Con Edison

Energy Storage Activities

June 15, 2015

EIA Conference
Con Edison Energy Storage (ES)

Presentation Overview

• Introduction to Con Edison
• Potential benefits of storage on our system
• Unique urban challenges
• Con Edison storage related activities
• Going forward
## Con Edison: Overview

<table>
<thead>
<tr>
<th></th>
<th>Customers</th>
<th>Infrastructure</th>
<th>Service Territory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electric</strong></td>
<td>3.4 million</td>
<td>One of the world's largest underground electric systems</td>
<td>All 5 boroughs of NYC and Westchester County</td>
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<tr>
<td><strong>Gas</strong></td>
<td>1.1 million</td>
<td>4,333 miles of gas mains &amp; services</td>
<td>3 out of the 5 NYC boroughs &amp; Westchester County</td>
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<tr>
<td><strong>Steam</strong></td>
<td>1,700</td>
<td>Largest district steam system in the world</td>
<td>Manhattan below 96th Street</td>
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- In Manhattan, up to 70,000 customers/sq mile; 2,000 MW/sq mile
- Our customers create about 4% of U.S. GDP – home to ~10% of Fortune 500 Companies
Con Edison System Load Characteristics

<table>
<thead>
<tr>
<th>Load Range (MW)</th>
<th># of Hours</th>
</tr>
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<tbody>
<tr>
<td>3,001</td>
<td>4,000</td>
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<tr>
<td>4,001</td>
<td>5,000</td>
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<td>5,001</td>
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<td>6,001</td>
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<td>11,000</td>
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<td>11,001</td>
<td>12,000</td>
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<td>12,001</td>
<td>13,000</td>
</tr>
<tr>
<td>13,001</td>
<td>13,322</td>
</tr>
</tbody>
</table>

Load (MW)

Hours of the Year (2013)
Animated Illustration of Network Load Changes

Peak Day Loads by Network

Manhattan Networks

Hour 24

% of Network Peak

0.5000

1.0000

AM
Animated Illustration of Network Load Changes

Peek Day Loads by Network

Manhattan Networks

Hour 24

% of Network Peak

0.5000
1.0000

AM
NYC Neighborhoods Use Electricity Differently

June 24th, 2013

System Peak: 4-5 pm

Eastern Queens

Central Brooklyn

Midtown Manhattan
Why is Con Edison Interested in Energy Storage?

• Improved Asset Utilization
  – Peak Shaving
  – Infrastructure Deferral
• Integration of Solar
• Ancillary Services
Cost is One Consideration

- Cost
- Power Density
- Energy Density
- Safety
- Cycle Life

Storage Device Characteristics
Energy Storage Challenges in New York City

• Limited Space
  – High value real estate

• Installation Challenges
  – Existing infrastructure
  – Complex construction projects
  – Specialized labor force

• Permitting
  – Fire Department of NY
  – NYC Department of Buildings
Innovating Solutions: Brooklyn-Queens Demand Management Program

Deferral of $1 billion in traditional network upgrades with distributed solutions

- Meets capacity shortfall through a $200 million program
- Energy Storage is included as part of both utility & customer-sited solutions
  - 1 MW Con Edison owned battery Integrated into our distribution system
  - Additional customer-sited solutions
Additional Con Edison Storage Activities

• Indian Point Contingency Plan
  – Targeted 125 MW of permanent peak demand reduction in the Con Edison service territory by 2016
  – Includes battery & thermal storage incentives for large customers

• Demonstration Projects
  – Transportable Energy Demonstration System (TEDS)
  – CCNY Nickel Zinc Battery
  – EOS Zinc-Air Battery Demonstration
  – Molten salt energy storage feasibility study
Going Forward

• Challenges & Opportunities
  – Grid integration ready
  – Competitively priced options
  – Uniform performance protocols and standards
  – Engaging customer-sited solutions
  – Reforming the Energy Vision Proceeding
Q&A