Resource Assessment and Determination
Pursuant to
Executive Order 59/
June Special Session Public Act 17-3
SIPRAC Presentation

Department of Energy and Environmental Protection and
Public Utility Regulatory Authority

February 8, 2018
The Order and legislations required DEEP and PURA to conduct an appraisal of nuclear power generating facilities.

DEEP and PURA were required to make determination of whether to conduct a procurement for nuclear power generating facilities and other zero carbon resources.

The final assessment was completed on February 1, 2017.
Process

• On August 2nd DEEP and PURA opened dockets

• DEEP and PURA retained the consultant services of Levitan & Associates, Inc. (LAI) to model and analyze Millstone's economic viability

• On December 14, 2017 DEEP and PURA issued a Draft Report

• DEEP and PURA held two public meetings and received 553 public comments on the findings in the Draft Report

• DEEP and PURA issued a Draft Resource Assessment and Determination issued on January 22, 2018

• DEEP and PURA received further comments on the draft and issued the Final Resource Assessment and Determination on February 1, 2018.
Information Requests to Dominion

- On August 15, 2017 DEEP and PURA issued thirty data requests to Dominion aimed at understanding the going forward costs and risks to the Millstone Station.

- Dominion provided responses on September 1st and 19th, providing public information and declining to provide “commercially sensitive information.”


- On January 10, 2018, Dominion submitted a more detailed document with forward looking financial projections.

- Dominion did not provide audited financial data regarding verifiable projected costs and expected revenues of Millstone.
Structure of Report

The Report provides:

1. Background on nuclear generation, the New England electricity sector, and Connecticut’s relevant environmental and energy public policies;


3. A summary of the results from the LAI assessment of economic and emission implications;

4. A discussion of policy options going forward; and

5. Final Determination and Recommendation.
Background


• In August 2000, Dominion Resources purchased Millstone for approximately $1.3 billion from CL&P.

• Ratepayers paid an additional $2.1 billion to UI CL&P for the stranded costs incurred by the utilities.

• Dominion has invested an additional $1.1 billion of capital since acquiring the station.
Connecticut GHG Reduction Targets

- Global Warming Solutions Act (GWSA) sets mandatory economy-wide GHG emissions reduction targets of 10% below 1990 levels by 2020 and 80% below 2001 levels by 2050
- Zero-carbon nuclear power is critical to meeting Connecticut’s targets.
Wholesale Energy Markets

- The wholesale electricity markets are designed to procure resources that are least cost without giving undue preference to any particular technology.

- Natural gas fired generation has become the most prevalent source of energy setting the price of electricity 75% of the time.

- In a deregulated market, it is up to each merchant generator to determine what return on investment is necessary to justify the continued operation of their generation assets.

Source: ISO-New England Regional Electricity Outlook, 2017
Nuclear units are “infra-marginal” units, which means that their marginal costs are lower than the hour price of the energy market.

Many of other older existing plants have the opposite situation with low fixed costs and high marginal costs.

Nuclear units are highly sensitive to energy prices.

The low price of natural gas is keeping energy prices low, while constraints on gas create volatility that neither Millstone nor customers like.

Source: ISO-New England Regional Electricity Outlook, 2017
Retirement Options

• A retirement decision is made about four years in advance through the Forward Capacity Market


• If Millstone were to decide to retire, under current rules, the ISO would not find that there is a reliability problem.

• Once Millstone submits a decision to retire, under current rules, there is very limited options for the State to take them off the retirement path.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Location</th>
<th>Size</th>
<th>Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brayton Point Station</td>
<td>Somerset, Mass.</td>
<td>1,535 MW</td>
<td>Coal &amp; oil</td>
</tr>
<tr>
<td>Salem Harbor Station</td>
<td>Salem, Mass.</td>
<td>749 MW</td>
<td>Coal &amp; oil</td>
</tr>
<tr>
<td>Pilgrim Nuclear Power Station</td>
<td>Plymouth, Mass.</td>
<td>677 MW</td>
<td>Nuclear</td>
</tr>
<tr>
<td>Vermont Yankee Station</td>
<td>Vernon, Vt.</td>
<td>604 MW</td>
<td>Nuclear</td>
</tr>
<tr>
<td>Norwalk Harbor Station</td>
<td>Norwalk, Conn.</td>
<td>342 MW</td>
<td>Oil</td>
</tr>
<tr>
<td>Mount Tom Station</td>
<td>Holyoke, Mass.</td>
<td>143 MW</td>
<td>Coal</td>
</tr>
</tbody>
</table>

Source: ISO New England
Levitan & Associates, Inc. Findings
Financial Condition of Millstone

- Levitan & Associates, Inc. (LAI) performed detailed simulation modeling of the New England wholesale energy market under several scenarios.
  - Reference case
    - Continued investment in energy efficiency, RGGI continues to tighten cap, Massachusetts procurements assumed, CT RPS expanded to 30% by 2030.
  - High and Low natural gas prices,
  - High clean energy build-out

- Without access to the books, LAI built up unit specific costs and operating information using public records.
Partial years of operation in 2021 and 2035 are not shown. CapEx for 2018-2021 is excluded in this chart, but is critical to continued operation after May, 2021.
Present value cash flows include CapEx outlays from 2018 forward and operating cash flows from June 1, 2021 through May 31, 2035. All cash flows are discounted to May 31, 2021 at 7.00% per year.
Millstone Late Filing

• Although received very late in this proceeding, and in considering comments on the Draft Report, DEEP and PURA evaluated the Dominion submission by conducting a series of high-level sensitivity scenarios, in which the LAI cost assumptions were adjusted using the alternative cost proxies, and in which rough assumptions on the impact of the recent federal tax law changes were applied.

• These sensitivity scenarios suggested that, if accurate, the cost assumptions asserted in Dominion and others’ comments could have a significant impact on Millstone Station’s profitability, such that the financial viability of Millstone’s continued operation could be at risk.

• More detailed and auditable financial data is necessary to verify the accuracy of actual costs to warrant concluding the Millstone Units are at risk.
LAI reviewed three hypothetical scenarios to replace Millstone if it were to retire:

1. The New England wholesale market would compensate for the loss of Millstone with the addition of new merchant gas-fired capacity ("0% Replacement Case");

2. EDCs contract for renewable energy and demand side management resources to compensate for a 1/4 of the lost Millstone energy ("25% Replacement Case") (Connecticut’s approximate load share of Millstone); and,

3. EDCs contract for renewable energy and demand side management resources to compensate for the full output of the lost Millstone energy ("100% Replacement Case").
25% Replacement Case:
- 1,206 MW of Connecticut Utility-Scale Solar
- 339 MW of Energy Efficiency and Passive Demand Response
- Increase in reliance on natural gas generation

100% Replacement Case:
- 1000 MW of imported clean energy
- 2412 MW of Connecticut Utility Scale Solar
- 677 MW of Energy Efficiency and Passive Demand Response
- 372 MW of off-shore wind

0% Replacement Case
- Significant increase in reliance on natural gas generation

None of the study cases considered the feasibility of siting or constructing the replacement technologies.
Levitan & Associates, Inc. Findings
CO2 Scenario Emissions

Connecticut Department of Energy and Environmental Protection
Levitan & Associates, Inc. Findings
Financial Condition of Millstone

[Graph showing present value of differential cost (benefit) in millions for different replacement cases, with EE/PDR Participant Benefit, EE/PDR Participant Cost, EE/PDR Utility Cost less energy benefit, OSW Net Energy and REC Cost, Solar Net Energy & REC Cost, Hydro Net Energy Cost, Transmission Cost, REC Cost-to-Load, Capacity Cost-to-Load, Energy Cost-to-Load, and Total Net Cost.]
Economic Benefits of Millstone

LAI found that continued operation of Millstone creates in-state annual outputs of $350.7 million (2017 dollars) through 2032 before tapering down for a total present value of $4.2 billion from 2018 to 2040.

An analysis by the NEI states that Millstone provides economic benefits of about $1.3 billion in Connecticut and another $1.3 billion to the rest of New England.

Millstone employs approximately 1100 workers (average salary about $167,000) and around 400 more contractors in one capacity or another.

CHMURA Economics & Analytics Report found that direct and secondary employment amounted to 3,900 jobs.
Policy Options

• DEEP and PURA briefly discuss a few mechanisms available to ensure important policy resources are built and retained:
  • Purchase Power Agreement (PPA)
  • Zero-emission Energy Credit (ZEC)
  • Multi-state options
    • PPA
    • ZEC
    • Carbon Adder within New England only (in addition to RGGI)
    • Dynamic Forward Clean Energy Market
Determination

• Under the initial LAI analysis, the Millstone Nuclear Units are profitable under expected market revenues through 2035.

• The finding that the Millstone Nuclear Units are viable and/or unlikely to retire is uncertain.

• The Millstone nuclear units provide significant value to Connecticut and to the entire New England region.

• Additional or new zero emission generating resources provide value to Connecticut and the New England region.

• Existing zero emission electricity generating resources provide benefits to Connecticut.

• The competitive solicitation process under June Special Session Public Act 17-3 is a reasonable mechanism through which to determine if it is in the interest of ratepayers to secure the value offered by new and existing zero emission resources.
DEEP will conduct a procurement or procurements for new and existing zero carbon generation facilities, according to the following conditions:

- **New Resources** will be scored based on both price and non-price criteria, as is typical with other DEEP resource procurements.

- **Existing Resources** which are not newly delivered to the ISO New England, are eligible to bid into the procurement.
  - Existing resources are assumed to be part of “reference” set of generation resources; their bids will only be scored based on price only and not on non-price benefits.

- **Existing Resources Confirmed at Risk** may elect to provide to DEEP and PURA credible evidence, such as audited financials, sufficient to support a finding that the resource will likely retire without ratepayer support, then the resource may be deemed an “existing resource confirmed at risk.”
  - Existing resources confirmed at risk are not assumed to be part of “reference” set of generation resources and will be scored based on price and non-price benefits.