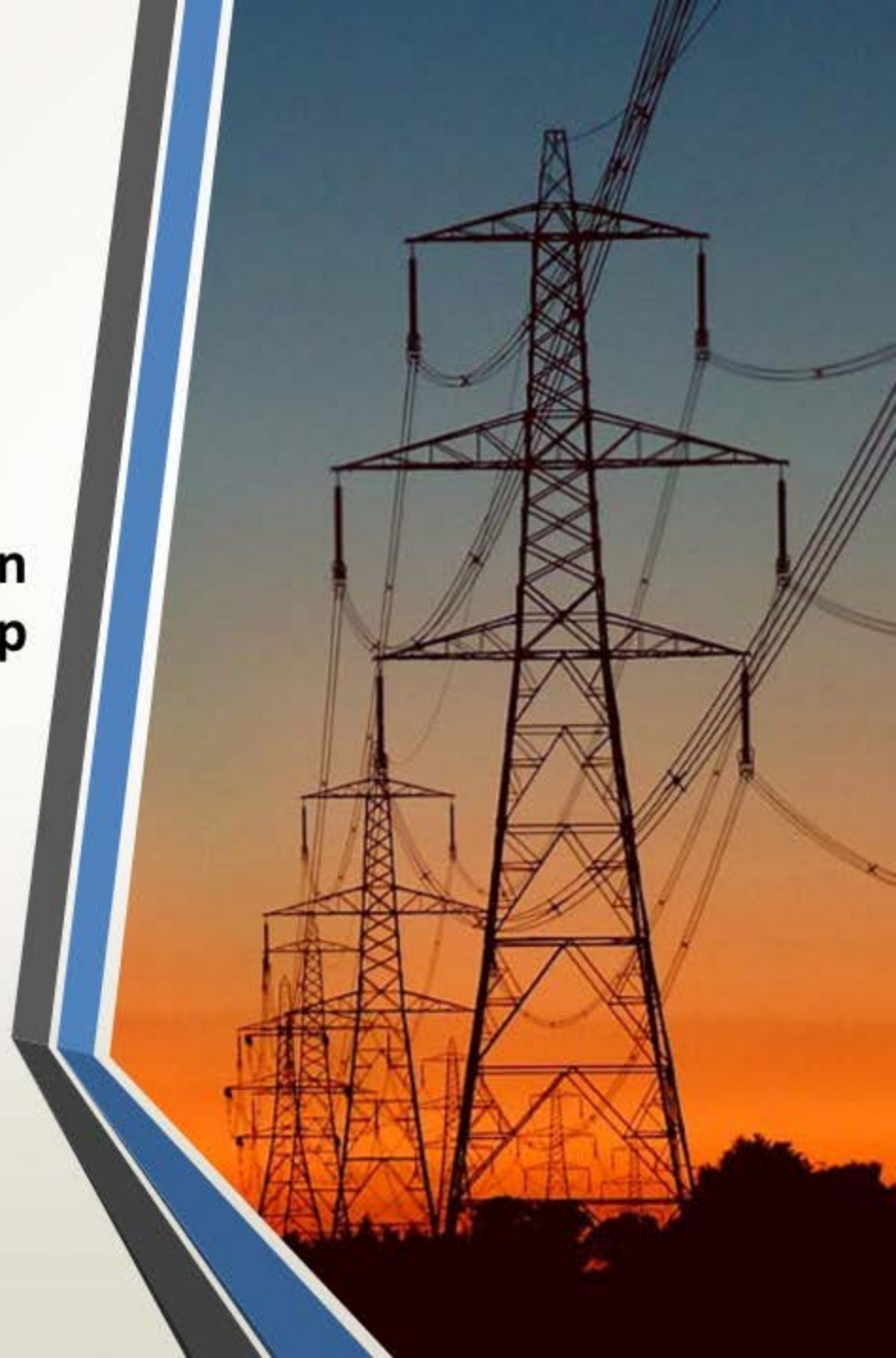




Florida Public Service Commission 2018 Ten-Year Site Plan Workshop FRCC Presentation

Eric Senkowicz
Director of Planning
Florida Reliability Coordinating Council, Inc.
October 11th, 2018





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.)

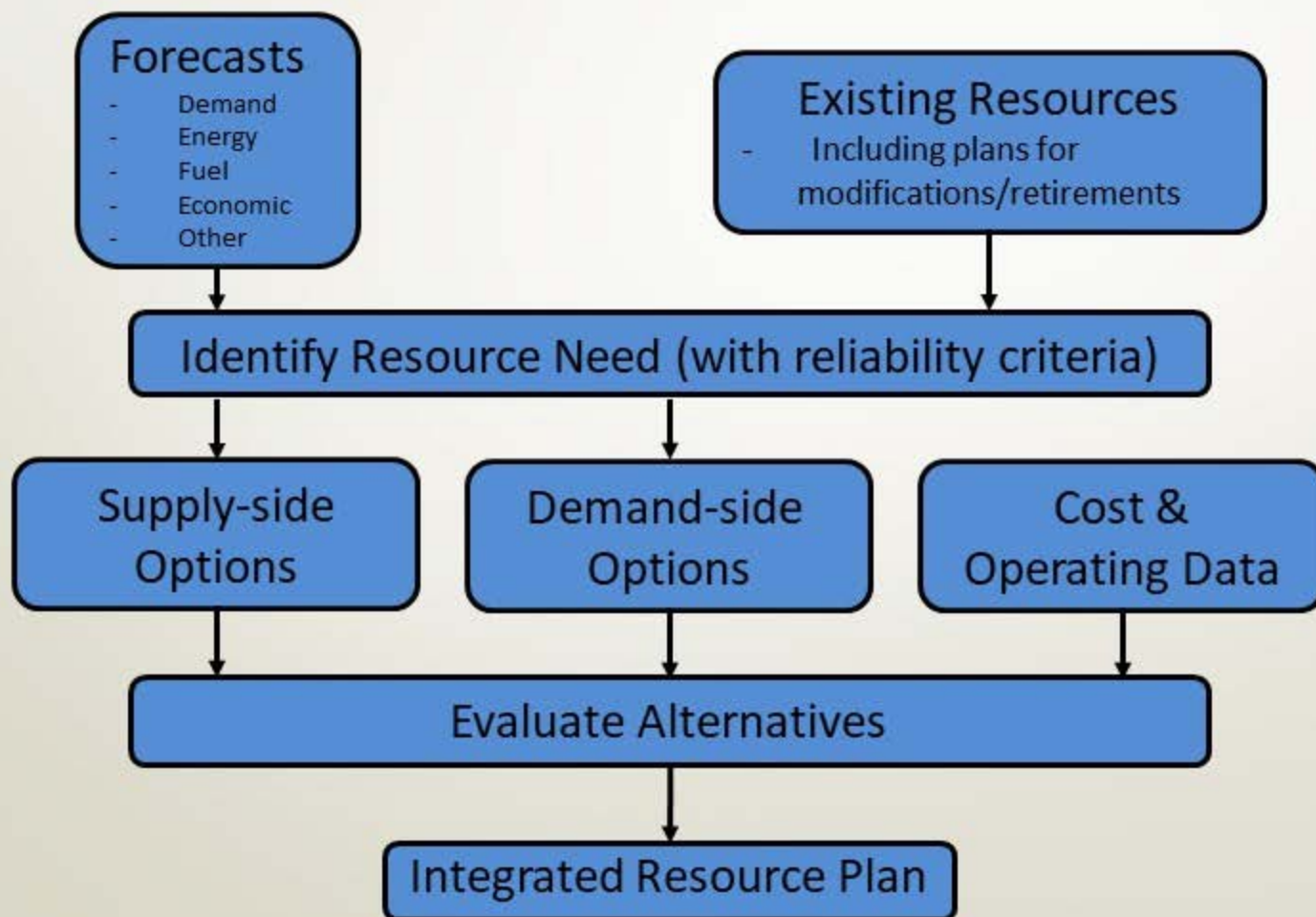
- Changes to FRCC Region's fuel mix over the next ten years (as a % of total energy served):
 - **Natural Gas** increases from 64% to 66%
 - **Renewable** increases from 2% to 8%
 - **Coal** decreases from 15% to 10%
- By 2027, Solar energy is projected to provide over 16,000 GWh of energy (a 44% increase when compared to the 2017 TYSPs)

FRCC

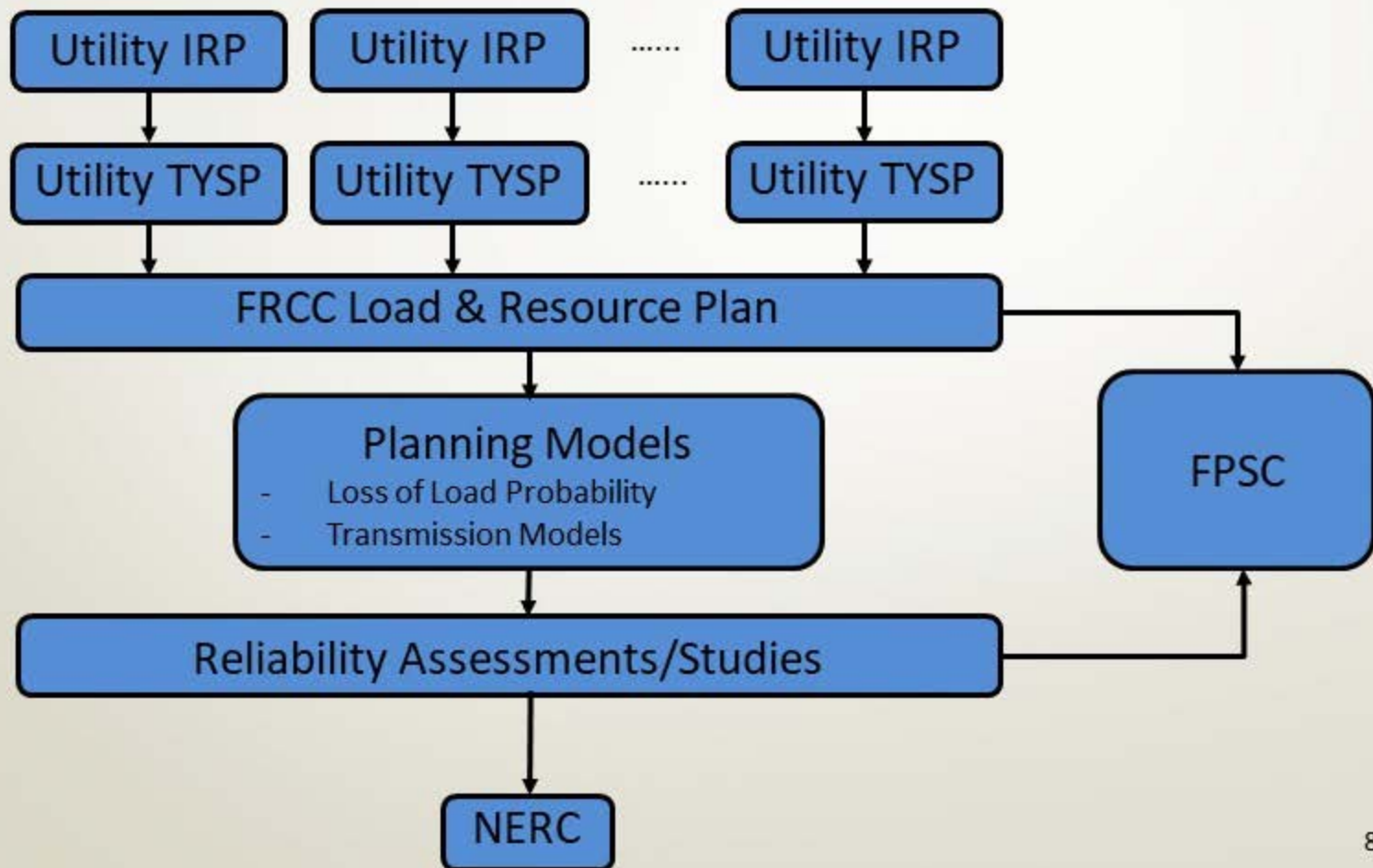
Load & Resource Plan

Methodology and Results

Utility Integrated Resource Planning (IRP) Process Overview



FRCC Planning Process Overview



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

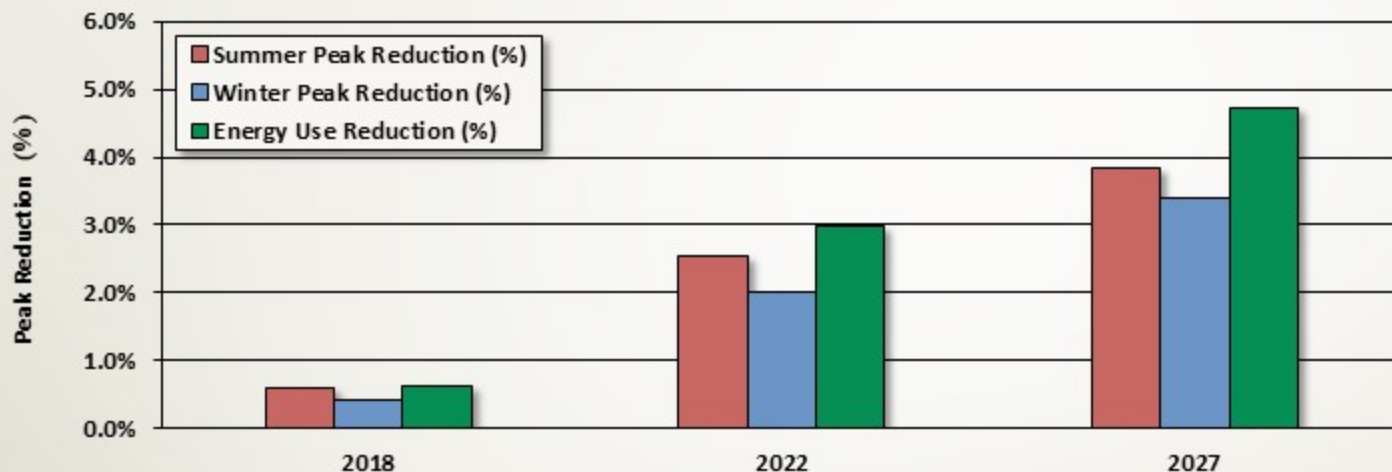


Impacts from codes and standards and
also from distributed generation (solar)



Commercial customer base challenges
presented by online commerce

Estimated Cumulative Impacts of Energy Efficiency Codes and Standards^{1/ 2/}

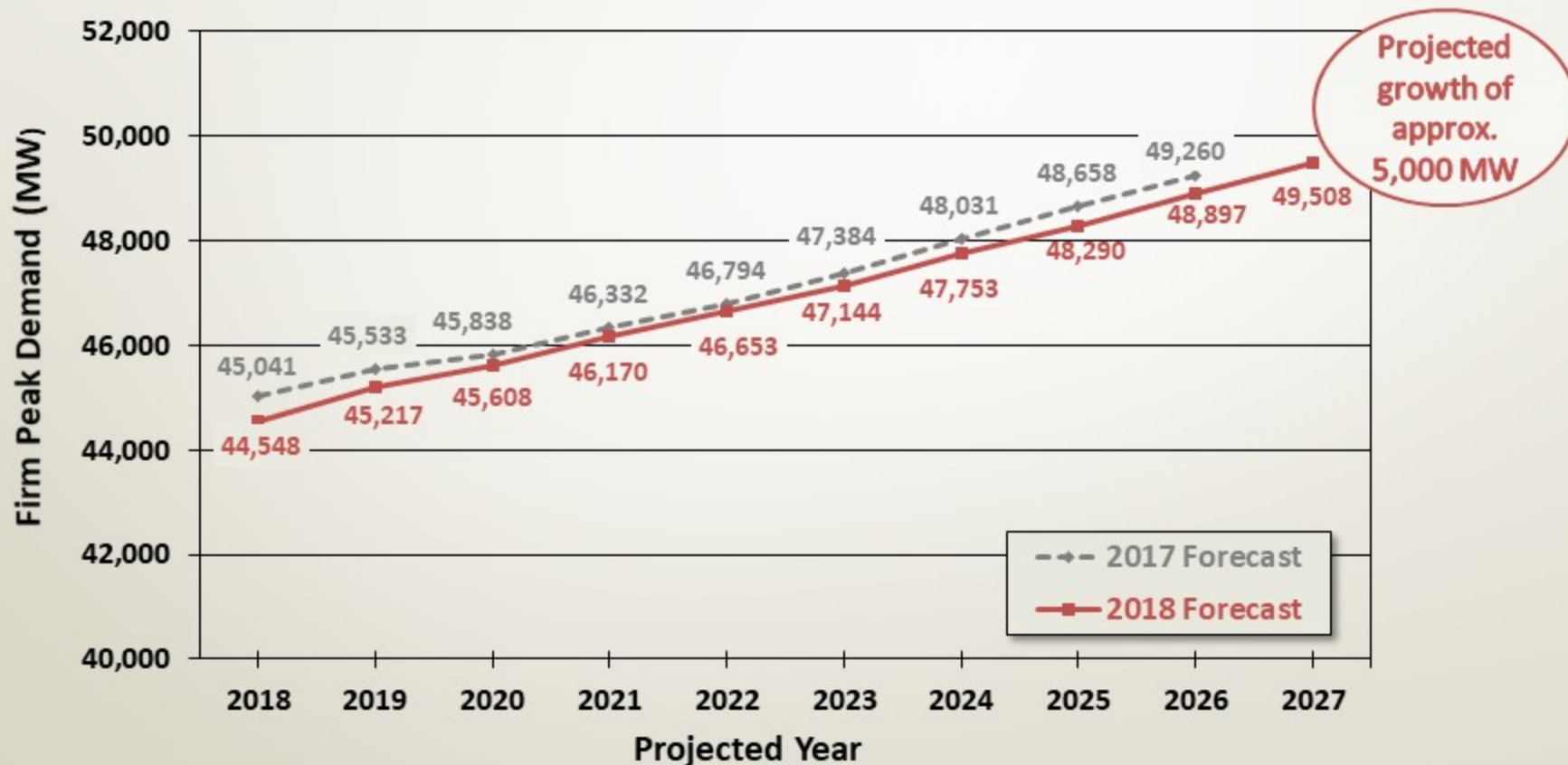


	2018	2022	2027
Summer Peak Reduction (MW)	300	1,200	2,000
Winter Peak Reduction (MW)	200	900	1,600
Energy Use Reduction (GWh)	1,500	7,400	12,400

^{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.

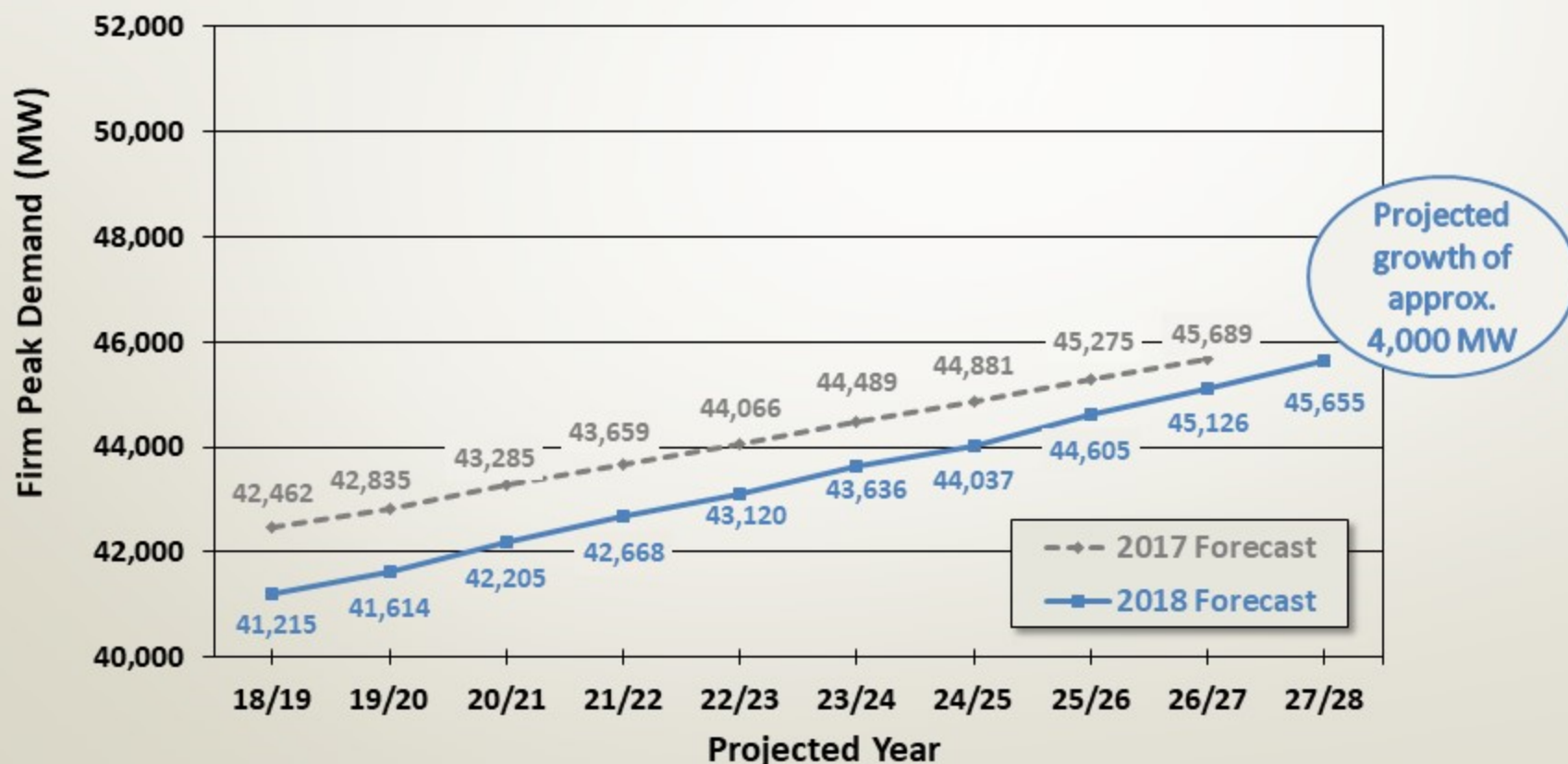
^{2/} For data and charts shown after this slide, Energy Efficiency codes and standards are embedded within utility load forecasts

Comparison of 2017 vs. 2018 Firm Peak Demand Forecast^{1/} (Summer)



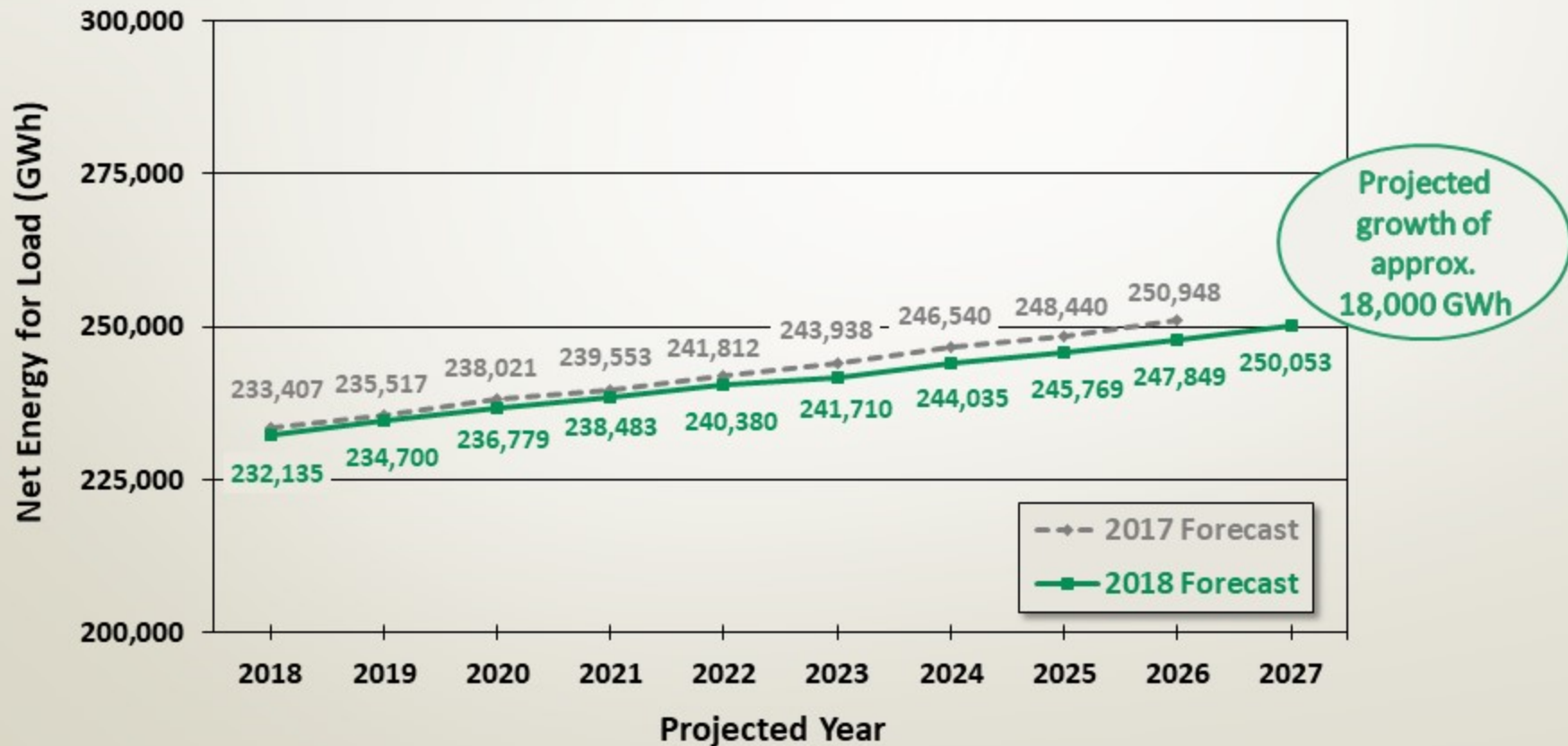
^{1/} Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards.

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.

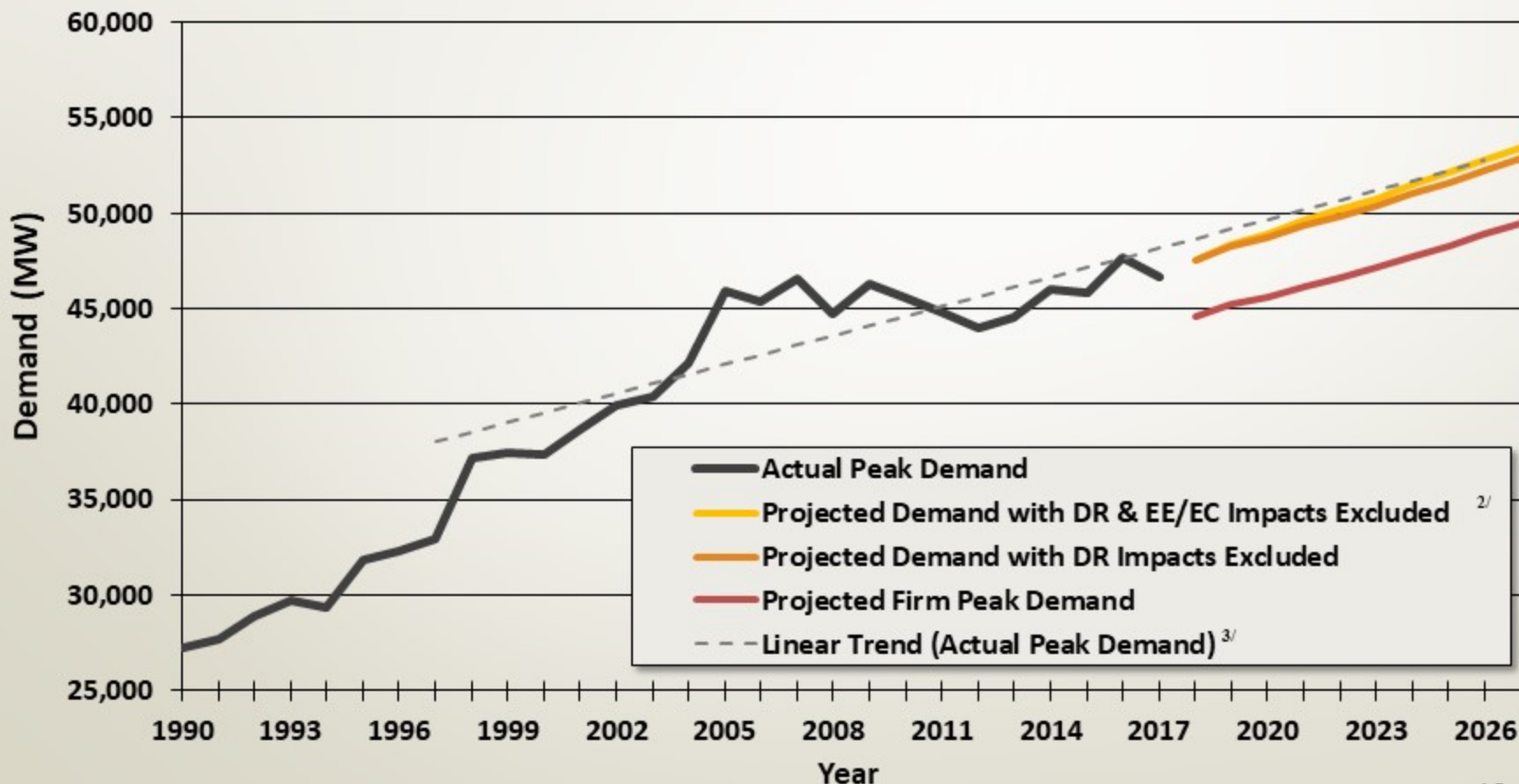
Comparison of 2017 vs. 2018 Net Energy for Load (NEL) Forecast^{1/}



^{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^{1/}

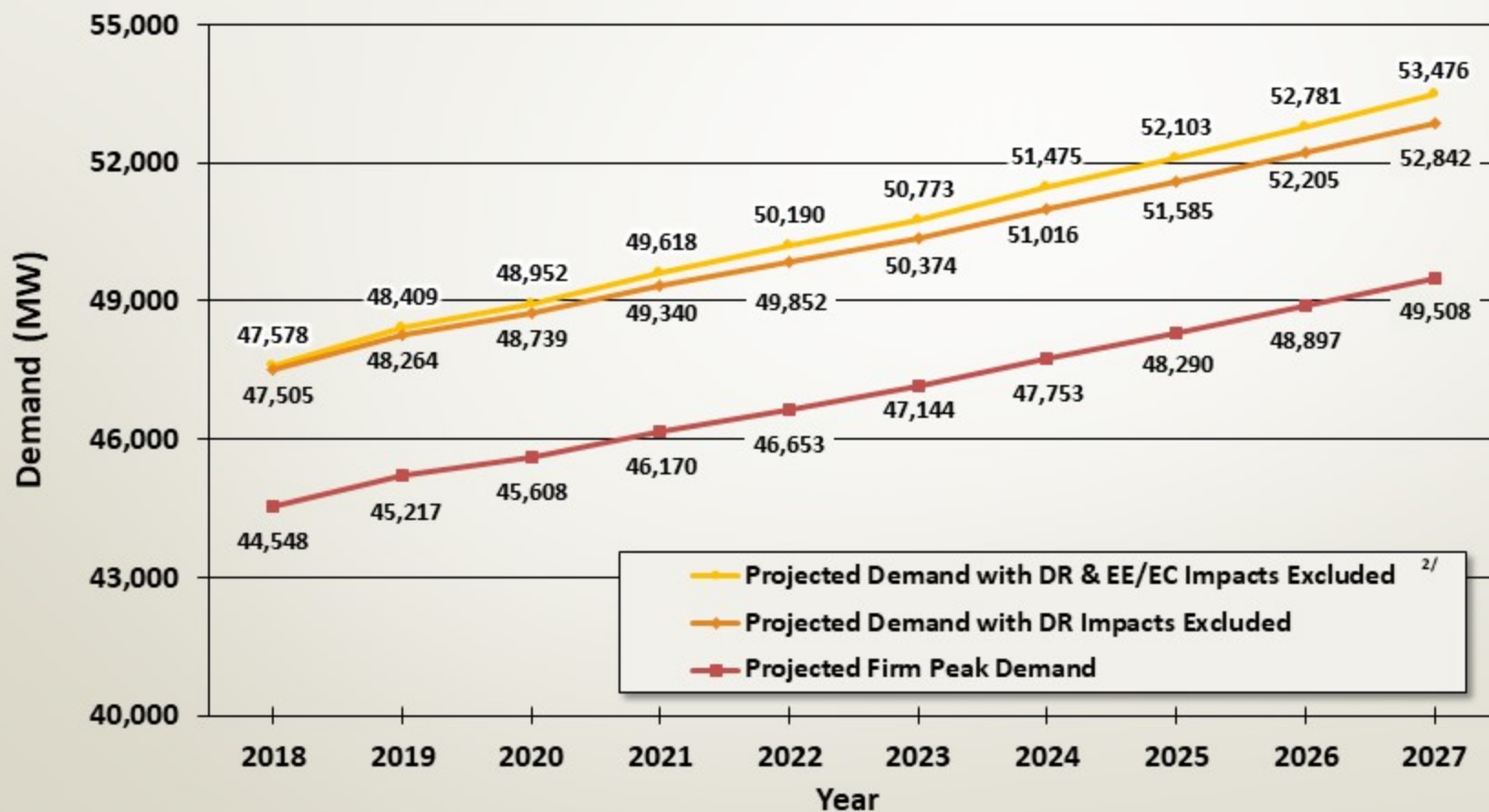


^{1/} Projected impacts of Energy Efficiency codes and standards are included in all projections.

^{2/} Impacts from cumulative Demand Response (DR) and incremental (2018-on) utility-sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are excluded.

^{3/} Linear trend based on actual peak demand from 1998 to 2017.

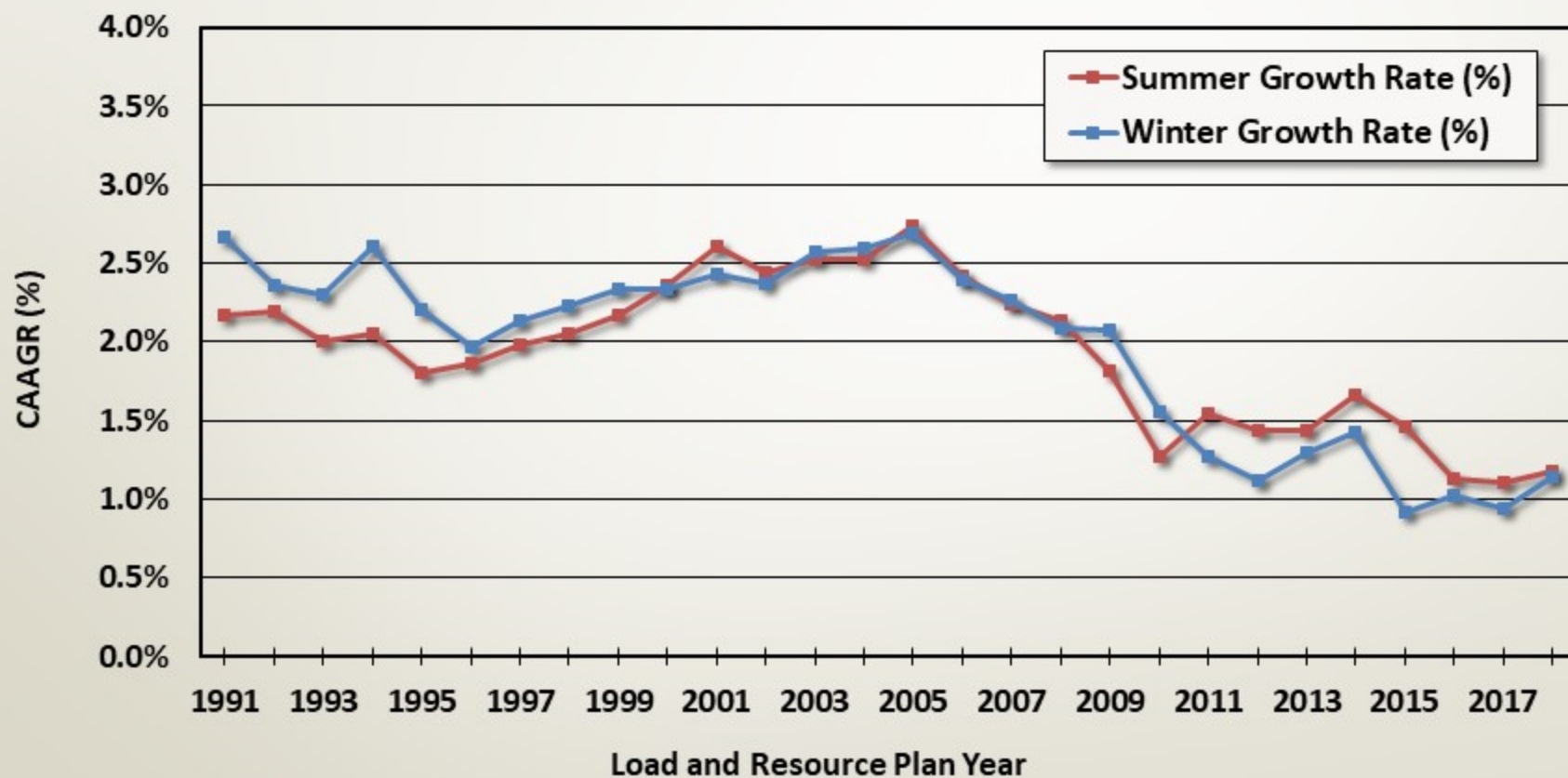
Forecasted Summer Peak Demands^{1/}



^{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



Big Bend Solar

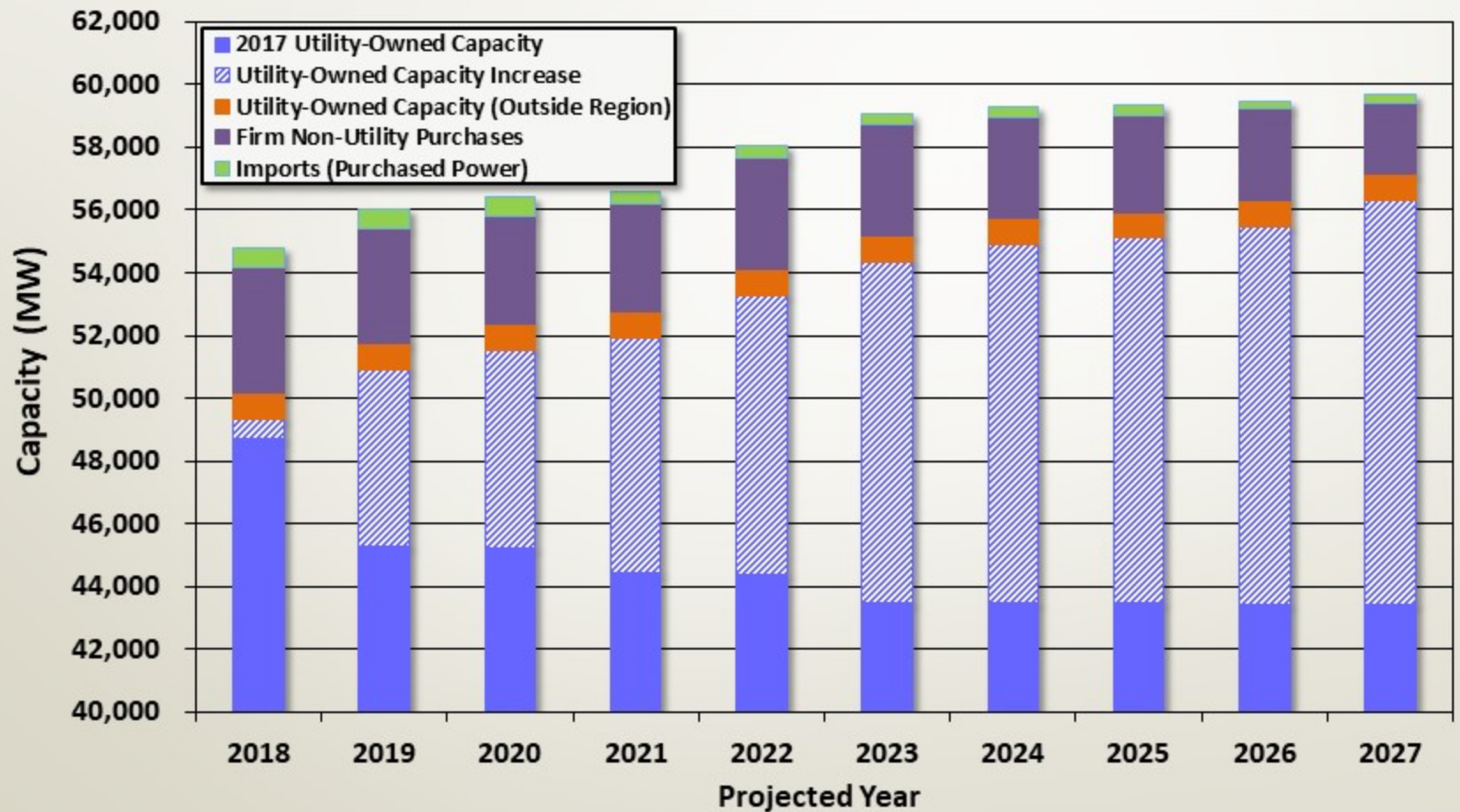
Generation Additions and Reserve Margins

- 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

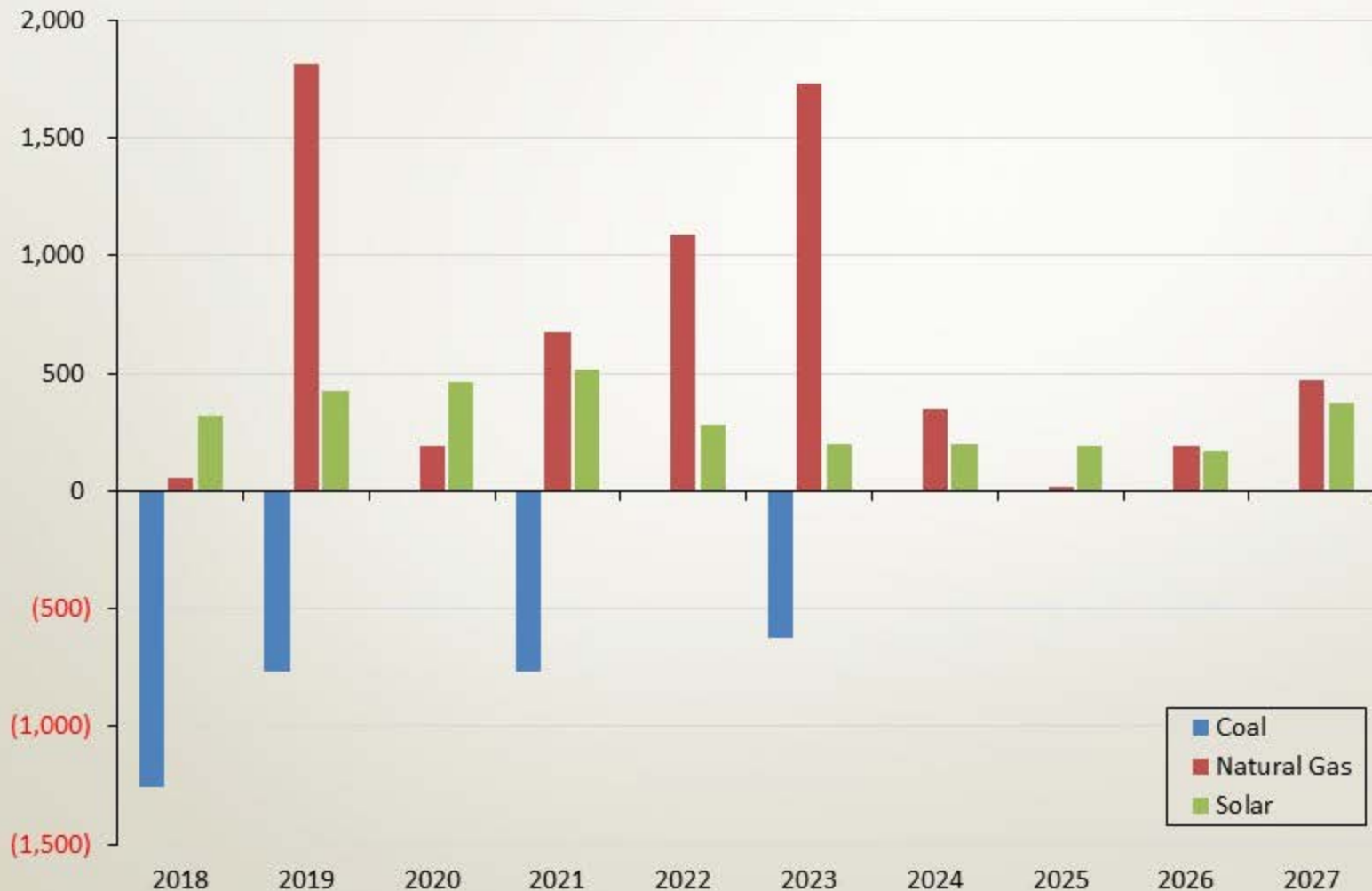


Stanton Solar

Projected Total Available Capacity (Summer)



Incremental Generation Firm Capability Changes over 10-yr Planning Horizon by Fuel Type





Nuclear Outlook is Stable in 10-yr Horizon

Existing^{1/} Nuclear Capacity (Summer)

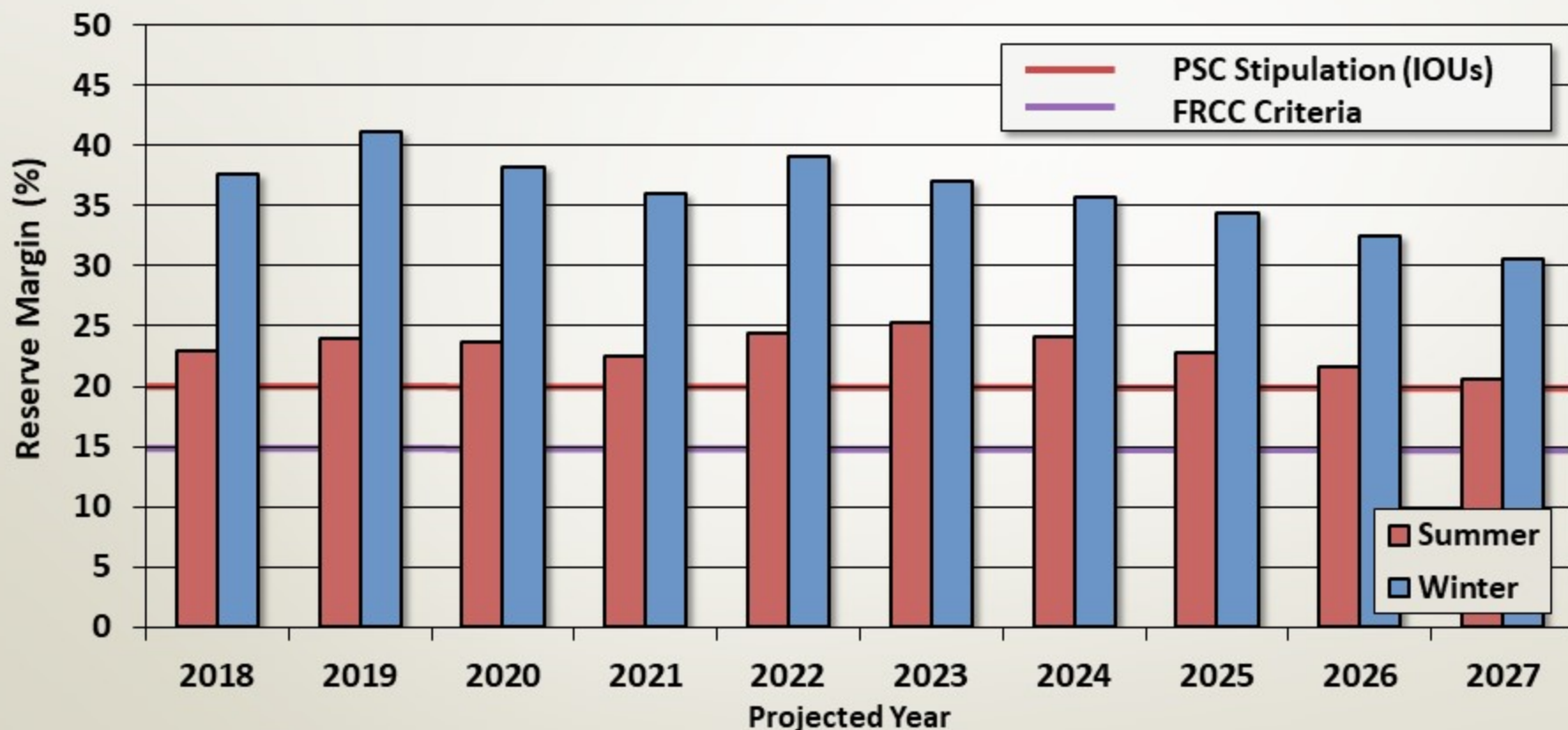
St. Lucie 1	981 MW
St. Lucie 2	986 MW
Turkey Point 3	811 MW
Turkey Point 4	821 MW
	<hr/>
	3,599 MW

Planned Nuclear Capacity (Summer)

Turkey Point 3 Upgrade (10/2018)	20 MW
Turkey Point 4 Upgrade (12/2018)	20 MW
	<hr/>
	40 MW

^{1/}Existing generation as of December 31, 2017

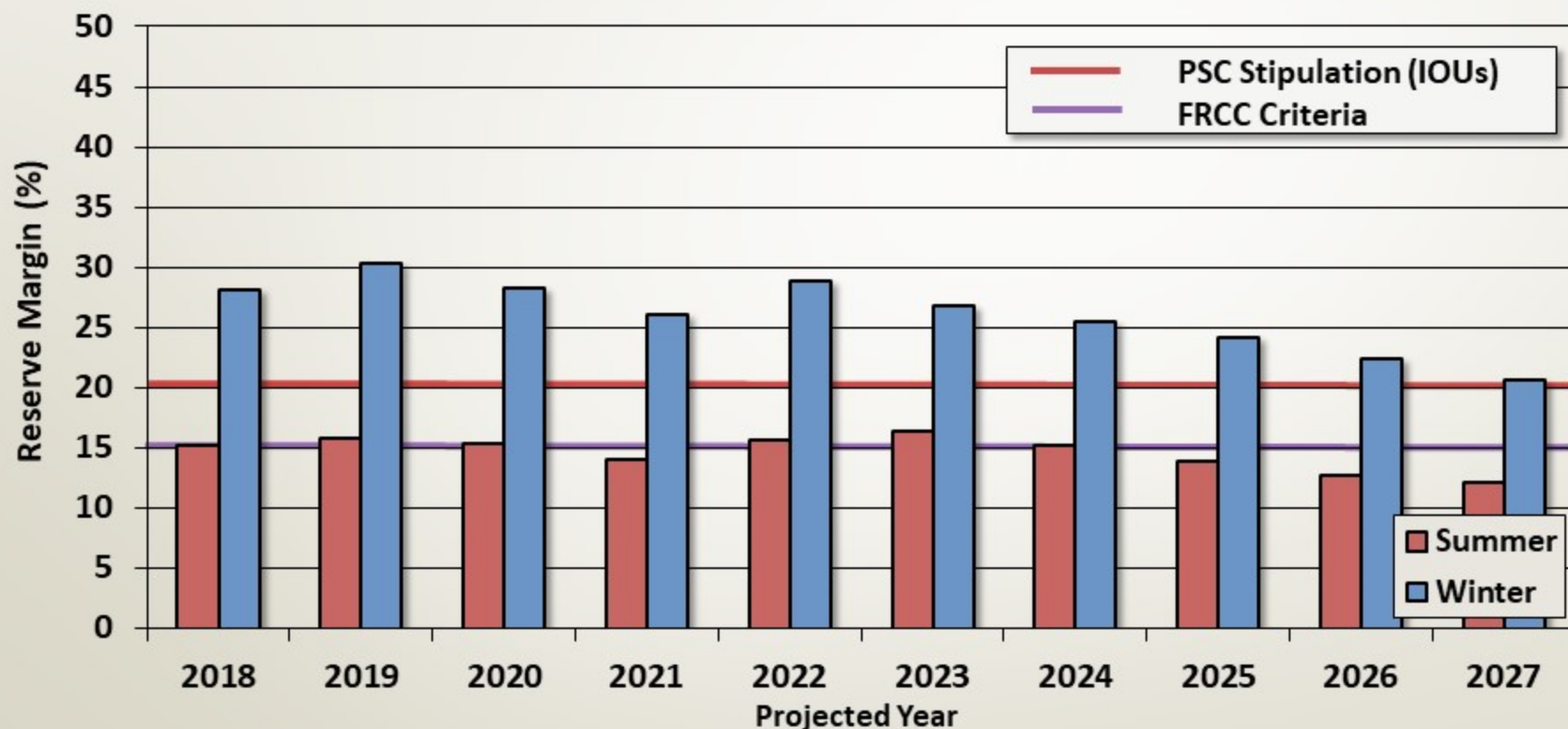
Planned Reserve Margin^{1/ 2/} (Based on Firm Load)



^{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 Margin^{1/} (Excluding projected DR and Utility EE/EC Impacts)^{2/}

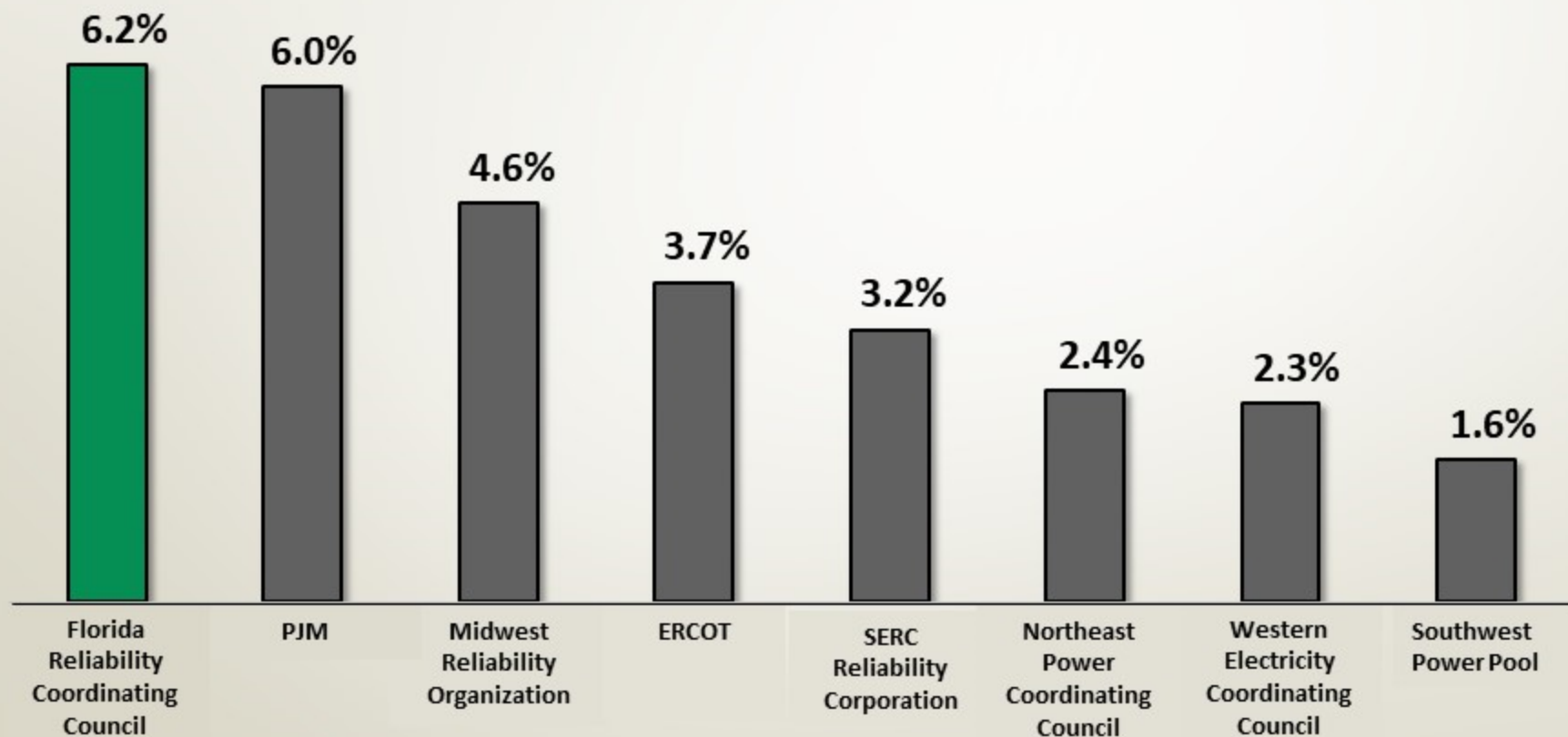


^{1/} Projected impacts of Energy Efficiency codes and standards are included in all projections.

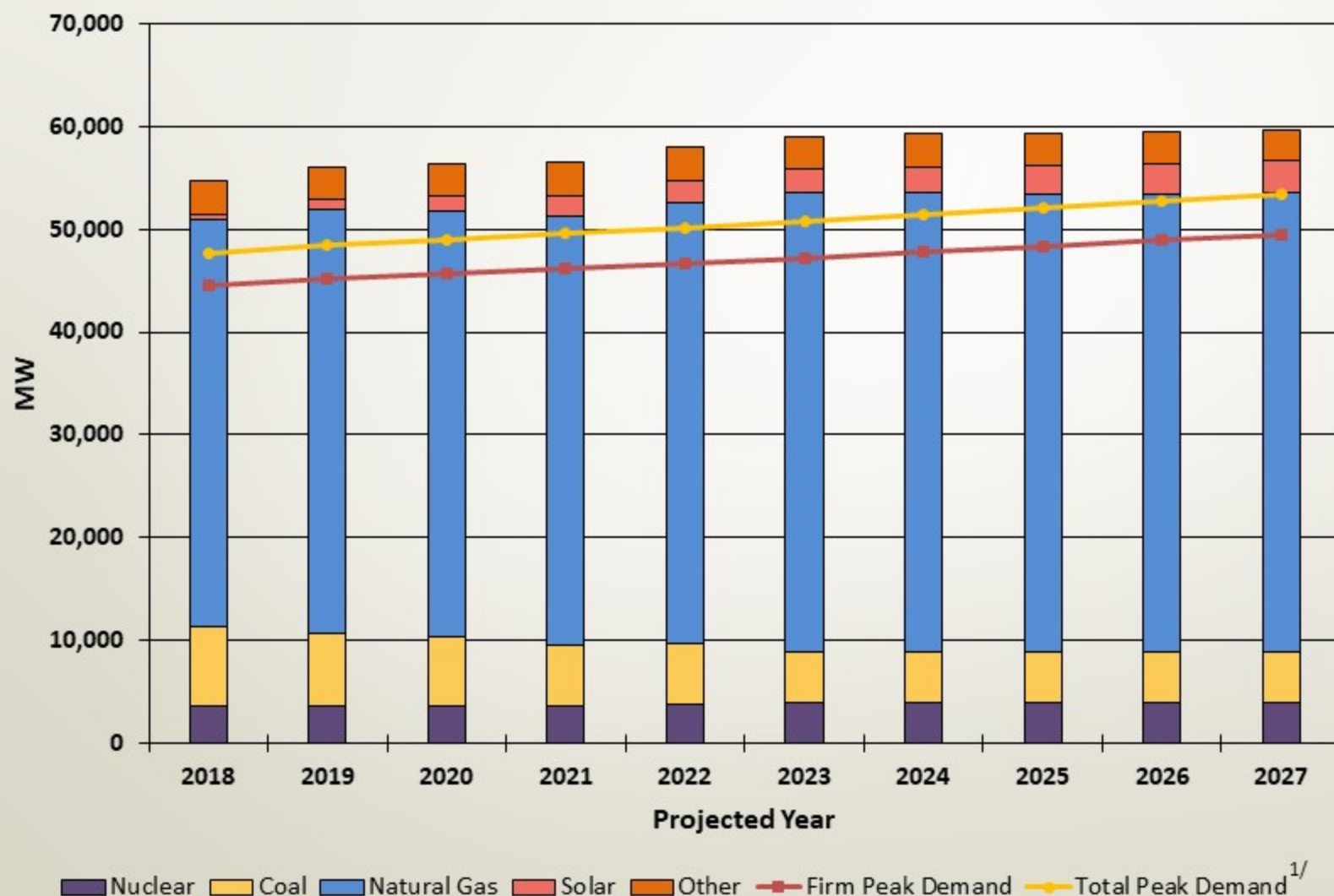
^{2/} Impacts from cumulative Demand Response (DR) and incremental (2018-on) utility sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are excluded.

^{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



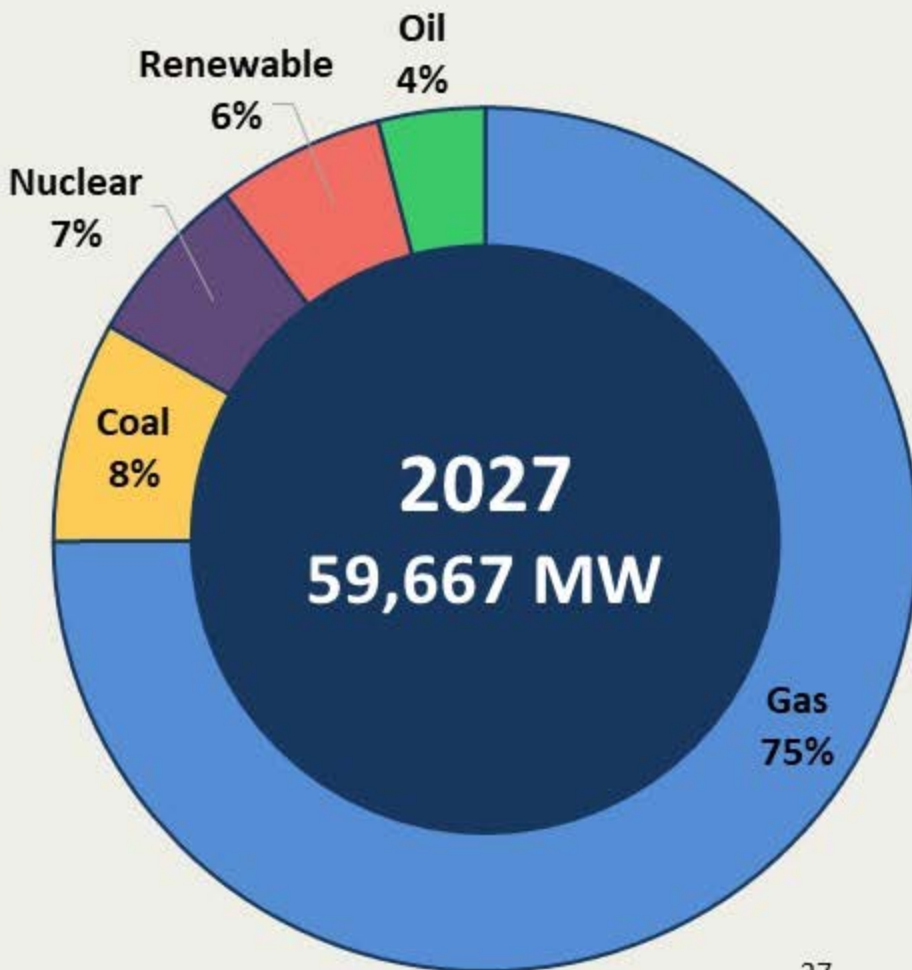
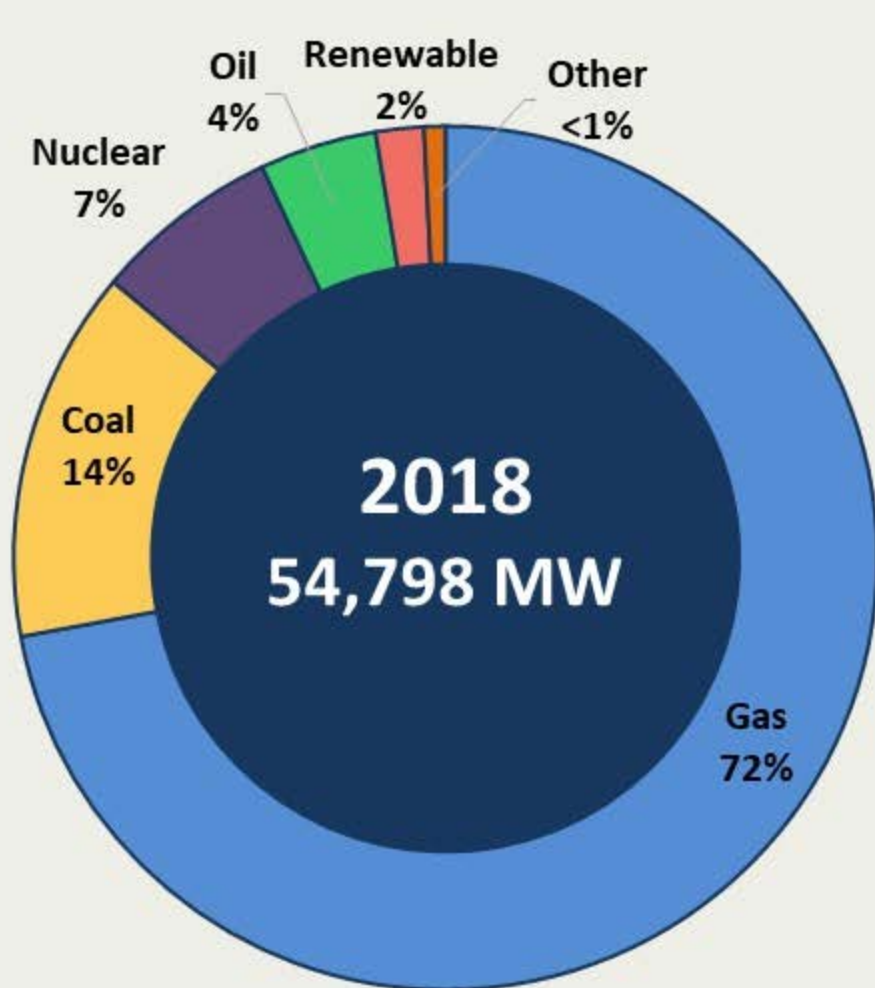
Total Available Summer Capacity By Fuel Type vs. Net Summer Peak Demand



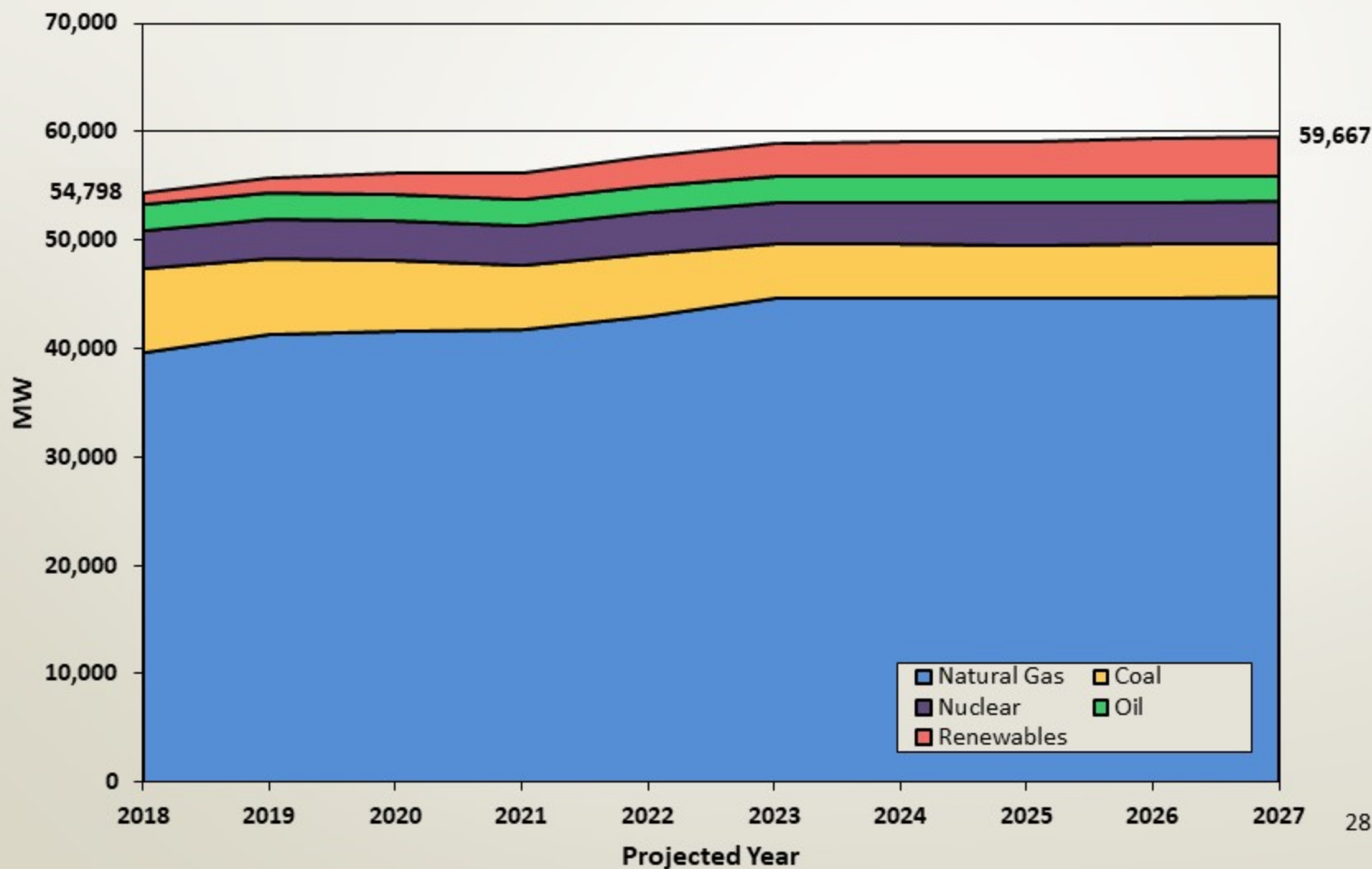
^{1/}Total Peak Demand includes projected impacts of DR and EE/EC

Forecasted Fuel Mix

Firm Summer Capacity (MW)

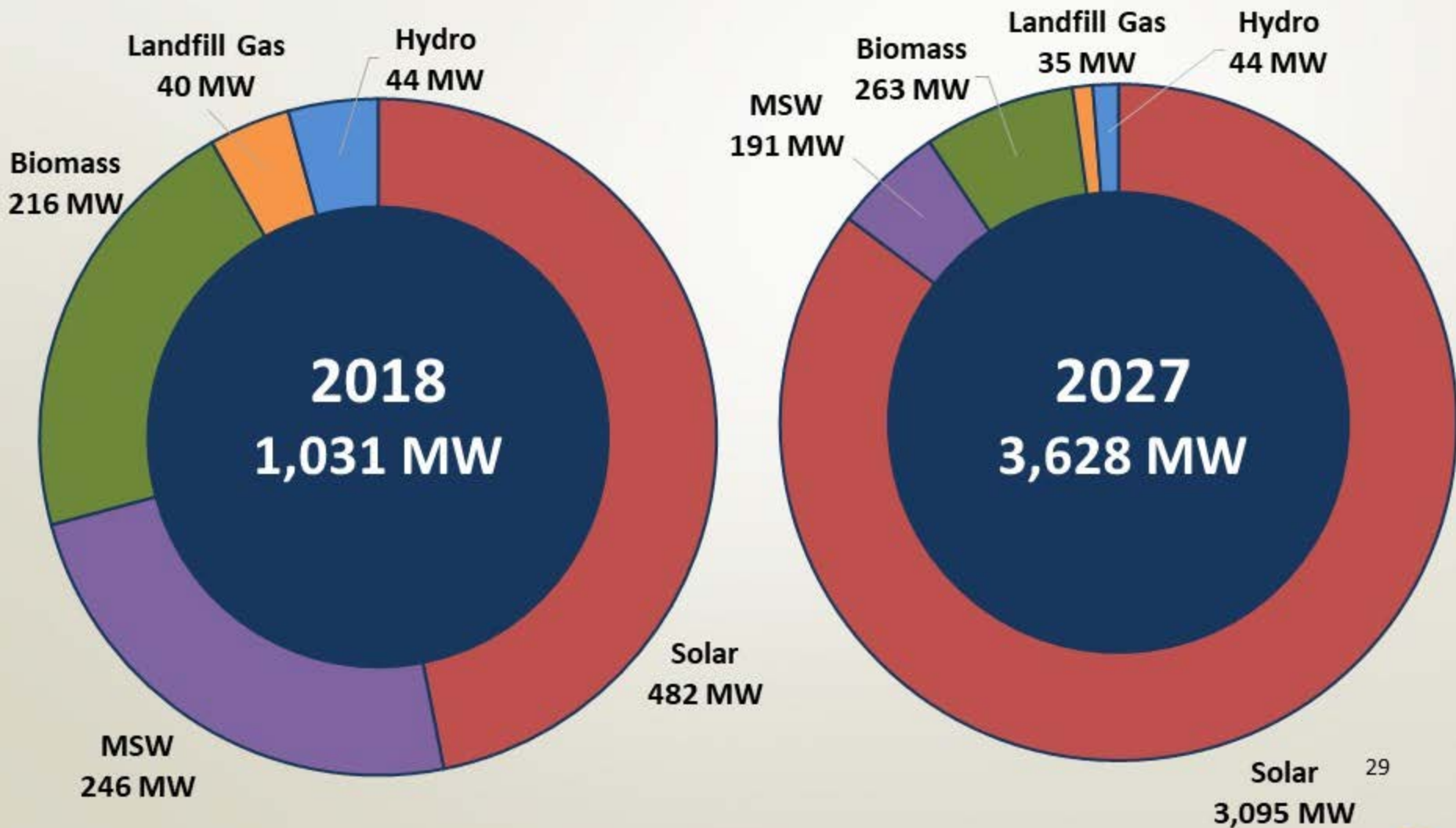


FRCC Summer Firm Capacity by Fuel Type



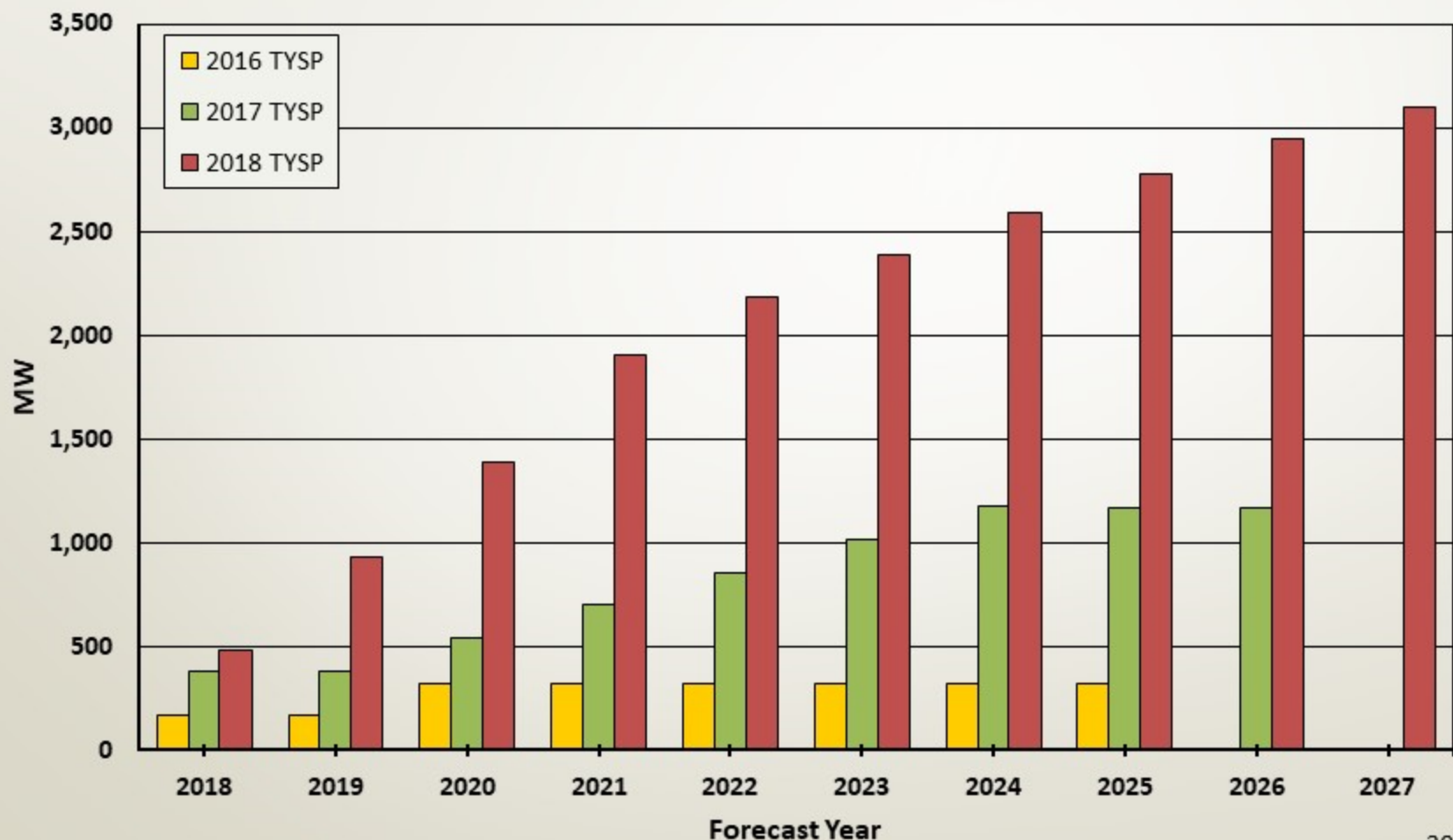
Forecasted Renewable Mix

Firm Summer Capacity



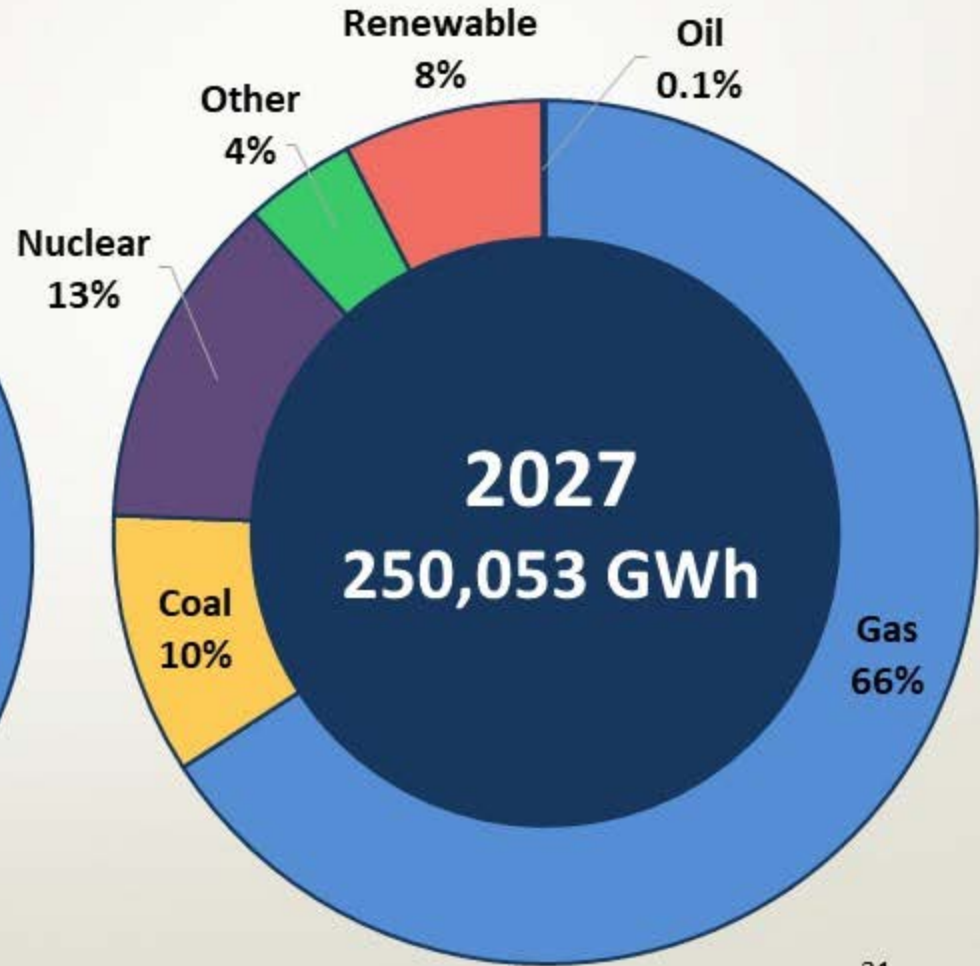
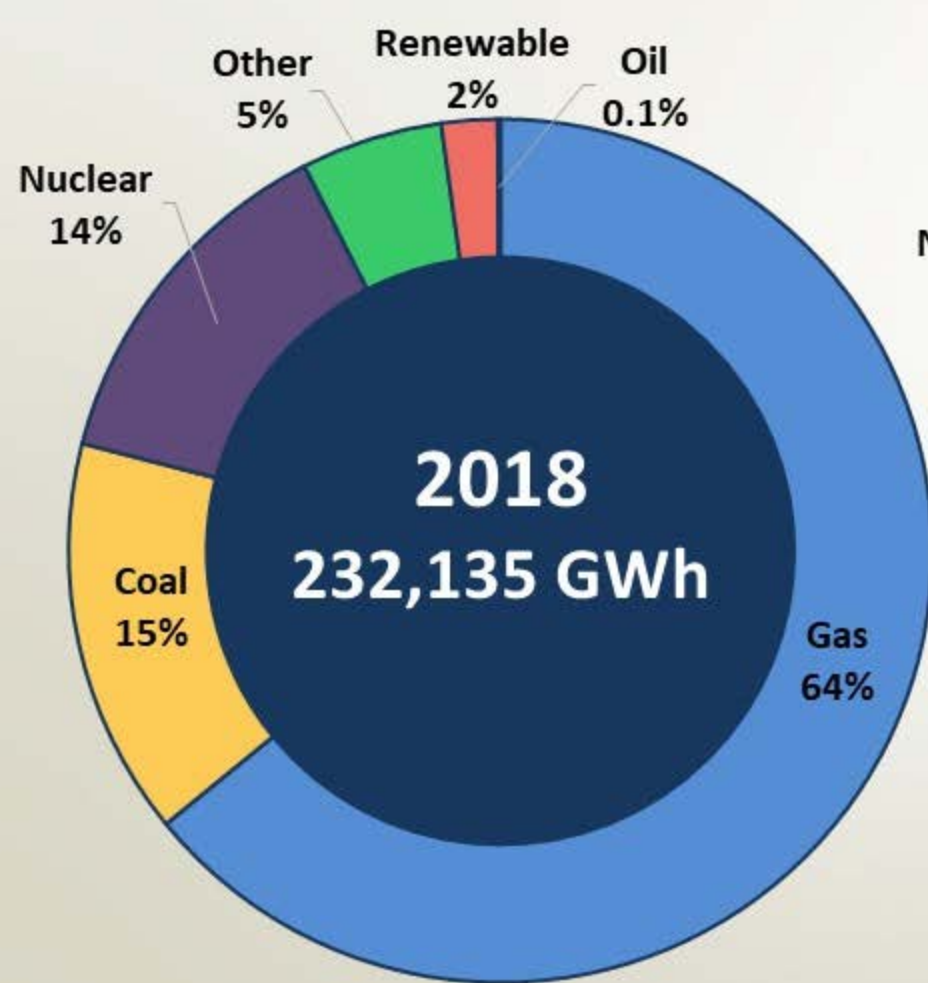
Forecasted Solar

Firm Summer Capacity



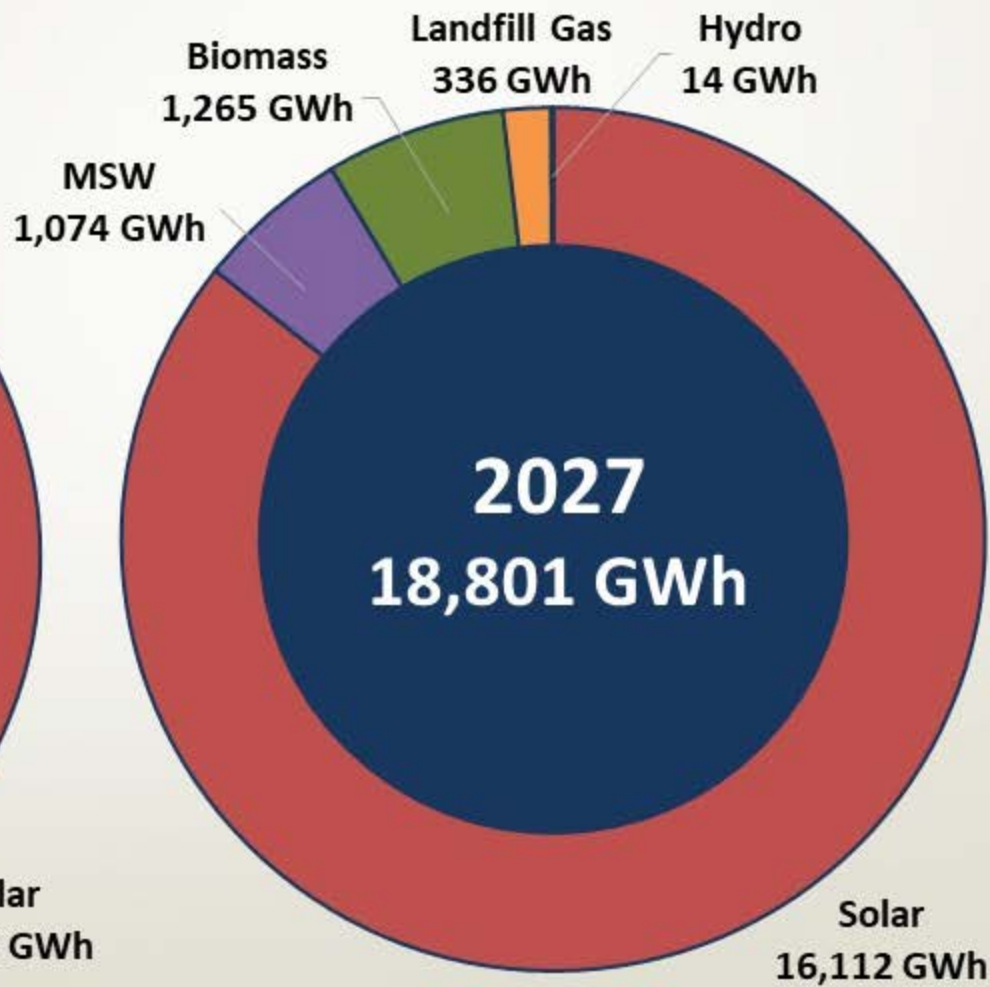
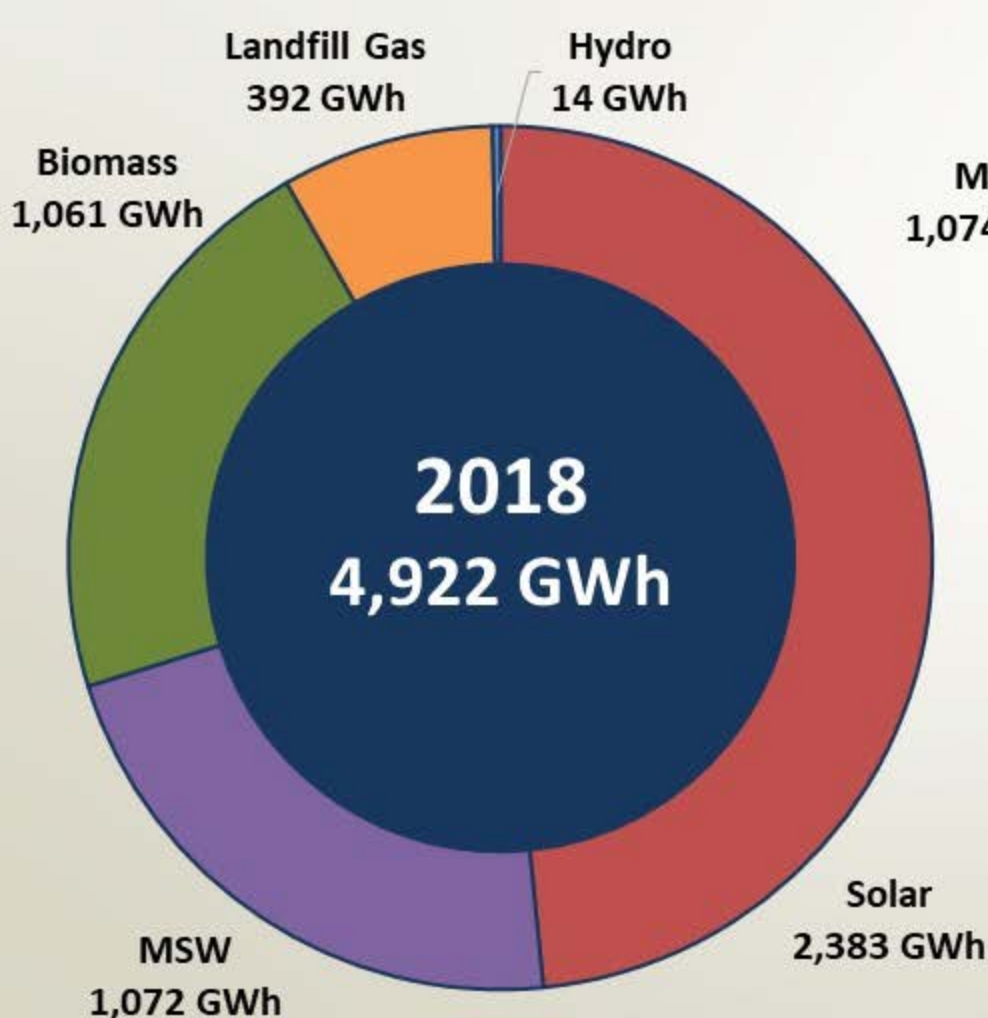
Forecasted Fuel Mix

Net Energy for Load (GWh)



Forecasted Renewable Mix

Total Energy Served



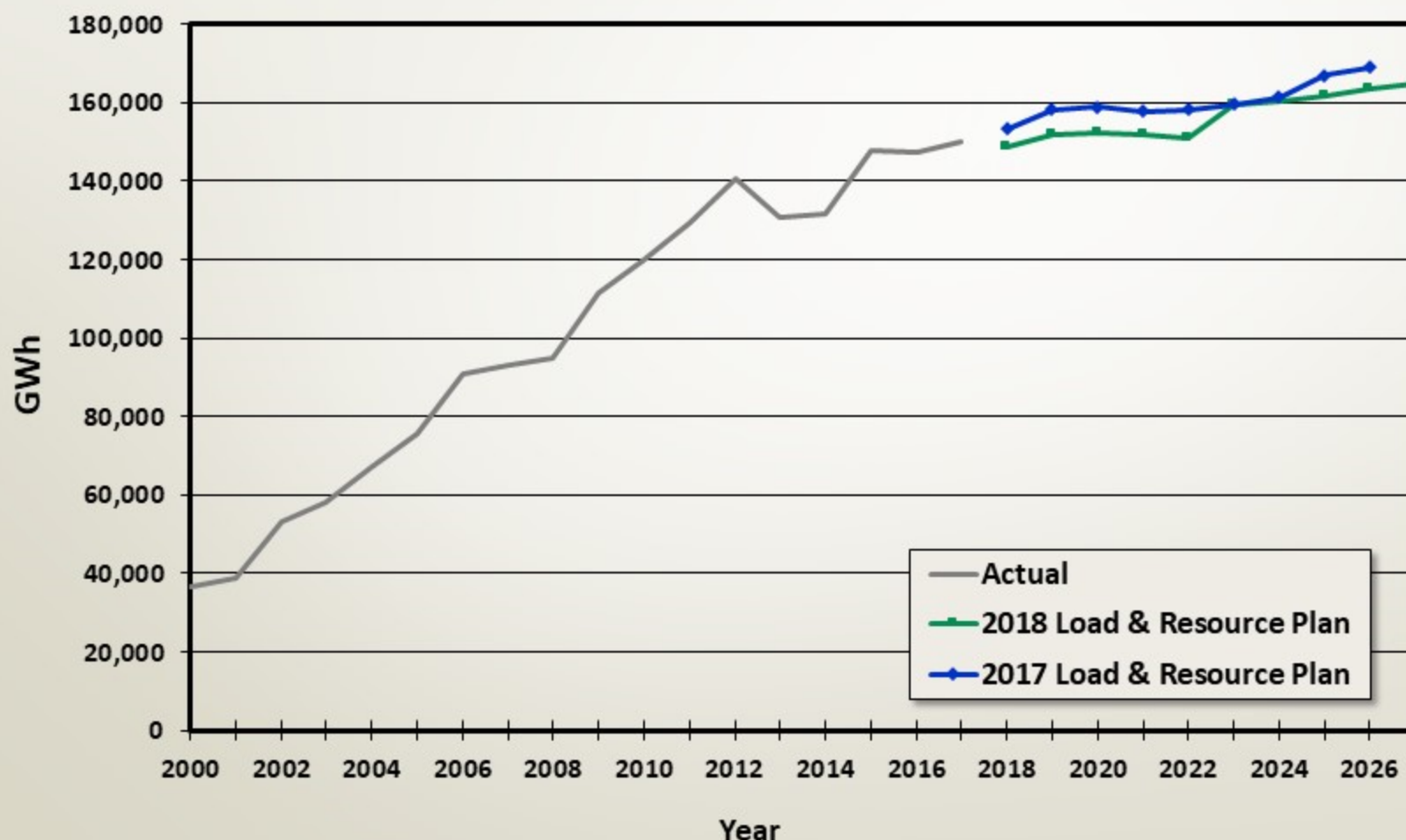
Natural Gas Infrastructure in Florida

- 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

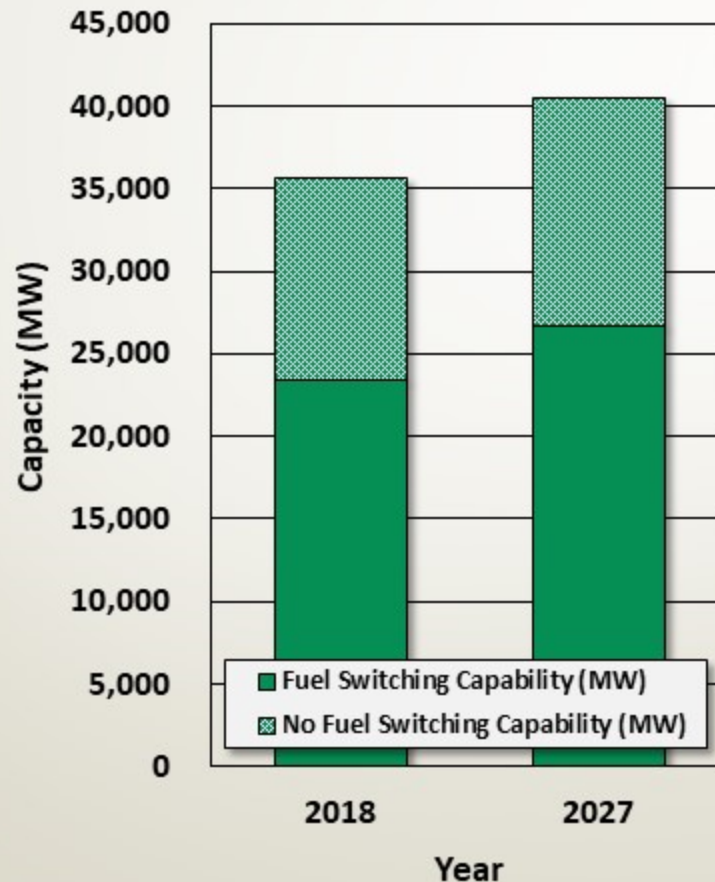
Energy Production from Natural Gas^{1/}



^{1/} Extended nuclear outages for uprate work resulted in higher gas usage in 2012

Natural Gas Alternate Fuel Capability

Summer Capacity (MW)



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?