<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:15 – 10:00</td>
<td>Registration</td>
<td>--</td>
</tr>
<tr>
<td>10:00 – 10:10</td>
<td>Welcome</td>
<td>Matt Ketschke, Con Edison</td>
</tr>
</tbody>
</table>
| 10:10 – 11:00| DSP Implementation as of June 2018 **DER Integration**               | • NYSEG/RG&E: Dave Conroy  
• Con Edison: Tom Mimnagh  
• AEE: Ryan Katofsky  
• Opus One Solutions: Dave MacRae |
| 11:00 – 11:10| Break                                                                | --                                                                                                    |
| 11:10 – 12:00| DSP Implementation as of June 2018 **Market Services & Information Sharing** | • National Grid: Rob Sheridan  
• O&R: Kristen Barone  
• Central Hudson: John Borchert  
• Demand Energy: Jeff Cook-Coyle  
• NRG: Kelli Joseph |
| 12:00 – 1:00 | Lunch (provided)                                                     | --                                                                                                    |
| 1:00 – 2:00  | **Value of DER Proceeding**                                         | • Con Edison: Steve Wemple  
• O&R: Kristen Barone  
• EDF: Elizabeth Stein  
• NY-BEST: Bill Acker |
| 2:00 – 2:55  | **REV Resources**                                                    | • REV Connect – Vanessa Ulmer, NYSERDA  
• Value Stack Calculator – Luke Forster, NYSERDA                                                 |
| 2:55 – 3:00  | **Conference Wrap-up & Adjourn**                                     | Damian Sciano, Con Edison                                                                             |
Welcome

Matt Ketschke, Con Edison
Thank You for Participating in 2017 Stakeholder Sessions!

For more information and summary material of 2017 stakeholder efforts, please visit [www.jointutilitiesofny.org](http://www.jointutilitiesofny.org)
Distributed System Implementation Plans
Purpose of the DSIPs

• Roadmap

• Major Areas of Focus
  • Planning
  • Operations
  • Markets
Key DSIP Principles

• Information Sharing
• Stakeholder Engagement
• Develop Tools
Information

• Level the Playing Field

• Encourage Innovation/Improve System Efficiency

• Beneficial Locations for DER
  • Hosting capacity/Streamlined Interconnection
Stakeholder Engagement

• Promote Utility/Stakeholder Relations
• Vet DSIP Topics
• Ongoing implementation
Tools

• Forecasting and Modelling
• Monitoring, Communication, and Control
• Advanced Metering/Customer Data
• Demonstration Projects
DSIP Filing Process

• Initial DSIPs - Base Level of Data
• Supplemental DSIP – Common Approaches and Tools
• Biennial updates
Conclusion
DSP Implementation as of June 2018

Overview
SDSIP Plan — Moving from Stage 1 to Stage 3

Stage 1: Grid Modernization
- Aging Infrastructure Replacement
- Advanced Grid Technologies

Stage 2: DER Integration
- DER Integration & Optimization; Dist. Platform Dev Initial Grid Services

Stage 3: Distributed Energy Markets
- Market Operations and Expanded Grid Services
- DLMP Dispatch & State Estimation Settlement Systems
- Monitoring & Comms
  - Grid/DER Mgt & Control
  - Situational Awareness
  - Grid Connectivity Model
  - Enhanced Data Analytics

Investments
- AMI Enabling DER Pricing Distribution Automation Initial Substation Automation Data Analytics

Distribution Infrastructure & Systems

DER Adoption Level

Distribution System Capability

Time

Today
Three Aspects of the Distributed System Platform

- Market Services
- DER Integration
- Information Sharing
DSP Implementation as of June 2018

DER Integration
## Actions & Results in DER Integration, June 2018

### ACTIONS

<table>
<thead>
<tr>
<th>Created online application portal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided access to circuit-level hosting capacity data</td>
</tr>
<tr>
<td>Enhanced forecasts to incorporate DER in a more robust and granular fashion</td>
</tr>
<tr>
<td>Established common interim monitoring and control standards for PV</td>
</tr>
<tr>
<td>Identified potential low-cost M&amp;C solutions while implementing interconnection advancements (e.g., DTT, SIR screens)</td>
</tr>
<tr>
<td>Began deployment or demonstration of foundational investments (e.g., AMI, ADMS, DERMS)</td>
</tr>
<tr>
<td>Proposed Earnings Adjustment Mechanisms (EAMs)</td>
</tr>
<tr>
<td>Operated REV demonstration projects (e.g., flexible interconnection, storage, marketplace, smart home rates)</td>
</tr>
<tr>
<td>Publish EV Readiness Framework</td>
</tr>
<tr>
<td>Began integration of energy storage through procurement and formation of safety agreements with local authorities</td>
</tr>
</tbody>
</table>

### RESULTS

| Greater automation and ease of interconnection process for DER (e.g., PV, storage, CHP) |
| Greater developer insight into areas of the distribution system where interconnecting DER may be less costly |
| DER forecasting as a standard part of the planning process; opens up NWA opportunities, VDER LSRV zones |
| Maintains electric system reliability and safety under current DER penetration and enables advanced market functions |
| Reduced barriers to entry for DER and greater predictability of costs for interconnecting developers |
| Developing DSP operational foundational investments to facilitate DER integration and market participation |
| Alignment of incentives with performance to deliver greater levels of EE, system efficiency, and ease of interconnection |
| Greater understanding of how to deploy these solutions across a service territory to address system needs |
| Support for expansion of the EV market and charging infrastructure |
| Greater opportunities for energy storage deployment |
Evolution of the Interconnection Process

**Where we started before REV**
- Largely manual process driven by detailed engineering analyses
- Lengthy process with low amounts of DER interconnection applications
- 317 MW of interconnected distributed solar as of 2014 (Source: NYSERDA)

**Where we’ll be in June 2018**
- Online application portal creates greater automation and ease of interconnection
- Interconnection EAM further aligns incentives; leads to greater customer satisfaction
- As of November 1, 2017, 904.4 MW of interconnected distributed solar and 1,263.1 MW of queued projects (Source: NYSERDA)
- Distribution system operations passive and real time management of DER

**Where we’ll be in 2020+**
- IOAP 3.0 facilitates increased automation in the DER interconnection process
- Significantly larger amounts of installed DER
- Active and predictive operations management of DER.
Evolution of Long-Term Load and DER Forecasting

**Where we started before REV**
- **Top-down, deterministic** planning methods which relied on load modifiers to account for DER
- Early demand-side management programs

**Where we’ll be in June 2018**
- Incorporation of **bottom-up approaches** allows for more targeted identification of locational system needs, LSRV zone, and NWA opportunities
- Enhanced forecasts to incorporate DER in a more robust and granular fashion
- **Substation-level 8760 forecasts** allow for greater developer insight into market opportunities

**Where we’ll be in 2020+**
- DER forecasting a standard part of the utility planning process
- Greater levels of **system monitoring information** as inputs into long-term load and DER forecasts
- Increased incorporation of **probabilistic methods** to more robustly account for uncertainties in DER output and adoption
Anticipated Results in **DER Integration, 2020+**

<table>
<thead>
<tr>
<th><strong>Interconnection Online Application Portal (IOAP) 3.0</strong></th>
<th><strong>facilitates increased automation in the DER interconnection process</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EAMs</strong></td>
<td><strong>reshape the traditional utility business model to align REV goals with outputs, innovation, and performance</strong> in EE achievement, system efficiency, ease of interconnection, and customer engagement</td>
</tr>
<tr>
<td><strong>Monitoring and control</strong></td>
<td><strong>of a broader set of asset types to preserve distribution system safety and reliability and facilitate economic and efficient markets</strong></td>
</tr>
<tr>
<td><strong>Ongoing implementation and deployment</strong></td>
<td><strong>of monitoring and control and foundational technologies</strong> enables active network management to facilitate system analysis and DER coordination, optimization, and control</td>
</tr>
<tr>
<td><strong>DER forecasting</strong></td>
<td><strong>a standard part of the utility planning process to assist with the identification of system needs</strong></td>
</tr>
<tr>
<td><strong>Higher levels of EV adoption</strong></td>
<td><strong>facilitated by increased penetration of charging infrastructure</strong></td>
</tr>
<tr>
<td><strong>Expanded smart inverter integration</strong></td>
<td><strong>including advanced functions, to allow for greater levels of DER adoption and for providing ancillary services</strong></td>
</tr>
</tbody>
</table>
Q&A
Break [10 minutes]
DSP Implementation as of June 2018

Information Sharing
Actions & Results in Information Sharing, June 2018

**ACTIONS**

- Developed individual **utility data portals** (e.g., system data, LSRV)
- Created central location on JU website where utilities publish links to individual **NWA and RFP opportunities**
- Proposed **whole building aggregated data** filing
- Began implementation of **Green Button Connect** (or similar)
- Produced **statewide anonymity standard**
- Agreed to protocol for **value-added data services**
- Supported launch of **REV Connect** to communicate DER opportunities for all utilities
- Provided various forecast data, including **8760 forecasts**
- Completed **stakeholder engagement** sessions for nine DSP implementation teams

**RESULTS**

- Increased **access and usability** of useful stakeholder-requested information
- **Enhanced transparency and efficiency** for developers to partake in NWA solicitations and other market opportunities
- Identify issues with privacy standards and **opportunities for potential automation** when volume dictates
- Availability of **more granular data** for customer or authorized 3rd party
- Provides consistent, aligned approach to **protecting customer privacy**
- Begins **market for information services** and development of platform service revenues (PSRs)
- Greater transparency for the developer community on **NWA and other REV-related opportunities**
- **Enhanced transparency** for developers to inform business development; greater insight into system needs
- **Stakeholder opportunities** to provide input on the implementation of various DSP-related efforts

**JOINT UTILITIES**

**OF NEW YORK**

*Draft for Discussion Purposes Only*
Evolution of System Data

Where we started before REV

- Traditional availability and accessibility of system data to 3rd party developers
- **No information** in online portals, limited machine-readable formats
- **No online portals** with hosting capacity information, limited developer insight into areas with greater locational value

Where we’ll be in June 2018

- Developed individual utility data portals (e.g., system data, LSRV, DRV) to provide greater transparency into high-value areas of the utility’s system
- Provided access to circuit-level hosting capacity data to give developers greater insight into areas with potentially lower interconnection costs

Where we’ll be in 2020+

- Advanced portals for non-wires alternatives (NWA) and system data give developers easy access to important information
- **Stage 4 hosting capacity** visualized, usable to streamline interconnection
Anticipated Results in Information Sharing, 2020+

Value-added data services and other platform service revenues (PSRs) established to align REV goals with enhanced utility performance

Advanced portals for NWA and system data give developers easy access to important information

Stage 4 hosting capacity visualized, usable to streamline interconnection

Green Button Connect (or similar) utilized for easy access to customer data, with privacy protections in place

Updated data privacy standards to protect customer information

Greater developer insight into locational system conditions and needs to inform business development
DSP Implementation as of June 2018

Market Services

- Market Services
- DER Integration
- Information Sharing
**Actions & Results in Market Services, June 2018**

### ACTIONS

- Identified, developed, and implemented **non-wires solutions**; common datasets and bidder pre-qualification implemented
- Implemented **advanced utility programs** (e.g., energy efficiency, demand response, demand-side management)
- Applied **Phase One VDER** value stack
- Aligned dispatch and communication protocols, and formalized roles and functions between DSP, NYISO, DER aggregator, and DER owner
- Enabled **dual participation** for DER
- Developed load and DER forecasts that leverage **probabilistic methods** and have greater temporal and locational granularity
- Developed improved **marginal cost studies**
- Implemented **new utility business model concepts** (e.g., rate reforms, platform service revenues, cost recovery mechanisms, EAMs, etc.)

### RESULTS

- **Greater volume of opportunities**: greater transparency, consistency, and efficiency for the entire NWA solicitation process
- Key step of **market development** allows for greater DER participation
- **Clearer market signal** to developers where DER can capture enhanced locational value
- Increased levels of **DER participation in wholesale markets** so DER can access more value, while ensuring distribution and bulk power system safety and reliability is maintained
- Opportunity for **DER to stack value**
- **Enhanced forecasting capabilities** while accounting for greater levels of uncertainty; more targeted identification of NWA opportunities and LSRV zones
- **Increased transparency** into and ability to estimate high-cost/high-value areas of the distribution system
- Further **alignment of incentives** to foster greater customer engagement, expanded DER deployment, and a more resilient electrical grid to further REV objectives

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Draft for Discussion Purposes Only
Evolution of Non-Wires Alternatives (NWA)

Where we started before REV

- BQDM proposed in the summer of 2014
- Limited opportunities for DER to compete with traditional utility infrastructure investments
- Disparate DER sourcing practices across the New York utilities

Where we’ll be in June 2018

- As of November 2017, 48 NWA opportunities identified
- NWA suitability criteria established that provide greater clarity into how NWA will be evaluated against traditional utility solutions
- Enhanced transparency, consistency, and efficiency for the entire NWA solicitation process

Where we’ll be in 2020+

- NWA procurement, selection, and settlement completed through each DSP’s Distribution Market Platform
**Evolution of ISO-DSP Coordination**

**Where we started before REV**
- **No active communication** between NYISO and utility distribution operators
- DER participation in wholesale market limited to **NYISO demand response programs**

**Where we’ll be in June 2018**
- Aligned **dispatch and communication protocols**, and **formalized roles and functions** between DSP, NYISO, Aggregator, and DER
- Coordination as part of **NYISO’s pilot program** helps test procedures for DER wholesale market participation

**Where we’ll be in 2020+**
- **DER participation in wholesale markets** directly to the NYISO, via a third-party aggregator, or via the DSP
- **Ongoing communications and coordination** with NYISO, Aggregators, and DER to provide information on distribution system constraints to inform bids
Anticipated Results in **Market Services, 2020+**

- **DER participation in VDER Phase Two**, where distribution components become more performance/market/value aligned
- Distribution Market Platform facilitates more DER value through a long-term transition toward **active transaction-based markets**
- NWA procurement, selection, and settlement completed through each DSP’s **Distribution Market Platform**
- Further enhancements to **probabilistic load and DER forecasting** methods and greater temporal and locational granularity
- DSP sources its **distribution-level services** close to real-time, such as constraint management, reactive power, and enhanced provision of DR services
- **VDER registration and settlement** completed through Distribution Market Platform
- **DER participation in wholesale markets** directly to the NYISO, via a third-party aggregator, or via the DSP
- Implementation of **flexible interconnection** enables greater levels of interconnected DER
Q&A
Lunch [1 hour]
Value of DER Proceeding

JU Phase One VDER Implementation Progress
VDER Framework

**Net Metering**

- Receive NEM for 20 years from in-service date
- Can opt into Value Stack subject to Phase One cap

**VDER Phase One**

- Mass market
  - NEM for life of system
  - Value Stack for 25 years

- Large C&I
  - NEM for life of system
  - Value Stack for 25 years

- CDG
  - Value Stack for 25 years with MTC

**VDER Phase Two**

TBD for new projects as of 1/1/2020

TBD

TBD
Unpacking the Value Stack

The retail value of NEM will be replaced by six individual components designed to better value exported energy to the distribution system.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply</strong></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>▪ Day Ahead Hourly Locational Based Marginal Price (LBMP)</td>
</tr>
<tr>
<td>Installed Capacity</td>
<td>▪ Volumetric credit applied to exports in all hours with option for higher credit in summer on-</td>
</tr>
<tr>
<td></td>
<td>▪ peak periods (Alt 2) and single coincident peak (Alt 3)</td>
</tr>
<tr>
<td>Environmental</td>
<td>▪ Represents the value of clean energy</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td></td>
</tr>
<tr>
<td>Market Transition Credit (MTC)</td>
<td>▪ Credit for mass market to bring compensation close to NEM</td>
</tr>
<tr>
<td></td>
<td>▪ Declines for new projects as tranches fill</td>
</tr>
<tr>
<td>Distribution Relief Value (DRV)</td>
<td>▪ Applicable to customers not eligible for MTC</td>
</tr>
<tr>
<td></td>
<td>▪ Based on performance during 10 peak distribution hours of previous year valued at MCOS</td>
</tr>
<tr>
<td>Locational System Relief Value</td>
<td>▪ Additional incentive for DER developed in high value areas</td>
</tr>
</tbody>
</table>
• In the initial stages of the DSP, DER can be compensated for distribution benefits contractually through Non-Wires solicitations and through the VDER tariff
  • VDER Tariff facilitates the integration of DER by providing for a more accurate distribution value compensation than traditional NEM.
  • Non-Wires solutions provide mechanisms for utilities to contract with DER to help solve specific distribution need

• VDER LSRV zones involve two aspects of the DSP: market services and information sharing by providing greater compensation to DER that provides additional distribution value

• There is a continuing need to create proper market signals to encourage developers and customers to deploy DER in ways that maximize net benefits for all customers
LSRV and NWA: Different Mechanisms, Same Needs

• Both Locational System Relief Value (LSRV) and Non-Wires Alternatives (NWA) are tools to encourage DER deployment in areas where there is more distribution value
  • Geographical overlap between LSRV zones and identified NWA opportunities
  • Solicitations for NWA will therefore reflect reductions in coincident requirements already obtained through LSRV commitments
  • Similarly, a successful NWA can eliminate (prospectively) an LSRV areas.

• MW caps for LSRV zones serve as an estimate of the amount of DER (on a coincident basis) needed to address a constraint/defer traditional infrastructure

20% of Con Edison load is in an LSRV zone
Value of DER Phase Two Proceeding and Links to DSP Enablement

Presented by Warren Myers and Marco Padula

Joint Utilities Stakeholder Engagement Conference
November 30, 2017
- **Expand Eligibility** - Application of VDER Value Stack to projects and technologies not eligible in Phase One (e.g., Clean Generation beyond those cited in Net Metering Statutes; CHP larger than 10 kW; stand-alone energy storage technologies)

- **Locational Distribution Value** – coordination of VDER Value Stack long run value and long run procurements of NWAs; More Granular Avoided Cost Estimation

- **Other Improvements and Modifications to the Value stack** - components related to the bulk system (bulk ancillary), distribution system (local ancillary); and societal values other than CO2/renewable value

- Utility DSIPs will serve as the venue for pursuing increased DSP functionality

- Increased DSP functionality and capabilities help granular, transactional pricing of DER
- Develop rate design proposal by December 2018 for transitioning of mass-market projects from NEM to new rate design beginning January 2020

- Working group will also consider network access charges, standby rates and buy-back rates

- Drafting process for the development of VDER Value Stack and Rate Design issues over the next 12 months

  - Stakeholder Engagement / Studies / Proposals

  - Staff Issue Papers / SAPAs / Commission Orders
REV Resources
REV Connect

Presenter: Vanessa Ulmer (NYSYERDA)
REV Resources
Value Stack Calculator

Presenter: Luke Forster (NYSYERDA)
Q&A
Thank you!

www.jointutilitiesofny.org