2020 Demand Response Forum

2/18/20
DR Forum Agenda

• Commercial Demand Response Programs
• Competitive Procurement Plan
• Rider R Participation
• Gas Demand Response Pilot
• Residential Demand Response Program (BYOT)
• Commercial & Industrial (C&I) Programs
• Advanced Metering Infrastructure (AMI) Project Update
• Green Button Connect
• Demand Response Management Systems
Commercial Demand Response Programs

2020 DR Forum

2/18/2020
Agenda

• What is Demand Response?
• Overview of DR Programs
• Ways to Participate in DR
• Incentives and Expectations
• How to Enroll in DR
What is Demand Response?

**Energy Efficiency Example**

EE provides sustained reduction in demand.

**Demand Response Example**

DR provides demand relief during a targeted timeframe.
Transmission (Wholesale) vs. Distribution

NYISO

Con Edison

Generating Station
(electricity generated at 13.8 to 22.0 kV)

Transformers
(voltage stepped up to transmission voltage)

Transmission Substation
(voltage stepped down to distribution voltage)

Area Substation
(480, 208, or 120 V)

Feeders

Network Customers
(residential, commercial, industrial, hospitals, schools, and street and traffic lights)

Connection To Others

Radial Customers
Wholesale vs. Distribution DR Programs

• Goal of NYISO Demand Response Programs
  – Resource adequacy

• Goals of Con Edison Demand Response Programs
  – 2-Hour Notification Program (DLRP - Distribution Load Relief Program)
    ▪ Increase electric service reliability
  – 21-Hour Notification Program (CSRP - Commercial System Relief Program)
    ▪ Peak shaving
Understanding Con Edison’s DR Programs

DLRP: 2-Hour Notification Program

- Called on a network basis for an isolated need
- For example, image below shows localized stress in the Battery Park network
- DLRP could be called in Battery Park City to provide at least 4 hours of load relief
- Customers receive notification 2 hours in advance of a DLRP event

CSRP: 21-Hour Notification Program

- Called in response to system-wide peak demand
- For example, image below shows networks peaking across New York
- CSRP customers called to provide 4 hours of load relief depending on peak time of the local network
- Customers receive notification at least 21 hours in advance of a CSRP event
Peak Day Loads by Network

Manhattan Networks

About Tableau maps: www.tableausoftware.com/mapdata
Why Should a Customer Enroll in DR?

• Potential source of revenue
• Incentivizes customers to better manage their electric demand
• Improves electric service reliability for the customer and neighborhood
How Much Load Do Customers Enroll?

Majority of customers enroll less than 20% of their highest summertime kW demand.

Some customers enroll over 80% of their highest kW demand. These customers are often industrial facilities that temporarily shut down operations.

2018 Customer DR Enrollment as a Percentage of Customer’s Peak Demand
How Do Customers Provide Load Relief?

Curtailment and Generation

• Load Reduction
  – HVAC
  – Lighting
  – Unnecessary Equipment
  – Elevator Banks
  – Production Lines

• Distributed Generation
  – Gas-Fired
  – Diesel (conditional)
  – Batteries
Who is Enrolling in Demand Response?

- **Commercial (Including Office, Restaurants, Lodging, Entertainment, Warehouses)**: 36%
- **Education**: 21%
- **Health**: 5%
- **Industrial / Manufacturing**: 5%
- **Miscellaneous**: 16%
- **Religious**: 2%
- **Retail**: 7%

Over 1,600 customers take advantage of DR incentives

- **City / Government**
- **Education**
- **Health**
- **Industrial / Manufacturing**
- **Miscellaneous**
- **Religious**
- **Retail**
- **Commercial (Including Office, Restaurants, Lodging, Entertainment, Warehouses)**
## DR Program Highlights

<table>
<thead>
<tr>
<th>Program</th>
<th>CSRPR</th>
<th>DLRP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capability Period</strong></td>
<td>May – September</td>
<td>May – September</td>
</tr>
<tr>
<td><strong>Number of Test Events</strong></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Test Event Duration</strong></td>
<td>1 hour</td>
<td>2 hours</td>
</tr>
<tr>
<td><strong>Average Number of Actual Events</strong></td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Event Duration</strong></td>
<td>4 hours</td>
<td>4-6 hours</td>
</tr>
<tr>
<td><strong>Total # of DR Event Hours</strong></td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total Annual DR Commitment**

~14 hours
### Incentive Rates

**Reservation Payment**

<table>
<thead>
<tr>
<th>CSRP Reservation Rates ($ / kW-month)</th>
<th>DLRP Reservation Rates ($ / kW-month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Other Regions</td>
<td>Tier 1</td>
</tr>
<tr>
<td>Westchester &amp; SI</td>
<td>Tier 2</td>
</tr>
<tr>
<td>$18</td>
<td>$18</td>
</tr>
<tr>
<td>$6</td>
<td>$25</td>
</tr>
</tbody>
</table>
**Incentive Rates**

**Reservation Payment**

- **100 kW pledge in Bowling Green (May – September)**

- **Reservation Payment**
  - **CSRP**: \[\$18/kW \times 100 \text{ kW} \times 5 \text{ months} = \$9,000\]
  - **DLRP**: \[\$18/kW \times 100 \text{ kW} \times 5 \text{ months} = \$9,000\]
  - Assumes 100% performance in all events
    - Lower performance will reduce reservation payment accordingly
Incentive Rates
Reservation Payment

Reservation Payment Example
100 kW Enrolled in CSRP & DLRP
100% Performance

- CSRP (Other Regions)
  - DLRP (Tier 2): $21,500

- CSRP (Other Regions)
  - DLRP (Tier 1): $18,000

- CSRP (SI & Westchester)
  - DLRP (Tier 1): $12,000
Incentive Rates

Performance Payment

• Performance Payment
  – 1 event (4-hour duration)
  – Assumes 100% performance
  – $1/kWh • 100 kW • 4 hours = $400

• Lower event performance will reduce reservation payments

<table>
<thead>
<tr>
<th>Performance Rates ($ / kWh)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservation</td>
<td>$1</td>
</tr>
<tr>
<td>Voluntary</td>
<td>$3</td>
</tr>
</tbody>
</table>
Eligibility Requirements

Metering

• Customer must have an interval meter or an AMI meter
  – All customers will have AMI by 2023
  – See the Con Edison Smart Meter website for more details

• Customers >500 kW Demand
  – Con Edison may provide an interval meter at no cost

• Customers <500 kW Demand
  – The customer is responsible for interval meter costs
Eligibility Requirements
Load Relief Pledge

How much can the customer pledge?

- Over 50 kW
  - Can enroll directly with Con Edison

- Under 50 kW OR Unsure
  - Can enroll with Aggregator
  - Can ONLY enroll with Aggregator

Enrolling Directly with Con Edison
- Receive full DR incentives
- Better for customers more experienced with DR

Enrolling with an Aggregator
- Can help customers develop tailored DR strategies
- Often bundle DR with other energy services
- Can enroll customers in NYISO DR programs
- Contract with customers for a portion of incentives
Enrollment Timeline

• Enrollment Deadline
  – All enrollments must be submitted by application deadline
  – Interval meters be installed by application deadline
  – Interval meters must be communicating by program start date

• Enrollments available in early March 2020 via DR Portal

<table>
<thead>
<tr>
<th>Enrollment Deadline</th>
<th>Program Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1, 2020</td>
<td>May 2020</td>
</tr>
<tr>
<td>May 1, 2020</td>
<td>June 2020</td>
</tr>
</tbody>
</table>
Summary

- Demand response is a temporary reduction in energy demand upon request
- Distribution Load Relief Program (DLRP)
  - Network grid reliability, 2-hour notification
- Commercial System Relief Program (CSRP)
  - Peak system load shaving, 21-hour notification
- Participate in both programs for maximum revenue
- Companies exist (aggregators) to help you enroll and perform
  - Get the list of approved aggregators at www.coned.com/DR
Competitive Procurement Plan

### 3-5 year competitive procurement with penalties

- Continue to operate a tariff program
- Offered at a premium or discount as appropriate based on most recent load forecasting
- Penalties for non participation

### Establish auto-DLM resource category

- Require higher performance factors
- Require stringent availability

### Orderly transition from Tier 2 to NWS

Stakeholder Engagement

• 9.11.2019 & 11.7.2019 Stakeholder Session

• Feedback:
  – Auto-DLM
    ▪ Communication through aggregators
    ▪ Respond to DLRP like events, within 10 minutes
  – Practical and financial considerations
    ▪ Procurements should be 18 months ahead of participation
    ▪ Enabling auto-DLM and energy storage will result in upfront costs
    ▪ The price certainty will ultimately bring down financing costs
  – More stringent requirements
    ▪ Require meaningful financial assurance tied to performance
    ▪ Penalties for failing to deliver
## Two New Similar Programs

<table>
<thead>
<tr>
<th></th>
<th>Day-Ahead-DLM</th>
<th>Auto-DLM</th>
</tr>
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<tbody>
<tr>
<td>Dispatch Criteria</td>
<td>Mandatory</td>
<td>Day-Ahead-DLM calls and/or 10 Minutes Notice + 88% forecast or DLRP Criteria</td>
</tr>
<tr>
<td></td>
<td>21 Hours Notice + 88% forecast or DLRP Criteria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 Minutes Notice + 88% forecast or DLRP Criteria</td>
<td></td>
</tr>
<tr>
<td>Incentive</td>
<td>Reservation (kW)</td>
<td>Rate per kW per year based on RFP response</td>
</tr>
<tr>
<td></td>
<td>Rate per kW per year based on RFP response</td>
<td>Rate per kW per year based on RFP response</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Performance (kWh)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Tiers</td>
<td>High</td>
<td>Identified in RFP</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Identified in RFP</td>
</tr>
<tr>
<td>Test Event</td>
<td>21 hours notice for 4 hours</td>
<td>10 minutes notice for 4 hours</td>
</tr>
<tr>
<td>Penalty</td>
<td>PF &lt; 80% declines at 2% per % below 80%</td>
<td>PF &lt; 80% declines at 2% per % below 80%</td>
</tr>
</tbody>
</table>
Deviations meant to provide reasonable flexibility and reflect commitment level

- Incentive set via RFP vs Tariff
- Call windows more flexible
- Day-Ahead dispatch option at lower threshold plus option to call with for contingencies
- Auto-DLM dispatched via automated dispatch signal
- 70% of contract paid after successful first year
- Financial assurance required
## Timeline

<table>
<thead>
<tr>
<th>Action</th>
<th>2021 Procurement</th>
<th>2022 Procurement</th>
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</thead>
<tbody>
<tr>
<td>1. Release RFP</td>
<td>October 2020</td>
<td>October 2020</td>
</tr>
<tr>
<td>2. Aggregators submit clarification questions</td>
<td>October 2020</td>
<td>October 2020</td>
</tr>
<tr>
<td>3. The Companies responds to clarification questions</td>
<td>October 2020</td>
<td>October 2020</td>
</tr>
<tr>
<td>4. Deadline for Aggregator enablement in the Company’s Oracle system</td>
<td>October 2020</td>
<td>October 2020</td>
</tr>
<tr>
<td>5. RFP response deadline</td>
<td>November 2020</td>
<td>November 2020</td>
</tr>
<tr>
<td>6. RFP award/notification</td>
<td>November 2020</td>
<td>November 2020</td>
</tr>
<tr>
<td>7. Contract execution date</td>
<td>January 2021</td>
<td>January 2021</td>
</tr>
<tr>
<td>8. Security requirement due for awarded Aggregations</td>
<td>February 2021</td>
<td>February 2021</td>
</tr>
<tr>
<td>9. Deficiency notification</td>
<td>N/A</td>
<td>December 2021</td>
</tr>
<tr>
<td>10. Early Exit Fee payment due</td>
<td>N/A</td>
<td>January 2022</td>
</tr>
<tr>
<td>11. Enrollment deadline</td>
<td>April 2021</td>
<td>April 2022</td>
</tr>
<tr>
<td>12. Capability Period start</td>
<td>May 2021</td>
<td>May 2022</td>
</tr>
</tbody>
</table>
Rider R Participation
Rider R topics

• Distributed Energy Resources (DER) at Con Edison
• Business models for DER
• Value of DER rates (VDER)
• The Value Stack
• Dual participation with Demand Response
DER at Con Edison

MW in-service

<table>
<thead>
<tr>
<th>Technology</th>
<th>MW in-service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>275</td>
</tr>
<tr>
<td>CHP</td>
<td>185</td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>20</td>
</tr>
<tr>
<td>Storage</td>
<td>8</td>
</tr>
</tbody>
</table>

# of customers in-service

<table>
<thead>
<tr>
<th>Technology</th>
<th># of customers in-service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>30,138</td>
</tr>
<tr>
<td>CHP</td>
<td>321</td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>39</td>
</tr>
<tr>
<td>Storage</td>
<td>47</td>
</tr>
</tbody>
</table>

MW in-queue

<table>
<thead>
<tr>
<th>Technology</th>
<th>MW in-queue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>215</td>
</tr>
<tr>
<td>CHP</td>
<td>117</td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>56</td>
</tr>
<tr>
<td>Storage</td>
<td>255</td>
</tr>
</tbody>
</table>

# in-queue

<table>
<thead>
<tr>
<th>Technology</th>
<th># in-queue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>4,678</td>
</tr>
<tr>
<td>CHP</td>
<td>166</td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>24</td>
</tr>
<tr>
<td>Storage</td>
<td>84</td>
</tr>
</tbody>
</table>

As of 12/31/19; CHP is not eligible for Rider R
Business models for DER

Mass Market
• For Residential (SC1) or Small Commercial (SC2) customers
• non-Demand billed Service Classes

Large Onsite
• For Large Commercial customers, including all demand-billed Service Classifications
• Credits apply to the Host Account’s Electric charges

Remote (RNM)
• Credits apply to the Host Account’s Electric charges
• Excess also applied to any number of “Satellite” Accounts
• Satellites must all be same entity as the Host

Community (CDG)
• Credits apply to Subscriber Accounts
• Minimum of 10 subscribers per Host; unless Host & all subscribers are on the same parcel
• No more than 40% of allocation to large accounts

Net Metering up to kW limit
Or Value Stack up to 5 MW

Net Metering up to 750 kW
Or Value Stack up to 5 MW

Value Stack up to 5 MW
Net Metering

- Volumetric bill credit equivalent to host $/kWh rates
- Primarily reduces $/kWh charges
- Excess credit carries over as a kWh credit to offset future kWh consumption

The Value Stack

- Monetary bill credit based on avoided costs & other incentives
- Usage behind the meter reduces $/kWh charges
- Excess credit carries over as a monetary value which offsets future Electric charges
- Grid export is valued and offsets all Electric charges
- Electric Energy Storage (e.g., batteries) eligible for Value Stack
- Available for NYPA customers
## The Value Stack

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>• Day Ahead Hourly LBMP</td>
</tr>
<tr>
<td>Installed Capacity</td>
<td>• Avoided NYISO ICAP</td>
</tr>
<tr>
<td></td>
<td>• May be credited per kWh or kW depending on generator type</td>
</tr>
<tr>
<td>Environmental</td>
<td>• NYSERDA REC or social cost of carbon</td>
</tr>
<tr>
<td>Distribution Relief Value (DRV)</td>
<td>• Utility’s avoided distribution costs</td>
</tr>
<tr>
<td></td>
<td>• Credited weekdays June 24 – Sept 15 during project’s CSRP call window hours</td>
</tr>
<tr>
<td>Locational System Relief Value (LSRV)</td>
<td>• Additional incentive in high load growth areas</td>
</tr>
<tr>
<td></td>
<td>• Resources will be called 10x per summer, min. performance during call event determines credit</td>
</tr>
<tr>
<td>Community Credit (CC)</td>
<td>• Additional credit for Community DG business model</td>
</tr>
<tr>
<td></td>
<td>• Available for certain technologies</td>
</tr>
</tbody>
</table>

### Illustrative rates for Solar PV

- **NEM for onsite SC 9**
- **Value Stack**
- **VS with CC**
- **VS with CC and LSRV**

- **Distribution**
- **Supply**
- **Environmental**
- **Capacity**
- **Energy**
- **CC**
- **DRV**
- **LSRV**
Value Stack and DR dual participation

• The Value Stack’s DRV and LSRV components compensate for Avoided T&D values

• Value Stack accounts can be enroll in Rider T programs **or** take DRV and LSRV, as applicable

• An account’s enrollment in Rider T represents a **one-time and irrevocable** decision to opt-out of DRV and LSRV

• A Value Stack customer’s enrollment in Rider T, either direct or via aggregator, will preclude the customer from receiving DRV and LSRV compensation for the remainder of the customer’s Value Stack term

• A Value Stack/DR dual participant is eligible for other Value Stack components (Energy, Capacity, Environmental, Community Credit; as applicable)
## Comparison of Distribution benefits in the Value Stack and in CSRP/DLRP

<table>
<thead>
<tr>
<th></th>
<th>Value Stack (Rider R)</th>
<th>DR (Rider T)</th>
<th>CSRP/DLRP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DRV</td>
<td>LSRV</td>
<td></td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Direct</td>
<td></td>
<td>Direct and Aggregators</td>
</tr>
<tr>
<td><strong>Eligibility</strong></td>
<td>Value Stack projects not on Rider T</td>
<td>Value Stack in high-value areas, not on Rider T</td>
<td>See Rider T</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Performance during preset days &amp; hours</td>
<td>Performance during events</td>
<td>Performance during Events</td>
</tr>
<tr>
<td><strong>Capability Period</strong></td>
<td>June 24 – September 15</td>
<td></td>
<td>May 1 – September 30</td>
</tr>
<tr>
<td><strong># of Events</strong></td>
<td>58 or 59 per season</td>
<td>10 per season</td>
<td>Variable</td>
</tr>
<tr>
<td><strong>Event criteria</strong></td>
<td>All non-holiday weekdays</td>
<td>System Forecast</td>
<td>System Forecast</td>
</tr>
<tr>
<td><strong>Performance measurement</strong></td>
<td>kWh Export</td>
<td>Minimum export during 4 hour event</td>
<td>kW reduction from baseline; including export if Value Stack</td>
</tr>
<tr>
<td><strong>Notice</strong></td>
<td>n/a</td>
<td>&gt; 21 hours</td>
<td>&gt; 21 hour Advisory</td>
</tr>
<tr>
<td><strong>Compensation</strong></td>
<td>Credits on Electric bill</td>
<td></td>
<td>Payment</td>
</tr>
</tbody>
</table>
Compensation for reduced import, export

Under dual participation, DR compensates Value Stack customers for reduced grid import and grid export.

Note: DR customers that participate in Rider R, including Value Stack, are restricted from performance payments.
Resources

• coned.com/solar
• coned.com/dg
• coned.com/rates
• nyserda.ny.gov
Gas Demand Response Pilot
Gas DR Pilot Objectives and Timelines

**Objective:** Incentivize customers to reduce natural gas demand during the coldest days of winter

Customers can participate by:
- Switching from gas to electric or CE steam
  **OR**
- Curtailing gas consumption for all or a portion of the event day

**Approved Timeline:** 2019/2020 winter season is the 2nd season of an initial 3-year offering
Pilot Eligibility

Firm service

Minimum enrollment value: 50 Therms

All Customer segments

Interval metering: One hour readings

No fuel switching to liquid fossil fuels
Eligible Zones

- Zones A and B are eligible
  - Zone A:
    - Central and Lower Westchester
    - North Bronx
    - North Manhattan
  - Zone B:
    - Queens
    - Southern Manhattan
### General Rules

<table>
<thead>
<tr>
<th>Rule</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capability Period</strong></td>
<td>November 1 - March 31</td>
</tr>
<tr>
<td><strong>Event Trigger</strong></td>
<td>18 F</td>
</tr>
<tr>
<td><strong>Notification Time</strong></td>
<td>Day-ahead: 21 hours in advance</td>
</tr>
<tr>
<td></td>
<td>Day-of: 2 hours in advance</td>
</tr>
<tr>
<td><strong>Call Window</strong></td>
<td>24-hour period (10:00 a.m. to 10:00 a.m.)</td>
</tr>
</tbody>
</table>
Possible Participation Strategies

Switch to Electric

Switch to CE Steam

Space Heating

Water Heating

Process Load

CHP

Note: If reduced use of CHP results in natural gas consumption of a different account changing, all impacted gas accounts must be enrolled in the program.

No fuel switching to liquid fossil fuels!
Thank You!

For more information, contact us at DR@coned.com
Residential Demand Response Program

Bring Your Own Thermostat (BYOT)
Bring Your Own Thermostat (BYOT)
Central A/C Program

Operations Overview
• **Devices:** Honeywell Home (includes Company-Provided Thermostats), Google Nest
• **Incentives:** $85 upfront, $25 3-year participation bonus, $75 extra in NWS areas
• **Event-Calling:** CSRP, DLRP

<table>
<thead>
<tr>
<th>2019 Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enrolled Thermostats</strong></td>
</tr>
<tr>
<td>35,000</td>
</tr>
</tbody>
</table>

2020 Strategy
• Integrate additional manufacturers
• Increase BYOT-only marketing
• Test event-calling strategies
• Consider how AMI rollouts will create additional opportunities for residential Demand Response
C&I Program Overview & Eligibility

Incentives available for efficient equipment that reduces annual electric and gas energy use in existing buildings.

**Commercial Customers**

- Must be a Con Edison customer with active commercial account

**Con Ed Account type**

- Electric: Must have an average billed demand over **100kW**
- Gas: Firm or Interruptible (NEW!)
C&I 2019 Accomplishments

$21+ million incentives

95+ million kWh annual savings

113,000+ dth annual savings

Equates to...

73,150 Metric Tons of CO2
Program Highlights

• Program Deadline
  – Projects must be completed by November 15th 2020

• Higher Incentive Rates for Electric and Gas Measures
  – Increased Incentive levels per measure
  – Cover up to 70% of project cost

• Participating Contractor Tools - Incentive Navigator Updates
  – 2020 Measures Available
  – Helpful Tools and Tips
  – Q1 Up Coming Updates

• Additional detailed requirements are listed on our website
  – www.coned.com/largecommercial
Future Webinars

• Q1– Multiple Webinars
  – 2nd Kick Off Webinar – Feb 28th
  – Steam Trap & Linear Pipe Insulation Project Submission Process – March 5th
  – Incentive Navigator, Estimator and Scheduler
  – Participating Contractor Training
Thank You!

C&I Inquiries Email
commercial@coned.com

Website
ConEd.com/largecommercial

Incentive Navigator
Incentivenavigator.coned.com
Advanced Metering Infrastructure (AMI)
Smart Meter Project Overview

• Full scale AMI implementation
  – 4.8 million meters
  – 3.6 million electric & 1.2 million gas meters
  – Cost of project: $1.285 billion

• Meter installation status
  – Approx. 2.8 million meters installed
  – Mass deployment completed in:
    • Staten Island
    • Westchester
    • Rockland and NJ (O&R)
## Deployment Plan

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- Grey: AMI Meter Rollout
- Dark grey: AMI Accelerated Rollout
Communications Network

- Relays, Access Points (APs)
- Socket AP
Electric Smart Meters

- Communicate with communication network devices as well as other smart meters
- Relay regular interval reads and a daily register read
- Collects:
  - ✓ 15 Minute usage data for residential customers*
  - ✓ 5 Minute usage data for commercial customers*
    - ✓ Transmitted every 15 minutes*
  - ✓ Voltage data
  - ✓ Outage data
  - ✓ Diagnostic notifications ("events and alarms")
- Does not collect:
  - ✗ Customer identifying information
  - ✗ Usage data on individual appliances or lights
Smart Gas Modules

• Generally attached to existing gas meters

• Record hourly interval gas readings
  – 24 interval reads per day
  – One register read at midnight

• Wake to transmit once per day
  – Battery life
  – Not part of the mesh network
  – Estimated 20-year battery life
Enables Digital Customer Experience, and REV goals

Customer Convenience

Reduced Operating Risk

Future Operating Benefits

Enabled Electricity Market
  • Foundation for demand response growth

Environmental Benefits
  • Reduced CO2 emissions & fuel consumption
Natural Gas Detector

• First-of-its-kind device
• Monitors the atmosphere near where gas service enters a building.
• Detects as little as 10% of the Lower Explosive Limit (LEL) of methane gas
• Audible alarm when triggered
• Uses AMI communications network to send a ticket to the Con Edison Gas Emergency Response Center (GERC), who will notify the fire department to respond jointly
• Pilot program began in October 2018. 8000 units in Westchester, 1000 in Manhattan.
• Full deployment to begin in 2020
Green Button Connect
Green Button Overview

• Launched in 2012 as a national data sharing standard
• Provides customers with easy access to their energy usage data in consumer-friendly and computer-friendly format
Share My Data

• Available Data
  ➢ Meter Number
  ➢ Energy or Net Energy Usage (kWh, net kWh, ccf)
  ➢ Reactive Power (kVAR)
  ➢ Total Electric Utility Bill Cost for current billing period
  ➢ Total Gas Utility Bill Cost for current billing period
  ➢ ICAP Tag
  ➢ Billing History (total electric and gas utility bill cost for previous bill periods)

<table>
<thead>
<tr>
<th>Customer Category</th>
<th>Usage Data Available</th>
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</thead>
<tbody>
<tr>
<td>Electric Commercial Customers with AMI Meters</td>
<td>5 minute intervals</td>
</tr>
<tr>
<td>Electric Residential Customers with AMI Meters</td>
<td>15 minute intervals</td>
</tr>
<tr>
<td>Electric Customers with Legacy Interval Meters*</td>
<td>15 minute intervals</td>
</tr>
<tr>
<td>All Gas Customers with AMI Meters</td>
<td>1 hour intervals</td>
</tr>
<tr>
<td>All customers with Non-interval Meters</td>
<td>Monthly</td>
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</tbody>
</table>
Share My Data

• Third-Party Registration/Technical Onboarding
  – Submit online registration form
  – Data Security Agreement must be signed
  – Self-Attestation
  – Technical Onboarding
  – Once completed Third Party will be:
    ▪ Listed for customers to see as a DERS option in My Account
    ▪ Ready to receive customer data
Con Edison Demand Response Management System
Agenda

1. We’ve Heard Your Feedback

2. Overview of Demand Response Portal
   • User Access
   • Account Lookup
   • Enrollments
   • Geospatial Maps
   • Events
   • Settlements
   • APIs

3. DR Forum Booths
We’ve heard your feedback

Most requested features

• More comprehensive account lookup tool with meter status
• Retain copy/paste from Excel as it’s the most common method of interaction
• Text messages and M2M dispatch signals would be useful enhancements to event notifications
• Learn from NYISO DRIS e.g. make everything exportable and intuitive

80%+ of survey respondents would utilize APIs if they were available
Overview of Demand Response Portal
Single Sign On

What’s New

• Single Log In for all Con Edison Applications

• Multi-Factor Authentication
  • Increased Security
  • Customer Protection
Configuring Users: We’ll be taking feedback for additional roles

What’s New

• Defined aggregator user roles – Admin & Operations

To come

• Additional roles: Finance, Engineering, Facility Ops
• Based on Stakeholder feedback
Account Lookup (New):

What’s New

• Identify any account, network, CSRP call-window, DLRP tier, and meter information

• AMI Meter accounts automatically added in enrollment process
Major changes to Enrollments

Minimum enrollment now 10 watts instead of 1 kilowatt

Bulk upload via excel & CSV
Enrollment Submission (New)

What’s New

• Enroll customers: manually, copy/paste, file upload

• Individual resources enrolled as asset: better reporting & forecasting

• More detailed information on enrollment status & issues
Portfolios Enrollments (New)

What’s New

• Customer accounts can be assigned to portfolios
Greater Accuracy with Geospatial Map (New)

What’s New

- Geospatial mapping to locate enrollments and customers by network
Event Scheduling & Handling

What’s New

- Scheduled events menu with interactive feedback to confirm participation and provide notes to improve operational reporting / availability estimates

- Fast-polling AMI Meters instead of MV90 Legacy Meters
  - See more data sooner
Event Performance Graph
Event Notifications

What’s New

• Text (need carrier)

• HTTP push message (to web service endpoint)

Still Available:

• Phone call

• Email
Settlements

Live

• Excel file uploads like current process

Future

• More detailed screens
• Backup information to validate & identify aggregator results
All functionality available via APIs

Built to Scale with APIs

10K Legacy Meters

5M AMI Meters
All functionality available via APIs

Built from ground up
Overview of APIs
Booths at 2020 DR Forum

Booth A + B – DR Portal Functionality
Booth C + D – DR Portal API’s
Booth E – AMI, DCX, DR
Booth F – NWS, NPS
Booth G – Refreshments

Visit our booths: Each have different focus area
Questions? Visit a booth or email: DR@coned.com