JOINT UTILITIES
OF NEW YORK

Joint Utilities of New York
EV Readiness Framework

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Introduction

The demand for electric vehicles ("EVs") and the supporting charging infrastructure is pressing: the rate of adoption of EVs is accelerating in New York and infrastructure providers have responded by deploying charging stations throughout the state. There are similarly encouraging movements in other transportation market segments, such as medium-duty EVs (e.g., urban delivery vehicles) and in heavy-duty segments, such as transit buses. Despite growing demand, hurdles to adoption remain. Hurdles include, but not limited to, availability of charging infrastructure, EV pricing, limited EV offerings in the marketplace, and lack of consumer awareness. EVs present a significant opportunity for investor owned utilities ("IOUs")—EV charging can increase asset utilization through increased electricity use, and has the potential to reduce electricity rates for all ratepayers. Further, EVs have the potential to provide valuable grid services, like load management and frequency regulation. EV battery storage could also be aggregated and bid into the wholesale marketplace for energy and capacity markets. However, the emerging EV market presents challenges in addition to the evolving role of the utility's role in the EV market.

In an effort to help demonstrate support for EVs and supporting charging infrastructure, and in response to suggestions received via the 2016 Electric Vehicle Supply Equipment (EVSE) stakeholder engagement process,[1] the Joint Utilities of New York have developed this EV Readiness Framework ("Framework"). This Framework focuses specifically on what the Joint Utilities of New York ("Joint Utilities") can do to become "EV ready." The objectives of EV readiness planning are to identify, prioritize, and execute actions in the near- to mid-term future in order to unlock the potential of transportation electrification as a broader initiative. More specifically, this Framework lays out the path to make each utility "EV ready" by discussing existing hurdles to widespread deployment of infrastructure (and vehicles, where appropriate).

The Joint Utilities recognize EVs as one of many valuable tools for achieving state clean energy objectives, and seek to support and encourage EV adoption to the extent practicable and cost-effective. Given the size of the current EV market, the Joint Utilities believe that this Framework (complemented by demonstration projects and active education and outreach efforts) is the most effective way for utilities to facilitate increased EVSE deployment and EV adoption. This type of early collaboration among the Joint Utilities, and between the Joint Utilities and stakeholders, will mean that the utilities have the appropriate tools, processes, and capabilities in place for when the EV market begins to grow more rapidly. By actively participating in conversations about EV market and technology development, the Joint Utilities will remain responsive to changing market conditions and be able to modify their approaches, as needed.

[1] The Joint Utilities hosted three EVSE stakeholder sessions in 2016. Meeting materials can be found on the Joint Utilities website: http://jointutilitiesofny.org/joint-utilities-of-new-york-engagement-groups/

Regulations, Policies, Enablers, and Hurdles

New York State is a signatory to the Multi-State Zero Emission Vehicle (ZEV) Action Plan, which established a collective goal of 3.3 million ZEVs by 2025; for New York, this is equivalent to about 800,000-900,000 ZEVs on the road by 2025.[2] If longer range battery EVs become more popular, then the estimated number of ZEVs required to meet the target could be reduced substantially.

New York State is also a ZEV state, adopting California's motor vehicle emission standards set forth in Title 13 of the California Code of Regulations.[3] Furthermore, manufacturers must meet a minimum requirement for the percentage of ZEVs made available for sale in the state. Under the program, manufacturers who sell or lease qualified ZEVs can earn and use vehicle equivalent credits that can be sold to other manufacturers. While ZEV adoption has been concentrated in California to-date, this is expected to change considerably in the next 1-3 years in part because of increased EV offerings and because the "travel provision" of the ZEV Program is set to expire for model year ("MY") 2018 vehicles. This travel provision enables automobile manufacturers to count the sale of a ZEV in California towards requirements in other states.[4] In other words, the ZEV credit generated in California can "travel" and be counted towards requirements in New York (albeit at a discounted rate). The provision was intended to encourage early action by automobile manufacturers and put some downward pressure on ZEV requirements in later years (closer to 2025). As the travel provision is phased out, automobile manufacturers will be pressed to sell more ZEVs in states like New York. There is also a so-called pooling provision in the ZEV Program that enables automobile manufacturers to exceed compliance in one state and transfer that over-compliance to another state.[5] Unlike the travel provision, the pooling provision does not have an expiration and it requires manufacturers to opt-in to the provision. Regardless of the impact on EV sales in New York of these provisions, the market will change in the near future.

The state's EV policies are generally borne out of the 2015 New York State Energy Plan ("Plan"), which committed the state to reduce greenhouse gas ("GHG") emissions 40 percent by 2030 and 80 percent by 2050. Transportation accounts for nearly 35 percent of New York's GHG emissions and the State Energy Plan specifically calls out EVs as a key element of the overarching strategy to reduce GHG emissions. The plan reads:[6]

Transportation accounts for 34% of the State's GHG emissions, and $26.7 billion in fuel costs each year. Building a cleaner, more efficient, and sustainable transportation system is a critical

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[2] Note that the 3.3 million ZEVs in the ZEV Action Plan is based on a calculation of the number of vehicles that would be required to meet the California ZEV rules. This estimate is subject to changes in the ZEV market and how individual automobile manufacturers opt to comply.
[3] https://www.arb.ca.gov/regact/regs-13.htm
[4] The credit is discounted based on vehicles sales in the state relative to vehicle sales in the California.
[5] The pooling provision has a variety of restrictions regarding transfer of credits between the so-called West and East Region pools.
[6] 2015 New York State Energy Plan, available online at https://energyplan.ny.gov/-/media/nysenergyplan/2015-state-energy-plan.pdf.

component of the State's energy strategy. A cleaner transportation system will include more vehicles using clean transportation fuels (especially plug-in electric vehicles) …

The Charge NY program is one of the key elements of the Plan. Charge NY is a collaboration between the New York State Energy Research and Development Authority ("NYSERDA"), the New York Power Authority ("NYPA"), and the Department of Environmental Conservation ("DEC"). These agencies are tasked with implementing the Multi-State ZEV Action Plan and aim to support the installation of 3,000 EV charging stations by 2018 (to support an anticipated 30,000-40,000 EVs). The initiative also developed best practices for municipal EVSE regulations, provides vehicle incentives such as reduced bridge tolls, and removed regulatory obstacles for installing EVSE at public parking lots.

NYSERDA is also administering the Drive Clean Rebate program as part of Charge NY, a $70 million EV rebate and outreach initiative to encourage the deployment of EVs. The majority of the funds ($55 million) is dedicated to rebates for the purchase or lease of a new EV—up to $2,000 per vehicle. In the first year of the program (March 2017 through March 2018), more than 5,750 rebates were issued to New York drivers, totaling more than $7.5 million in funding disbursed. The remaining $15 million will support consumer awareness initiatives, installing more charging stations, developing and demonstrating new technologies, and other efforts to put more EVs on the road.

New York has also targeted EVs in municipal fleets. In 2016, the state allocated $2 million in funding for municipalities—$750,000 of the funding was dedicated to vehicle rebates valued at up to $5,000, and another $1.25 million was allocated to EV infrastructure projects, covering the costs up to $250,000 per facility for installation of EVSE, up to $8,000 per Level 2 charging port or $32,000 per DC fast charger port.[7] Another $3 million was allocated to municipal fleets and rural electricity cooperatives in early 2017 to help deploy EVs in fleets.[8]

The state's policies and the priorities of the Joint Utilities related to transportation electrification are designed to address the hurdles to increase EV adoption in New York, especially those that can be addressed through policy and coordinated action. These include the higher price of EVs compared to conventional vehicles running on gasoline, lack of EV charging infrastructure, lack of consumer awareness, and lack of coordination amongst stakeholders. There are other hurdles that will be cleared by other stakeholders in the EV ecosystem—for instance, automobile manufacturers will be expanding EV offerings significantly over the next several years.

Guiding Principles for Utility Involvement in EVSE

During the 2016 EVSE stakeholder engagement process, the Joint Utilities established a set of guiding principles for utility involvement in supporting the increased adoption of EVs and

[7] 2016 Rebates for Municipalities, available online: http://www.nytowns.org/images/Documents/Announcement/munizevfacts.pdf. Note that an additional $1 million was allocated to hydrogen fuel cell infrastructure.

[8] The summary of this initiative is available online at https://www.governor.ny.gov/news/governor-cuomo-announces-3-million-municipalities-and-electricity-cooperatives-purchase. Accessed February 2018.

supporting charging infrastructure to help inform the development of this joint EV Readiness Framework:

- The Joint Utilities will facilitate EVSE growth and encourage EV adoption in New York by increasing their collective readiness for future market development;
- The resulting EV Readiness Framework will be aligned with and responsive to New York initiatives for advancing the adoption of EVs;
- The development of the EV Readiness Framework will be informed by federal, state, local, and Commission policies for advancing the adoption of EVs;
- The Joint Utilities and each utility are stakeholders that must collaborate to support the achievement of state and regional EV market objectives;
- The utilities will seek to maximize long-term net benefits to utility customers by enabling the improved asset utilization that EVs offer, while mitigating incremental peak load impacts and supporting local, state, regional, and federal energy policy goals; and
- For the near-term, demonstration and pilot projects will be the primary means for the utilities, in concert with stakeholders, to develop and test different EVSE deployment approaches.

Participating stakeholders at the September 28, 2017 EVSE stakeholder engagement session[9] reinforced the importance of the guiding principles to advance EV adoption.

[9] Summary presentation material for the stakeholder meeting on September 28, 2017 can be found on the Joint Utilities website http://jointutilitiesofny.org/joint-utilities-of-new-york-engagement-groups/. A list of the participating stakeholders can be found in Appendix A.

Joint EV Readiness Framework

This joint EV Readiness Framework addresses the near-term priorities resulting from the stakeholder engagement sessions, with a focus on infrastructure planning, education and outreach, forecasting EV growth, and demonstration and pilot programs. The Joint Utilities EVSE Working Group has formulated these issues into the following areas: Infrastructure Planning, Streamlining Charging Infrastructure Deployment, Rate Design Considerations, and Education and Outreach. Readiness activities in each of these four areas are intended to favorably position the utilities to support increases in EV adoption, and are aligned with and responsive to New York initiatives for advancing the adoption of EVs.

The Joint Utilities recognize that proactive engagement can have a significant impact on EV adoption. The Joint Utilities anticipate that elements of this Framework can be implemented in the near term future, in order to pave the way for future market growth. However, other Framework elements are contingent on a specific degree of market maturity and utility-specific territory considerations. For example, some potential utility actions may not be practical or economical until the overall EV market in New York achieves certain thresholds, or a certain sustained annual growth rate.

The Joint Utilities and stakeholders agree that practical demonstration projects may form the basis of planning related to transportation electrification moving forward. Further, the Joint Utilities and stakeholders have noted that rapid technological advances and the diversity of EVs in the market today requires utilities to begin planning for charging infrastructure today for the EV deployment of tomorrow. In order to develop a better understanding of the most effective way to engage in transportation electrification, the Joint Utilities continue to be involved in a wide array of demonstration and pilot projects. Some of these projects are highlighted in the text of this Framework, where most relevant. For the sake of reference, Appendix B includes a comprehensive list of the demonstration and pilot projects that utilities have completed, are currently executing, or anticipating. Many of the projects included in the appendix can also be found on the REV Connect website (https://nyrevconnect.com/utility-profiles/), which includes summaries, relevant filings, and available data by REV[10] demo project for each utility.

The Joint Utilities will continue to use the EV Readiness Framework to identify useful indicators for assessing market performance, and continue to update internal assessments related to determining the thresholds at which distribution system impacts or benefits of EVs may become more significant. While the Joint Utilities have developed this common Framework, the market indicators, EV programs and their implementation plans, and timelines taken by individual utilities will vary due to utility-specific factors. This Framework should not be misconstrued as a transportation electrification investment plan—that was not the task laid out by the Joint Utilities when charged with developing this Framework. Rather, the elements and objectives of this proposed EV Readiness Framework are the result of conversations with stakeholders, as well as over the course of the utilities' routine EVSE business operations.

[10] Reforming the Energy Vision ("REV").

Infrastructure Planning

The Joint Utilities have worked to communicate internally and externally with stakeholders regarding their respective approaches to charging infrastructure planning. This work focuses on the approach to forecasting EV populations and the corresponding load; this load is subsequently incorporated into mid- to long-term planning and modeling. This modeling helps the respective utilities determine the projected utility system impacts and corresponding investments required.

i. EV Penetration Forecasting Approach and Methodology

As noted previously, the EV market is poised for significant growth over the next several years due to increased consumer offerings, more competitive vehicle pricing, and favorable policies. And because of this potential, utilities have incorporated EV growth forecasts into system planning, which informs distribution system investment plans. However, the expected near-term levels of EV adoption will not have a material impact on utility system planning. The incorporation of forecasted EV penetration and adoption rates into the system planning process varies by utility. Some utilities have developed internal models and EV adoption scenarios to estimate when EV adoption may begin to impact utility system planning. Others currently use EV adoption forecasts as inputs to system planning, for which resulting investment plans identify distribution system investments needed over the following three to five years.

The methodology employed by the utilities to forecast EVs are available in the utility DSIP filings. The utilities that are conducting EV forecasting are using similar methodologies and similar data sources. For instance, utilities have relied on vehicle registration data as part of their forecasting, mainly to help understand growth rates and update the baseline against which forecasted increases are reported. Furthermore, utilities are conducting their forecasts for various terms, ranging from 5-20 years. The forecasting approaches vary by the geography being employed—the most granular being at the level of the zip code and the broadest forecast is conducted system wide. Some utilities vary inputs into the forecasting and develop a scenario approach, while others do not. Regardless of the scenario, the Joint Utilities do not observe a substantive impact on system operations over the next five years. The Joint Utilities differ in their approach to how the market will respond to the ZEV program; some force a “fair share” compliance with the program, while others do not. This does lead to a potential discrepancy in the associated impact of EVs, but not for the next five years.

The forecasting methodologies of each utility are generally consistent with industry practices around the country. The Joint Utilities have the tools and access to data that is required to track changes in the EV market, thereby enabling them to accommodate EV growth through system-level planning.

The Joint Utilities are also supportive of forecasting exercises for other purposes beyond system planning. For instance, forecasting exercises can help quantify the range of EV penetration that might be required to help achieve the state’s GHG reduction requirements. In principle, these would be part of a broader review of utility operations and include energy efficiency, distributed energy resources (“DER”), renewable generation, etc. Regardless, these types of exercises

should not be confused with utility system planning and associated investments required to accommodate load growth.

ii. Projected Utility System Impacts and Investment

At the aggregated system level, the Joint Utilities generally find that the power demands of EV charging are small. There is potential for distribution-level impacts as a result of EV clustering and charging at discrete locations (e.g., with significant fast charging demands). The deployment of fast charging equipment for heavy-duty vehicles or buses can make these issues even more acute. However, considering the anticipated power and energy demands of EVs in the near- to mid-term future, the impacts can be addressed through normal infrastructure without an extension of investments. In other words, anticipated modest impacts will only require modest interventions. Furthermore, the anticipated adoption rates for EVs and the required expansion of charging infrastructure are within the range of what utilities can respond to in a timely fashion, while demonstration and pilot projects help them plan for more targeted proactive engagements. In general, the Joint Utilities continue to take a long view on EVs, and view the associated load growth attributable to EVs as small percentage per year of overall anticipated system load. As such, the concomitant utility response is to manage that growth as part of a utility's broader portfolio.

Consider, for instance, that the Joint Utilities typically find that the most favorable EV adoption forecasts show demand and volume growth of around 15-20% by 2035, or about 1% per year. And this growth represents typical historical load growth rates. Comparatively, utilities have previously managed rapid growth of 1-1.5% per year for the entire utility portfolio, which is considerably larger than anticipated EV impacts.

The Joint Utilities confidence in their ability to respond to EV growth over the near- to long-term future should not be confused as a passive response to the challenges that EV growth represent. The Joint Utilities are proactively positioned to deal with some of the nuanced aspects of EV growth. Consider, for instance, that utilities are anticipating more aggressive EV adoption in certain areas than other. EV adoption in the service territory of San Diego Gas & Electric ("SDG&E") is a good illustration of this type of impact: EV drivers are concentrated in the north coastal areas of SDG&E's service territory. SDG&E has responded to that growth accordingly and likely made more infrastructure investments than if those EVs had been deployed where they had more capacity. However, even the concentration of EVs in a particular part of the utility service territory has been managed accordingly.

The Joint Utilities emphasize that it is important to not confound the notion of EV readiness with the availability of EV charging infrastructure. The former is a function of planning capabilities and ensuring proactive measures are implemented to accommodate EV growth and the corresponding charging activity. The latter is a function of a variety of parameters, many of which are outside the purview of utilities, including a sustainable business model for EV charging. To date, the Joint Utilities have found no compelling evidence to demonstrate that their planning criteria—including probabilistic planning and reviewing potential impacts at different levels of system granularity—are insufficient to handle increased EV adoption. The Joint Utilities recognize there are aspects of transportation electrification that are not explicitly accounted for in their current assessments, such as travel patterns to help understand more specifically where EVs might charge over the course of a trip. Furthermore, the Joint Utilities

are not currently forecasting the potential for medium and heavy-duty vehicle electrification. Conversely, the Joint Utilities note that there are several system level changes which will help them improve their ability to respond to increased EV adoption. For instance, advanced metering infrastructure ("AMI") is a major REV initiative, and will help utilities respond more comprehensively to EV adoption with improved data. The array of demonstration and pilot projects (as discussed in more detail in Appendix B) are also helping the Joint Utilities develop an improved understanding of EV driver behavior, charging demands, and charging infrastructure utilization.

Streamlining Charging Infrastructure Deployment

There are many challenges associated with deploying charging infrastructure. The Joint Utilities have been and are engaged in a variety of projects deploying charging infrastructure, and continue to seek ways to reduce the barriers to deploying charging infrastructure. The Joint Utilities have been and will continue to be engaged in projects that include deploying Level 2 and DC fast charging infrastructure, smart charging pilots, workplace charging deployments, and system reinforcement projects whereby the utility makes the necessary upgrades to accommodate future installation of EVSE. The following sub-sections focus on the near-term actions that can help streamline deployment, while potentially reducing installation costs. For governments, local and regional planning efforts must be aligned, recognizing that all land use planning and decisions in New York are made by local jurisdictions. Meanwhile, regional planning agencies are responsible for long-term regional transportation plans, which are increasingly inclusive of alternative fuel vehicles like EVs.

i. Service Connection Requirements and Processes

There is general recognition among stakeholders and the Joint Utilities that existing utility processes for new service connection requests in New York were not designed with EVs in mind. New service connection requests come from a variety of sources outside of EVSE projects—traditionally, new service requests come from commercial and residential construction projects, which are traditionally larger and take longer than a "standard" EVSE installation project. As a result, the new service request process is aligned with construction projects (new builds and renovation), and can take many weeks and sometimes months from the time the applications are submitted. This has the potential to delay EVSE deployment projects. However, the Joint Utilities seek to balance the desire to accelerate new service request process with competing priorities and resource constraints. While the Joint Utilities recognize the need for streamlined processes, the current demand for new service requests linked to EVSE does not warrant a major overhaul or dedicated staff. Pilot projects and other initiatives (e.g., Electrify America) may require reconsideration of processes, but today, there is simply not enough demand to warrant a separate or parallel new service connection process specifically designed for EVSE.

Until demand warrants a separate or parallel process, the Joint Utilities are sharing experiences and lessons learned to help improve their existing individual service connection processes to provide a more positive user experience. Currently, developers can submit applications through utility web portals or by sending hard mailed copies. The Joint Utilities have considered enhancing their online resources in the near-future to support the anticipated growth in EV adoption. This includes providing more customer facing instructions for EVSE new service requests online, as well as, providing contact information specific for EVSE applicants. Each company is also identifying internal indicators to track that will trigger further review of the process as well as identifying internal resources to support EVSE applicants. These internal application evaluation improvements, coupled with improved customer facing portals specific to EVSE projects, will ultimately help inform a smoother connection process.

Business Use Case for EVSE Deployment

Anecdotal evidence suggests that EV service providers have submitted multiple new serve connection requests at one time, presumably with the intent to identify the most cost-effective location for deploying charging infrastructure. Unfortunately, when this happens, it is common for none of the sites to ultimately be developed. The Joint Utilities are keen on avoiding this type of scenario because it is an ineffective allocation of staff resources. The Joint Utilities understand that EV service providers are focused on minimizing installation costs while maximizing the potential utilization of charging infrastructure assets, while also working with potential site hosts to negotiate access. The Joint Utilities will work with service providers to identify the best way to provide insight into the ideal locations for charging deployment from a system perspective.

ii. Local Ordinances, Building Codes and Design Guidelines

Local, zoning, and parking ordinances, building codes, and design guidelines for EVSE may enable easier and less costly installation. Adjustments to local ordinances, adoption of building codes, and common design guidelines may also help streamline the installation of charging infrastructure. Clear regulations can help ensure that there are sufficient charging stations to meet projected demand as well as enable future growth. Further, it is important that enforcement mechanisms be put in place to ensure that any updated or new ordinances and regulations are effective.

- *Local Plans.* Local community plans, often referred to as comprehensive plans, are forward-looking documents that both define a community's vision for the future and respond to anticipated future conditions with strategies and related actions. Community plans can proactively facilitate and encourage EV use. They can do so by establishing policies that encourage inclusion of EV charging infrastructure in new development or that support charging stations as a key element of the local transportation system.
- *Zoning and Parking Ordinances.* Zoning codes can allow, encourage, or require appropriate placement of EVSE in various land use designations associated with developed land. Zoning code provisions, design standards, and parking rules can also specify requirements for design and installation, signage, accessibility, fees, time limits, lighting, and maintenance. Through zoning codes, design standards, and parking rules, local governments have the opportunity to ensure both that there are sufficient charging opportunities to meet projected EV demand and that EV parking spaces are effectively designed and regulated to accommodate charging vehicles.

- *Permitting Processes.* Streamlined permitting and inspection processes are key to EV planning. This can help expedite the installation of EVSE at appropriate locations, provide the service at a reasonable cost to consumers, and maintain the safety of consumers and the public. NYSERDA developed a document to help government groups streamline residual EVSE permitting.[11]
- *Building Codes.* Building codes contain safety standards and specifications that guide new construction and renovations. There are two major opportunities to create building codes that support EV deployment. The first is to specify standards for EVSE in the building code to ensure that any EVSE installations are safe and accessible. The second is to require pre-wiring for EVSE to lower the cost of future EVSE installations. Pre-wiring refers to the practice of providing sufficient basic infrastructure, such as conduits, junction boxes, outlets serving garages and parking spaces, adequate wall or lot space for future EVSE, and adequate electrical panel and circuitry capacity to meet anticipated future demand for EVSE.

NYSERDA has developed various documents to help local and regional governments understand how to integrate EVSE into the built environment[12] and how to become EV ready.[13] There are a variety of resources available to local and regional agencies seeking to develop EV readiness policies. It is difficult to track these initiatives at the local level, however, research during the development of this Framework indicates that there has been only modest adoption of EV ready policies at the local level. There are, however, a handful of notable examples in New York, as outlined here.

- New Rochelle incorporated EVs into is Comprehensive Plan (referred to as EnvisioNR), calling for an expansion of the city's green fleet, installing more EV charging stations, and establishing an EV shuttle service. Getting this type of material into general plans can help make investments and commitments from local governments easier.
- New York City took an integrated approach, combining the consideration of building codes and parking via Intro 1176, passed by the City Council as Local Law 130 of 2013. That legislation targeted parking garages and open lots via its building code to address barriers to installing EVSE. The regulation, among other things, requires all new or renovated parking garages to lay conduit capable of accommodating conductors with at least 3.1 kW of electrical capacity between the electrical supply panel and at least 20 percent of the parking spaces of the garage. New or renovated open parking lots have a similar requirement.

[11] Residential EVSE Permit Process Best Practices, 2013. https://www.nyserda.ny.gov/-/media/Files/Programs/ChargeNY/Permit-Process-Streamlining.pdf
[12] EV Ready Codes for the Built Environment, 2012. Available online at https://www.nyserda.ny.gov/-/media/Files/Programs/ChargeNY/EV-Ready-Codes-for-the-Built-Environment.pdf
[13] Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools, 2012. https://www.nyserda.ny.gov/-/media/Files/Programs/Clean-Energy-Communities/Creating-EV-Ready-Towns-and-Cities-A-Guide-to-Planning-and-Policy-Tools.pdf.

There are a variety of ways for local and regional governments to engage in EV readiness. For the most part, the Joint Utilities can be supportive of these policies and provide technical support, where appropriate.

Despite the limited potential for utility engagement on local EV readiness plans and policies, utilities can choose to focus on notification protocols with local and regional governments. One of the primary causes for concern for EVs is clustering of the load associated with EV charging. Utilities generally have a transformer replacement program to target transformers that have reached the end of their useful life or have been identified as overloaded. However, the adoption of EVs may occur faster in some areas, thereby causing gaps in the information that utilities would generally use to inform their replacement programs. Some replacements occur because a transformer fails while in service; utility notification protocols can help avoid transformer failure. In order for utilities to minimize the potential grid impacts of charging EVs, they need to know where the vehicles are being deployed and how they are being charged (e.g., Level 1 vs. Level 2). This information allows the utility to evaluate if the local distribution system is adequate to serve EV charging needs. For commercial installations that require electrical inspectors and permitting, there is less risk associated with utility notification because the entities involved are more accustomed to dealing with utilities.

The typical residential installation will have three parties: 1) the homeowner and EV driver, 2) the contractor, and 3) the electrical inspector. The electrical inspector is there to protect the interests of the homeowner on behalf of the local government. Contractors engaged in the installation of EVSE have generally been trained to encourage the homeowner to notify the local utility of the installation. Even if homeowners do not contact their utility expressly to notify them of an EVSE installation, homeowners may take advantage of EV friendly rates (e.g., time-of-use rates) offered by utilities. Despite these various opportunities to notify the utility, there is still considerable anecdotal evidence of homeowners who have chosen to forgo utility notification after installing EVSE and charging an EV. Even at low rates of non-notification, this has the potential to become a problem, particularly in those areas that are expected to have high rates of EV adoption. Although the utilities have not implemented automated processes to manage significant volumes of residential notifications, they have worked with NYSERDA to incorporate utility notification into the application for the state's EV rebate program. The Joint Utilities will continue to work with their local stakeholders to advance utility notification as the demand for residential charging increases.

The Joint Utilities will continue to engage local and regional government stakeholders seeking to adopt "EV ready" policies and plan, and provide support where possible. Much of this support will likely take the form of education and outreach, as discussed in more detail below.

iii. Interoperability and Standardization

EVs are an emerging market area with many different, non-standardized EVSE protocols and technology configurations. Some of this variation exists at the level of the charge plug itself (e.g., competing plug types for Direct Current Fast Charging). Other variation among public EVSE transaction systems requires EV drivers to carry multiple membership cards for public networks with different payment systems. Still more variation exists in the communication architectures and protocols used by EVSE manufacturers and service providers to communicate between EVSE stations and utility back-office transaction and station management platforms.

Interoperability represents the capability of a device to function as intended with other devices without special effort of the user. In the case of EVs, drivers should be able to charge their vehicle at charging stations, regardless of the network provider and the payment system. One of the most pressing issues associated with interoperability relates to the interaction between the customer and the EVSE, primarily at non-residential charging stations. There are several network operators including Car Charging Group (operating the Blink network), ChargePoint, EVgo, SemaConnect, and EV Connect. Access to charging stations operated by these network operators may require membership and an access card, which creates a situation whereby drivers have to hold many access cards to ensure they can charge their vehicle. And when EV drivers do not have a membership to that network, they may be able to charge their vehicles, but it can be cumbersome and more expensive than card holders. The network service provider industry responded to some extent by forming the ROEV™ Association—although there is good representation there, not all infrastructure providers are members. Further, that group was founded in 2015 and there still is no approved interoperability for members of the association.

The industry is coalescing around the Open Charge Point Protocol ("OCPP"). This communication protocol enables charging equipment and network operators to match interoperable hardware and software. It is important to note that OCPP is not a recognized standard; rather, it is the leading candidate for consideration by a standards making body in Europe ("eMI3"), which will also impact the North American market. For the sake of reference, Electrify America is requiring that any equipment on its network to be based on the OCPP.

It is also important to note that OCPP does not address all interoperability and standardization issues, such as roaming protocols. The same standards organization, eMI3 is chartered with solving these types of issues, including but not limited to roaming protocols, station-to-network management protocol, and identifying station locations.

The issues of interoperability and standardization are becoming more pressing. Multiple states, including California, Washington, and Massachusetts have started to take up the challenge of addressing interoperability more seriously. California, for instance, passed the Electric Vehicle Charging Open Access Act in 2013. The act requires publication of all station locations on the Alternative Fuels Data Center ("AFDC") website; disclosure of all fees before a charging event begins, including plug-in fees if not a member of the network; and provide accessibility to nonmembers of the network, including the ability to accept multiple forms of payment.

The Joint Utilities are also keenly aware that interoperability and standardization are keys to minimizing constrained or stranded assets. In other words, given the nascent and emerging market for EV charging infrastructure, the Joint Utilities will seek to ensure that any investments are maximized and not beholden to the success (or failure) of a single network provider. Interoperability ensures the success of the charging infrastructure system and the continued operation of EVSE.

The Joint Utilities appreciate and understand the complexity of interoperability and standardization, especially as it impacts EV adoption. More specifically, the Joint Utilities understand that consumers will likely become increasingly frustrated by a charging infrastructure network that is disjointed and lacks the user-friendly experience they expect from advanced technology solutions. And, for the Joint Utilities, a positive customer experience is paramount, regardless of the technology. The Joint Utilities are tracking the evolution of the

OCPP and are supportive of the EV charging provider community's intentions behind moving towards a common standard, especially because it will lead to an improved customer experience.

At this time, when EV adoption is modest and utilities are seeking to understand their own role in transportation electrification, the Joint Utilities think interoperability is important for the development of a robust EVSE market and encourage adoption of interoperability standards. The Joint Utilities are positioned to continue learning more about the potential of EVs and EVSE in the near- to mid-term future, and will be tracking progress along with stakeholders towards standardization of communication protocols that will provide maximum benefit to EV drivers, and ultimately ratepayers.

Rate Design Considerations

As noted previously, when EV charging is unmanaged, there is potential for increased costs to utilities and customers, especially if charging occurs coincident with peak demands. Utility rates have proven to be an effective way to encourage EV drivers to charge at preferred times.[14] As the EV population grows, this shift could also help improve system efficiency. With EV deployment in its early stages, utilities can begin to explore effective rate design considerations. Furthermore, the New York State legislature passed Assembly Bill A288 in 2017, which requires utilities to file a residential EV charging tariff by April 1, 2018. The regulation also requires utilities to report periodically to the New York Public Service Commission ("Commission") the number of customers who have signed up for the tariff, the total amount of electricity delivered to those using the tariff, and other data requested from the Commission.[15]

Today, most of the Joint Utilities have a time-of-use (TOU) rate structure available to EV drivers, as highlighted in the Table 1 below; and Con Edison has a dedicated EV rate. All of the rates included in the table require a TOU meter.

Table 1: Joint Utilities TOU Rates

Utility	Rates	Peak / Off-Peak & Notes
Central Hudson	Whole house TOU rate[a]	Peak: 2-7pm
Orange & Rockland	Whole House TOU rate[b]	Jun—Sep: peak, shoulder peak, and off peak Oct—May: peak and off-peak
Con Edison	Whole house TOU	Peak: 8a-12midnight Off-peak: 12midnight-8a 1-yr price guarantee
	Dedicated EV TOU	
National Grid	Whole house TOU[c]	Peak: 7a-11p Super-peak: weekdays 2-6pm June-Aug. Off-peak: 11p-7a 1-yr price guarantee for EV drivers
RG&E	Whole house TOU[d]	Peak: weekdays 7a-9p

[14] See for instance NYSERDA. 2015. "Electricity Pricing Strategies to Reduce Grid Impacts from Plug-in Electric Vehicle Charging in New York State," NYSERDA Report 15-17. Prepared by M.J. Bradley & Associates LLC.
[15] Full text of the legislation is available online: http://legislation.nysenate.gov/pdf/bills/2017/A288

Utility	Rates	Peak / Off-Peak & Notes
		Off-peak: all remaining hours
NYSEG	Whole house TOU[e]	Peak, mid-peak, off-peak: varies by season (summer, fall, winter, spring)
	TOU rate	Peak: 7a-11p Off-peak: 11p-7a

a. Central Hudson previously had a whole house TOU rate that allowed customers to choose from three different on-/off-peak periods; however, that program ended 12/01/2017.
b. More information available online at https://www.oru.com/en/save-money/energy-saving-programs/time-of-use.
c. More information available online at https://www.nationalgridus.com/time-of-use
d. More information available online at https://www.rge.com/YourHome/pricingandrates/timeofuserate.html
e. More information available online at https://www.nyseg.com/YourHome/pricingandrates/timeofuserate.html

The Joint Utilities continue to seek ways to improve their TOU rate offerings and increase EV driver participation while staying within their rate-based principles. This might include, for instance, increasing the difference between the peak and non-peak rates or shrinking peak periods to the extent feasible.

In addition to these TOU rates, Con Edison is investigating charging behavior via the SmartCharge New York program. The SmartCharge program provides EV drivers a reward for charging at off-peak times. The program uses technology provided by FleetCarma, and will help Con Edison understand charging behavior, and EV driver response to incentives, thereby informing rate design efforts.

Ultimately, the utilities will seek to align rate design with the following key considerations:

- Comply with the requirements of Assembly Bill 288;
- Minimize the costs of EV charging and potential distribution system impacts;
- Encourage EV drivers to charge at preferred times using price signals;
- Provide EV charging rates that drivers can easily understand; and
- Provide EV drivers with a cost competitive rate when compared to the standard/flat rate, and the potential to realize cost savings relative to gasoline.

The Joint Utilities note that there is little evidence of interest amongst EV owners for a dedicated TOU rate that requires a separate meter. For instance, in Pacific Gas & Electric's service territory, less than 0.5% of EV drivers are on a separately metered EV rate. One of the drivers behind Con Edison's SmartCharge program was the lack of interest in the separately metered rate for EV drivers. The Joint Utilities note that Assembly Bill A288 may lead to additional metering costs. It is not explicitly clear what the utilities will be required to report to the Commission related to consumers on the required rate. The bill also leaves open the issues such as net metering. It is conceivable that consumers could be able to net meter with their previous bill, but not when transferred to the dedicated residential EV rate. This is not to say that the legislation will definitively require more metering costs or complicate net metering for residential customers, rather, it leaves issues like these open. When considering these potential issues in light of the lack of historical evidence indicating consumer interest in the

separately metered EV rates, it is conceivable that the utilities are being required to develop and offer a rate that few customers will opt into.

Alternative solutions that obviate the need for second meters have been proposed by stakeholders, including concepts such as using meters in EVSE or using the vehicle to meter electricity consumption. The Joint Utilities welcome these concepts, while also highlighting that utility metering requirements extend beyond simply a utility grade meter in the EVSE. The Joint Utilities will continue to use programs such as the SmartCharge program and other initiatives to minimize additional metering costs to EV drivers.

The Joint Utilities recognize that EV service providers and other stakeholders have expressed explicit concern about the potential negative impacts of demand charges on DC fast charging. It is important to understand that demand charges are a subset of many factors that impact the business case for DC fast charging. First and foremost, it is unclear that there is a sustainable business model for DC fast charging—the underlying revenue model for publicly available charging infrastructure is based on the resale of electricity, a commodity that is inexpensive compared to the high cost of infrastructure for EV charging. Similarly, the near term demand for non-residential charging is uncertain due a number of variables, including but not limited to BEV vs PHEV deployment, consumer willingness to pay, and driver behavior (e.g., non-residential dwell times and daily miles traveled). In consideration of all of these factors, internal modeling by members of the Joint Utilities has demonstrated that even with the elimination of all delivery and demand charges, and modest utilization rates, the return on DC fast charging is unsustainable at this time—the overall capital and operating costs are simply too high.

The Joint Utilities recognize that DC fast charging has the potential to play a significant role as an enabling technology for higher rates of EV adoption. The Joint Utilities do not believe that the elimination of demand charges for low load factor loads is sustainable in the long term, however, they are committed to finding solutions that address short term economic solutions that enable the growth of the market. The Joint Utilities are actively seeking solutions to improve the business case for DC fast charging including increasing utilization of DC fast charging equipment and seeking ways to help developers tap into various sources of funding that will help drive the market.

Con Edison's Business Incentive Rate for EV Quick Charging Station Program

Con Edison filed a proposed tariff in December 2017 for a business incentive rate (BIR) for electric vehicle charging. The tariff proposes changes to the BIR that would enable ConEd to implement the EV Quick Charging Station Program, and is designed to help "attract new business customers to the service area and will mitigate the high cost of EV charging station operation in an immature market with low station utilization."

As noted in the next section, the utilities will also turn to consumer education and outreach efforts to help EV drivers understand the potential benefits of EV rates.

Education and Outreach

As outlined in the Supplemental DSIP, stakeholders and the Joint Utilities identified several issues that prevent the growth of EVs due to lack of awareness of EVSE. For example, prospective customers may lack familiarity with EVs and their benefits, and auto manufacturers

and car dealerships could enhance their customer engagement and incentive programs. With input from the 2016 and 2017 stakeholder engagement sessions, the Joint Utilities have expanded their efforts to help promote the adoption of electric vehicles, engagement and education initiatives. Each utility is moving forward at a different pace, based on current and anticipated demand within their service territories.

The Joint Utilities seek to create a positive customer experience and have identified effective communication channels through multiple avenues based on the interests of the targeted audience. For the purposes of this Framework, education and outreach efforts are distinguished by those focused on EVs or EV charging.

i. Vehicles

Utilities recognize the lack of consumer knowledge of EV benefits. Each utility maintains a webpage or web portal focused on EV initiatives. Some web portals provide educational resources, information about rebate programs, contact information, EV FAQs, and information regarding EV benefits. The Joint Utilities use their website portals and specific outreach events to educate customers of the benefits of using EVs, including economic and environmental benefits. Consumers need to be highly educated on EVs to understand what incentives and programs are available to them, as a higher penetration of EVs will provide benefits to everyone. Some companies hold in-person test-drive events to introduce EVs to consumers one-on-one, answer questions and encourage EV growth.

The Joint Utilities use also social media accounts to promote EVs, advertise different incentive programs, spread awareness, post early announcements around voluntary TOU rates, and announce local education events at dealerships.

In addition to speaking directly to consumers, several utilities are also partnering with dealerships to offer discounts to employees and customers for different electric vehicle models. For example, utilities have partnered with Nissan on their 2017 Nissan Leaf $10,000 rebate program, notifying customers through utility websites, email and social media accounts. Some utilities hold education events at dealerships to educate the public of discount programs. Utilities have also worked with dealerships on their outreach efforts as they play a critical role in consumer awareness. Lastly, some utilities have been promoting discounts by Original Equipment Manufacturers (“OEMs”) to both employees and customers.

ii. EV Charging

As noted previously, the Joint Utilities are engaged in a variety of projects deploying charging infrastructure. With regard to education and outreach, utilities are providing resources to consumers interested in understanding more about the potential advantages of EV charging, especially on a TOU rate. The Joint Utilities are not just focused on consumers and drivers; some utilities are talking to businesses about installing charging stations for their employees as a great way to launch EV programs and encourage EV adoption. There are also various EV charger ownership models being explored by utilities.

As noted previously, the SmartCharge New York is a rate case funded program that was initiated in April 2017 and rewards off-peak charging behavior without tariff change that is open to any EV owners in Con Edison's service territory.[16]

iii. Additional Outreach Opportunities

Through the 2017 stakeholder engagement process during the development of the Readiness Framework, some third party companies continued to urge the Joint Utilities to strengthen their education and outreach efforts and work together and separately with automakers and the industry on EV marketing efforts. For example, utilities can play an important role in raising awareness of locations of local charging stations. Stakeholders have identified several additional engagement opportunities for the Joint Utilities including:

- Disseminate information on the benefits of EVs and TOU rates to their customers via bills, etc.;
- Engage with EV driving groups and other communities to understand their interests and feedback on the need for EVSE plans;
- Plan an EV awareness event;
- Support the development of EVSE interoperability specifications and standards for EV charging spaces; and
- Increase awareness of the location of available charging stations.

The Joint Utilities agree on the importance of working together on developing communication efforts and will continue to solicit feedback from a diverse group of stakeholders to help inform their efforts as they advance their customer engagement strategies. It will be necessary for the Joint Utilities to also work with regulators to offer incentive programs, and position the utility as a resource to work closely with local groups to host events to spread consumer awareness of the benefits of EVs.

[16] More information on SmartCharge New York can be found on their website https://www.fleetcarma.com/smartchargenewyork/.

Summary

The Joint Utilities are poised to support EV adoption and EV charging infrastructure deployment through a combination of initiatives outlined in this EV Readiness Framework. The challenge of EV readiness is to maintain proactive measures that will support EV adoption in a nascent market, while helping achieve and, where possible, accelerate the long-term potential of transportation electrification. The Joint Utilities have prioritized charging infrastructure planning, streamlining charging infrastructure deployment in New York, advancing rate design considerations that will improve the customer experience while minimizing impacts to utility system operation, and conducting education and outreach efforts that raise awareness about EVs.

The role of the utility varies considerably across the core elements of the EV Readiness Framework—in some cases, readiness will be achieved through proactive measures, while in others, utilities remain in a position of information gathering. Consider, for instance, rate design: the Joint Utilities are proactively seeking to encourage behavior that supports and improves prospects for increased EV adoption. On the other hand, the Joint Utilities are tracking initiatives that promote interoperability and standardization, rather than spearheading them. Regardless of the role, the Joint Utilities are advancing various initiatives as evidenced by the array of demonstration and pilot projects discussed throughout the text, and listed in Appendix B, that will help achieve EV readiness, thereby supporting EV adoption across New York.

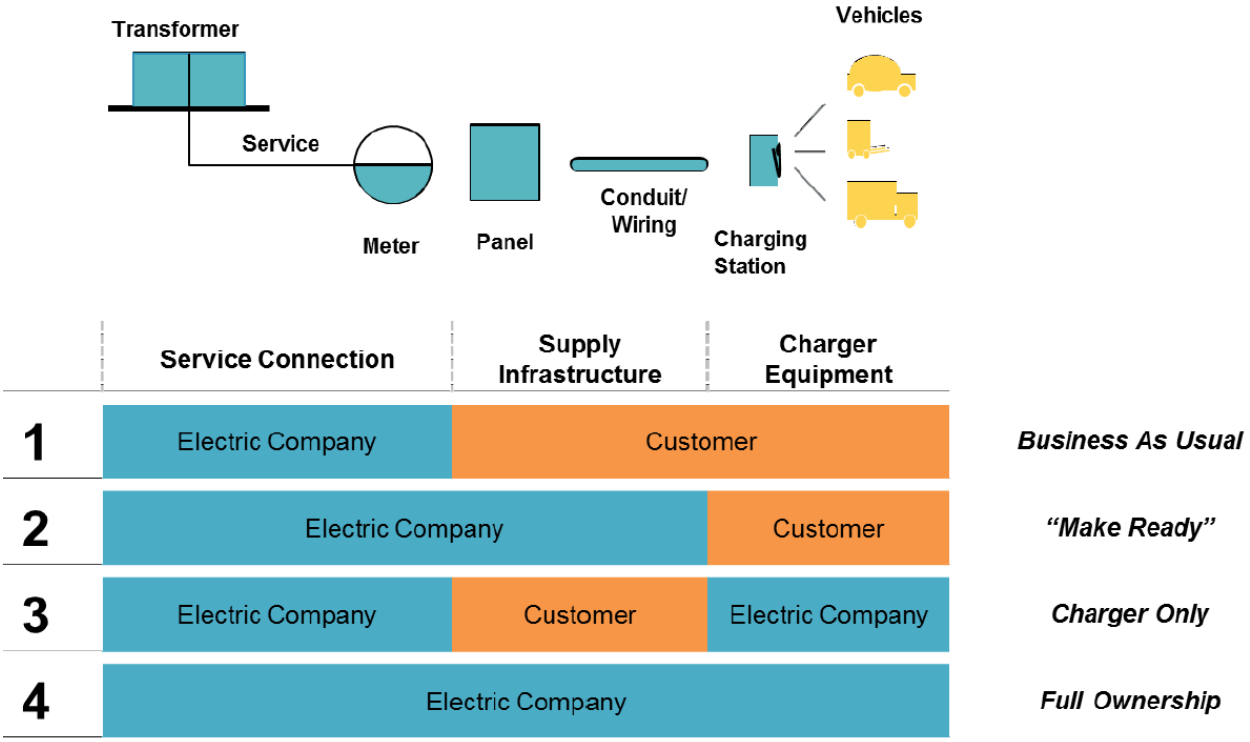
While the Joint Utilities recognize common priorities within the scope of EV readiness, the means to achieve that readiness will happen in different ways and on different timescales. The EV Readiness Framework affords individual utilities the flexibility to achieve readiness via different pathways, and to be responsive to changing market conditions. This is an important consideration for the Joint Utilities: to ensure that each utility is positioned to respond to the challenges and opportunities unique to their service territories, while also recognizing the benefits of joint action. The Joint Utilities commitment to collaboration and achieving EV readiness will help support the transition to broader EV adoption in New York.

Throughout the development of this Framework, some stakeholders have sought clarification and explicit intent from the Joint Utilities regarding investment plans linked to EV deploying charging infrastructure. As noted previously, this framework is intended to help guide utilities as they prepare for and seek to accommodate increased EV penetration in their service territory. The actions required to get ready for increased EV adoption and a willingness to support increasing EV adoption should not be confused with the investments required to accelerate the deployment of EV adoption. The Joint Utilities refer to the Edison Electric Institute's recent report on Accelerating EV Adoption, which summarizes the variety of ways that utilities can engage in EV charging deployment, as shown in the figure below, and summarized here:

- *Business as Usual*. Electric company funds the distribution upgrades that may be needed to the service connection side.
- *Make Ready*. Electric company funds the installation and supply infrastructure costs up to the charging equipment. The customer procures and pays for the charging equipment.

- *Charger Only*. Electric company funds and/or owns the charging equipment, utilizing the existing supply infrastructure on the premises and/or offsetting any installation costs.
- *Full Ownership*. Electric company funds and/or owns the full installation, up to and including the charging equipment.

Figure 1: Electric Company Charging Infrastructure Deployment Options



Source: EEI, Accelerating EV Adoption, Figure 4

This EV Readiness Framework encompasses a broader scope than just investments in charging infrastructure, and it is purposely structured to help utilities regardless of how their respective plans inevitably change or evolve with regard to EV charging infrastructure. For instance, there have been many changes in the EV market (e.g., increased EV offerings for buyers, increasingly competitive EV pricing, more state-level engagement, and a variety of utility efforts) over the course of preparing this Framework, and the core elements of the Framework remain unchanged. The Joint utilities will look to this EV Readiness Framework as both the market and their engagement in transportation electrification changes over time.

Appendix A. 2016-2017 Stakeholder Engagement

a. Participating Organizations

The following organizations participated in one or more engagement group meetings on EVSE either in person or virtually:

- Albany Capital District EV Drivers
- Acadia Center
- Alliance for Electrification Transportation
- Atlas Public Policy
- BYD Heavy Industries
- Capital District Clean Communities
- Chanje
- ChargePoint
- Clean Communities
- Clean Energy Collective, LLC
- Climate Action Associates
- Constellation Energy
- Direct Energy
- EarthKind Energy
- Edison Electric Institute
- Electrification Coalition
- Electric Power Research Institute
- Energetics Incorporated
- EnergyHub
- Environmental Defense Fund
- EV-Box North America
- EV Connect
- EVgo Services Institute
- Exelon, a Constellation Company
- General Electric
- General Motors
- GreenLots
- ICF
- International Brotherhood of Electrical Workers
- Long Island Power Authority
- Metropolitan Transportation Authority
- MJ Bradley & Associates
- Natural Resources Defense Council
- Navigant Consulting
- New York Battery & Energy Storage Technology Consortium
- New York Independent System Operator
- New York Power Authority
- New York State Department of Public Service
- New York State Energy Research and Development Authority
- NRG Energy
- NYC Department of Transportation
- NYC Mayor's Office of Sustainability
- PACE Energy & Climate Center
- Plug in America
- Siemens
- Sierra Club
- SunPower
- Sustainable Westchester
- Tesla
- Verde Energy USA

Appendix B. Demo and Pilot Projects

Demo and pilot projects listed by utility are presented below.

Central Hudson

Anticipated Demo and Pilot Projects

Residential EV Incentive Program	**Project Name**	**Residential Electric Vehicle Incentive Program**
	Time Frame	Pending Rate Case Approval - Begin 7/2018
	Location	Central Hudson service territory
	Description	Central Hudson customers that purchase an EV will receive a rebate of $1,250 after proof of vehicle purchase. Any vehicle, as long as it's EV will be rebated. Hybrids do not apply. Applies to any Central Hudson customer. The rebate does not change based on customer income level.
	Notes	This program is pending Commission approval. Links to testimony and exhibits are below: • https://www.cenhud.com/static_files/cenhud/assets/pdf/ebf_eam_testimony.pdf • https://www.cenhud.com/static_files/cenhud/assets/pdf/ebf_eam_exhibits.pdf

Con Edison

Previous and Current Demo and Pilot Projects

Residential EV Incentive Program	**Project Name**	**Consert Pilot**
	Time Frame	1/12 – 3/15
	Location	EV owner homes
	Description	Sub-meter EV load and disaggregate from house
	Notes	Branch circuit submeter with cell data retrieval
Charging Infrastructure	**Project Name**	**MV DCFC Development**
	Time Frame	9/13 – 4/17
	Location	EPRI Knoxville, TN
	Description	Medium voltage feed directly to DCFC
	Notes	Eliminate losses due to step down and back up
Rate Design	**Project Name**	**Capture economic value of TE**
	Time Frame	6/15 – 12/15
	Location	Academic exercise with EPRI
	Description	Early stages of E3 benefits modeling for cost tests. Benefits apply to LMI customers
	Notes	Traditional utility/customer/society cost tests

Charging Infrastructure	**Project Name**	**GE / FedEx / DOE / Columbia**
	Time Frame	6/11 – 6/14
	Location	NYC FedEx
	Description	Create smart charging at 50% of current cost. Commercial fleet application
	Notes	Demand management with machine learning
Vehicle-Grid	**Project Name**	**Open vehicle-grid integration platform**
	Time Frame	5/14 - Present
	Location	Various under EPRI members
	Description	Open platform for DR control of vehicle loads – technology development
	Notes	Brings vehicle SOC into the decision process
Charging Infrastructure	**Project Name**	**Workplace Charging with FleetCarma**
	Time Frame	1/16 – Present
	Location	Throughout territory
	Description	Pull data on charging from employees to model fees. Methodology appropriate for LMI customers
	Notes	Allows for charge data without expensive metering
Rate Design	**Project Name**	**SmartCharge New York**
	Time Frame	1/17 – 12/19
	Location	Throughout territory
	Description	Reward off-peak charging behavior w/o tariff change. Methodology appropriate for LMI customers.
	Notes	Behavioral modification via reward points

Anticipated Demo and Pilot Projects

Vehicles	**Project Name**	**Electric Transit Bus Pilot**
	Time Frame	1/18 – 12/20
	Location	Manhattan/Brooklyn/Queens
	Description	Optimize approach and costs for transit bus charging. Benefits to riders
	Notes	Develop in depot and curbside charging models
Vehicles	**Project Name**	**School Bus Demo Pilot**
	Time Frame	6/18 – 6/21
	Location	Westchester
	Description	5 e-buses with V2G capability during summer. Clean air for school kids.
	Notes	Part of REV demos
Charging Infrastructure	**Project Name**	**Curbside Charging Demo Pilot**
	Time Frame	6/18 – 6/21
	Location	5 boroughs of NYC
	Description	Up to 100 curbside charging locations installed. Potential for additional 25 NYC fleet street locations.
	Notes	Part of REV demos

Charging Infrastructure	**Project Name**	**Smart Home Charging Demo Pilot**
	Time Frame	Pending further technology review
	Location	NYC and Westchester
	Description	Up to 500 smart L2 home chargers. Single family homes
	Notes	Part of REV demos
Charging Infrastructure	**Project Name**	**System Planning and Design Demo Pilot**
	Time Frame	Pending further analysis and cost considerations
	Location	NYC and Westchester
	Description	Market facing charger siting maps for planning. Potential for NYCHA siting.
	Notes	Part of REV demos

National Grid

Previous and Current Demo and Pilot Projects

Rate Design	**Project Name**	**Public Level 2 Charging Pilot**
	Time Frame	Began 2013; ongoing
	Location	National Grid NY Service Territory (Upstate)
	Description	Operate 66 public Level 2 charging stations in upstate NY, installed in partnership with Chargepoint, using NYSERDA grant funds. Stations are owned and maintained by National Grid but operated by customers (site hosts) on their own meters. Most site hosts provide free charging to drivers, and locations are visible on Plugshare.com.
	Notes	Nearly 2,000 unique drivers from 1,000 different zip codes have used these stations since installation. Available to all customers
Charging Infrastructure	**Project Name**	**Voluntary Time of Use Rate**
	Time Frame	Launched Spring 2017
	Location	National Grid NY Service Territory (Upstate)
	Description	New whole-house TOU rate (for supply and delivery service) could provide EV customers with an estimated $150+ of savings per year from switching charging to after 11pm. Rate includes a price guarantee for EV drivers: if a customer provides evidence of an EV registration, after 12 months National Grid will compare total bill charges under new rate vs. prior rate and if they paid more, they credit them for the difference.
	Notes	See www.ngrid.com/timeofuse for more details. Available to all customers.

Anticipated Demo and Pilot Projects

Charging Infrastructure	**Project Name**	**Charging Host Program Demonstration ("Make-Ready")**
	Time Frame	In discussion in 2017 rate case
	Location	National Grid NY Service Territory (Upstate)
	Description	Under the program, the Company will make capital upgrades to accommodate the future installation of EV charging stations at

		commercial customers' properties and provide incentives to property owners to encourage the installation of these stations.
Consumer Education	**Project Name**	**Consumer EV Education**
	Time Frame	In discussion in 2017 rate case
	Location	National Grid NY Service Territory (Upstate)
	Description	The proposed Consumer EV Education program will involve education efforts to boost awareness of EV options (e.g., battery EVs and plug-in hybrid EVs) and encourage participation in EV programs. The program will provide information about EV technologies, charging options, and available incentives. Customers will be targeted through a wide range of marketing channels, including public events, social media, direct mail, call centers, and the Company's website and mobile tools.

NYSEG and RG&E

Anticipated Demo and Pilot Projects

Rate Design	**Project Name**	**Smart Home Rate**
	Time Frame	Q2 2018 Launch
	Location	Ithaca, NY
	Description	Will include an EV rate that will vary depending on the flexibility to defer charging to a later time if/when needed
	Notes	Includes collaboration with Cornell University and will be filed as the NYSEG Smart Home Rate Pilot
Vehicle-Grid	**Project Name**	**Integrated Electric Vehicle and Battery Storage System**
	Time Frame	Operational by Q4 2018
	Location	Rochester, NY
	Description	Will include utility owned electric vehicles at a company facility with vehicle to grid capability and will include flexible DC fast chargers along with solar PV and a stationary battery intended to mitigate the load impact of the DC fast chargers.
Charging Infrastructure	**Project Name**	**DC Fast Charging**
	Time Frame	Operational by Q4 2018
	Location	Tompkins County, NY
	Description	Market partnership to collaboratively design and implement a DC fast charger pilot project that will inform a scalable model. The project will seek to maximize the benefits of collaboration between NYSEG and the market partner and will include collaboration on site identification, charger utilization, pricing mechanisms, and user experience.

O&R

Utility specific programs will be determined in the near-term future.