Florida Public Service Commission
2018 Ten-Year Site Plan Workshop
FRCC Presentation

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Florida Reliability Coordinating Council, Inc.
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Vision: To maintain a highly reliable and secure bulk power system for peninsular Florida
Agenda

2018 FRCC Load & Resource Plan

- Overview
- Methodology and Results
  - Integrated Resource Planning Process
  - Load Forecast and Demand-Side Management (DSM)
  - Generation Additions and Reserve Margins
  - Fuel Mix
  - Renewable Resources
  - Natural Gas Infrastructure in Florida
2018 Load & Resource Plan Overview

- Firm peak demand and energy sales forecasts slightly lower than 2017 TYSP; yet, continue to show growth over the next ten years
- Almost 11,000 MW of new firm generation planned over the next ten years
- Planned Reserve Margins above 20%
- DSM continues to be a significant component of reserves
2018 Load & Resource Plan Overview (cont.)

- Changes to FRCC Region’s fuel mix over the next ten years (as a % of total energy served):
  - **Natural Gas** increases from 64% to 66%
  - **Renewable** increases from 2% to 8%
  - **Coal** decreases from 15% to 10%

- By 2027, Solar energy is projected to provide over 16,000 GWh of energy (a 44% increase when compared to the 2017 TYSPs)
FRCC
Load & Resource Plan

Methodology and Results
Utility Integrated Resource Planning (IRP) Process Overview

Forecasts
- Demand
- Energy
- Fuel
- Economic
- Other

Existing Resources
- Including plans for modifications/retirements

Identify Resource Need (with reliability criteria)

Supply-side Options

Demand-side Options

Cost & Operating Data

Evaluate Alternatives

Integrated Resource Plan
FRCC Planning Process Overview

Utility IRP → Utility TYSP → FRCC Load & Resource Plan → Planning Models → Reliability Assessments/Studies → NERC

FPSC

Planning Models:
- Loss of Load Probability
- Transmission Models
Load Forecast and DSM\(^1\)

- Firm summer and winter peak demands grow 1.2% and 1.1% per year; respectively
- Firm peak demand forecasts slightly lower than 2017 TYSPs
- Net Energy for Load grows 0.8% per year
- Forecasted energy sales slightly lower than 2017 TYSPs

\(^1\)Demand-Side Management (DSM) is made up of Demand Response (DR) and Utility-sponsored Energy Efficiency/Energy Conservation (EE/EC)
Load Forecast and DSM (cont.)

- Demand Response (DR) reduces firm summer peak (MW) by 6.4% on average over the ten-year period
- Utility-sponsored Energy Efficiency/Energy Conservation (EE/EC) programs reduce summer peak (MW) by 1.3% by 2027
- Energy Efficiency delivered through mandated codes and standards\(^1\) reduces summer peak (MW) by approximately 4.0% by 2027

\(^1\)Projected impacts of Energy Efficiency codes and standards included in all utilities’ forecasts.
Load Forecast Factors

- Florida unemployment (actual) continues to decrease
- Population growth is projected to remain strong
- Wage and income growth have not kept pace with employment growth
- Impacts from codes and standards and also from distributed generation (solar)
- Commercial customer base challenges presented by online commerce
Estimated Cumulative Impacts of Energy Efficiency Codes and Standards\(^1\)/\(^2\)/

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2022</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer Peak Reduction (MW)</td>
<td>300</td>
<td>1,200</td>
<td>2,000</td>
</tr>
<tr>
<td>Winter Peak Reduction (MW)</td>
<td>200</td>
<td>900</td>
<td>1,600</td>
</tr>
<tr>
<td>Energy Use Reduction (GWh)</td>
<td>1,500</td>
<td>7,400</td>
<td>12,400</td>
</tr>
</tbody>
</table>

\(^1\) Utilities provide estimates on the incremental (2018-on) impacts of Energy Efficiency codes and standards. These impacts were compared against peak and NEL for all utilities. The amounts shown above likely understate the full impact of code and standards because not all utilities were able to estimate impacts.

\(^2\) For data and charts shown after this slide, Energy Efficiency codes and standards are embedded within utility load forecasts.
Comparison of 2017 vs. 2018 Firm Peak Demand Forecast\(^1\) (Summer)

**Projected growth of approx. 5,000 MW**

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\(^1\) Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards.
Comparison of 2017 vs. 2018 Firm Peak Demand Forecast\(^1\) (Winter)

\(^1\) Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards.
Comparison of 2017 vs. 2018
Net Energy for Load (NEL) Forecast\(^1\)

\(^1\) Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards.
Summer Peak Demands
Actual and Forecasted

- **Actual Peak Demand**
- **Projected Demand with DR & EE/EC Impacts Excluded**
- **Projected Demand with DR Impacts Excluded**
- **Projected Firm Peak Demand**
- **Linear Trend (Actual Peak Demand)**

1/ Projected impacts of Energy Efficiency codes and standards are included in all projections.
2/ Impacts from cumulative Demand Response (DR) and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are excluded.
3/ Linear trend based on actual peak demand from 1998 to 2017.
Forecasted Summer Peak Demands$^{1}$

$^{1}$ Projected impacts of Energy Efficiency codes and standards are included in all projections.

$^{2}$ Impacts from cumulative Demand Response (DR) and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are excluded.
Historical Compound Average Annual Growth Rate$^{1/}$ for Firm Peak Demand (MW)

1/ Projected growth rate from prior forecasts
Generation Additions and Reserve Margins

- 11,000 MW of new generation planned over the next ten years
- Planned Reserve Margins projected to remain above 20% over the next ten years
- DSM continues to be a significant component of reserves
Projected Total Available Capacity (Summer)

- 2017 Utility-Owned Capacity
- Utility-Owned Capacity Increase
- Utility-Owned Capacity (Outside Region)
- Firm Non-Utility Purchases
- Imports (Purchased Power)
Incremental Generation Firm Capability Changes over 10-yr Planning Horizon by Fuel Type
Nuclear Outlook is Stable in 10-yr Horizon

**Existing Nuclear Capacity (Summer)**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Lucie 1</td>
<td>981</td>
</tr>
<tr>
<td>St. Lucie 2</td>
<td>986</td>
</tr>
<tr>
<td>Turkey Point 3</td>
<td>811</td>
</tr>
<tr>
<td>Turkey Point 4</td>
<td>821</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,599 MW</strong></td>
</tr>
</tbody>
</table>

**Planned Nuclear Capacity (Summer)**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey Point 3 Upgrade (10/2018)</td>
<td>20</td>
</tr>
<tr>
<td>Turkey Point 4 Upgrade (12/2018)</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40 MW</strong></td>
</tr>
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</table>

1/Existing generation as of December 31, 2017
Planned Reserve Margin\(^1\/\)\(^2\) (Based on Firm Load)

1/ Projected impacts of Energy Efficiency codes and standards are included in all projections.

2/ Impacts from cumulative Demand Response (DR) and incremental (2018-on) utility sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are included.
Planned Reserve Margin¹/  
(Excluding projected DR and Utility EE/EC Impacts)²/

¹/ Projected impacts of Energy Efficiency codes and standards are included in all projections.
²/ Impacts from cumulative Demand Response (DR) and incremental (2018-on) utility sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are excluded.
³/ PSC stipulation and FRCC criteria are based on firm load as per slide 22. The values shown on this slide are solely for illustrative purposes.
Demand Response as a Percentage of Peak Demand
Summer 2018

<table>
<thead>
<tr>
<th>Organization</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida Reliability Coordinating Council</td>
<td>6.2%</td>
</tr>
<tr>
<td>PJM</td>
<td>6.0%</td>
</tr>
<tr>
<td>Midwest Reliability Organization</td>
<td>4.6%</td>
</tr>
<tr>
<td>ERCOT</td>
<td>3.7%</td>
</tr>
<tr>
<td>SERC Reliability Corporation</td>
<td>3.2%</td>
</tr>
<tr>
<td>Northeast Power Coordinating Council</td>
<td>2.4%</td>
</tr>
<tr>
<td>Western Electricity Coordinating Council</td>
<td>2.3%</td>
</tr>
<tr>
<td>Southwest Power Pool</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Source: North American Electric Reliability Corporation’s (NERC) 2018 Summer Reliability Assessment (https://www.nerc.com/pa/RAPA/ra/Pages/default.aspx)
Total Available Summer Capacity By Fuel Type vs. Net Summer Peak Demand

Projected Year

2018  2019  2020  2021  2022  2023  2024  2025  2026  2027

MW

0  10,000  20,000  30,000  40,000  50,000  60,000  70,000

Nuclear  Coal  Natural Gas  Solar  Other  Firm Peak Demand  Total Peak Demand

1/ Total Peak Demand includes projected impacts of DR and EE/EC
Forecasted Fuel Mix
Firm Summer Capacity (MW)

2018
54,798 MW

2027
59,667 MW

- Gas 72%
- Coal 14%
- Nuclear 7%
- Renewable 2%
- Other <1%
- Oil 4%
- Renewable 6%
- Nuclear 7%
- Coal 8%
- Gas 75%
- Oil 4%
Forecasted Renewable Mix

Firm Summer Capacity

2018
1,031 MW

- Biomass: 216 MW
- Landfill Gas: 40 MW
- Hydro: 44 MW
- MSW: 191 MW
- Solar: 482 MW

2027
3,628 MW

- Biomass: 263 MW
- Landfill Gas: 35 MW
- Hydro: 44 MW
- MSW: 3095 MW
- Solar: 3,095 MW
Forecasted Solar
Firm Summer Capacity

![Forecasted Solar Firm Summer Capacity Chart](chart_image)
Forecasted Fuel Mix

Net Energy for Load (GWh)

2018
232,135 GWh

Coal 15%
Nuclear 14%
Renewable 2%
Oil 0.1%
Other 5%

2027
250,053 GWh

Coal 10%
Nuclear 13%
Renewable 8%
Oil 0.1%
Other 4%
Gas 66%
Forecasted Renewable Mix
Total Energy Served

2018
4,922 GWh

2027
18,801 GWh

- Biomass: 1,061 GWh
- Landfill Gas: 392 GWh
- Hydro: 14 GWh
- MSW: 1,072 GWh
- Solar: 2,383 GWh

- Biomass: 1,265 GWh
- Landfill Gas: 336 GWh
- Hydro: 14 GWh
- Solar: 16,112 GWh
Natural Gas Infrastructure in Florida

- Three major pipelines supply natural gas to the region
  - Florida Gas Transmission
  - Gulfstream
  - Sabal Trail/Florida Southeast Connection
- Gas infrastructure expansion and capabilities on pace with generation additions
- Over the 10-yr forecast, natural gas generation with alternate fuel capabilities remains between 64-66%
2018 FRCC Fuel Reliability

- Fuel Reliability Working Group (FRWG)
  - Reviews existing interdependencies of fuel availability and electric reliability
  - Coordinate regional responses to fuel issues and emergencies
  - Commission periodic studies and analysis on FRCC gas infrastructure
  - Report findings to FRCC Operating Committee
Energy Production from Natural Gas

1/ Extended nuclear outages for uprate work resulted in higher gas usage in 2012
Natural Gas Alternate Fuel Capability

Summer Capacity (MW)

![Bar chart showing capacity from 2018 to 2027 with fuel switching and no fuel switching capability.](chart.png)
**Conclusion**

- Based on 2018 TYSPs, planned Reserve Margins above 20% for all peak periods for the next ten years
  - DSM continues to be a significant component of reserves
  - Energy Efficiency codes and standards continue to reduce demand and energy forecasts
- Planned gas infrastructure capacity increases support planned generation additions
- Existing gas infrastructure expansion capabilities can support potential additional generation
Conclusion (cont.)

- Changes to FRCC’s fuel mix over the next ten years (as a % of total energy served):
  - **Natural Gas** increases from 64% to 66%
  - **Renewable** increases from 2% to 8%
  - **Coal** decreases from 15% to 10%
- Solar energy is projected to provide over 16,000 GWh of energy by 2027 (a 44% increase when compared to the 2017 TYSPs)
  - At current solar penetration levels, no impacts to reliability have been identified
Questions?