The Evolution and Future of the Con Edison Steam System

October 21, 2022
Agenda

• Steam System Overview
  • History
  • Current System
  • Customer Base and Uses
  • Benefits
  • Distribution Overview

• Future Outlook
  • Current Policies and Regulations
  • Clean Energy Commitment
  • Steam LRP Vision
  • Business Trajectory
  • Projected Emissions
  • Technologies and Strategies

• Questions
Steam System Overview
Con Edison Steam – Rich in History
STEAM SYSTEM OVERVIEW

Con Edison Steam System Overview

- 1600 customers
- 105 Miles of pipe
- 700MW Electric Capacity
- 11.4 million lb/hr Steam Capacity
- 125 psi to 180 psi operating range

- 59th Street Station
- 74th Street Station
- Ravenswood Station via Tunnel
- 60th Street Station
- BNYCP Contracted via Tunnel
- East River Station
Generating Assets

STEAM SYSTEM OVERVIEW

- Boiler
- Treated Water
- Steam Sendout
- Steam Turbine
- * Unit 7
- * Unit 6
- Electric Output
- Generator
- Gas Turbine
- HRSG
- Treated Water
- Steam Sendout
- Generator
- Electric Output
- Steam to Turbine
- Steam Sendout
# Steam Customer Base

## Steam System Overview

<table>
<thead>
<tr>
<th>Building Types</th>
<th>Building Qty</th>
<th>% of Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial (Offices)</td>
<td>590</td>
<td>45.4%</td>
</tr>
<tr>
<td>Residential</td>
<td>551</td>
<td>25.0%</td>
</tr>
<tr>
<td>Commercial (Other)</td>
<td>200</td>
<td>9.0%</td>
</tr>
<tr>
<td>Hospitals</td>
<td>39</td>
<td>8.2%</td>
</tr>
<tr>
<td>Commercial (Hotels)</td>
<td>86</td>
<td>5.9%</td>
</tr>
<tr>
<td>Educational Facilities</td>
<td>71</td>
<td>3.7%</td>
</tr>
<tr>
<td>Museums</td>
<td>17</td>
<td>2.6%</td>
</tr>
<tr>
<td>Religious Facilities</td>
<td>33</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

- Each account has a dedicated Account Manager
- Strong relationship with developers
- Provide customer education and training
STEAM SYSTEM OVERVIEW

Steam Customer Uses

1. Metering/PRV Station
2. Energy Production
3. Heat/Hot Water Distribution Systems
4. Domestic Hot-Water Systems
5. Air-Conditioning
6. Condensate Collection and Reuse
7. Dry Cleaning
8. Cafeteria/Kitchen
9. Food Processing
10. Lab/Hospital
11. Cleaning
12. Recovered Space
13. Humidification
Benefits of the Steam System

**Enhances Building Market Value**
- Saves building real-estate space
- Avoids need of tall stacks
- Assists with LEED/Energy Star’s Portfolio Manager ratings

**Provides Cleaner Energy**
- No local emissions for customer building
- Uses cogeneration (approx. 60%)
- Predominately uses natural gas (approx. 97%)
- Uses environmental controls uneconomic for individual buildings

**Efficiency of a Centralized System**
- Maintains a stable year-round efficiency by aggregating loads
- Capable of integrating various emerging technologies
- Centralized investments benefit all customers uniformly
Recently Added Customers
Steam System Future Outlook
Current Policies and Regulations

NY State Climate Leadership & Community Protection Act (CLCPA)
- Reduce statewide GHG emissions 85% by 2050 from 1990 level across all sectors and achieve net zero emissions
- Achieve a zero emissions electric system by 2040

NYC Local Law 97
- Requires all city buildings greater than 25,000 sq. ft. to meet occupancy code specific greenhouse gas emission rates
- Subject to annual penalty if out of compliance
Pillar 4
Initiative 1: Reduce the carbon footprint of our steam system (about 85% of our Scope 1 emissions) via energy efficiency; low-carbon fuels; electrification of boilers with clean energy; carbon capture and sequestration; carbon offsets; among other methods.
Steam Long Range Plan Vision

1. **Continue to strengthen** NYC’s energy resiliency
2. **Maintain utilization** of system through decarbonization and customer education
3. Fully **support** city and state and work with stakeholders to reach emissions goals
4. Assess and invest in decarbonization technologies that are **cost effective**
5. Committed to **core investments** to continue delivering clean, safe and reliable service
6. Support voluntary **electrification** and develop **energy efficiency** programs
Steam Operations Projected Emissions

STEAM SYSTEM FUTURE OUTLOOK

STEAM METRIC TONS OF CO₂ (1000)

STEAM METRIC TONS OF CO₂ (1,000)

- Carbon-free electric grid
- Reduce via carbon offsets
Steam can enable a clean energy future by using low carbon fuels, integrating innovative technologies, and supporting customer energy efficiency.

**Potential Technologies and Strategies**

**Short-Term Efforts**
- Variance Reduction
- No 2. Oil Conversion
- Station Pressure Reduction
- Energy Efficiency Programs

**Mid-Term Efforts**
- Hot Water Systems
- Low Carbon Fuels
- Industrial Heat Pumps
- Waste Heat Recovery Sources
- Geothermal
- Carbon Offsets

**Long-Term Efforts**
- Electric Boilers
- Energy Storage
- Carbon Capture
## STEAM SYSTEM FUTURE OUTLOOK

### Main Technologies – Low Carbon Fuels

<table>
<thead>
<tr>
<th>Low Carbon Fuels</th>
<th>Opportunities</th>
<th>Challenges</th>
<th>Pilot Project</th>
</tr>
</thead>
</table>
|                  | • Focus on Green Hydrogen  
|                  | • All current units able to burn hydrogen with modifications | • Robust safety measures  
|                  | | • NOx emission rate higher compared to NG  
|                  | | • Contract opportunities  
|                  | | • Infrastructure & fuel costs  
|                  | | • Developing potential NYC H₂ hub concepts  
|                  | | • Potential electrolysis pilot at one site |
### STEAM SYSTEM FUTURE OUTLOOK

# Main Technologies – Electric Boilers

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Challenges</th>
<th>Pilot Project</th>
</tr>
</thead>
</table>
| Electric Boilers | • Readily available  
• Established technology | • 50 MW per 150 Mlb/hr unit  
• Green electric supply | • One or more units at two potential sites |

[Diagram of Electric Boilers]
### Main Technologies – Industrial Heat Pumps

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Challenges</th>
<th>Pilot Project</th>
</tr>
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</table>
| • Opportunities at all stations  
• Supports electric transmission cooling needs  
• Potential expansion to customer cooling and thermal energy storage | • Green electric supply | • Pilot for feedwater preheating at one site |

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**Industrial Heat Pumps**

- Green electric supply
- Pilot for feedwater preheating at one site
STEAM SYSTEM FUTURE OUTLOOK

Recent Steam Communications

Con Edison Clean Energy Commitment

Con Edison Steam Press Release

Con Edison Long Range Plans

NY1 Report on the future of Con Edison Steam

Con Edison Podcast on future of the Steam System

Bowery Boys Podcast on NY Steam System

Brief video description of NY Steam System