: Information Technology

Scope:

This project is to review and update the current Damage assessment processes for RG&E. We will Blueprint and document the current RG&E damage assessment solutions including but not limited to IT and business processes, mobile software, mobile devices, user management and security from an internal (employee) and external (mutual aid) standpoint, data management and architecture as well as IT hardware architecture. From this analysis we will design, build and deploy an end to end common solution that meets business requirements and encompasses not only internal employees but external mutual aid crews, utilizing more modern and integrated software now available following the implementation of the GIS Upgrade project.

Reasons and Benefits:

This project will provide the business with an end to end fully supported damage assessment solution and process for RG&E. Better user interface and integration will allow for more accurate damage assessment collation following major storms

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
300	0	0	0	0

NYSEG and RG&E 5-Year Capital Investment Plan

RG&E

Regulatory Driven Efforts

Line of Business: Common
Category: Information Technology

Scope:

Implement Rate Case items including Surcharges Energy Efficiency Tracker, Interruptible Gas changes and Retail Access changes. Changes to SAP to accommodate these regulatory process changes.

Surcharges

As part of Surcharge project, we have incorporated charts below as an example of the surcharges in SAP billing engine applicable for *RG&E*. These surcharges are bundled with several other surcharges and are shown in invoice as *Transition charge*.

Electricity Delivery Charges				
Basic service charge				15.11
Delivery charge	2280	kwh	@ 0.0403	91.88
Transition charge	2280	kwh	@ 0.00658734	15.02
Revenue decoupling mech	2280	kwh	@ 0.001782	4.06
SBC charge	2280	kwh	@ 0.005782	13.18
Subtotal Electricity Delivery				\$139.25

Surcharge
Electric Share the Savings
Heat Pump Share the Savings
Beneficial Electrification
Distributed Energy Resources ("DER") Utilization
Electric Peak Reduction
covid 19 RAM
Electric Vehicle Make Ready Recovery Surcharge 1
Energy Storage
Non-Wire Alternatives Cost Recovery
Electric Vehicle Price Guarantee Cost Recovery
Gas Share the Savings
Gas Heating Load Peak Reduction
covid 19 RAM
Non-Pipe Alternatives Cost Recovery
Firm Gas Revenue Adjustment From Interruptible Customers



NYSEG and RG&E 5-Year Capital Investment Plan

Energy Efficiency Tracker (EET)

EE Tracker is another surcharge which was bundled under System Benefit charge is required to be moved and we were ordered to include it under “Delivery Charge as part of the NYSEG 2020 Rate Case. SAP Billing configuration changes were performed to post a credit for the Energy Efficiency Tracker in the Delivery Charges for Customers enrolled in the New York Power Authority (NYPA) incentives: “New NYPA Expansion” (WNY), “Recharge New York” (RNY). A NYSEG Special Contract customer is also exempt (IE-NO-SBC operand). The new credit is applied to their bills for their EET Exempt Load.

Interruptible Gas (IG)

As part of the 2020 New York Rate Case, changes were proposed for Interruptible Gas service classifications that will redesign the delivery rates and minimal use requirements at NYSEG. The changes include supply charge redesign for NYSEG and include new penalty provisions.

SAP Billing Master data configuration was done by changing four existing rate categories and also developed an interface to upload the price provided by GTS

Reasons and Benefits:

Mandatory changes to maintain regulatory compliance.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
71	0	0	0	0

RG&E

Primavera PPM Cloud

Line of Business: Common
Category: Information Technology

Scope:

“Primavera Cloud” is a capital project designed to renew the existing Primavera Cloud PPM current license structure for an additional five year period and increase the number of licenses to expand the system benefits to other business areas such as Electric Operations. Current licenses were scoped to support the Projects’ organization and will expire in Q2 2025.

Primavera PPM Cloud is a fully integrated project and portfolio management system containing three modules that provide scheduling (P6), project controls, cost controls, and workflows (Unifier), and business analytics and data warehouse (Analytics). It has been customized to support the RG&E environment.

Prior to the implementation of Primavera for the Projects’ business area, large capital projects were managed through a significant number of manual processes and disconnected tools (e.g., email, Excel, MS Project); this required substantial manual effort and significant time to aggregate data and analyze the portfolio. A consolidated, accurate and timely view of schedule data is critical to effectively manage the planning, delivery and monitoring of projects.

The implementation of Primavera positively transformed the way capital projects are managed and supports the accuracy and predictability of the portfolio. It transformed disparate tools and processes into a single, connected platform. It increased insight and enabled capital project teams and management to make more timely and informed decision in execution and planning. It drives cost efficiency and reduces risk for project delivery and portfolio management and supports a more efficient capital project delivery and improved project cycle time.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
61	0	0	0	0

Common Operational Smart Grids

NYSEG

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NYSEG

Data Center Consolidation

Line of Business: Common
Category: Operational Smart Grids

Scope:

This project will standardized hardware, software and applications for all the Operational Smart Grids (OSG) data centers and consolidate and reduce the overall total number of data centers.

Reasons and Benefits:

Standardized Hardware, Software, Applications for all the OSG Data Centers and consolidate and reduce the overall total number of Data Centers. Resources can be shared across OpCo's to provide additional support capabilities when needed. Less facilities to pay for and maintain. Overall operating cost savings with the reduction of Data Centers and facilities that need to be supported.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
575	4,019	24,120	20,440	11,187

NYSEG

Telecomm Infrastructure

Line of Business: Common
Category: Operational Smart Grids

Scope:

This project will continue to deploy and expand telecom infrastructure in order to enhance communications capabilities and connectivity throughout the NYSEG territory for distribution automation and monitoring activity. Routers and Ethernet switches will be deployed utilizing a mix of fiber, copper, and wireless technologies for interconnections with redundancy and diversity. Various protocols will be implemented to support dynamic rerouting of traffic in the event of a transport or circuit failure.

This project will also support the deployment of a lifecycle replace of the existing Private Land Mobile Radio Systems (LMR) with a new Digital Mobile Radio solution (DMR). The current LMR systems are at or beyond end-of-life.

Reasons and Benefits:

Expand network communications infrastructure for improved capacity, reliability and functionality for operation of gas and electric networks.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
11,347	7,729	7,265	6,756	6,840

NYSEG

Telecomm Fiber

Line of Business: Common
Category: Operational Smart Grids

Scope:

The purpose of purchasing fiber optic cable is to enhance our connectivity and create high bandwidth communications and backhaul points. New fiber will be constructed, or existing dark fiber pairs will be purchased through local carriers, to provide connectivity for substations and service centers across our footprint. Wherever viable, the fiber will be deployed in redundant rings with unique entrances into our facilities. This will allow for connectivity with routers and Ethernet switching equipment to dynamically reroute traffic in the event of a fiber failure.

Reasons and Benefits:

This project will minimize the number of microwave hops and repeaters in the field as well as help manage the size and capability of the WiMAX network architecture

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,728	7,975	7,277	5,650	5,085

NYSEG

NY WAN Expansion

Line of Business: Common
Category: Operational Smart Grids

Scope:

NY WAN (Wide Area Network) Expansion involves WiMAX (Worldwide Interoperability of Microwave Access) or future broadband microwave technologies deployments to support automation activities at NYSEG. These will primarily involve a point-to-multipoint setup which includes the deployment of a Base Station (with associated network backhaul) and multiple end point devices to provide service for SCADA and AMI data.

Reasons and Benefits:

The NY WAN Expansion project is a WiMAX area network conceptualized to support smart grid communication equipment deployments as an end-to-end solution to meet requirements for communication paths and provide flexible solution for the company.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,331	6,726	6,322	5,880	5,500

NYSEG

OSG Communications Tower, Shelter Facility Improvements

Line of Business: Common
Category: Operational Smart Grids

Scope:

Tower and Com Shelter new builds and repairs

Reasons and Benefits:

AVANGRID OSG remote communication tower and shelter locations house critical communication network elements. Each location has specific needs to support critical network equipment for fiber, microwave, radio systems. These systems include AC and DC backup power systems, cabling, heating, ventilation and cooling systems, single point grounding systems and security access systems. They also provide for a redundant and diverse design for the network. Failures associated with these components will cause failures to critical communications circuits needed for reliable energy delivery and their associated monitoring systems. Failure to critical wireless networks that support day to day field operational voice systems, and worker health and safety monitoring systems. Through ongoing wireless and fiber expansion project efforts, NYSEG will build communication facilities (towers and shelters) for NYSEG OSG communications equipment. The new facilities will be security enhanced com huts, indoor racks and cabinets, outdoor enclosures. The facility will include the building structure, AC and DC power plant, HVAC, racks, inside plant fiber / wireless network elements, and ancillary equipment to establish the OSG equipment as operational and functional on the network. Additional initiatives will include enhancements to ensure the reliability and availability of the OSG Com systems. This includes upgrades to 8 locations every year. The efforts include: 1. Replacement of HVAC systems 2. Cable segment upgrades 3. UPS and DC Power system upgrades 4. Grounding upgrades. 5. Com shelter / room reconfiguration and expansion.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,000	3,000	3,000	4,000	4,000



NYSEG

FCC License Radio Spectrum purchase

Line of Business: Common
Category: Operational Smart Grids

Scope:

The purchase of spectrum

Reasons and Benefits:

The purchase of spectrum will provide NYSEG Operational Smart Grids (OSG) long term capabilities for enhancing wireless systems supporting SCADA control, monitoring, open and close functions, and station to station teleprotection application needs, enable expandability for field area network expansions, provide for redundant and diverse designs for the network elements and monitoring systems. Additional spectrum allows for enhancement of critical daily operational voice systems used to communicate to field operations and monitor the health and safety of NYSEG field teams.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,000	4,400	2,000	1,000	1,000

NYSEG

Energy Control Systems Infrastructure

Line of Business: Common
Category: Operational Smart Grids

Scope:

NY Energy Control Systems Infrastructure encompasses incremental hardware refresh activities and technology upgrades as well as improvements to Electric, Gas and Business Area systems.

Reasons and Benefits:

These improvements are necessary to keep support, security and reliability at appropriate levels required by the demands of high availability of SCADA environments.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
415	2,725	4,971	2,061	2,016

NYSEG

FAN + Mobile Technology Refresh and Expansion

Line of Business: Common
Category: Operational Smart Grids

Scope:

Enhance, explore, refresh NYSEG wireless broadband systems to allow for technology diversity, provide high-speed, reliable, and cost-effective communication alternatives to public carriers, PTSN services, as well as provide diversity and redundancy to public carrier circuits for critical applications that require it.

Reasons and Benefits:

NYSEG Operational Smart Grids (OSG) Field Area Network (FAN) refresh and expansion of wireless broadband systems. provides the wireless network infrastructure for the distribution SCADA and AMI radio systems and the grid and distribution automation applications. NYSEG utilizes WiMAX, 802.11, LTE, 5G, and other wireless technologies that have demonstrated the promise to deliver high performance for critical application needs while not requiring direct line of sight between antennas. Newer technologies that include LTE, 5G, and 802.11 WiFi6 are an important component for enhancement of NYSEG’s Wireless strategies. They provide the last component required to implement all wireless mobile subsystems the NYSEG fiberoptic core transport system. The NYSEG wireless broadband infrastructure enhancements and technology refresh efforts are ongoing and will be carried through 2026.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
400	2,300	3,200	3,100	3,100

NYSEG

Telecomm Vertical Builds

Line of Business: Common
Category: Operational Smart Grids

Scope:

The building of vertical infrastructure is necessary to support our deployment of wireless and cellular technology. This project will construct 4 towers at a height of up to 350 feet and an additional 11 steel monopoles at a height of up to 195 feet. These will serve primary locations for WiMAX base stations and microwave backhaul supporting services for all traffic types.

Reasons and Benefits:

These towers will provide better overall coverage for wireless communications and reach for future technologies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,360	2,459	2,459	1,459	1,459

NYSEG

NY AMI Lifecycle

Line of Business: Common
Category: Operational Smart Grids

Scope:

This project is a transition and implementation plan to cover infrastructure hardware, physical data center requirements, support agreements, internal and external resource alignment for the next AMI Head End System lifecycle replacement.

Reasons and Benefits:

This project will address asset condition replacement, efficiency and strategic initiative for transitioning the AMI Head End System responsibility to Smart Grids.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	6,928

NYSEG

ECC Life cycle

Line of Business: Common
Category: Operational Smart Grids

Scope:

This is a program to replace and Enhance Energy Control systems.

Reasons and Benefits:

This program allows the Companies to achieve critical systems uptime of 99.90% of availability and cyber compliance targets.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
768	956	1,100	1,250	1,320

NYSEG

Virtualization Expansion

Line of Business: Common
Category: Operational Smart Grids

Scope:

Expansion of existing VxRail (Hyper Converged Infrastructure) clusters to meet increasing compute, memory, and storage requirements and addition of CIP cluster to make virtualization available to the Electric SCADA environment.

Reasons and Benefits:

Increasing the footprint of our virtualization platform minimizes downtime and simplifies data center management. Virtual infrastructure allows for faster provisioning of applications and resources and improves disaster recovery position.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,645	1,541	0	1,600

NYSEG

Historian and Analytic Upgrades Program

Line of Business: Common
Category: Operational Smart Grids

Scope:

Integrate the Energy Management System data into the PI Historian system.

Reasons and Benefits:

The project will improve user access to data in a secure and reliable manner. There will also be increased efficiencies for all users that require access to critical information and allow for cross operating company visibility to key information.

This is to add critical system information into the Historian and Analytics system to provide increased benefits based on actual and accurate data. This would also plan to have a connecting into the metering systems to be able to run analytics for several use cases to benefit customers and currently proposed as the solution to other NY PSC regulatory requirements that we will need to adhere against.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	134	3,480	142	146

NYSEG

Rochester Consolidation

Line of Business: Common
Category: Operational Smart Grids

Scope:

RG&E is consolidating operations to fewer locations in the Rochester area. Two of the facilities that are being vacated are the East Ave and West Ave locations. Within these facilities, there are data centers that support critical electric and gas network communication and control systems for both NYSEG and RG&E. These facilities need to be removed from the East and West Ave locations and relocated to other facilities in the Rochester area. Due to the critical nature of the systems, the equipment is not able to be taken offline and moved to the new locations. New equipment will need to be purchased, installed and operational in the new locations and the existing equipment at East and West Ave will be decommissioned, removed from the site, and repurposed.

The facilities located at East Ave will be relocated to the Company’s Mushroom Blvd location in Phase 1 of the project. The West Ave facilities will be relocated to the Company’s Scottsville Rd location in Phase 2 of the project.

Reasons and Benefits:

Meet corporate mandate to vacate Rochester East Ave (ASAP) and West Ave (2023).

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,028	882	0	0	0

NYSEG

NMC Solar Winds

Line of Business: Common
Category: Operational Smart Grids

Scope:

SolarWinds is software for the Telecomm Networks Management Center. Over the next three years, the telecomm group will purchase the remaining licenses necessary to complete the SolarWinds implementation and associated services for all network elements within AVANGRID. Solarwinds licenses purchased are for the software being used in the monitoring and management of the AVANGRID Security Domain (ASD) network. In addition to monitoring, the software will be used as a performance management tool for the network and with troubleshooting and fault management. The ASD servers, routers, switches and other data points are fed into the Solarwinds software as a major management piece of the Network Management Center (NMC).

Reasons and Benefits:

The need to optimize and further expand the Management of the ASD and OSG networks relies on continued engineering efforts and additional license purchases. Delay of this project will place us further behind in the addition of new nodes in to the NMC monitoring, as well as the need for engineering to assist with the migration of the OSG on to the ASD transport network.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
494	379	379	379	379

NYSEG

OMS Enhancements

Line of Business: Common
Category: Operational Smart Grids

Scope:

This project will continue the build out of the NY Siemens Spectrum system and the Outage Management System (OMS) systems. The NY Spectrum system enhancements consist of Supervisory Control and Data Acquisition (SCADA) and Software upgrade work.

Reasons and Benefits:

The continued buildout of these systems is critical to realize the full benefits and efficiencies these systems provide.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
375	375	375	375	375

NYSEG

Solar Battery Backup Integration

Line of Business: Common
Category: Operational Smart Grids

Scope:

Development and deployment of Solar battery backup systems

Reasons and Benefits:

The purchase of Solar Battery backup systems will provide AVANGRID OSG capabilities for enhancing systems that support critical SCADA and Teleprotection application needs, and the associated networks and network elements, their monitoring and alarm systems, and functional operations, including outage notifications and restoration efforts. Additional Solar battery backup allows for enhancement to increase the reliability of critical operational elements for up to 120 hours during loss of commercial AC.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
500	500	250	200	200

NYSEG

Veritas Growth

Line of Business: Common
Category: Operational Smart Grids

Scope:

Bring existing VxRail (Hyper Converged Infrastructure) clusters to parity and add additional stretched Cluster for Critical Infrastructure Program (CIP) specific applications. Addition of segregated vCenter servers for CIP applications. Memory upgrades for existing VxRail Nodes

New network equipment for CIP specific clusters

Reasons and Benefits:

Expansion and upgrades to the VxRail environments enable effective support of applications slated to transition from IT to OSG, extends service life of the overall platform, and ensures consistency across operating companies in the CIP realm.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
44	484	81	81	601

NYSEG

Microsoft Licensing

Line of Business: Common
Category: Operational Smart Grids

Scope:

Purchase Licenses and Software Assurance to cover all Microsoft products currently supported by Operational Smart Grids Infrastructure.

IT is no longer providing these licenses to OSG and OSG will need agreements with Microsoft in order for OSG to remain within compliance and keep the software to remain active.

Reasons and Benefits:

"OSG would no longer be dependent on Corporate IT for Microsoft Licensing. Corporate IT and OSG Infrastructure would no longer need to coordinate true up of Microsoft licensing. Ownership and management of these licenses would belong to OSG Infrastructure.

** This is a mandatory expense due to Corp IT policies. Without this funding all Microsoft products will no longer be legally licensed which in a Microsoft audit would lead to legal fines. ***"

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
898	0	0	0	0

NYSEG

Oracle Exadata

Line of Business: Common
Category: Operational Smart Grids

Scope:

Standardization and consolidation from 13 to 2 instances. Migration of the following workloads to Exadata Servers:

- iCDS for NYSEG, RG&E, and CMP (4)
- New York Spectrum Development (DEV) environment (4)
- Production Spectrum DMZ Historian (2)
- Addition of Quality Assurance System (QAS) Spectrum DMZ Historian (2)
- iBase (1)

Includes contractor labor, internal labor, and materials costs for deployment of Exadata and migration of workloads.

Reasons and Benefits:

Exadata offers greater performance and scalability with less hardware than separate platforms per workload. Identified as an Every Day Better (EDB) project initiative.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
12	0	0	0	836

NYSEG

Networks ECTRM

Line of Business: Common
Category: Operational Smart Grids

Scope:

The Energy Services Groups from NYSEG is participating in the licensing and implementation of a new Energy/Commodity Trading & Risk Management System (ECTRM) to manage their commodity procurement functions. TRMTracker is the name of the specific product to be provided by Hitachi Energy.

The scope of this project is to implement deal capture, risk management, back office and reporting functionality. The following TRMTracker base product and specialized modules (nMarket) modules will be implemented to support the following:

- Front Office: setup static data and book structure, flexible deal entry for physical and financial instruments for different commodities, market communication (PJM, NYISO, ISO New England) for ISO transactions, integration with exchanges and other sources
- Middle Office: setup required static data (e.g., price curves, contract, counterparty, and credit party data), workflows/alerts, risk measures such as VaR, risk and limit reporting
- BackOffice: integration with ISOs for downloading settlements and prices, settlement and accounting, and hedge-effectiveness testing
- Data extractions, reporting and integration for Front, Middle and Back offices
- Including Gas in storage WACOG and Gas Transmission System communication for Front Office, Counterparty, Contract, Credit Party Data and exposure reporting against limits and collateral for Middle Office SAP interface and simultaneous settlements for both IFRS and GAAP for Back office, and Delivered Cost of Gas as City Gate report. Such list shall not be a limitation on the reporting requirements, and any further requirements shall be as reasonably agreed to by the Parties and documented in a change request, if applicable.

The following activities are included in the scope of this project:

- Project Management (Project management includes managing Supplier resources and tasks and coordinating with Customer's Project Manager)
- Implementation Specification/Requirements
- Design documentation



NYSEG and RG&E 5-Year Capital Investment Plan

- Functional and technical training (including preparing required training material) and train the trainers
- Necessary knowledge transfer to technical staff and administrative & functional users
- Unit and stress testing
- Assistance in creating UAT test scripts and test plan
- Assistance in functional and regression UAT testing
- Detailed project plan for execution phase
- Software installation on Development, Test and Production environments
- Setup required business processes in TRMTracker and any modules in scope

Reasons and Benefits:

NYSEG currently utilizes the Allegro system for managing commodity transactions but, as they are not able to upgrade to the current version, it is not possible to receive proper product support. The system has failed disaster recover drills for three consecutive years and there is no back up system to record the details and track commodity transactions. System failure could lead to a material weakness of audit controls. Aside from system continuity, there are also efficiencies for the Company. The system will be shared by all Avangrid companies which will lower the overall cost to each Company.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
769	0	0	0	0

NYSEG

Full OMS Functional alignment ABB-Spectrum

Line of Business: Common
Category: Operational Smart Grids

Scope:

Streamline OMS functionality and integration across all systems. This includes integration with Mobility, WFM, Damages, ...

Reasons and Benefits:

Full benefits and efficiency of best in class OMS system

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	250	250	250	0

NYSEG

Itron Mobile Hardware Replacement

Line of Business: Common
Category: Operational Smart Grids

Scope:

NYSEG currently utilizes FC300 Itron devices to read meters. Itron will end support for the FC300 devices by December 31, 2022 as they are phasing out the equipment. The Company is losing the ability to fix them as parts are not readily available anymore.

The Itron devices will be replaced with either Panasonic or Dell tough books.

Reasons and Benefits:

Mobile read collectors FC300 are critical to collect reads for customer billing. The ability to collect this data will impact customers by inaccurate or delayed billing. There is major compliance and customer service risk if we don't have replacements by 12/31/2022.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
488	0	0	0	0

Common OSG

RG&E

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RG&E

Data Center Consolidation

Line of Business: Common
Category: Operational Smart Grids

Scope:

Standardized Hardware, Software, Applications for all the OSG Data Centers and consolidate and reduce the overall total number of Data Centers.

Reasons and Benefits:

Standardized Hardware, Software, Applications for all the OSG Data Centers and consolidate and reduce the overall total number of Data Centers. Resources can be shared across NYSEG and RG&E to provide additional support capabilities when needed. Less facilities to pay for and maintain. Overall operating cost savings with the reduction of Data Centers and facilities that need to be supported.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
345	2,685	13,929	12,671	7,766

RG&E

ROC Hydrogen Pilot C

Line of Business: Common
Category: Operational Smart Grids

Scope:

RG&E are partnering with RED on a phased project to blend up to 20% hydrogen into RED's 40 psi fuel lines with the goal of reducing RED's greenhouse gas (GHG) emissions and evaluating the ability of the existing technology to blend and combust hydrogen in a safe and efficient manner. The first three phases of the project would include isolated system testing to evaluate the impact of hydrogen blends from 5% to 20%, collecting data and information used to determine the ultimate blending percentage for on-site electrolysis, hydrogen storage and blending in Phase 4. Hydrogen blending aims to reduce on-site GHG emissions and provide opportunity for a baseline demonstration project. The third phase, on-site electrolysis of up to 20 MW could provide sufficient hydrogen for blending, as well as provide hydrogen for on-site fueling of the local bus fleet, with additional capacity to supply off-site vehicle fueling stations as well.

Reasons and Benefits:

Rochester Gas and Electric provides natural gas services to a variety of industrial, commercial, and residential customers across their service territory. RG&E's single largest customer is RED Rochester, a small utility which provides heat, power, and steam through a centralized heat and power (CHP) plant, and a variety of additional utility services to Kodak Eastman Business Park in Rochester. In 2018, RED converted their on-site energy generation facility from coal to natural gas, retrofitting existing boilers and adding new equipment; at that time RG&E constructed a dedicated natural gas pipeline serving RED's processes with approximately 1,800 mcfh of natural gas at a pressure of 120 psig MAOP, regulated to 40 psig for their fuel lines. As RED continues to pursue decarbonization efforts, blending hydrogen into their natural gas system is a sensible next step.

When thinking about the benefits of blending, RG&E considers the following as the most relevant:

- Learning for customers:

The Rochester hydrogen blending pilot is a project that will enable the production of a large amount of data, not only in the behavior of hydrogen in combustion, but also its interactions with gas pipes, valves and other equipment. This information will be very valuable for RG&E and its customers in their path to modernizing and decarbonizing the gas infrastructure.



NYSEG and RG&E 5-Year Capital Investment Plan

- Reducing peak consumption of natural gas:

The learnings from this pilot project can be applied to all of RG&E’s gas network in order to displace incremental volumes of natural gas, reducing the pressure to procure the finite resource and the pressure that peak demand puts on the system.

- Creating in house capabilities:

With the implementation of this pilot project, RGF&E personnel that serve all customers will be able to learn and train on the proper handling of hydrogen gas. RG&E will be industry leaders that will be able to apply their knowledge to the daily operations of the gas system once hydrogen blending is rolled out at system-scale.

- Contributing to industry-wide learning

Being one of the first pilot projects in the country to blend hydrogen into natural gas infrastructure and equipment with systemic data gathering, this pilot project will produce valuable information for the industry as a whole. EPRI is a key partner that will enable fast distribution of knowledge.

- Decarbonization of the natural gas infrastructure

Learning about the ability of the system to incorporate hydrogen will be crucial in the implementation of carbon reduction strategies for the city of Rochester specifically and the state of New York more generally. Displacing the use of fossil fuels for a clean fuel will have considerable climate benefits that will accelerate the achievement of the CLCPA goals.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	6,000	14,000	0

RG&E

Telecomm Infrastructure

Line of Business: Common
Category: Operational Smart Grids

Scope:

This project will continue to deploy and expand telecom infrastructure in order to enhance communications capabilities and connectivity throughout the RG&E territory for distribution automation and monitoring activity. Routers and Ethernet switches will be deployed utilizing a mix of fiber, copper, and wireless technologies for interconnections with redundancy and diversity. Various protocols will be implemented to support dynamic rerouting of traffic in the event of a transport or circuit failure.

This project will also support the deployment of a lifecycle replace of the existing Private Land Mobile Radio Systems (LMR) with a new Digital Mobile Radio solution (DMR). The current LMR systems are at or beyond end-of-life.

Reasons and Benefits:

Expand network communications infrastructure for improved capacity, reliability and functionality for operation of gas/electric networks.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
5,007	2,686	2,525	2,348	2,380

RG&E

Telecomm NY WAN Buildout

Line of Business: Common
Category: Operational Smart Grids

Scope:

WiMAX deployments to support automation activities

Reasons and Benefits:

NY WAN (Wide Area Network) Expansion involves WiMAX (Worldwide Interoperability of Microwave Access) or future broadband microwave technologies deployments to support automation activities at RG&E. These will primarily involve a point-to-multipoint setup which includes the deployment of a Base Station (with associated network backhaul) and multiple end point devices to provide service for SCADA and AMI data. .

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,107	3,397	3,193	2,970	2,200

RG&E

Telecomm Fiber

Line of Business: Common
Category: Operational Smart Grids

Scope:

The purpose of purchasing fiber optic cable is to enhance our connectivity and create high bandwidth communications and backhaul points. New fiber will be constructed, or existing dark fiber pairs will be purchased through local carriers, to provide connectivity for substations and service centers across our footprint. Wherever viable, the fiber will be deployed in redundant rings with unique entrances into our facilities. This will allow for connectivity with routers and Ethernet switching equipment to dynamically reroute traffic in the event of a fiber failure.

Reasons and Benefits:

This project will minimize the number of microwave hops and repeaters in the field as well as help manage the size and capability of the WiMAX network architecture

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,243	2,325	1,418	1,276	1,148

RG&E

FAN + mobile technology refresh and expansion

Line of Business: Common
Category: Operational Smart Grids

Scope:

Enhance, explore, refresh AVANGRID wireless broadband systems to allow for technology diversity, provide high-speed, reliable, and cost-effective communication alternatives to public carriers, PTSN services, as well as provide diversity and redundancy to public carrier circuits for critical applications that require it.

Reasons and Benefits:

AVANGRID OSG Field Area Network (FAN) refresh and expansion of wireless broadband systems. provides the wireless network infrastructure for the distribution SCADA and AMI radio systems and the grid and distribution automation applications. AVANGRID utilizes WiMAX, 802.11, LTE, 5G, and other wireless technologies that have demonstrated the promise to deliver high performance for critical application needs while not requiring direct line of sight between antennas. Newer technologies that include LTE, 5G, and 802.11 WiFi6 are an important component for enhancement of AVANGRID’s Wireless strategies. They provide the last component required to implement all wireless mobile subsystems the AVANGRID fiberoptic core transport system. The AVANGRID wireless broadband infrastructure enhancements and technology refresh efforts are ongoing and will be carried through 2026.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
400	1,300	2,200	2,100	2,100

RG&E

Telecomm Vertical Builds

Line of Business: Common
Category: Operational Smart Grids

Scope:

The building of vertical infrastructure is necessary to support our deployment of wireless and cellular technology. This project will construct 1 tower at a height of up to 350 feet and an additional 4 steel monopoles at a height of up to 195 feet. These will serve primary locations for WiMAX base stations and microwave backhaul supporting services for all traffic types.

Reasons and Benefits:

These towers will provide better overall coverage for wireless communications and reach for future technologies.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,442	959	959	959	959

RG&E

OSG Communications Tower, shelter Facility Improvements (Com)

Line of Business: Common
Category: Operational Smart Grids

Scope:

Tower and Com Shelter new builds and repairs

Reasons and Benefits:

AVANGRID OSG remote communication tower and shelter locations house critical communication network elements. Each location has specific needs to support critical network equipment for fiber, microwave, radio systems. These systems include AC & DC backup power systems, cabling, heating, ventilation and cooling systems, single point grounding systems and security access systems. They also provide for a redundant and diverse design for the network. Failures associated with these components will cause failures to critical communications circuits needed for reliable energy delivery and their associated monitoring systems. Failure to critical wireless networks that support day to day field operational voice systems, and worker health and safety monitoring systems. Through ongoing wireless and fiber expansion project efforts, AVANGRID will build communication facilities (towers and shelters) for AVANGRID OSG communications equipment. The new facilities will be security enhanced com huts, indoor racks and cabinets, outdoor enclosures. The facility will include the building structure, AC and DC power plant, HVAC, racks, inside plant fiber / wireless network elements, and ancillary equipment to establish the OSG equipment as operational and functional on the network. Additional initiatives will include enhancements to ensure the reliability and availability of the OSG Com systems. This includes upgrades to 8 locations every year. The efforts include: 1. Replacement of HVAC systems 2. Cable segment upgrades 3. UPS & DC Power system upgrades 4. Grounding upgrades. 5. Com shelter / room reconfiguration and expansion.

NYSEG and RG&E 5-Year Capital Investment Plan

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
500	1,000	1,500	2,500	1,500

RG&E

Energy Control Systems Infrastructure

Line of Business: Common
Category: Operational Smart Grids

Scope:

NY Energy Control Systems Infrastructure encompasses incremental hardware refresh activities and technology upgrades as well as improvements to Electric, Gas and Business Area systems.

Reasons and Benefits:

These improvements are necessary to keep support, security and reliability at appropriate levels required by the demands of high availability of SCADA environments.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
827	970	2,579	1,203	872

RG&E

FCC License Radio Spectrum purchase

Line of Business: Common
Category: Operational Smart Grids

Scope:

The purchase of spectrum

Reasons and Benefits:

The purchase of spectrum will provide AVANGRID OSG long term capabilities for enhancing wireless systems supporting SCADA (control, monitoring, open and close functions, and station to station teleprotection application needs, enable expandability for field area network expansions, provide for redundant and diverse designs for the network elements and monitoring systems. Additional spectrum allows for enhancement of critical daily operational voice systems used to communicate to field operations and monitor the health and safety of AVANGRID field teams.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,000	1,000	1,000	500	500

RG&E

NY AMI Lifecycle

Line of Business: Common
Category: Operational Smart Grids

Scope:

NY AMI will install smart meters and associated equipment in NYSEG's territory.

Reasons and Benefits:

NY AMI will be an essential foundational system in realizing REV goals to empower customers through new tools and information to effectively manage and reduce usage, establish and animate new markets to promote the implementation of DER's, and minimize environmental impacts of power generation and energy consumption. NYSEG will gain early outage detection to assist with restoration efforts as well as streamline internal business processes.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	4,059

RG&E

Virtualization Expansion

Line of Business: Common
Category: Operational Smart Grids

Scope:

Includes contractor labor, internal labor, and materials costs for deployment of additional nodes and memory to existing non-CIP production environments, and adds a parallel CIP environments in NY.

Additional funds allocated for support of compliance effort.

NY: Bring existing VxRail clusters to parity and add additional stretched Cluster for CIP specific applications. Addition of segregated vCenter servers for CIP applications. Memory upgrades for existing VxRail Nodes

NY and CT: New network equipment for CIP specific clusters

Reasons and Benefits:

Expansion and upgrades to the VxRail environments enable effective support of applications, extends service life of the overall platform, and ensures consistency across operating companies in the CIP realm.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	1,003	946	0	890

RG&E

Historian and Analytic Upgrades Program

Line of Business: Common
Category: Operational Smart Grids

Scope:

Integrate the Energy Management System data into the PI Historian system.

Reasons and Benefits:

Integrate the Energy Management System data into the PI Historian system.

This is to add critical system information into the Historian and Analytics system to provide increased benefits based on actual and accurate data. This would also plan to have a connecting into the metering systems to be able to run analytics for several use cases to benefit customers and currently proposed as the solution to other NY PSC regulatory requirements that we will need to adhere against.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	158	1,709	79	82

RG&E

Rochester Consolidation

Line of Business: Common
Category: Operational Smart Grids

Scope:

RG&E is consolidating operations to fewer locations in the Rochester area. Two of the facilities that are being vacated are the East Ave and West Ave locations. Within these facilities, there are data centers that support critical electric and gas network communication and control systems for both NYSEG and RG&E. These facilities need to be removed from the East and West Ave locations and relocated to other facilities in the Rochester area. Due to the critical nature of the systems, the equipment is not able to be taken offline and moved to the new locations. New equipment will need to be purchased, installed and operational in the new locations and the existing equipment at East and West Ave will be decommissioned, removed from the site, and repurposed.

The facilities located at East Ave will be relocated to the Company’s Mushroom Blvd location in Phase 1 of the project. The West Ave facilities will be relocated to the Company’s Scottsville Rd location in Phase 2 of the project.

Reasons and Benefits:

Meet corporate mandate to vacate Rochester East Ave (ASAP) and West Ave (2023).

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,268	535	0	0	0

RG&E

NMC Solar Winds

Line of Business: Common
Category: Operational Smart Grids

Scope:

SolarWinds is software for the Telecomm Networks Management Center. Over the next three years, the telecomm group will purchase the remaining licenses necessary to complete the SolarWinds implementation and associated services for all network elements within AVANGRID. Solarwinds licenses purchased are for the software being used in the monitoring and management of the AVANGRID Security Domain (ASD) network. In addition to monitoring, the software will be used as a performance management tool for the network and with troubleshooting and fault management. The ASD servers, routers, switches and other data points are fed into the Solarwinds software as a major management piece of the Network Management Center (NMC).

Reasons and Benefits:

The need to optimize and further expand the Management of the ASD and OSG networks relies on continued engineering efforts and additional license purchases. Delay of this project will place us further behind in the addition of new nodes in to the NMC monitoring, as well as the need for engineering to assist with the migration of the OSG on to the ASD transport network.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
313	229	229	229	229

RG&E

ECC Life cycle

Line of Business: Common
Category: Operational Smart Grids

Scope:

This is a program to replace and Enhance Energy Control systems.

Reasons and Benefits:

This program allows the Companies to achieve critical systems uptime of 99.90% of availability and cyber compliance targets.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
160	160	162	164	166

RG&E

Veritas Growth

Line of Business: Common
Category: Operational Smart Grids

Scope:

NYSEG/RG&E: replace two 103TB 5240 with two 240TB 5340 FLEX--remaining two 5240 appliances remain viable this cycle. Additional TB licensing also required. OpCo split is 63% NYSEG; 37% RG&E

Assessment of platform utilization and licensing is performed annually to determine additional capacity and licensing to meet anticipated need at required retention periods.

Current period growth requires additional storage on half of deployed appliance hardware—which is end of sale—requiring upgrade to newer appliance platform.

Includes contractor labor, internal labor, and materials costs for assessment and deployment of additional storage shelves to data protection nodes and capacity licensing.

Reasons and Benefits:

Data protection platform must grow with the environment or retention policies will need to be reduced beyond best practice levels reducing our level of protection.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
26	294	49	49	371

RG&E

OMS Enhancements

Line of Business: Common
Category: Operational Smart Grids

Scope:

This project will continue the build out of the NY Siemens Spectrum system and the Outage Management System (OMS) systems. The NY Spectrum system enhancements consist of Supervisory Control and Data Acquisition (SCADA) and Software upgrade work.

Reasons and Benefits:

The continued buildout of these systems is critical to realize the full benefits and efficiencies these systems provide.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
125	125	125	125	125

RG&E

Solar Battery Backup Integration

Line of Business: Common
Category: Operational Smart Grids

Scope:

Development and deployment of Solar battery backup systems

Reasons and Benefits:

The purchase of Solar Battery backup systems will provide AVANGRID OSG capabilities for enhancing systems that support critical SCADA and Teleprotection application needs, and the associated networks and network elements, their monitoring and alarm systems, and functional operations, including outage notifications and restoration efforts. Additional Solar battery backup allows for enhancement to increase the reliability of critical operational elements for up to 120 hours during loss of commercial AC.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
250	100	50	100	50

RG&E

Microsoft Licensing

Line of Business: Common
Category: Operational Smart Grids

Scope:

Purchase Licenses and Software Assurance to cover all Microsoft products currently supported by Operational Smart Grids Infrastructure.

IT is no longer providing these licenses to OSG and OSG will need agreements with Microsoft in order for OSG to remain within compliance and keep the software to remain active.

Reasons and Benefits:

OSG would no longer be dependent on Corporate IT for Microsoft Licensing. Corporate IT and OSG Infrastructure would no longer need to coordinate true up of Microsoft licensing. Ownership and management of these licenses would belong to OSG Infrastructure.

This is a mandatory expense due to Corp IT policies. Without this funding all Microsoft products will no longer be legally licensed which in a Microsoft audit would lead to legal fines.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
536	0	0	0	0

RG&E

Networks ECTRM

Line of Business: Common
Category: Operational Smart Grids

Scope:

The Energy Services Groups from RG&E is participating in the licensing and implementation of a new Energy/Commodity Trading & Risk Management System (ECTRM) to manage their commodity procurement functions. TRMTracker is the name of the specific product to be provided by Hitachi Energy.

The scope of this project is to implement deal capture, risk management, back office and reporting functionality. The following modules will be implemented:

- TRMTracker base product and specialized modules (nMarket) to support the following:
- Front Office: setup static data and book structure, flexible deal entry for physical and financial instruments for different commodities, market communication (PJM, NYISO, ISO New England) for ISO transactions, integration with exchanges and other sources
- Middle Office: setup required static data (e.g., price curves, contract, counterparty, and credit party data), workflows/alerts, risk measures such as VaR, risk and limit reporting
- BackOffice: integration with ISOs for downloading settlements and prices, settlement and accounting, and hedge-effectiveness testing
- Data extractions, reporting and integration for Front, Middle and Back offices
- Including Gas in storage WACOG and Gas Transmission System communication for Front Office, Counterparty, Contract, Credit Party Data and exposure reporting against limits and collateral for Middle Office SAP interface and simultaneous settlements for both IFRS and GAAP for Back office, and Delivered Cost of Gas as City Gate report. Such list shall not be a limitation on the reporting requirements, and any further requirements shall be as reasonably agreed to by the Parties and documented in a change request, if applicable.

The following activities are included in the scope of this project:

- Project Management (Project management includes managing Supplier resources and tasks and coordinating with Customer's Project Manager)
- Implementation Specification/Requirements
- Design documentation

NYSEG and RG&E 5-Year Capital Investment Plan

- Functional and technical training (including preparing required training material) and train the trainers
- Necessary knowledge transfer to technical staff and administrative & functional users
- Unit and stress testing
- Assistance in creating UAT test scripts and test plan
- Assistance in functional and regression UAT testing
- Detailed project plan for execution phase
- Software installation on Development, Test and Production environments
- Setup required business processes in TRMTracker and any modules in scope

Reasons and Benefits:

RG&E currently utilizes the Allegro system for managing commodity transactions but, as they are not able to upgrade to the current version, it is not possible to receive proper product support. We have lacked the internal resources to keep the version current over the years. The lack of support is evident as the system has failed disaster recover drills for 3 consecutive years and there is no back up system to record the details and track commodity transactions. System failure would certainly lead to a material weakness of audit controls. Aside from system continuity, there are also efficiencies for the Business Area and Corporate Accounting (for which FTE reductions have already been taken) and will allow all Networks' Utilities to participate together which uses leverage to lower the overall cost vs have each Company procure their own system.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
408	0	0	0	0

RG&E

Oracle Exadata

Line of Business: Common
Category: Operational Smart Grids

Scope:

Standardization and consolidation from 13 to 2 instances. Migration of the following workloads to Exadata Servers:

- iCDS for NYSEG, RG&E, and CMP (4)
- New York Spectrum Development Environment (DEV) (4)
- Production Spectrum DMZ Historian (2)
- Addition of Quality Assurance System (QAS) Spectrum DMZ Historian (2)
- iBase (1)

Includes contractor labor, internal labor, and materials costs for deployment of Exadata and migration of workloads.

Reasons and Benefits:

Exadata offers greater performance and scalability with less hardware than separate platforms per workload. Identified as an Every Day Better (EDB) project initiative.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
10	0	0	0	356

RG&E

Itron Mobile hardware replacement

Line of Business: Common
Category: Operational Smart Grids

Scope:

RG&E currently utilizes FC300 Itron devices to read meters. Itron will end support for the FC300 devices by December 31, 2022 as they are phasing out the equipment. (The company is losing the ability to fix them as parts are not readily available anymore).

Replacing devices with Panasonic or Dell tough books.

Reasons and Benefits:

Mobile read collectors FC300 are critical to collect reads for customer billing. This will impact revenue stream and customers. There is major compliance and customer service risk if we don't have replacements by 12/31/2022.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
260	0	0	0	0

RG&E

Full OMS Functional alignment ABB-Spectrum

Line of Business: Common
Category: Operational Smart Grids

Scope:

Streamline OMS functionality and integration across all systems. This includes integration with Mobility, WFM, Damages, ...

Reasons and Benefits:

Full benefits and efficiency of best in class OMS system

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	83	83	83	0

Common Physical and Cyber Security

NYSEG

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NYSEG

Avangrid Security Domain (ASD) OSG Telecommunications

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Installation of telecommunications infrastructure including fiber, Wi-MAX, network architecture design telecommunications infrastructure, implementation of switching and routing within transport backbone for DWDM IP/MPLS.

Reasons and Benefits:

Continued expansion of Telecommunications Infrastructure for all Avangrid automation programs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
7,209	12,594	7,125	6,125	6,125

NYSEG

ASD Security System Installation

Line of Business: Common
Category: Physical and Cyber Security

Scope:

This program, formerly known as System Cutover, relates to security work on various facilities to continue implementing the five-year Security Deployment plan. Systems to be installed are based on a security tier for each facility that is based on risk. Tier 1 and 2 facilities (e.g., bulk substation) receive card access control systems, Public Address (PA) systems, video surveillance, video analytics and thermal cameras (Tier 1 also receives additional physical hardening due to critical nature). Tier 3 facilities (e.g., large office/service center, cash office, hydro) receive card access control systems, video surveillance and video analytics. Tier 4 facilities (e.g., small offices, store yards) receive card access control systems and video surveillance. Additional work includes the enhancement of communication networks to allow for the transport of video back to the Security Operations Center (SOC) for remote monitoring of security network, access control and video monitoring systems. to allow for the transport of video back to the Security Operations Center (SOC) for remote monitoring of security network, access control and video monitoring systems.

Reasons and Benefits:

Compliance with the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards, including;

- CIP-002 BES Cyber System Categorization
- CIP-003 Security Management Controls
- CIP-004 Personnel & Training
- CIP-006 Physical Security of BES Cyber Systems
- CIP-011 Information Protection
- CIP-013 Supply Chain Risk Management
- CIP-014 Physical Security

In addition, this program is designed to meet regulations defined by Homeland Security, and other State, local and Federal laws to maintain security of personnel and asset protection.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
10,867	5,343	7,293	8,456	5,637

NYSEG

Global Cybersecurity Directors Plan

Line of Business: Common
Category: Physical and Cyber Security

Scope:

All OSG assets and systems in all OpCos for electric and gas transmission and distribution to improve cybersecurity at Avangrid.

Reasons and Benefits:

Increase the Cybersecurity maturity against NIST-CSF.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
10,574	4,975	6,468	727	727

NYSEG

Avangrid Security Domain (ASD) OSG Infrastructure

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Continued development of tools and capabilities with cyber security for Avangrid Network across all OPCOs.

Reasons and Benefits:

Secure infrastructure. Centralized Physical security system for Avangrid Networks. This includes the professional services and hardware/software lifecycle of all direct and auxiliary systems which include advanced cybersecurity technologies and capabilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,867	4,004	2,988	424	3,607

NYSEG

FIRE PROTECTION

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Design and installation/replacement of smoke detector/fire alarm system, mass notification systems, automated extinguisher monitoring systems and fire suppression systems:

- Lowville Service Center
- Walton Service Center
- Liberty Service Center
- Walden Service Center
- Trumansburg Service Center
- Border City Substation
- Flatt Street Substation
- Greenidge Substation
- Haley Road Substation
- Hamilton Road Substation
- Macedonia Substation
- Sleigh Road Substation
- State Road Substation
- Wright Avenue Substation

Reasons and Benefits:

This program addresses fire protection system projects to ensure the safety of our facilities as well as ensuring our systems are up to date and in compliance with local and federal requirements as well as the National Fire Protection Association (NFPA) Standards. Applicable Standards and Regulations for the State of New York are:

- 2020 Fire Code of NYS
- Part 1228 of Title 19 New York Codes Rules & Regulations (NYCRR) Section 1228.4 Carbon Monoxide Detection in Commercial Buildings
- OSHA 1910.38 Emergency Action Plans
- OSHA 1910.157 Portable fire extinguishers.
- NFPA 1, Fire Code
- NFPA 10, Standard for Portable Fire Extinguishers

NYSEG and RG&E 5-Year Capital Investment Plan

- NFPA 13, Standard for the Installation of Sprinkler Systems.
- NFPA 12, Standard for the installation of Carbon Dioxide Extinguishing Systems
- NFPA 70, National Electric Code
- NFPA 72, National Fire Alarm and Signal Code
- NFPA 75, Standard for the Fire Protection of Informational Technology Equipment (Data Centers).
- NFPA 101, Life Safety Code
- NFPA 110, Standard for Emergency & Standby Power
- NFPA 111, Standard on Stored Electrical Energy
- NFPA 750, Standard for the installation of Water Mist Fire Protection Systems.
- NFPA 850, Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations.
- NFPA 851, Recommended Practice for Fire Protection for Electric Generating Plants and Current Converter Stations.
- NFPA 855, Standard for the Installation of Stationary Energy Storage Systems
- NFPA 2001, Standard for Clean Agent Fire Extinguishing Systems.
- NFPA 2010, Standard for the installation of Fixed Aerosol Fire-Extinguishing Systems

Fire protection projects include the design and installation/replacement of smoke detector/fire alarm systems, mass notification systems, automated extinguisher monitoring systems and fire suppression systems. Compliance with local and federal laws as well as applicable NFPA Standards reduces fire risk and loss to Company infrastructure by increasing resiliency to maintain operations. This improves AVANGRID’s ability to maintain excellence in customer service through critical asset protection.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,000	2,500	2,500	2,500	2,500

NYSEG

QSR - Security Plan

Line of Business: Common
Category: Physical and Cyber Security

Scope:

The purpose of the Security Plan is to consolidate and strengthen the company’s security posture through the deployments of security solutions and technologies. The key areas of focus include Network Security, Workplace Server and Endpoint Security, Cloud Security, Application Security, Identity and Access Security, and Security Operations.

Reasons and Benefits:

This plan is required to provide NYSEG with the necessary IT cybersecurity capabilities to improve the companies Security posture and keep pace with the increasing security threats towards the US, the industry, and the company. The Security plan addresses several areas of security that provides a security in-depth strategy. This includes, but not limited to, our advancement with perimeter security solutions, hardening of our endpoints, and increased detection and response capabilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
173	373	390	388	396

NYSEG

Tripwire Implementation

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Three major factors drive the needs for this project. First, compliance procedures and toolsets are different at all OSG Infrastructure operating companies. In many cases, solutions involving manual processes are deployed to fit a specific need. This creates compliance silos which increases reporting complexity and creates inefficiencies and reduces accuracy. Second, lack of visibility into core system performance and configuration metrics reduces overall Bulk Energy System (BES) Reliability. Finally, environments outside of the highly regulated Electric systems often have inadequate or missing Cyber Security controls. To arrive at the selection of the Tripwire Suite, an evaluation of the current toolsets used across the Infrastructure group was performed. POCs were done for product suites that met the need for addressing the above issues and the Tripwire Suite was found to be the best fit.

Reasons and Benefits:

The project will provide improved visibility and enhancements to cyber security for all Operational Smart Grids Infrastructure managed systems, is required as part of the NERC CIP Compliance Automation requirements and will provide a standardized system across NYSEG.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	1,318

NYSEG

IT-OT DR/DMZ

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Avangrid IT Data Centers are being consolidated; one on the East Coast and one on the West Coast. This project will provide Operational Smart Grids (OSG) OT the ability to access systems through the changes imposed by the IT Data Center consolidation for the East/West coast.

Reasons and Benefits:

Strategic Iberdrola / AVANGRID goal.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
848	0	0	0	0

NYSEG

Cybersecurity Innovation Lab

Line of Business: Common
Category: Physical and Cyber Security

Scope:

This project will connect OpCo labs and evaluate centralized solutions for efficiencies, collaborate with vendors on proofs-of-concept including stakeholders for success criteria and evaluate NYSEG cost-benefit

Reasons and Benefits:

Enable evolution of cybersecurity architecture and assure coverage of all NYSEG digital assets.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	377	196	23	35

NYSEG

DRAGOS

Line of Business: Common
Category: Physical and Cyber Security

Scope:

DRAGOS brings advance analytics and visualization to industrial protocols on private networks via on-premises solutions and ability to share anonymized observations with government, peer utility and private sector partners.

Avangrid OSG has 11 datacenters in which to implement mitigation, supporting 14 lines of businesses, where 126 third party interconnections must be mitigated. CIP must be separate implementation per interpretation from the ERO.

Our firewalls may allow many unmonitored connections without sufficient intrusion detection and threat analytics capabilities. Continuous monitoring suffers from a lack of visibility for these interfaces today. Action is required immediately, given the warnings from US Government intelligence reports, USA Office of the President Executive Orders in flight, the near daily news of attacks in the USA, and a need to have the right narrative for reliability and the life-safety of our customers.

Reasons and Benefits:

Mitigate cyber risk registered and managed by Corporate Risk. Comply with Corporate Governance and Cybersecurity Policy and Rules as sponsored by the Board of Directors. Establish a leadership position for grid security and build confidence in the Avangrid Brand among stakeholders, regulatory authorities, agencies, peer utilities and whole of government Incident response.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	38	0



Common Physical and Cyber Security

RG&E

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RG&E

Avangrid Security Domain (ASD) OSG Telecommunications

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Installation of telecommunications infrastructure including fiber, Wi-MAX, network architecture design telecommunications infrastructure, implementation of switching and routing within transport backbone for DWDM IP/MPLS.

Reasons and Benefits:

Continued expansion of Telecommunications Infrastructure for all Avangrid automation programs.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
4,916	4,184	3,353	3,353	3,353

RG&E

ASD Security System Installation

Line of Business: Common
Category: Physical and Cyber Security

Scope:

This program, formerly known as System Cutover, relates to security work on various facilities to continue implementing the five-year Security Deployment plan. Systems to be installed are based on a security tier for each facility that is based on risk. Tier 1 and 2 facilities (e.g., bulk substation) receive card access control systems, Public Address (PA) systems, video surveillance, video analytics and thermal cameras (Tier 1 also receives additional physical hardening due to critical nature). Tier 3 facilities (e.g., large office/service center, cash office, hydro) receive card access control systems, video surveillance and video analytics. Tier 4 facilities (e.g., small offices, store yards) receive card access control systems and video surveillance. Additional work includes the enhancement of communication networks to allow for the transport of video back to the Security Operations Center (SOC) for remote monitoring of security network, access control and video monitoring systems. to allow for the transport of video back to the Security Operations Center (SOC) for remote monitoring of security network, access control and video monitoring systems.

Reasons and Benefits:

Compliance with the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards, including;

- CIP-002 BES Cyber System Categorization
- CIP-003 Security Management Controls
- CIP-004 Personnel & Training
- CIP-006 Physical Security of BES Cyber Systems
- CIP-011 Information Protection
- CIP-013 Supply Chain Risk Management
- CIP-014 Physical Security

In addition, this program is designed to meet regulations defined by Homeland Security, and other State, local and Federal laws to maintain security of personnel and asset protection.

NYSEG and RG&E 5-Year Capital Investment Plan**Five Year Capital Plan**

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,402	2,890	275	4,750	2,965



RG&E

Avangrid Security Domain (ASD) OSG Infrastructure

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Continued development of tools and capabilities with cyber security for Avangrid Network across all OPCOs.

Reasons and Benefits:

Secure infrastructure. Centralized cyber security system for Avangrid Networks. This includes the professional services and hardware/software lifecycle of all direct and auxiliary systems which include advanced cybersecurity technologies and capabilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
3,595	4,004	2,988	424	3,607

RG&E

Global Cybersecurity Directors Plan

Line of Business: Common
Category: Physical and Cyber Security

Scope:

All OSG assets and systems in all OpCos for electric and gas transmission and distribution to improve cybersecurity at Avangrid.

Reasons and Benefits:

Increase the Cybersecurity maturity against NIST-CSF.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
6,480	3,050	3,959	437	437

RG&E

FIRE PROTECTION

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Design and installation/replacement of smoke detector/fire alarm system, mass notification systems, automated extinguisher monitoring systems and fire suppression systems:

- Canandaigua Service Center
- 89 East Avenue Corporate Office
- Fillmore Service Center
- Mushroom Boulevard Service Center
- Pavillion Service Center
- Sodus Service Center
- Scottsville Road Service Center
- Station 5 Hydro Gate House
- Station 26 Hydro and Substation
- Station 42 Substation
- Station 43 Substation
- Station 48 Substation
- Station 49 Substation
- Station 67 Substation
- Station 80 Substation
- Station 122 Substation

Reasons and Benefits:

This program addresses fire protection system projects to ensure the safety of our facilities as well as ensuring our systems are up to date and in compliance with local and federal requirements as well as the National Fire Protection Association (NFPA) Standards. Applicable Standards and Regulations for the State of New York Are:

- 2020 Fire Code of NYS
- Part 1228 of Title 19 New York Codes Rules & Regulations (NYCRR) Section 1228.4 Carbon Monoxide Detection in Commercial Buildings
- OSHA 1910.38 Emergency Action Plans
- OSHA 1910.157 Portable fire extinguishers.
- NFPA 1, Fire Code

NYSEG and RG&E 5-Year Capital Investment Plan

- NFPA 10, Standard for Portable Fire Extinguishers
- NFPA 13, Standard for the Installation of Sprinkler Systems.
- NFPA 12, Standard for the installation of Carbon Dioxide Extinguishing Systems
- NFPA 70, National Electric Code
- NFPA 72, National Fire Alarm and Signal Code
- NFPA 75, Standard for the Fire Protection of Informational Technology Equipment (Data Centers).
- NFPA 101, Life Safety Code
- NFPA 110, Standard for Emergency & Standby Power
- NFPA 111, Standard on Stored Electrical Energy
- NFPA 750, Standard for the installation of Water Mist Fire Protection Systems.
- NFPA 850, Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations.
- NFPA 851, Recommended Practice for Fire Protection for Electric Generating Plants and Current Converter Stations.
- NFPA 855, Standard for the Installation of Stationary Energy Storage Systems
- NFPA 2001, Standard for Clean Agent Fire Extinguishing Systems.
- NFPA 2010, Standard for the installation of Fixed Aerosol Fire-Extinguishing Systems

Fire protection projects include the design and installation/replacement of smoke detector/fire alarm systems, mass notification systems, automated extinguisher monitoring systems and fire suppression systems. Compliance with local and federal laws as well as applicable NFPA Standards reduces fire risk and loss to Company infrastructure by increasing resiliency to maintain operations. This improves AVANGRID’s ability to maintain excellence in customer service through critical asset protection.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
1,090	1,090	1,090	1,090	1,090

RG&E

QSR - Security Plan

Line of Business: Common
Category: Physical and Cyber Security

Scope:

The purpose of this security Plan is to consolidate and strengthen the company’s security posture through the deployments of security solutions and technologies. The key areas of focus include Network Security, Workplace Server and Endpoint Security, Cloud Security, Application Security, Identity and Access Security, and Security Operations.

Reasons and Benefits:

This plan is required to provide RG&E with the necessary IT cybersecurity capabilities to improve the companies Security posture and keep pace with the increasing security threats towards the US, the industry, and the company. The Security plan addresses several areas of security that provides a security in-depth strategy. This includes, but not limited to, our advancement with perimeter security solutions, hardening of our endpoints, and increased detection and response capabilities.

Five Year Capital Plan

All amounts shown below in thousands (\$000’s)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
88	213	217	222	227

RG&E

Tripwire Implementation

Line of Business: Common
Category: Physical and Cyber Security

Scope:

"Engagement includes 3 days of onsite visits from the Technical Account Manager (TAM), and 2 seats of training in addition to the Resident Engineer interaction and knowledge transfer.

At the end of the 60-month term, all 'in-use' licenses would convert to permanent, perpetual licenses. Support costs for the converted perpetual licenses would not exceed the prior year's fees (year 5), with a maximum 5% uplift on support cost for the converted perpetual licenses thereafter, in perpetuity."

Reasons and Benefits:

"Key Benefits:

1. Improved Visibility and Enhancements to Cyber Security for all OSG Infrastructure managed systems. Direct impacts on BES Reliability.
2. NERC CIP Compliance Automation
3. Toolset Standardization and Consolidation"

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	0	808

RG&E

IT-OT DR/DMZ

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Corporate IT is consolidating to two data centers; one on the East coast and one on the west coast. This project will provide the ability for OT systems to access those systems.

Reasons and Benefits:

Strategic Iberdrola / AVANGRID goal.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
517	0	0	0	0

RG&E

Cybersecurity Innovation Lab

Line of Business: Common
Category: Physical and Cyber Security

Scope:

To connect OpCo labs and evaluate centralized solutions for efficiencies; collaborate with vendors on proofs-of-concept including stakeholders for success criteria and evaluate Avangrid cost-benefit

Reasons and Benefits:

Enable evolution of cybersecurity architecture and assure coverage of all Avangrid digital assets

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	231	120	14	21

RG&E

DRAGOS

Line of Business: Common
Category: Physical and Cyber Security

Scope:

Avangrid OSG has 11 datacenters in which to implement mitigation, supporting 14 line of businesses, where 126 third party interconnections must be mitigated. CIP must be separate implementation per interpretation from the ERO.

The true risk is that OSG is much too porous and our firewalls allow many unmonitored connections without sufficient intrusion detection and threat analytics capabilities. Continuous monitoring suffers from a lack of visibility for these interfaces today. Action is required immediately; given the warnings from US Government intelligence reports, USA office of the president Executive orders in flight, the near daily news of attacks in the USA, and a need to have the right narrative for reliability and the life-safety of our customers. DRAGOS brings advance analytics and visualization to industrial protocols on private networks via on-premises solutions and ability to share anonymized observations with government, peer utility and private sector partners. <https://www.energy.gov/articles/biden-administration-takes-bold-action-protect-electricity-operations-increasing-cyber-0>

Reasons and Benefits:

Mitigate Risk registered and managed by Corporate Risk and leadership. Comply with Corporate Governance and Cybersecurity Policy and Rules as sponsored by the Avangrid Board of Directors. Establish a leadership position for grid security and build confidence in the Avangrid Brand among stakeholders, regulatory authorities, agencies, peer utilities, and whole of government Incident response.

NYSEG and RG&E 5-Year Capital Investment Plan***Five Year Capital Plan***

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
0	0	0	23	0



Common Training

NYSEG

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NYSEG

Training Facility

Line of Business: Common
Category: Training

Scope:

Project includes construction of new 3 story state of the art training facility to house Electric, Gas, and Field Customer Service Training in Johnson City, NY and any supplemental work required to construct building. Ancillary enclosed structure for 12 poles at 30 foot height with a total clearance of 40 foot height and a max capacity of 75 people to conduct pole top training.

All components of project are focused on safety and building/maintaining a qualified workforce. Electric, Field Customer Service and Gas Training are in scope for this project. Current Electric, Gas, and Field Customer Service training facilities are scattered throughout the 40+ acre yard. The new facility will bring all these areas together at 1 location to better leverage synergies amongst the programs in NY.

Reasons and Benefits:

Current training facilities are scattered throughout 40-acre property causing logistical and safety concerns. Further, the capacity of the current facility is not capable of handling a roughly 15% operational headcount growth along with the natural attrition rate of approximately 8%. The increased throughput at the facility raises safety and training concerns.

Benefits include added synergies across programs with workforce reporting to and training out of 1 facility. Deloitte also attributes as 22% ROI on capital investments related directly to training and engagement. Safety concerns are decreased through advanced systems and facilities built to accommodate increased capacity. This includes parking, classroom size, classroom location with relation to outdoor facilities, emergency needs, etc.

Construction of a new building provides opportunities for significant advancements with training technology including several mixed reality platforms. With the available space and technology these platforms can be tested and deployed at scale to the field further creating a safer and more efficient workforce.

A new facility aligns with company initiatives for Every Day Better as well as the goal of best in class. The facility will allow trainees a greater speed to mastery benefiting the

NYSEG and RG&E 5-Year Capital Investment Plan

customer by increase workforce capacity to reduce outage time as well an increase in public safety.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
2,000	12,200	350	350	500

NYSEG

Training – Fleet

Line of Business: Common
Category: Training

Scope:

Equip training yard with rental fleet in 2022 as appropriate to the training needs of students. Beyond 2022 fleet will be purchased for the training yard specifically. Electric and Gas vehicles are in scope for this project. Vehicles include bucket truck, digger truck, gas van, as well as other additions prioritized by training requirement.

Reasons and Benefits:

Current fleet used in training is antiquated and, in some cases, unsafe. Current vehicles are end of life and sent to training instead of auction or borrowed from divisions when possible. Electric fleet break down frequently and pose a potential safety hazard. Further, students are being trained on outdated fleet that is not comparable to that used in day to day activities. For example, training's bucket truck has different controls than those used in division due to age of training's vehicle.

New additions to fleet will provide for realistic recreation of day to day scenarios for trainees on equipment used in the field. These real-world simulations provide for greater speed to mastery and increased safety through practice. Training with fleet used as part of trainee's job enhances efficiency for the customer with decreased emergency response times. New vehicles also create increased student engagement when presenting familiar scenarios to those seen in the field.

There are also direct advantages with respect to safety. New fleet have increased safety features to demonstrate as well as increase safety during training activities. This fleet would also be more environmentally safe as there is decreased risk for leaking fluids due to breakage.

NYSEG and RG&E 5-Year Capital Investment Plan

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
325	1,560	0	0	0

NYSEG

Training Equipment and Tools

Line of Business: Common
Category: Training

Scope:

This is a project to replace equipment for the training department. Equipment replacements include, but are not limited to, McElroy Tapping equipment, PowerComm PLC application simulator for substation and meter training, Mueller tapping equipment, Adapter test sets, Megger PQ analyzer kits, 3 Phase Recloser for training, Doble Sets, Rangefinder for electric field, and safety related equipment such as Timpson Trainer to give safe live line training scenarios.

Reasons and Benefits:

Alignment with mandated compliance training to build field trainee competence. Training with equivalent tooling to what is used in the field promotes confidence and shorter time mastery. Concepts with tools are relevant, but many tools and equipment have subtle differences in operation that effect the learners time to mastery. Pending regulations require gas training prior to being qualified. Project is in collaboration with Gas and Electric Operations.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
500	250	200	250	250

NYSEG

Training Technology Projects

Line of Business: Common
Category: Training

Scope:

This project will develop an immersive learning experience for Electric and Gas Operations and Customer Service. Immersive learning includes Augmented Reality (AR) and Virtual Reality (VR) along with other mixed reality immersing technologies to support Technical Training in a repetitive safe environment. This project will purchase the headsets, related computing devices to support AR, VR and mixed reality creation and execution and the equipment support the immersive learning environment initiative.

Reasons and Benefits:

The addition of technology enhancers for progression training will increase speed to mastery, reduce travel for training and, according to a study completed by Deloitte Finances Online, deliver an ROI of 22%. In addition, there are added benefits related to reputational value (alignment w/peers), talent attraction and retention. The student benefits from being able to practice scenarios that they do not get to experience often in the field with great repetition. These technologies also provide a medium for testing.

Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
60	28	26	10	30

Common Training

RG&E

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RG&E

Training Equipment and Tools

Line of Business: Common
Category: Training

Scope:

This is a project to replace equipment for the training department. Equipment replacements include, but are not limited to, McElroy Tapping equipment, PowerComm PLC application simulator for substation and meter training, Mueller tapping equipment, Adapter test sets, Megger PQ analyzer kits, 3 Phase Recloser for training, Doble Sets, Rangefinder for electric field, and safety related equipment such as Timpson Trainer to give safe live line training scenarios.

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Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
250	125	50	125	0

RG&E

Training Technology Projects

Line of Business: Common
Category: Training

Scope:

This project will develop an immersive learning experience for Electric and Gas Operations and Customer Service. Immersive learning includes Augmented Reality (AR) and Virtual Reality (VR) along with other mixed reality immersing technologies to support Technical Training in a repetitive safe environment. This project will purchase the headsets, related computing devices to support AR, VR and mixed reality creation and execution and the equipment to support the immersive learning environment initiative.

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Five Year Capital Plan

All amounts shown below in thousands (\$000's)

<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
15	14	13	9	2

Appendix C - Disadvantaged Communities

NYSEG Electric Projects	940
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NYSEG Electric Projects

NYSEG Electric Projects by Disadvantaged Communities	
City of Auburn	Substation Modernization - Wright Avenue
City of Binghamton	DSIP - ADMS EV Charging Hub NY Spectrum HW Refresh CapEx Substation Modernization - Noyes Island T
City of Columbia	Craryville New Substation Breaker and Circuit Upgrade
City of Elmira	Hillcrest Transformer Replacement -Cap Woodlawn SS Transformer
City of Ithaca	Distributed Energy Storage pilot- Load Managed Distribution System Optimization Ithaca - College Ave Underground Ithaca Electrification Projects – Phase 1 Ithaca Electrification Projects – Phase 2 Tompkins County Demand Side LMI HVAC Management Pilot
Town of Ausable	Fossil Hydro Operations HYDRO Regulatory Mandates Minor Capital Program Rainbow Falls Powerhouse Entrance / Hill Stabilization RainbowFalls-fishbypassstudy-Env.Complia
Town of Bradford	Keuka/Bradford Concrete Spillway and Toe Resurfacing Repairs/Improvements Keuka/Bradford Dam Automation
Town of Cheektowaga	Sloan Substation Load Relief
Town of Chesterfield	HYDRO Regulatory Mandates
Town of Plattsburgh	Fossil Hydro Operations HYDRO Regulatory Mandates Mill C Intake Trash Rack & Raker Project Mill C Spillway Concrete Improvements Project Minor Capital Program Saranac Plant Control Systems Upgrade Project
Town of Saranac	



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Electric Projects by Disadvantaged Communities
Fossil Hydro Operations
High Falls Draft Tube Stop Logs and Gantry Project
High Falls Intake Upgrades Project
High Falls U2 Generator Rewind
HYDRO Regulatory Mandates
Minor Capital Program
Saranac Plant Control Systems Upgrade Project
Town of Schaghticoke
Fossil Hydro Operations
HYDRO Regulatory Mandates
Mechanicville Bay A, Bay B, Bay C Bag Replacement Program & Inclinometer Upgrade
Minor Capital Program
Town of Schuyler Falls
Cadyville Right Abutment / Spillway Improvements Project
Cadyville U1 T-G Major Rebuild
Cadyville Upgrade U1 & U2 Cooling water systems
Fossil Hydro Operations
HYDRO Regulatory Mandates
Kent Falls - CAPITAL Project
Kents Falls Low Level Floodgate
Kents Falls Right Abutment & Toe Scour Upgrades Project
Kents Falls U2 T-G Major Rebuild
Kents Falls Upstream Training Wall Extension
KF Dam Left Abutment & Drainage Improvement
KF Internal Riser Shaft and Tank
Minor Capital Program
Saranac Plant Control Systems Upgrade Project
Town of Stephentown
Stephentown Energy Storage
Wales Center Energy Storage
Town of Stillwater
Fossil Hydro Operations
HYDRO Regulatory Mandates
Mechanicville Bay A, Bay B, Bay C Bag Replacement Program & Inclinometer Upgrade
Mechanicville Intake Upgrades and Downstream Passage Project
Mechanicville Upstream Eel Ladder Project
Minor Capital Program
Upper Mechanicville Plant Control System Upgrade Project
Town of Vestal
DSIP - ADMS
NY Spectrum HW Refresh CapEx
Village of Brewster
Crafts Substation Transformer Upgrade



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Electric Projects by Disadvantaged Communities
Village of Dundee
Milo Substation Rebuild
Village of Endicott
Substation Modernization - Clark Street
Village of Owego
Substation Modernization - South Owego
Implementations/enhancements are system wide and not community specific.
15 Loop Automation Schemes
AMI Integration for ISO
AMI Project E
Animal Guard Program
Application Interface Upgrades
Automate SAP CCS Dist Gen Billing
Battery Program
BES Program - FERC Compliance
Breaker Program
Checkpoint Firewall Upgrades Subs
Circuit Sensor Implementation Plan
Comprehensive Area Studies
CYME Server
DER- ICCP connection to NYISO
Dist Line
Distributed Energy Resource Management System (DERMS)
Distribution Automation
Distribution Line Deficiencies
Distribution Load Relief Program
DSIP - Advanced Planning Tools
DSIP - Enterprise Analytics
DSIP - GIS Enhancements GMEP
DSIP - Grid Automation
Elec Better
Electric Meters
Electric Reliability Application (ERA) Integration
FERC Order 2222 DER Aggregations/Billing/Metering
FERC Order 881
General Equipment - OPS-SO
General Equipment - OPS-T&D
Gov't Highway
Heritage Hills Upgrade
IEDR
IEE Service Mode
Ind/Comm
LED Streetlighting



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Electric Projects by Disadvantaged Communities
Make Ready
NERC Alert Priority III
PCB Transformer Replacements
Pole Replace (WPIT) Program CAP
Recloser Automation
Res Line
Resiliency Automation, Hardening and Topology
REV - Electric Vehicles
SCADA/Automation
Serv Conn
Siemens Spectrum upgrade to V7
Spectrum Planned Work Module
Storms Electric
Street Light
Substation Major Program
Substation Minor Capital
Switched Source Tie Controller
T&S Asset Condition Replacement Program
TLD Replacements
Trans line
Transmission GIS and GIS Interface optimization
URD Replacement Program
Not going to Disadvantaged communities
Academic Institution Collaboration
FICS Scalability Plan
Low Income Clean Generation
Medium & Heavy Duty EV Make-Ready Program
NY Energy Storage RFP
SMSI Field Deployment
Stillwater NWA



RG&E Electric Projects

RG&E Electric Projects by Disadvantaged Communities	
City of Rochester	
	DSIP - ADMS
	Fossil HYDRO-General Equipment
	Hydro Generation S2 Modernization
	HYDRO Regulatory Mandates
	Hydro Upgrade
	Mandated RG&E - East Main St HWY Project
	Minor Capital Program
	NY Spectrum HW Refresh CapEx
	S2 Central Ave Dam Superstructure Modernization
	S26 Generator Protection and Controls Upgrade
	S5 Gate 2 Hinge Upgrade
	S5 Gate 5 Rubplate and Bottom Seal Upgrade Project
	S5 Intake Stop Log Gantry Upgrade Project
	S5 Powerhouse T-G Rotating Equipment Guards
	S5 Spillgate #2 Rock Stabilization - 1st priority
	S5 Surge Tank Expansion (Align with tunnel inspection)
	S5 Tunnel System (Construction Joints, Intake Shaft Transition, Surge Tank Found
	S5 Unit 3 Turbine-Generator New Runner
	S5 Unit 3 Turbine-Generator New Turbine Isolation Valve
	Station #5 surge Tank Rock fall Pro
	Station 2 Generator Protection and Controls Upgrade
	Station 29 Modernization Project
	Station 34 Modernization Project
	Station 37 Modernization Project
	Station 38 Total Refurbishment D
	Station 46 - Replace #1 #3 Transf. Banks T
	Station 49 4KV to 12KV Upgrade
	Station 49 Transformer Addition
	Station 5 Gate 3 Rubplate, Rubplate and Breastwall Seal Upgrade Project
	Station 5 Headgates/Dam
	Station 5 Substation Mod D
Town of Brighton	
	Station 82 Upgrades
Town of Irondequoit	
	Station 51
Village of Sodus	
	Sta 210 Modernization Prj - Install WO
Village of Wolcott	



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Electric Projects by Disadvantaged Communities

Station 192 Trans Facilities Upgrade
Implementations/enhancements are system wide and not community specific.
AMI Integration for ISO
AMI Project E
Animal Guards CAP
Application Interface Upgrades
Automate SAP CCS Dist Gen Billing
Battery Prog
BES Program - FERC Compliance
Breaker Prog
Checkpoint Firewall Upgrades Subs
Comprehensive Area Studies
CYME Server
DER- ICCP connection to NYISO
Dist Line
Distributed Energy Resource Management System (DERMS)
Distribution Automation
Distribution Line Deficiencies
DSIP - Advanced Planning Tools
DSIP - Enterprise Analytics
DSIP - GIS Enhancements GMEP
DSIP - Grid Automation
Elec Better
Electric Meters Program
Electric Reliability Application (ERA) Integration
FERC Order 2222 DER Aggregations/Billing/Metering
FERC Order 881
General Equipment - OPS-SO
General Equipment - OPS-T&D
Gov't Highway Majors CAP
Gov't HW
IEDR
IEE Service Mode
Ind/Comm
LED Streetlighting
Make Ready
Mandated - State St
PCB Transformer Replacements
Pole Replace (WPIT) Program CAP
Recloser Automation
Replace DC Pilot Wire System
Res Line
Resiliency Automation, Hardening and Topology



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Electric Projects by Disadvantaged Communities
REV - Electric Vehicles
ROC 5 Amazon
SCADA/Automation
Serv Conn
Siemens Spectrum upgrade to V7
Spectrum Planned Work Module
STORM ELECTRIC
Street Light
Substation Major Program
Substation Minor Program
T&S Asset Condition Replacement Program
TLD Replacements
Town of Brighton Arc Light Conversion
Trans line
Transmission GIS and GIS Interface optimization
UG Cable Replacements
URD Replacement Program
Not going to Disadvantaged communities
Academic Institution Collaboration
FICS Scalability Plan
Low Income Clean Generation
Medium & Heavy Duty EV Make-Ready Program
NY Energy Storage RFP
SMSI Field Deployment
UG Cable Injection



NYSEG Gas Projects

NYSEG Gas Projects by Disadvantaged Communities	
City of Binghamton	Critical Valve Installations, Binghamton
City of Cortland	North Main Cortland Leak Prone Main
City of Ithaca	Geothermal District Energy System Pilot Project
City of Norwich	Broad St Norwich Leak Prone Main
City of Oneonta	Winney Hill Leak Prone Main
Town of Maine	Boswell Hill 124 Psig Bare Steel Leak Prone Main
Town of Oneonta	Winney Hill Leak Prone Main Winney Hill Regulator Station
Town of Otsego	Winney Hill Regulator Station
Town of Union	Boswell Hill 124 Psig Bare Steel Leak Prone Main
Town of Vestal	Boswell Hill 124 Psig Bare Steel Leak Prone Main
Village of Cayuga	West Genesee Street Leak Prone Main
Village of Endicott	Boswell Hill 124 Psig Bare Steel Leak Prone Main
Village of Horseheads	Gardner Regulator Station
Implementations/enhancements are system wide and not community specific.	
	Regulators
	Gas Meters
	AMI Project Gas
	Common Gas SCADA Platform
	Gas Operations Departmental
	Gas RTU/Telemetry Upgrade
	Low Pressure Relief Valve Program
	Regulator Modernization and Automation Program
	Leak Prone Main Replacement Program - LPM
	Leak Prone Service Replacement Program
	Government Jobs

NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Gas Projects by Disadvantaged Communities

New Services
Distribution Main Replacement
Distribution Mains - New Business
Large Government Jobs
Non Leak Prone Service Replacement Program
Click-Gas Inspections and Scheduling
Not going to Disadvantaged communities
Hornby Regulator Station
Pendleton - SW System and Regulator Station Upgrade
Canandaigua Feeder Main Reinforcement Project
Vienna Road Regulator Station
Chambers Road Regulator Station
Spruce Haven Farm RNG
Limestone Regulator Station
Hebron Station/Line J Retirement



RG&E Gas Projects

RG&E Gas Projects by Disadvantaged Communities
City of Rochester
Mt Read SF115 psi, Replace Gas Mains
Ridgeway Ave Leak Prone Main
Town of Brighton
Winton Road South Leak Prone Main
Implementations/enhancements are system wide and not community specific.
Regulators
Gas Meters
AMI Project Gas
Common Gas SCADA Platform
Gas Operations Departmental
Regulator Modernization and Automation Program
Leak Prone Main Replacement Program - LPM
Leak Prone Service Replacement Program
Government Jobs
New Services
Distribution Main Replacement
Large Government Jobs
Non Leak Prone Service Replacement Program
Incremental Customer Growth
Distribution Mains New Business
Click-Gas Inspections and Scheduling
Not going to Disadvantaged communities
CM-1A Regulator Station
CM-1 (CM-6) Transmission Gas Main Replacement
CM-1 Pipeline Section 4 Chili GS to Ballantyne Road
Caledonia Station Rebuild
Mendon Gate Station
MF60 Southeast Phase 1 (Mendon Gate - Rte 64), Install Gas Main
Transmission Short Segments, Install Gas Mains
MF120 Eastern Monroe, State Road, Install Gas Main
MF60 Southeast Phase 3 (Malone Rd), Install Gas Main
Chambers St. Reinforcement Leak Prone Main
MF60 Southeast Phase 4 (County Rd 9), Install Gas Main, Rebuild Station 449

NYSEG Common Projects

NYSEG Common Projects by Disadvantaged Communities	
City of Auburn	
	ASD Security System Installation
	Auburn Service Center Projects
	Avangrid Security Domain (ASD) OSG Telecommunications
	FIRE PROTECTION
City of Binghamton	
	ASD Security System Installation
	Avangrid Security Domain (ASD) OSG Telecommunications
	Binghamton Service Center
	Binghamton Service Center Underground Tank Removal
	Consolidation KGO
	ECC Projects
	KGO Cooling Tower Replacement
	KGO House Power/Transformer Upgrade
	KGO Projects
	KGO UPS/Battery Upgrades
	Training Facility
	Video Conferencing
City of Cortland	
	ASD Security System Installation
	Avangrid Security Domain (ASD) OSG Telecommunications
City of Elmira	
	ASD Security System Installation
	Elmira Service Center Projects
	Geneva Service Center East Projects
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
City of Hornell	
	Hornell Service Center Projects
City of Ithaca	
	ASD Security System Installation
	Consolidation Ithaca
	Ithaca Underground Tank Removal/Replacement
City of Lockport	
	Avangrid Security Domain (ASD) OSG Telecommunications
	Lockport Service Center Projects
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
City of Mechanicville	



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities
Avangrid Security Domain (ASD) OSG Telecommunications
Mechanicville Service Center Projects
City of Norwich
Norwich Operations Center Projects
City of Oneonta
Oneonta Service Center Projects
Video Conferencing
City of Plattsburgh
Plattsburgh Service Center
Plattsburgh Site Upgrades
City of Rochester
Rochester Consolidation
Town of Addison
Avangrid Security Domain (ASD) OSG Telecommunications
Town of Albion
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of Barre
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of Carmel
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of Chateaugay
Avangrid Security Domain (ASD) OSG Telecommunications
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of Chatham
Avangrid Security Domain (ASD) OSG Telecommunications
Town of Cincinnatus
Avangrid Security Domain (ASD) OSG Telecommunications
Town of Clinton
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of Cohocton
Avangrid Security Domain (ASD) OSG Telecommunications
Town of Dannemora
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of Delhi
OSG Communications Tower, shelter Facility Improvements (Com)
Telecomm Vertical Builds
Town of DeRuyter



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Elmira	
	Avangrid Security Domain (ASD) OSG Telecommunications
	FIRE PROTECTION
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Gaines	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Halfmoon	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Hamburg	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Henrietta	
	Rochester Consolidation
Town of Horseheads	
	Video Conferencing
Town of Ithaca	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Kirkwood	
	Mailroom Digitization
Town of Lancaster	
	Avangrid Security Domain (ASD) OSG Telecommunications
	Hamburg Operations Center Projects
	Lancaster Service Center Garage Projects
	Lancaster Service Center Projects
Town of Lansing	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Liberty	
	FIRE PROTECTION
	Liberty Service Center Projects
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Lockport	
	Avangrid Security Domain (ASD) OSG Telecommunications
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Long Lake	
	Long Lake Building Expansion
Town of Lowville	
	FIRE PROTECTION



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities	
Town of Lyons	NY WAN Expansion
Town of Milo	NY WAN Expansion OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Morris	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Mount Morris	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Murray	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of North Salem	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Nunda	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Oneonta	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Ovid	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Owego	NY WAN Expansion
Town of Phelps	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Plattsburgh	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds Video Conferencing
Town of Ridgeway	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Rockland	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Saranac	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Seneca Falls	



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Shelby	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Springfield	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Stamford	
	Stamford Operations Center Projects
Town of Starkey	
	NY WAN Expansion
Town of Unadilla	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Union	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Vestal	
	ECC Life cycle
	Video Conferencing
Town of Walton	
	FIRE PROTECTION
	Walton Service Center Projects
Town of Waterloo	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of West Seneca	
	Avangrid Security Domain (ASD) OSG Telecommunications
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Brewster	
	Brewster Generator
	Brewster HVAC
	Brewster Service Center Projects
	Video Conferencing
Village of Chateaugay	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Cooperstown	
	Avangrid Security Domain (ASD) OSG Telecommunications
Village of Dannemora	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Dresden	
	FIRE PROTECTION



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities	
Village of Dundee	NY WAN Expansion
Village of Elbridge	FIRE PROTECTION
Village of Forestville	OSG Communications Tower, shelter Facility Improvements (Com)
Village of Hammondsport	Avangrid Security Domain (ASD) OSG Telecommunications
Village of Holley	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Jeffersonville	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Johnson City	Avangrid Security Domain (ASD) OSG Telecommunications Training Equipment and Tools Training Technology Projects
Village of Keeseville	Avangrid Security Domain (ASD) OSG Telecommunications
Village of Lansing	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Lodi	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Lyndonville	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Lyons	NY WAN Expansion
Village of Marcellus	FIRE PROTECTION
Village of Medina	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Morris	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Newark	FIRE PROTECTION
Village of Owego	NY WAN Expansion



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities	
Village of Penn Yan	FIRE PROTECTION
Village of Trumansburg	FIRE PROTECTION
Village of Walden	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Village of Wolcott	ASD Security System Installation
Village of Albion	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Implementations/enhancements are system wide and not community specific.	
	Avangrid Security Domain (ASD) OSG Infrastructure
	BMS System
	Click Upgrade & Long Cycle work
	Client Project Requests and Integration Projects
	Contact Center Knowledge Database
	Contractor Portal
	Customer Insights
	Customer Journey Redesign
	Cybersecurity Innovation Lab
	Damage Assessment
	Data Center Consolidation
	Digital Journey EDB Transformation
	DRAGOS
	END USER Life Cycle
	Energy Control Systems Infrastructure
	Energy Manager Enhancements
	ESRI UN Deployment
	FAN + mobile technology refresh and expansion
	FCC License Radio Spectrum purchase
	Fleet Replacement Program
	Full OMS Functional alignment ABB-Spectrum
	GIS Utility Network Model Implementation
	Global Cybersecurity Directors Plan
	Global Telematics Solution
	Historian and Analytic Upgrades Program
	IT-OT DR/DMZ
	Itron Mobile hardware replacement
	Kiosk Upgrade
	Lab Equipment
	Liferay WCM Implementation



NYSEG and RG&E 5-Year Capital Investment Plan

NYSEG Common Projects by Disadvantaged Communities
Microsoft Deployment Life Cycle
Microsoft Licensing
Minor Projects
Mobile Phones Project
NETENG Life Cycle
NETSEC Life Cycle
NMC Solar Winds
NY AMI Lifecycle
OMS Enhancements
Oracle Exadata
Orchestration Platform - Customer Journey
Progressive Style
PureEngage to PureConnect Migration
QSR - Security Plan
Regulatory Driven Efforts
RPA Electric & Gas Operation
SAP Enhancements
SPCC West
STORAGE Life Cycle
Tablet Project
Telecomm Fiber
Telecomm Infrastructure
Training – Fleet
Tripwire Implementation
UNIX Life Cycle
Veritas Growth
Virtualization Expansion
WINTEL Life Cycle
Not going to Disadvantaged communities
EV Chargers
Low Risk Buildings Projects
Networks ECTRM
Solar Panels



RG&E Common Projects

RG&E Common Projects by Disadvantaged Communities	
City of Canandaigua	
	Canandaigua Truck Garage Projects
	FIRE PROTECTION
City of Rochester	
	3 City Center
	ASD Security System Installation
	Avangrid Security Domain (ASD) OSG Telecommunications
	FIRE PROTECTION
	Mailroom Digitization
	ROC Hydrogen Pilot
	Rochester Consolidation
	Scottsville Rd HVAC Phase I
	Scottsville Rd Service Center Projects
	Scottsville Road Consolidation Proj.
	Telecomm Fiber
	Video Conferencing
Town of Bergen	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Bolivar	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Town of Brighton	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Fiber
	Telecomm Vertical Builds
Town of Caledonia	
	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Chilli	
	FIRE PROTECTION
Town of Gates	
	ROC Hydrogen Pilot
	Telecomm Fiber
Town of Hamlin	
	ROC Hydrogen Pilot
Town of Henrietta	
	Rochester Consolidation
Town of Hume	
	FIRE PROTECTION



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Common Projects by Disadvantaged Communities	
Town of Irondequoit	Telecomm Fiber
Town of Leroy	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Macedon	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Mendon	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Mount Morris	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Ogden	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Pavillion	FIRE PROTECTION
Town of Pittsford	Avangrid Security Domain (ASD) OSG Telecommunications
Town of Rose	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Rushford	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Sodus	FIRE PROTECTION OSG Communications Tower, shelter Facility Improvements (Com) Sodus Service Center Projects Telecomm Vertical Builds
Town of Vestal	ECC Life cycle
Town of Walworth	Avangrid Security Domain (ASD) OSG Telecommunications OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Webster	Eastern Monroe Operations Center Projects
Town of Williamson	OSG Communications Tower, shelter Facility Improvements (Com) Telecomm Vertical Builds
Town of Wolcott	



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Common Projects by Disadvantaged Communities	
	Telecomm NY WAN Buildout
Village of Belmont	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Brockport	
	ROC Hydrogen Pilot
Village of East Rochester	
	ROC Hydrogen Pilot
Village of Fillmore	
	Avangrid Security Domain (ASD) OSG Telecommunications
	Fillmore Operations Center Projects
Village of Friendship	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Henrietta	
	Avangrid Security Domain (ASD) OSG Telecommunications
	FIRE PROTECTION
	Mailroom Digitization
	Mushroom Blvd Projects
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
	Video Conferencing
Village of Johnson City	
	Training Equipment and Tools
	Training Technology Projects
Village of Newark	
	Telecomm Fiber
Village of Victor	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Webster	
	OSG Communications Tower, shelter Facility Improvements (Com)
	Telecomm Vertical Builds
Village of Wolcott	
	Avangrid Security Domain (ASD) OSG Telecommunications
	ROC Hydrogen Pilot
	Telecomm Fiber
Village of Sodus	
	ASD Security System Installation
	Avangrid Security Domain (ASD) OSG Telecommunications
	OSG Communications Tower, shelter Facility Improvements (Com)
	ROC Hydrogen Pilot
	Telecomm Fiber



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Common Projects by Disadvantaged Communities

Telecomm Vertical Builds
Village of Sodus Point
ROC Hydrogen Pilot
Telecomm Fiber
Implementations/enhancements are system wide and not community specific.
Avangrid Security Domain (ASD) OSG Infrastructure
BMS System
Click Upgrade & Long Cycle work
Client Project Requests and Integration Projects
Contact Center Knowledge Database
Contractor Portal
Customer Insights
Customer Journey Redesign
Cybersecurity Innovation Lab
Damage Assessment
Data Center Consolidation
Digital Journey EDB Transformation
DRAGOS
END USER Life Cycle
Energy Control Systems Infrastructure
Energy Manager Enhancements
ESRI UN Deployment
FAN + mobile technology refresh and expansion
FCC License Radio Spectrum purchase
Fleet Replacement Program
Full OMS Functional alignment ABB-Spectrum
GIS Utility Network Model Implementation
Global Cybersecurity Directors Plan
Global Telematics Solution
Historian and Analytic Upgrades Program
IT-OT DR/DMZ
Itron Mobile hardware replacement
Kiosk Upgrade
Lab Equipment
Liferay WCM Implementation
Microsoft Deployment Life Cycle
Microsoft Licensing
Minor Projects
Mobile Phones Project
NETENG Life Cycle
NETSEC Life Cycle
NMC Solar Winds
NY AMI Lifecycle



NYSEG and RG&E 5-Year Capital Investment Plan

RG&E Common Projects by Disadvantaged Communities
OMS Enhancements
Oracle Exadata
Orchestration Platform - Customer Journey
Progressive Office
PureEngage to PureConnect Migration
QSR - Security Plan
Regulatory Driven Efforts
RPA Electric & Gas Operation
SAP Enhancements
STORAGE Life Cycle
Tablet Project
Telecomm Infrastructure
Tripwire Implementation
UNIX Life Cycle
Veritas Growth
Virtualization Expansion
WINTEL Life Cycle
Not going to Disadvantaged communities
EV Chargers
Low Risk Building Projects
Networks ECTRM
Solar Panels

