Facility Repowering Project
March 2019
Danskammer Energy – Existing Operations

- Built in the 1950s and originally fueled by coal
- Converted to oil and natural gas during the 1980’s and 1990’s

- Operating natural gas plant
- Provides capacity reliability and peak generation response to NYISO
- Current capacity factor <5% annually
- Expected to increase significantly post IP closure
Project Overview: Complementing NY Renewable Growth

- The new facility will:
  - Power more than 500,000 New York homes and businesses
  - Reduce emissions per megawatt hour of generation
  - Use air cooled condensers to eliminate use of Hudson River water for cooling
  - Provide NYISO with quick start, fast ramping generation when wind & solar aren’t available
  - Provide significant economic benefits to surrounding communities
  - Studying feasibility and economics of solar and batteries on site
Proposed Site Configuration – Smaller Footprint

Key Components:

1. Gas turbine
2. Heat recovery steam generator
3. Steam turbine
4. Air cooled condensers
Proposed Site Configuration – Existing Infrastructure

Key Components:

1. Gas turbine
2. Heat recovery steam generator
3. Steam turbine
4. Air cooled condensers.
Benefits

- Over $50 million in property and school taxes over next 20 years
- Over $100 million spent locally during construction
- Provides ~40 local high-paying operations jobs
- More than 400 union construction jobs
# Existing vs. Repowered Facility

<table>
<thead>
<tr>
<th>Existing</th>
<th>Repowered</th>
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<tbody>
<tr>
<td>➢ Significant start times (11 hours)</td>
<td>➢ Rapid start (less than 10 minutes)</td>
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<tr>
<td>➢ Less efficient / higher emissions</td>
<td>➢ 80-90% emissions reduction</td>
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<tr>
<td>➢ Uses Hudson River for cooling</td>
<td>➢ Requires 50% less natural gas</td>
</tr>
<tr>
<td>➢ Higher electricity cost</td>
<td>➢ No use of Hudson River water</td>
</tr>
<tr>
<td>➢ Difficulty supporting renewables</td>
<td>➢ Lower cost electricity</td>
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<td>➢ Backs up renewables</td>
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Using the existing brownfield site provides key environmental advantages
**We estimate the new technology used in the plant would reduce emissions on a PER HOUR basis as follows:**

- 95% reduction in NO$_x$ emissions
- 88% reduction in CO emissions
- 85% reduction in VOC emissions
- 75% reduction in PM-10 emissions
- 47% reduction in heat rate from 11,838 Btu/KW-hr for the existing steam plant to 6,300 Btu/KW-hr
- 40% reduction in CO$_2$e emissions from 1,490 lb/MW-hr for the existing steam plant to 900 lb/MW-hr for the combined cycle plant

**This graph has been prepared based on modeling from existing generation that uses the same technology Danskammer will use. Additional air quality emissions modeling will be verified by independent third party analysis.**
Renewable Generation Progress for NY

NYISO Data 2006-2017

• **Renewable Breakdown**
  - 2006: ~21%
    - Hydro 19%
    - **Wind <1%**
    - Other 2%
  - 2011: ~24%
    - Hydro 20%
    - **Wind 2%**
    - Other 2%
  - 2017: ~28%
    - Hydro 23%
    - **Wind 3%**
    - Other 2%
NY Renewable Challenges

- Low capacity factor for wind (26% avg.) and solar (14% avg.)
- Space for renewable energy mostly in rural upstate areas
  - Heavy bird migration pathways in best wind locations
- Lack of existing transmission to transport energy downstate hinders renewable progress
- To produce ~300 MW of wind takes 28,000 acres, 9 miles of roads

Source: NYISO 2018 Power Trends Report
Article 10 Timeline

Construction Will Take Approximately 30 Months After Final Approval

- May 2018: Public Involvement Program Filed
- Feb 2019: Preliminary Scoping Statement Filed
- Mid 2019: Article 10 Application Filed
- Mid 2020: Potential Construction Phase
- Late 2019: Public Hearings
- Mid 2019: Studies Conducted
- Dec 2018: Open Houses Held

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Article 10 Planned Studies

- Wetlands delineation
- Traffic counts and analysis
- Noise monitoring and modeling
- Cultural resource consultations
- Visual simulations and analysis

- Air emissions modeling
- Economic modeling
- Electric System Impacts
- Electric interconnection system impacts and reliability
Questions?