2018 Distribution System Implementation Plan (DSIP)
Stakeholder Session
Agenda

• Registration / Breakfast / Networking
• Remarks by Matt Ketschke, SVP
• DSIP background
• DSIP Content
  – DER Integration
  – Information Sharing
  – Market Services
• Open Discussion
State Energy Plan for 2030

- 40% reduction in Greenhouse Gas (GHG) emissions from 1990
- 50% of electricity generation from renewable energy resources
- 600 Trillion BTU increase in statewide energy efficiency
- 1500 MW (2025) Of Energy Storage
How often is the DSIP filed?

Every 2 years...
How are the joint utilities standardizing their approach?

Via stakeholder engagement, consistent sections in the DSIP and standardization of portals, terminology and calculations wherever possible.
DSIP Overview

• 2016 DSIP filing
  – Initial DSIP (June 30, 2016)
    • Current state assessment & Utility Handbook
    • Five-year plan
  – Supplemental DSIP (November 1, 2016)
    • Submitted jointly by all investor owned NYS utilities

• 2018 DSIP filing
  • Staff whitepaper issued on April 26, 2018 containing 239 questions across 14 topics
  • Joint Utilities agreed on common outline that includes additional info: Long-term Vision, DSP Progress, Innovation and Demonstration Projects, Grid Modernization
  • DSIP 2018 filed on July 31, 2018
  • Joint Market Design and Integration Report to follow the DSIPs pending Staff guidance
2018 DSIP Layout

• Executive Summary
• Progressing the DSP
  • Long Term Vision
  • Demonstration Projects
  • Grid Modernization
• Topical Section - Integrated Planning; Advanced Forecasting; Grid Operations; EV, ES, EE, Customer Data, System Data, Cybersecurity, Interconnection, Hosting Capacity and NWS
• Information on DSIP Governance, MCOS, BCAH
• Appendix
Reading the DSIP

- Executive Summary with highlights
- Callout boxes with use cases and section highlights
- List of achievements and future actions in each section
- Timelines
- Questions listed in the Guidance document answered in Q&A format

Summary of Achievements

Invested in new M&C capabilities, including ongoing investments in AMI, GIS, and DERMS, as well as network protector relays that allow bi-directional communication with SCADA.

Piloted low-cost M&C solutions, such as the ConnectDER™ meter collar.

ENERGY STORAGE

O&R anticipates having approximately 12MW/46MWh of energy storage online by the end of 2019.

O&R is actively working to integrate energy storage into all facets of grid operations and is currently in the process of procuring energy storage systems to defer the construction of two substations.

MARCUS GARVEY VILLAGE COMMUNITY DER

This multi-technology solution includes a 400 kW solar PV system, 400 kW fuel cell and 300 kW/1.2 MWh lithium-ion battery-based energy storage system.

Once completed, it will serve the power and energy needs of residents and businesses at the apartment complex in Brooklyn's Brownsville area.
DSP Evolution

- NYISO
- DSP
- Aggregators
- DER Customers: Solar, DR, Battery

Network Types:
- Red: Signals/Telemetry
- Blue: Wholesale Services
- Light Blue: Distribution Services
Con Edison’s vision for modernizing the grid is built around delivering benefits to customers cost-effectively. These benefits begin in the near term and extend into the future, and include:

- Enhancing safety for the public and utility workers.
- Empowering customers with more choices to meet their energy needs.
- Being more resilient to extreme weather events and climate change.
DSIP Content Categories

**DER Integration**
- Integrated Planning
- Advanced Forecasting
- Grid Operations
- DER Interconnection
- Hosting Capacity
- Beneficial Locations for DER and NWS

**Information Sharing**
- Distribution System Data
- Customer Data
- Cyber Security
- Advanced Metering Infrastructure

**Market Services**
- EV Integration
- EE Integration and Innovation
- Energy Storage Integration
- Procuring NWS
DER Integration
DER Integration

3 year Network/Substation level 8760 forecasts

DER Forecasting (Deterministic, Probabilistic) ➔ Load Forecasting (Deterministic, Probabilistic) ➔ System Analyses (e.g., Load Flow Analysis) ➔ Interconnection ➔ Distribution Investment Plan ➔ Non-Wires Suitability Criteria ➔ Hosting Capacity Analysis

Components of traditional distribution system planning
New or expanded aspects of a high-DER planning framework
Grid Operations

Real Time Operations

Observe & Respond

Optimize

ADMS / DSP Platform

OMS
Outage Mgt
Predictions
Switching
Crew Mgt
Metrics

ADMS
Power Flow State
Estimation
FLISR
Integrated
Volt/VAR
Control

DERMS

Market System

DSCADA / Aggregator Systems

Field Equipment

AMI

Sensor Nodes
MOABs
Reclosers
Cap Banks

Dmd Response
DG / Inverters
Energy Storage
Electric Vehicles
Building Mgt Sys

Foundational Utility Assets and Systems
Emerging Utility Assets and Functions
Emerging Third Party Assets and Systems
# DER Interconnection

**Accomplishments**
- Streamlined interconnection process consistent with IOAP Phase 1 requirements.
- Licensed and updated PowerClerk® as needed
- Developed several technical documents with the Joint Utilities and ITWG
- Collaborated with EPRI on smart inverters and DER interconnection
- Engaged developers – Successful Focus Groups

**Commitments**
- Adapt to accommodate new technologies
- Refine PowerClerk® through innovation
- Annual focus groups
- Participate in ITWG and IPWG
- Coordinate with the ITWG to improve reporting and transparency.
DER Interconnection – O&R

- O&R has processed over 3700 applications since 2016.

- O&R partnered with the University of Vermont to receive a $1.8 million award from the U.S. Department of Energy’s SunShot Initiative via their newest program Enabling Extreme Real-time Grid Integration of Solar Energy or “ENERGISE”.

- O&R was awarded a grant from NYSERDA (“NYSERDA PON 3026”) to build a DER Interconnection Assessment Application.
Hosting Capacity

• Definition:
  – Hosting Capacity is the amount of DER that can be accommodated without adversely impacting power quality or reliability under current configurations and without requiring infrastructure upgrades.

• Hosting Capacity is
  – Location dependent
  – Feeder-specific
  – Time-varying

• Hosting capacity considers DER interconnection without allowing
  – Voltage/flicker violations
  – Protection mis-operation
  – Thermal overloads
  – Decreased safety/reliability/power quality

• Hosting capacity evaluations require precise models of entire distribution system

Source: 2016 EPRI “Hosting Capacity for NY”
Hosting Capacity

Stage 1 – Distribution Indicators

Stage 2 – Hosting Capacity Evaluations

Stage 2.1 – Additional System Data

Stage 3.0 – Advanced Hosting Capacity Evaluations, Sub-feeder level, Existing DER

Stage 3.X – Additional Enhancements to Advanced Hosting Capacity Evaluations

Stage 4 – Fully Integrated DER Value Assessments

2016 – Early 2017

October 2017 - 2018

April 2018

October 2019

Increasing effectiveness, complexity, and data requirements
Hosting Capacity

- Stage 2 feeder-level hosting capacity analysis for non-network and network circuits
- Non-wires layers added
- Additional system data in pop-up boxes, including aggregated queued and connected DG at the substation level updated monthly.
- Continued progression with definition of Stage 3 approach, which considers existing DER and sub-feeder level analysis
Stage 2 Hosting Capacity
Hosting Capacity – Secondary Network Layer

- Released with 2018 DSIP
- Con Edison specific design
Additional Value Layers

LSRV Opportunities

NWS Layers
Distribution System Data

• Established online data portal and used Hosting Capacity maps
• Worked with the Joint Utilities to establish a central portal for utility system data.
• Continued discussions with stakeholders to identify the range of system data currently available and to better understand their needs
Discussion & Break (10 Minutes)
Information Sharing
Cybersecurity and Data Security

- Maintain Joint Utilities Cyber and Privacy Framework while sharing lessons learned.

- Participated in the North American Electric Reliability Corporation’s (“NERC”) GridEx IV

- Data Security Agreement needs to be followed by all parties accessing utility systems, where they attest to meet data security procedures and requirements.
Customer Data

Accomplishments

• Implemented Green Button Connect (GBC) Phase 1 (“Share My Data”)

• DERS are able to access customer data via EDI in addition to GBC

• Customers with smart meters can access and download their near-real time energy usage

• Launched a central landing page for DERS and prospective CCAs

• Launched a web service that automatically uploads aggregated whole building data directly into EPA Portfolio Manager®

• Implemented PSC-approved privacy standards that balance clean energy objectives with customer protection

• Provided initial aggregated community-level data to NYSERDA in support of the UER

Commitments

• Provide near-real time data to authorized third parties by the end of 2018

• Implement GBC Phase II by the end of 2018

• Begin offering data access to ESCOs via RESTful APIs

• Further refine GBC, including potential functional improvements

• Continue to engage stakeholders regarding use cases and expansion of the statewide data sharing standard
AMI - Enables Digital Customer Experience, REV Goals, and Reduced Operating Risks

**Customer Convenience**
- Eliminates need to provide home access for meter reading or turn-ons/turn-offs

**Reduction Operating Risk**
- Contingency management

**Future Operating Benefits**
- Advanced sensor technologies

**Enabled Electricity Market**
- Foundation for time variant pricing plans & demand response growth

**Environmental Benefits**
- Reduced CO2 emissions & fuel consumption

**New Business Opportunities**
- Smart City applications

**Contingency Management**
- Network Protector/ Distribution asset control
- Targeted load shedding

**Environmental Benefits**
- CVO – 2% emission reduction
- Facilitate integration of DER

**New Sensor Technology**
- Public safety improvement
- Integrated methane sensor
- CO/stray voltage sensor
AMI - Deployment Plan – Consolidated Edison

<table>
<thead>
<tr>
<th>Year</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Staten Island**
- **Westchester**
- **Brooklyn**
- **Manhattan**
- **Bronx**
- **Queens**

- Green: Communication System Rollout
- Blue: Meter rollout
### AMI - Deployment Plan – O&R

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
</tbody>
</table>

- **Rockland County**
  - Q1 2017: Communication System Rollout
  - Q1 2019: Meter rollout

- **Orange and Sullivan counties**
  - Q2 2018: Communication System Rollout
  - Q1 2019: Meter rollout

- **New Jersey**
  - Q4 2019: Communication System Rollout
  - Q4 2020: Meter rollout
Market Services
Energy Storage

- Statewide target of 1500MW of Battery by 2025
- O&R and CECONY are actively working to integrate storage in all facets of grid operation
- O&R and CECONY are actively exploring how storage can provide benefit to multiple stakeholders
Energy Storage

Promoting storage using Non-wires and Demonstration Projects

**Demonstration Projects**
- Innovative Storage Business Models
- Commercial Battery Storage Project
- Storage on Demand
- Clean Virtual Power Plant
- Transportable Energy Storage System (Research & Development Project)
- Smart Home Rate – Track 2

**Non-Wires Projects**
- Monsey
- Pomona
- BQDM – Utility Owned
- BQDM – Marcus Garvey Apartments
- Water St
- Plymouth St
EV Integration

- EV Readiness Framework
- Collaboration with EPRI on Open Vehicle Grid Integration Platform
- CECONY EV Programs:
  - SmartCharge NY
  - Time of Use Rates
  - Facilitating Charging infrastructure deployment
- Demonstration projects
  - NYC Curbside Charging
  - Quick Charging
- Fleet Initiative
  - Con Edison Transportation
  - School Bus V2G Project
  - Electric Transit Bus Charging
- O&R is partnering with an auto manufacturer
- O&R proposed to own, operate, and deploy utility owned EVSE
EE Integration and Innovation

- Aligning EE resources with planning and system needs
- Targeted new customers at different levels of vertical supply chain
- Increased Low to Moderate Income offerings
- Collaborated with NYSERDA
- O&R has proposed nine more programs in its current rate case that align with future EE goals
- CECONY increased EE saving 300 GWh, equivalent to electricity consumed by over 33,000 homes
- Leveraged Demonstration Projects
  - Online Marketplace (Con Edison and O&R)
  - Connected Homes
  - Building Efficiency Marketplace
Demonstration & Innovation Projects – Con Edison

- Customer Engagement & Market Development
  - Building Efficiency Marketplace
  - Connected Homes
  - Shared Solar Pilot Program
  - New Energy Solution for LMI
- Innovative Pricing Pilots and Rate Design
  - Smart Home Rate
  - Innovative Pricing as per Customer Engagement Plan
- Electric Vehicle Demonstration Projects
- Energy Storage Demonstration Projects
- Interconnection: ConnectDER Meter Collar
Demonstration & Innovation Projects – Orange and Rockland

- Innovative Storage Business Model
  - Deploy FTM and BTM storage
  - Explore multiple revenue streams for the same asset
  - Provide incentive and benefit to multiple stakeholders

- Optimal Export Demonstration Project
  - Maximizing a DG project’s size and ability to export without negatively impacting reliability and distribution system performance
  - Alleviating the need for costly distribution system upgrades in order to interconnect

- Innovative Pricing Pilots and Rate Design
  - Smart Home Rate
  - Innovative Pricing as per Customer Engagement Plan
  - Order to interconnect

- Customer Engagement Marketplace Demo
  - Engage customers
  - Animate the Market with 3rd parties
  - DER and EE product Offering
## Procuring Non-Wires: Con Edison

<table>
<thead>
<tr>
<th>Project Name/Description</th>
<th>Required Load Relief</th>
<th>Need Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glendale</td>
<td>55</td>
<td>NA</td>
<td>Continuing BQDM</td>
</tr>
<tr>
<td>Columbus Circle</td>
<td>4</td>
<td>2021</td>
<td>RFP Closed. Evaluating</td>
</tr>
<tr>
<td>Hudson</td>
<td>7.1</td>
<td>2021</td>
<td>RFP Closed. No viable portfolio</td>
</tr>
<tr>
<td>Williamsburg</td>
<td>2.5</td>
<td>2020</td>
<td>RFP Closed. Evaluating</td>
</tr>
<tr>
<td>Plymouth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water St</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flushing Crossing</td>
<td>7.3</td>
<td>2019</td>
<td>RFP Closed. No viable portfolio</td>
</tr>
<tr>
<td>W42nd St Load Transfer</td>
<td>42</td>
<td>2021-2027</td>
<td>RFP Closed. Evaluating</td>
</tr>
<tr>
<td>Chelsea Network Feeder relief</td>
<td>3.2</td>
<td>2021</td>
<td>RFP being developed</td>
</tr>
<tr>
<td>Parkchester No. 1 Cooling</td>
<td>15</td>
<td>2021-2027</td>
<td>RFP being developed</td>
</tr>
<tr>
<td>Newtown Transformer Installation</td>
<td>24</td>
<td>2022-2027</td>
<td>RFP closed 8/31/18</td>
</tr>
</tbody>
</table>
### Procuring Non-Wires: O&R

<table>
<thead>
<tr>
<th>Project Name/Description</th>
<th>Project Type</th>
<th>Required Load Relief</th>
<th>Need By Date</th>
<th>Anticipated RFP Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monsey Load Relief/Reliability</td>
<td>2.5MW – 3MW</td>
<td>2021</td>
<td>Released</td>
<td></td>
</tr>
<tr>
<td>Pomona Load Relief Upto 6MW</td>
<td>2021 Released</td>
<td>West Haverstraw Reliability 5MW</td>
<td>Released</td>
<td></td>
</tr>
<tr>
<td>Blooming Grove Load Relief/Reliability</td>
<td>15.5MW</td>
<td>2021 Q4-2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sterling Forest (Tuxedo Park) Load Relief/Reliability</td>
<td>746 kW</td>
<td>2021 Q3-2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Warwick Load Relief/Reliability</td>
<td>7MW</td>
<td>2022 Q3-2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountain Lodge Park (Blooming Grove) Load Relief/Reliability</td>
<td>280kW</td>
<td>2022 Q4-2019</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2018 DSIP Overview
Highlighting achievements and planning for future success

Significant DER growth
- Doubling of solar since Jan 2016 with 650 MWAC expected by 2023
- Ramp-up of storage, EE, CHP

Grid modernization
- Phased investment in foundational and enabling technologies
- Evolution of capabilities in line with grid and market needs

Implementation of DSP capabilities
- capacity maps
- Improved interconnection process and incorporation of storage
- More granular load/DER forecasting
- Formalized NW identification
- More detailed and comprehensive hosting

Expanded data sharing
- Implementation of GBC Phase I with Phase II by end of 2018
- Published 8,760 load forecasts
- Better data visualization and downloadable files

Enhanced customer engagement
- AMI-enabled tools to educate and engage customers
- Demonstration projects to test new outreach strategies

Continued market enablement
- More NW solicitations
- Access to VDER and innovative pricing
- Coordination with NYISO to enable value stacking
- EV and storage facilitation
High-Level Commitments

- Continue to collaborate with the Joint Utilities, including developing common tools and methodologies and sharing lessons learned

- Engage stakeholders, including NYISO, DPS Staff, and NYSERDA through Joint Utilities efforts and Con Edison and O&R-specific outreach

- Actively participate in ongoing proceedings, such as Energy Storage Roadmap, EV, and EE initiatives

- Refine internal processes and tools to keep pace with stakeholder needs

- Leverage demonstration projects to advance new business and operational models, bringing projects to scale as appropriate

- Continue executing investment plans, such as AMI and DSP investments
Open Discussion