FLORIDA’S RENEWABLE ENERGY PROJECTS:
UPDATE ON FINANCING, ENVIRONMENTAL LICENSING, AND CONSTRUCTION

Florida Chamber of Commerce
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Public Utilities

- Public Utilities as Regulated Monopolies
  - Provide everyday necessities to the public at large (electricity, gas, water, telephone, transportation);
  - *Build expensive infrastructure; duplication of infrastructure is not economically efficient.*
  - *Have clearly defined territories and are required to serve all users in their territories; reliability of service very important;
  - *Allowed to charge reasonable, just, non-discriminatory rates (with oversight by regulators)*;
Chapter 366, Florida Statutes--Electric Generators in Florida

- Section 366.02(1), F.S. says:
  “‘Public utility’” means every person, corporation, partnership, association, or other legal entity . . . supplying electricity . . . to or for the public within this state . . . ; [but excludes municipal or rural cooperatives].”
PW Ventures

- *PW Ventures, Inc., v. Nichols*, 533 So. 2d 281 (Fla. 1988) (Co-generator could not sell its electricity to another business; had to sell to a regulated public utility.)

- Co-gen proposed to construct, own, and operate a facility that would provide power to a manufacturing facility. Co-gen asked PSC for declaratory statement that it would not be considered a regulated utility and was free to sell its power to the customer.

- PSC ruled it was a regulated utility subject to PSC jurisdiction.

- On appeal, the Florida Supreme Court looked to Section 366.02(1), Florida Statutes to determine if the co-generator was a regulated utility.

- Per Court--"to the public" means "to any member of the public," even a single entity.
PW Ventures

- “What PW Ventures proposes is to go into an area served by a utility and take one of its major customers.”
- “Under PW Ventures' interpretation, other ventures could enter into similar contracts with other high use industrial complexes on a one-to-one basis and drastically change the regulatory scheme in this state.”
- “The effect of this practice would be that revenue that otherwise would have gone to the regulated utilities which serve the affected areas would be diverted to unregulated producers.”
- “This revenue would have to be made up by the remaining customers of the regulated utilities since the fixed costs of the regulated systems would not have been reduced.”
PURPA & Implementation of PURPA In Florida
Public Utility Regulatory Policies Act of 1978 (PURPA), an overview

- In 1978, Congress passed the Public Utility Regulatory Policies Act (PURPA) with the purpose of encouraging the development of more efficient energy generation from industrial waste heat and renewables.
Public Utility Regulatory Policies Act of 1978 (PURPA), an overview

- PURPA requires electric utilities to purchase power from established non-utility Qualified Facilities (QFs).
- QFs are small power producers and cogenerators who sell power to utilities.
Public Utilities Regulatory Policies Act of 1978 (PURPA), an overview

- at “avoided cost”
- “Avoided cost” means the cost the utility would have incurred by producing the power itself or purchasing from another supplier.
- Designed to protect ratepayers by limiting recovery of utility costs to those that otherwise would be included
- Federal Energy Regulatory Commission (FERC) directed states to implement PURPA.
Implementation of PURPA in Florida, Section 366.051, F.S.

- Section 366.051, F.S., requires utilities to purchase power from QFs and renewable energy generators within their service territories at the “full avoided cost.”
Implementation of PURPA in Florida, Section 366.051, F.S.

- The “avoided cost payment” is divided into two categories: Capacity and Energy.
  - “Capacity - The size of the customer base that has been calculated, as well as how much money it would cost to build a power plant to meet that demand. Once this is determined, the payment is fixed. In order to get the full payment, however, the generator must be operating when needed, especially during peak times. If not, penalties are enforced.”
  - “Energy - The amount of fuel and maintenance that would be required to operate a plant. Based on kilowatt hours produced by the renewable energy generator and sold to the utility, this payment fluctuates because of changes in fuel prices.”
# Levelized Cost of Energy

<table>
<thead>
<tr>
<th>Plant type</th>
<th>Capacity factor (%)</th>
<th>Levelized capital cost</th>
<th>Fixed O&amp;M</th>
<th>Variable O&amp;M (including fuel)</th>
<th>Transmission investment</th>
<th>Total system LCOE</th>
<th>Subsidy</th>
<th>Total LCOE including Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dispatchable Technologies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional Coal</td>
<td>85</td>
<td>60.0</td>
<td>4.2</td>
<td>30.3</td>
<td>1.2</td>
<td>95.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Coal-Gasification Combined Cycle (IGCC)</td>
<td>85</td>
<td>76.1</td>
<td>6.9</td>
<td>31.7</td>
<td>1.2</td>
<td>115.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGCC with CCS</td>
<td>85</td>
<td>97.8</td>
<td>9.8</td>
<td>38.6</td>
<td>1.2</td>
<td>147.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Natural Gas-fired</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional Combined Cycle</td>
<td>87</td>
<td>14.3</td>
<td>1.7</td>
<td>49.1</td>
<td>1.2</td>
<td>66.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Combined Cycle</td>
<td>87</td>
<td>15.7</td>
<td>2.0</td>
<td>45.5</td>
<td>1.2</td>
<td>64.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced CC with CCS</td>
<td>87</td>
<td>30.3</td>
<td>4.2</td>
<td>55.6</td>
<td>1.2</td>
<td>91.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional Combustion Turbine</td>
<td>30</td>
<td>40.2</td>
<td>2.8</td>
<td>82.0</td>
<td>3.4</td>
<td>128.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Combustion Turbine</td>
<td>30</td>
<td>27.3</td>
<td>2.7</td>
<td>70.3</td>
<td>3.4</td>
<td>103.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

U.S. average levelized costs (2012 $/MWh) for plants entering service in 2019

Table 1. Estimated Levelized Cost of Electricity (LCOE) for New Generation Resources, 2019
## Levelized Cost of Energy

U.S. average levelized costs (2012 $/MWh) for plants entering service in 2019

<table>
<thead>
<tr>
<th>Plant type</th>
<th>Capacity factor (%)</th>
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<th>Variable O&amp;M (including fuel)</th>
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<th>Subsidy</th>
<th>Total LCOE including Subsid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Nuclear</td>
<td>90</td>
<td>71.4</td>
<td>11.8</td>
<td>11.8</td>
<td>1.1</td>
<td>96.1</td>
<td>-10.0</td>
<td>86.1</td>
</tr>
<tr>
<td>Geothermal</td>
<td>92</td>
<td>34.2</td>
<td>12.2</td>
<td>0.0</td>
<td>1.4</td>
<td>47.9</td>
<td>-3.4</td>
<td>44.5</td>
</tr>
<tr>
<td>Biomass</td>
<td>83</td>
<td>47.4</td>
<td>14.5</td>
<td>39.5</td>
<td>1.2</td>
<td>102.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Non-Dispatchable Technologies

<table>
<thead>
<tr>
<th>Plant type</th>
<th>Capacity factor (%)</th>
<th>Levelized capital cost</th>
<th>Fixed O&amp;M</th>
<th>Variable O&amp;M</th>
<th>Transmission investment</th>
<th>Total system LCOE</th>
<th>Subsidy</th>
<th>Total LCOE including Subsid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>35</td>
<td>64.1</td>
<td>13.0</td>
<td>0.0</td>
<td>3.2</td>
<td>80.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind-Offshore</td>
<td>37</td>
<td>175.4</td>
<td>22.8</td>
<td>0.0</td>
<td>5.8</td>
<td>204.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar PV(^2)</td>
<td>25</td>
<td>114.5</td>
<td>11.4</td>
<td>0.0</td>
<td>4.1</td>
<td>130.0</td>
<td>-11.5</td>
<td>118.6</td>
</tr>
<tr>
<td>Solar Thermal</td>
<td>20</td>
<td>195.0</td>
<td>42.1</td>
<td>0.0</td>
<td>6.0</td>
<td>243.1</td>
<td>-19.5</td>
<td>223.6</td>
</tr>
<tr>
<td>Hydro(^3)</td>
<td>53</td>
<td>72.0</td>
<td>4.1</td>
<td>6.4</td>
<td>2.0</td>
<td>84.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examples of Avoided Cost Impacts on Recent Florida Projects

- TECO/Energy 5.0, L.L.C. proposed 25 MW solar voltaic project—

- “TECO’s evaluation of the Contract, without revenues from the sale of RECs, indicates that the purchased power . . . would have a net cost above TECO’s as-available energy costs of approximately $44 million to $65 million over the life of the contract.” (From December 3, 2009 staff recommendation)
Examples of Avoided Cost Impacts on Recent Florida Projects

Table 2: Summary of Levelized Cost Estimates

<table>
<thead>
<tr>
<th>Project</th>
<th>$/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy 5.0 Project (Estimated by Staff)</td>
<td>22.4'</td>
</tr>
<tr>
<td>TECO Self Build (Estimated by Staff)</td>
<td>38.0'</td>
</tr>
<tr>
<td>Navigant Estimate</td>
<td>28.8'</td>
</tr>
<tr>
<td>FPL De Soto Project</td>
<td>49.5'</td>
</tr>
</tbody>
</table>

Based on the data compiled by staff, the levelized cost estimate of the Energy 5.0 facility appears to be reasonable when compared to other similar projects. However, as discussed below, the Contract remains substantially above TECO’s avoided-cost.
Conclusion:

The voluntarily negotiated Contract between TECO and Energy 5.0 will provide a viable source of renewable energy that will displace energy generated by fossil fuels, thus reducing the state's dependence on these resources and promoting fuel diversity.

Section 366.91(1), F.S., provides:

The Legislature finds that it is in the public interest to promote the development of renewable energy resources in this state. Renewable energy resources have the potential to help diversify fuel types to meet Florida's growing dependency on natural gas for electric production, minimize the volatility of fuel costs, encourage investment within the state, improve environmental conditions, and make Florida a leader in new and innovative technologies.

In this instance, we find it appropriate to approve TECO's Petition for its Solar Energy Purchased Power Agreement with Energy 5.0 in order to provide fuel diversity benefits to the Company and its customers, and to further the goals of promoting renewable solar energy resources and encouraging investment in solar technology in Florida. We also find it is appropriate in this case that TECO shall be authorized to recover the energy payments associated with this voluntarily negotiated solar energy power purchase agreement through our periodic review of fuel and purchased power costs through TECO's annual fuel cost recovery factor.
Examples of Avoided Cost Impacts on Recent Florida Projects


  “If GREC, LLC contracted with an IOU, recovery of payments . . . would be subject to our approval and we would be able to prevent ratepayers from paying above avoided cost for the renewable energy and capacity of the project . . . [and] our decision may have been different.”
Recent FERC Orders on “Avoided Cost”

“States have the authority to dictate generation resources from which utilities may procure electric service . . . [and] the avoided cost rate may take into account the cost of electric energy from the generators being avoided, e.g., generators with certain characteristics [such as renewable resources.]”

*Cal. PUC.*, 134 FERC ¶ 61,044 (2011)
EPA’s Proposed Rule: Existing Source Performance Standards for Fossil Fuel-Fired Power Plant

- Clean Power Plan
- “Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units,” 79 Fed. Reg. 34,830 (June 18, 2014) (Proposed Rule)
- Based on section 111(d) of Clean Air Act
- Calls for 30% reduction of CO₂ emissions nationwide by 2030, using 2005 baseline
EPA’s Proposed Rule: Existing Source Performance Standards for Fossil Fuel-Fired Power Plant  Continued

- Sets individual goals for each State using 2012 “actual” CO₂ emission rates in each state
  - e.g. Florida 2012 CO₂ emission rates = 1199 tpy CO₂/MWH
  - 2030 Florida Goal = 740 tpy CO₂/MWH, or, approximately 38% reduction

- Provides guidance to States on how to achieve reductions - Best System of Emission Reduction (BSER) - using four broad categories of building blocks
## BSER Building Blocks

<table>
<thead>
<tr>
<th>Building Block</th>
<th>Description</th>
<th>Projected Outcomes and Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Improve the heat rate (i.e., efficiency) at existing coal-fired power plants through operational improvements and equipment upgrades</td>
<td>Improve heat rates by 6%. Costs $6 to $12 per metric ton (MT) of CO$_2$ emissions avoided</td>
</tr>
<tr>
<td>2</td>
<td>Implement electricity dispatch procedures to substitute lower CO$_2$ emitting sources, primarily natural gas combined cycle plants (NGCC), for electricity from coal-fired plants</td>
<td>Increase utilization rate of existing rate of Existing NGCC units from a national average of 46% of capacity to 65%-75%. $30/MT of CO$_2$ emissions avoided</td>
</tr>
</tbody>
</table>
### BSER Building Blocks Continued

<table>
<thead>
<tr>
<th>Building Block</th>
<th>Description</th>
<th>Projected Outcomes and Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Substitute electricity from very low/zero-emitting sources, including renewable (e.g., wind and solar) and nuclear, for electricity from fossil-fueled plants. For renewable energy, EPA evaluated best practices based on the renewable portfolio standards in six regions, and applied a growth factor. Based on that analysis, each state was given a renewable energy target. For nuclear energy, EPA projected that plans currently under construction would be completed, and that certain units currently slated for retirement would continue to operate. EPA does not give states “credit” for currently operating nuclear plants not scheduled for retirement.</td>
<td>Complete nuclear plants under construction; avoid retirement of 6% of nuclear capacity, and state-by-state projected increases of renewable energy use. $10 - $40/MT CO₂ emissions avoided</td>
</tr>
</tbody>
</table>
BSER Building Blocks Continued

<table>
<thead>
<tr>
<th>Building Block</th>
<th>Description</th>
<th>Projected Outcomes and Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Reduce electric use through improvements in “demand side management” (i.e., increased efficiency by energy users). EPA based its evaluation of what it believed to be the best demand side practices in the various states.</td>
<td>1.5% annual improvement in energy efficiency. $16 - $424/MT of CO$_2$ emissions avoided</td>
</tr>
</tbody>
</table>
Conclusion

Avoided cost issues present regulatory hurdles for alternative energy sources

Recent FERC opinions appear to create pathway to overcome avoided cost issue in certain circumstances

But state regulatory scheme plays significant role

EPA’s proposed 111(d) standards might provide incentive for additional renewables
Questions?

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