Industry Perspective: Overcoming Revenue Challenges

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Chief Operating Officer CENG
Exelon Generation
About Us

EXC
Exelon is headquartered in Chicago and trades on the NYSE under EXC.

Exelon is the #1 utility company on the FORTUNE 500 (#89 overall).

Exelon is America’s #1 zero-carbon nuclear energy provider.

$31.4B
Operating revenue in 2016

Presence in 48 states
Exelon is a FORTUNE 100 company that works in every stage of the energy business: power generation, competitive energy sales, transmission and delivery.

10M
Electric and natural gas utility customers
Exelon’s Constellation business serves approx. 2.2 million residential, public sector and business customers.

Exelon was named to Fortune magazine’s 2017 list of the “World’s Most Admired Companies.”

33,300
Megawatts of total power generation

20,200
Megawatts of nuclear generation

Learn more about our family of companies

Want to learn more? Download our Fact Sheet.
U.S. Nuclear Energy Market
A Nuclear Operator’s View
Economic Challenges to Nuclear Energy

- Rising nuclear costs
- Flat electricity demand
- Increase in Natural gas supply
- Lack of Carbon policy
- Aging transmission System constraints
## Premature Nuclear Plant Shutdowns

<table>
<thead>
<tr>
<th>Plant</th>
<th>MWe</th>
<th>Reason</th>
<th>Closure Year</th>
<th>Latest Electricity Generated (bkWh/year)</th>
<th>Latest CO2 Emissions Avoided (million tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystal River 3</td>
<td>860</td>
<td>Mechanical</td>
<td>2013</td>
<td>7.0</td>
<td>5.3</td>
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<tr>
<td>San Onofre 2 &amp; 3</td>
<td>2,150</td>
<td>Mechanical</td>
<td>2013</td>
<td>18.1</td>
<td>8.8</td>
</tr>
<tr>
<td>Kewaunee</td>
<td>566</td>
<td>Market</td>
<td>2013</td>
<td>4.5</td>
<td>4.8</td>
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<tr>
<td>Vermont Yankee</td>
<td>620</td>
<td>Market</td>
<td>2014</td>
<td>5.1</td>
<td>2.7</td>
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<tr>
<td>Fort Calhoun</td>
<td>479</td>
<td>Market</td>
<td>2016</td>
<td>3.5</td>
<td>3.7</td>
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<tr>
<td>FitzPatrick*</td>
<td>838</td>
<td>Market</td>
<td>2017*</td>
<td>5.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Clinton*</td>
<td>1,065</td>
<td>Market</td>
<td>2017*</td>
<td>8.7</td>
<td>9.2</td>
</tr>
<tr>
<td>Quad Cities 1 &amp; 2*</td>
<td>1,819</td>
<td>Market</td>
<td>2018*</td>
<td>15.6</td>
<td>13.2</td>
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<tr>
<td>Pilgrim</td>
<td>678</td>
<td>Market</td>
<td>2019</td>
<td>5.0</td>
<td>2.6</td>
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<tr>
<td>Oyster Creek</td>
<td>610</td>
<td>Policy</td>
<td>2019</td>
<td>5.3</td>
<td>4.4</td>
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<tr>
<td>Diablo Canyon 1 &amp; 2</td>
<td>2,240</td>
<td>Combination</td>
<td>2024-2025</td>
<td>18.5</td>
<td>8.3</td>
</tr>
<tr>
<td>Three Mile Island 1</td>
<td>838</td>
<td>Market</td>
<td>2019</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>Indian Point</td>
<td>2,069</td>
<td>Market</td>
<td>2021</td>
<td>17</td>
<td>8.5</td>
</tr>
</tbody>
</table>

- 13,156 MWe of baseload capacity
- 77 million short tons of CO2 avoided
- 15% of Clean Power Plan’s 2030 414-million-ton target
- Approximately 9,550 direct jobs

*Closure avoided due to revised legislation in Illinois and New York
Rising Nuclear Plant Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Cost ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>28.27</td>
</tr>
<tr>
<td>2005</td>
<td>39.08</td>
</tr>
<tr>
<td>2010</td>
<td>36.59</td>
</tr>
<tr>
<td>2011</td>
<td>39.08</td>
</tr>
<tr>
<td>2012</td>
<td>39.75</td>
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<tr>
<td>2013</td>
<td>36.91</td>
</tr>
<tr>
<td>2014</td>
<td>36.35</td>
</tr>
<tr>
<td>2015</td>
<td>35.50</td>
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</tbody>
</table>
# Reactor Size/Scale Impacts Costs

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Plants / Sites</th>
<th>Fuel</th>
<th>Capital</th>
<th>Operating</th>
<th>Total Operating (Fuel + Operating)</th>
<th>Total Generating (Fuel + Capital + Operating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All U.S.</td>
<td>60*</td>
<td>6.76</td>
<td>6.82</td>
<td>20.42</td>
<td>27.17</td>
<td>34.00</td>
</tr>
<tr>
<td>Plant Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Unit</td>
<td>25</td>
<td>6.77</td>
<td>8.37</td>
<td>25.83</td>
<td>32.60</td>
<td>40.97</td>
</tr>
<tr>
<td>Multi Unit</td>
<td>35</td>
<td>6.75</td>
<td>6.34</td>
<td>18.75</td>
<td>25.50</td>
<td>31.85</td>
</tr>
<tr>
<td>Operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>12</td>
<td>7.18</td>
<td>8.51</td>
<td>21.05</td>
<td>28.23</td>
<td>36.74</td>
</tr>
<tr>
<td>Fleet</td>
<td>48</td>
<td>6.63</td>
<td>6.33</td>
<td>20.24</td>
<td>26.87</td>
<td>33.20</td>
</tr>
</tbody>
</table>

- Costs exclude shutdown plants
- Source: Electric Utility Cost Group (EUCG)
Declining Wholesale Electricity Prices

- $45-75/MWh Price Range
- $30-50/MWh Price Range
- $30-42/MWh Price Range

Legend:
- WEST (ZONE A)
- HUD VL (ZONE G)
- Mass Hub
- PJM East HUB
- PJM WEST HUB
- CHICAGO HUB
- CINERGY-INDIANA ZONE
The power price is set by the price of natural gas; both have deteriorated substantially over the past 10 years. Energy prices in PJM are at a 10-year low and lower than forward projections from just a year ago.
Fracking’s Impact on Cost

As production increases, prices decrease.


Two-year forward on natural gas prices

Source: U.S. Energy Information Administration, Natural Gas Annual
Due to the Production Tax Credits for wind, that technology is growing in otherwise uneconomic markets, suppressing prices and driving out unsubsidized competitors. The subsidy insulates it from market feedback.
U.S. Nuclear Energy Market
Valuing Nuclear Energy
Valuing Our Generation Fleet

NY Governor Andrew Cuomo at a rally at FitzPatrick with the Nine Mile Point cooling tower in the background.

Ginna employees at a rally for the RSSA
Valuing Our Generation Fleet

Illinois Governor Bruce Rauner celebrating the legislation at a local high school
Pennsylvania created the nation’s first state “Nuclear Energy Caucus” with more than 60 members of the legislature.

Capacity Markets Help

The PJM capacity market creates prices that attract energy-related investments and power supply resources needed to meet consumer needs for electricity years into the future.

Clearing determined by the intersection of the supply and the demand curves.
U.S. Nuclear Energy Market
Operators’ Focus Areas
Exelon is consistently one of the lowest-cost and most efficient producers of electricity in the nation.

Over the next five years, Exelon Nuclear projects a negative cost CAGR, while maintaining strong generation performance.
Example: Average Nuclear Refueling Days

Exelon 2016 Average Refueling – 22.3 Days
U.S. Nuclear Energy Market
Licensing to Support 80 Years
Subsequent License Renewal

- On June 7, 2016, Exelon announced it is seeking an additional 20-year operating license for Peach Bottom
- Allow operation until 2053 and 2054
- File formal application for license extension in 2018
- Ongoing discussions with Nuclear Regulatory Commission (NRC) on licensing process
- Clear path forward for relicensing to 80 full years
Why Peach Bottom?

- Strong Record of Performance
- 95.83% capacity factor in 2016
- No automatic trips in more than 10 years
- Five consecutive breaker-to-breaker runs
- Completed major extended power uprate in 2015, under budget and ahead of schedule, that increased site output by more than 12%
License Renewal & Costs

• Industry’s clear path to license renewal is undercut by declining profits and even substantial losses across the industry

• State policies are helpful, RTO-level changes would better position sites to withstand the market fluctuations over the long-term

• National energy policy?
Questions?