Florida Public Service Commission
2017 Ten-Year Site Plan Workshop
FRCC Presentation

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President and CEO

September 12, 2017

Agenda

FRCC Load & Resource Plan

- 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

Reliability Assurance Process – FRCC

- April 2017 Energy Alert

Florida Reliability Coordinating Council

Vision: To maintain a highly reliable and secure bulk power system for peninsular Florida

2017 Load & Resource Plan
Executive Summary

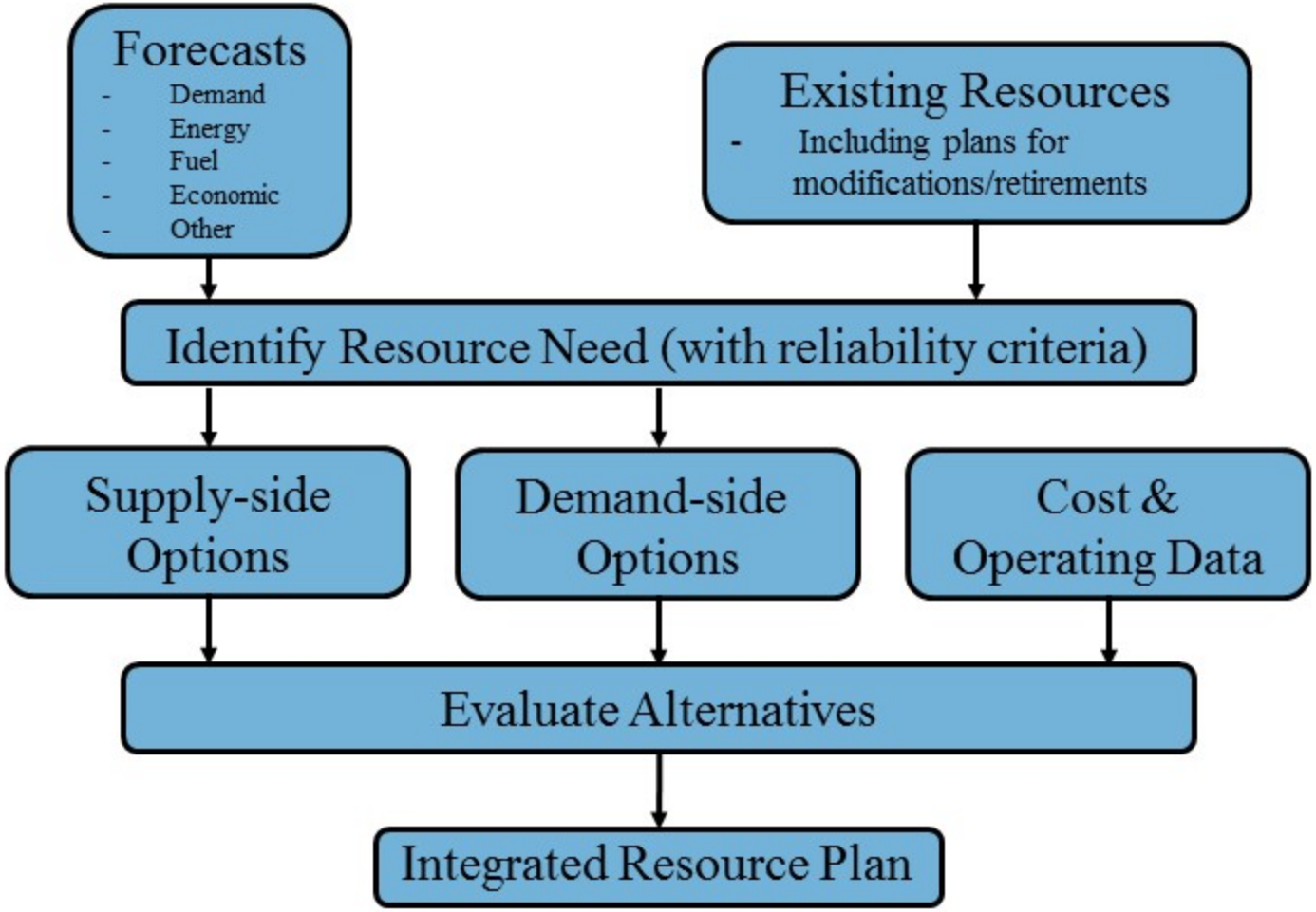
- Firm peak demand forecasts slightly lower than 2016 TYSP
- Forecasted energy sales comparable to 2016 TYSP
- 9,200 MW of new firm generation planned over the forecast horizon
- Planned Reserve Margins at or above 20%
- Demand Side Management (DSM) projected to be a significant component of projected reserves

2017 Load & Resource Plan
Executive Summary (cont.)

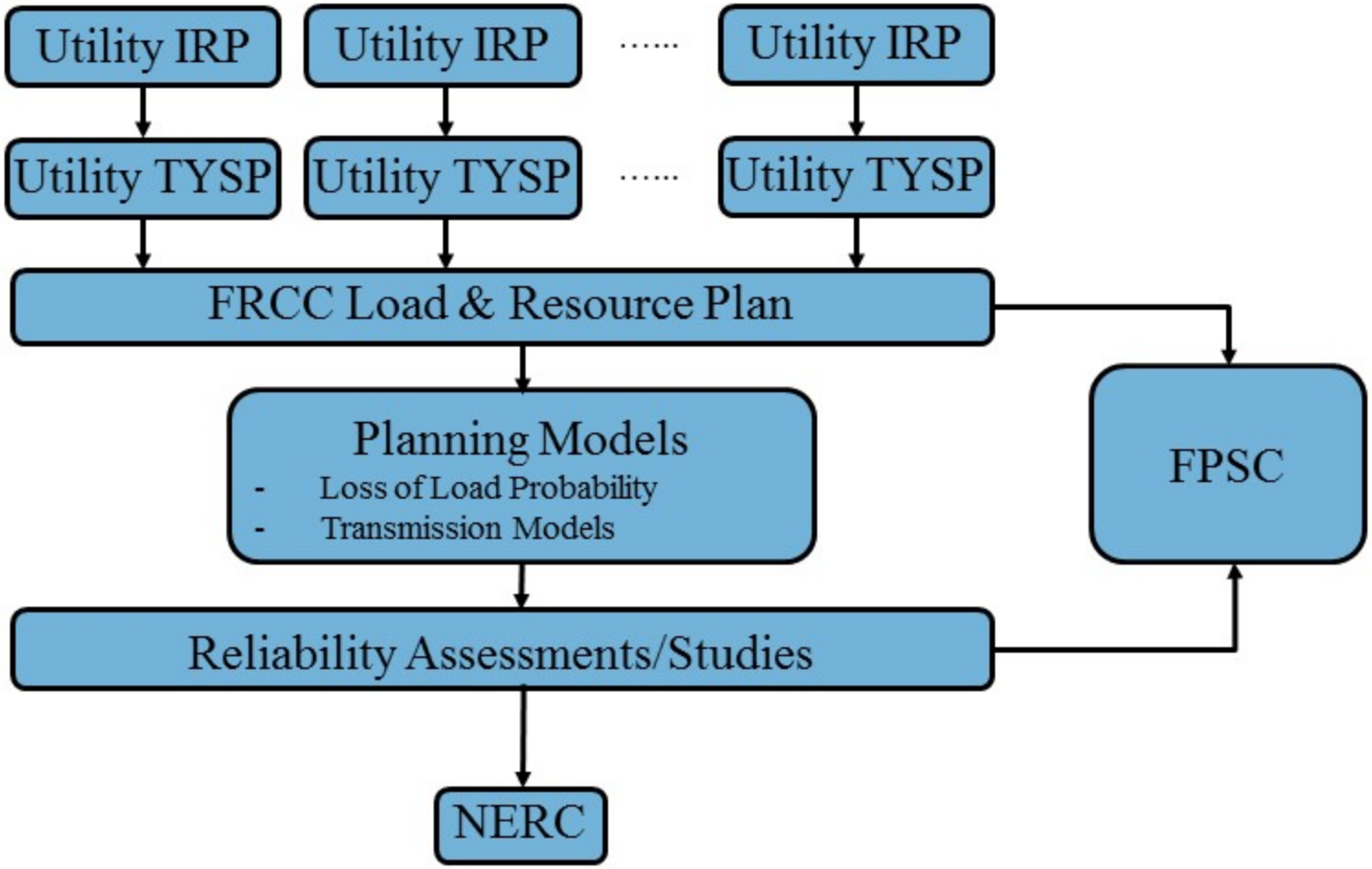
- Changes to FRCC Region's fuel mix over the next ten years (as a % of total energy served):
  - Natural Gas increases from 63% to 67%
  - Renewable increases from 2% to 5%
  - Coal decreases from 19% to 12%
- Solar energy increases 7,600 GWh
- Third major natural gas pipeline in-service July 2017

FRCC
Load & Resource
Plan

Utility Integrated Resource Planning (IRP) Process Overview



FRCC Planning Process Overview



Load Forecast and Demand-Side Management (DSM)

- Firm peak demand forecasts slightly lower than 2016 TYSPs
  - Firm summer and winter peak demands grow 1.1% and 0.9% per year; respectively
- Forecasted energy sales comparable to 2016 TYSPs
  - Net Energy for Load grows 0.9% per year

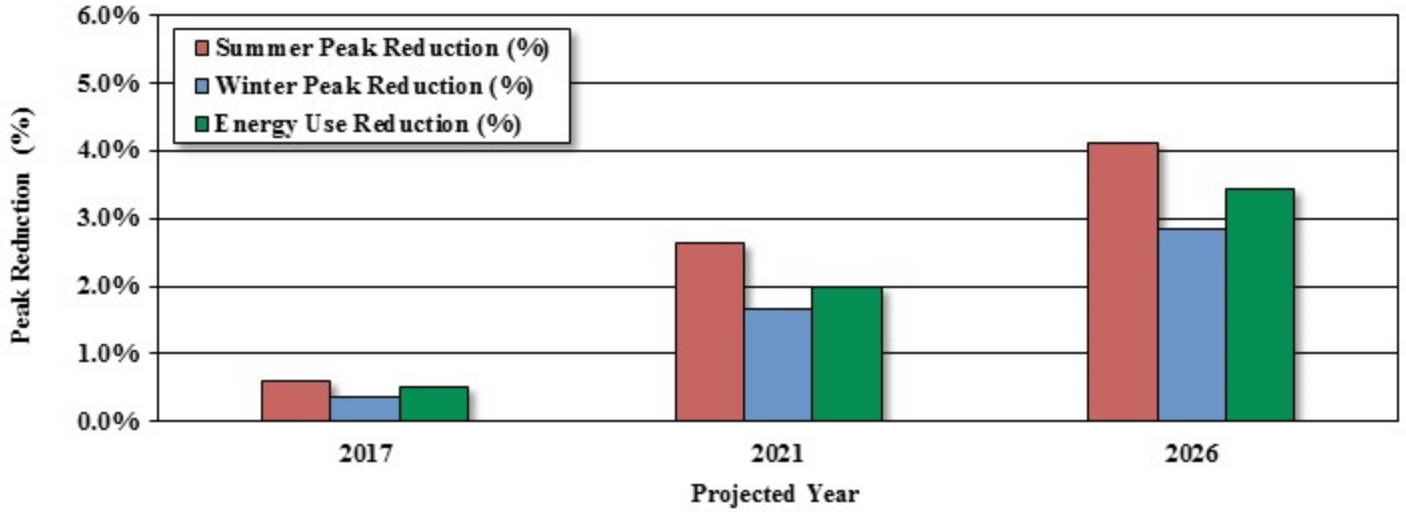
Load Forecast and DSM (cont.)

- Demand Response (DR) reduces firm summer peak (MW) by 6.3% on average
- Utility-sponsored Energy Efficiency/Energy Conservation (EE/EC) programs reduce summer peak (MW) by 1.4% by 2026
- Energy Efficiency delivered through mandated codes and standards reduces summer peak (MW) by at least 4.1% by 2026
- DSM is made up of DR and Utility-sponsored EE/EC
- 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
- Actual employment growth remains healthy, but wage and income growth have not kept pace
- Increasing impacts from codes and standards and also (to a lesser extent) from customer-owned distributed generation (solar)
- Commercial customer base is being monitored due to challenges presented by online commerce

Estimated Cumulative Impacts of Energy Efficiency Codes and Standards[1/ 2/]

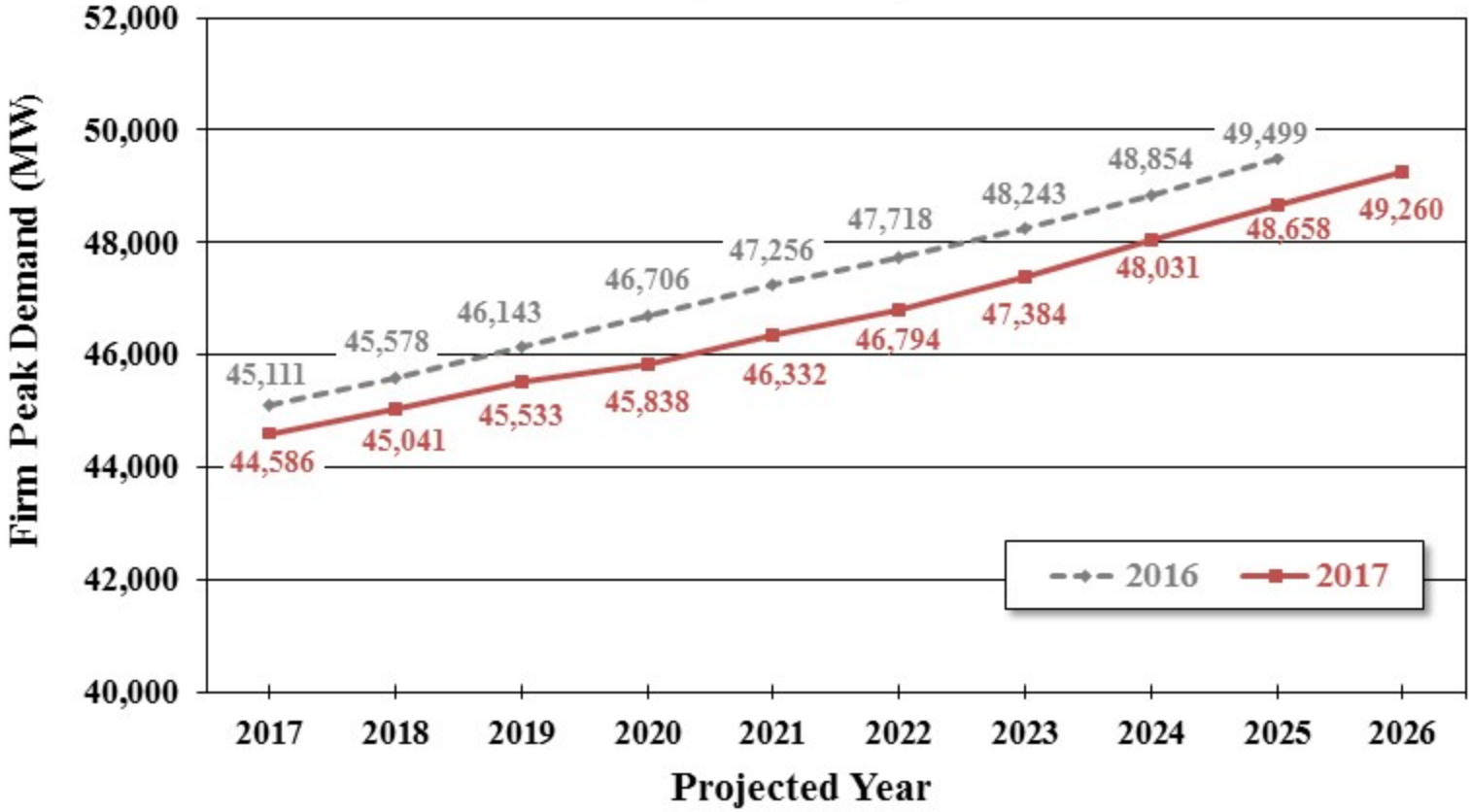


	2017	2021	2026
Summer Peak Reduction (MW)	300	1,300	2,100
Winter Peak Reduction (MW)	100	700	1,300
Energy Use Reduction (GWh)	1,200	4,800	9,000

[1/] Two utilities provide estimates on the incremental (2017-on) impacts of Energy Efficiency codes and standards. These impacts were compared against peak and NEL for all utilities. The amounts above likely understate the full impact of code and standards – since not all utilities were able to estimate impacts.

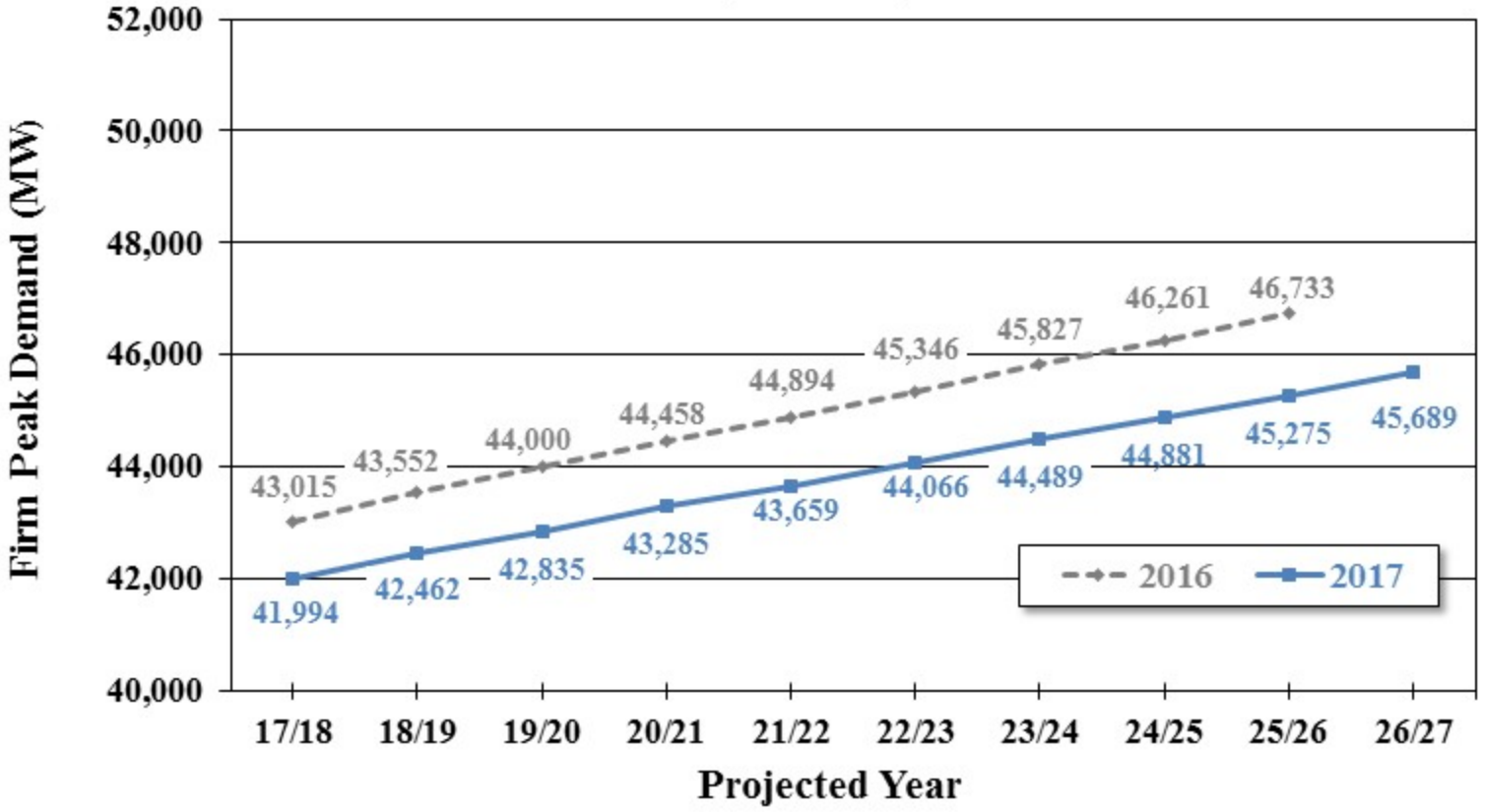
[2/] For data and charts shown after this slide, Energy Efficiency codes and standards are embedded within utility load forecasts

Comparison of 2016 vs. 2017
Firm Peak Demand Forecast[1/]
(Summer)



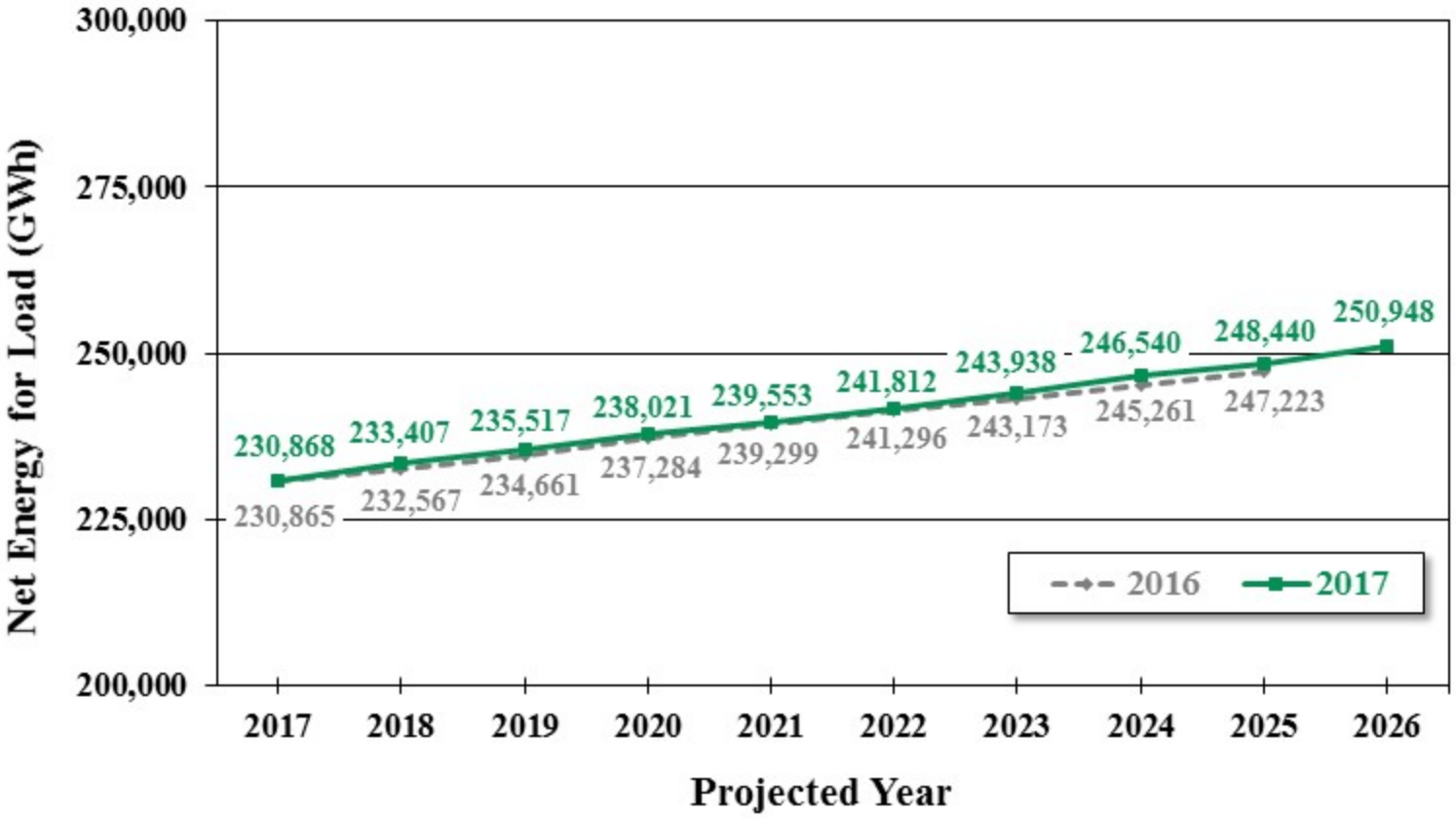
[1/] Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2017-on) utility sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards

Comparison of 2016 vs. 2017 Firm Peak Demand Forecast[1/] (Winter)



[1/] Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2017-on) utility sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards

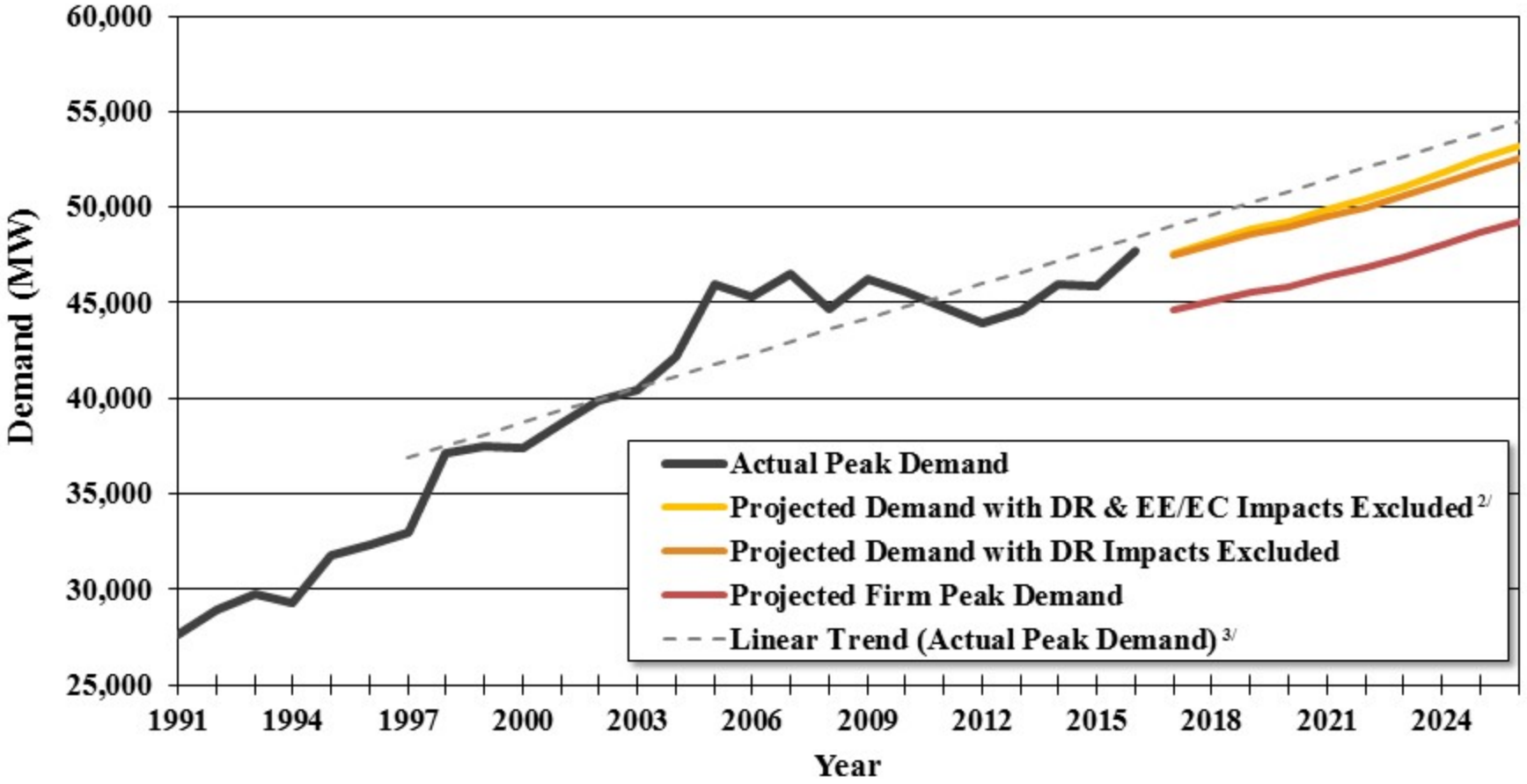
Comparison of 2016 vs. 2017
Net Energy for Load (NEL) Forecast



[1/] Firm Peak Demand includes impacts of DSM (cumulative Demand Response and incremental (2017-on) utility sponsored Energy Efficiency/Energy Conservation) as well as Energy Efficiency Codes and Standards

Summer Peak Demands

Actual and Forecasted[1/]

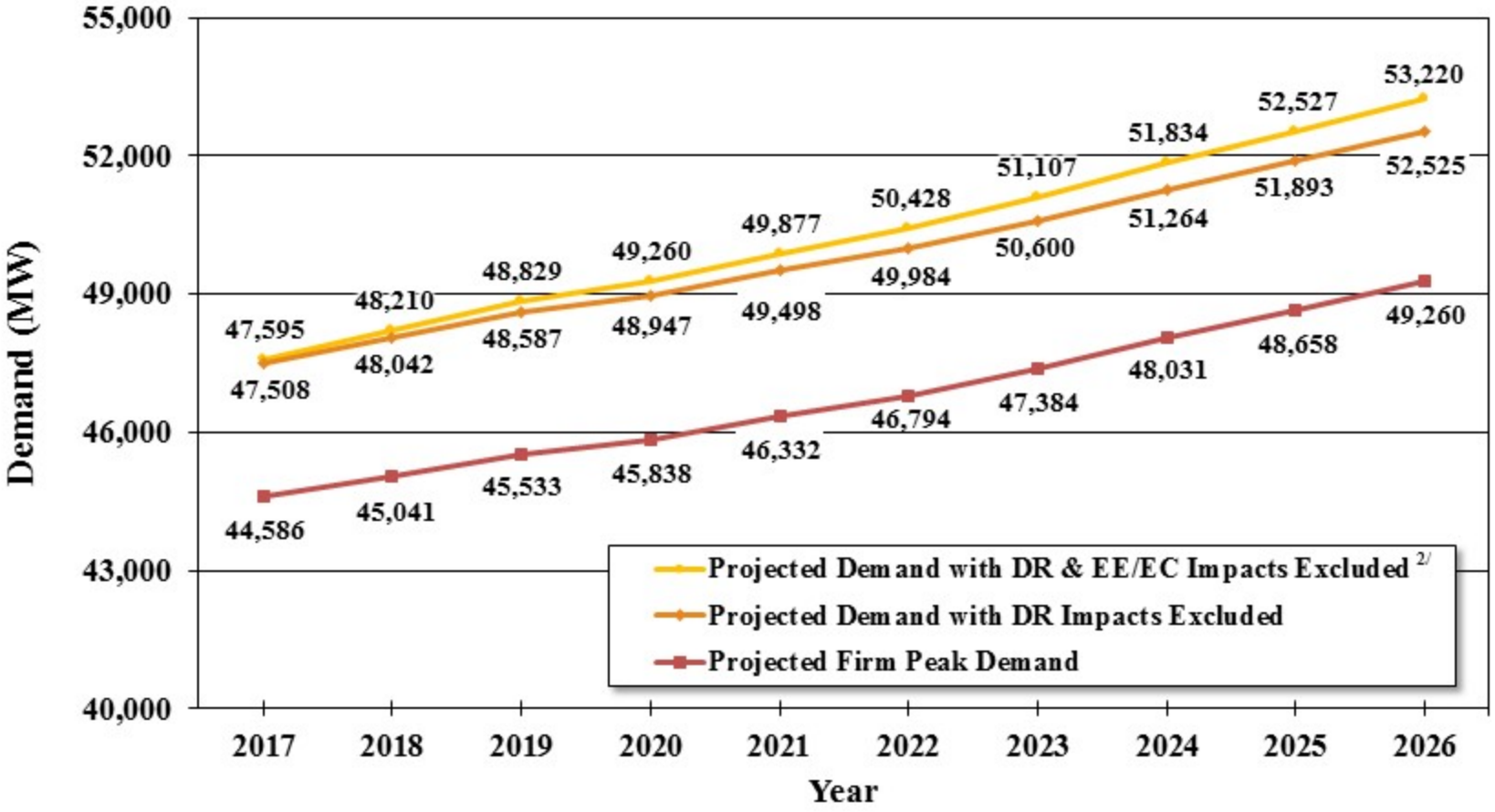


1/ Projected impacts of Energy Efficiency codes and standards are included in all projections.

2/ Impacts from cumulative Demand Response (DR) and incremental (2017-on) utility-sponsored Energy Efficiency/Energy Conservation (EE/EC) programs are excluded.

3/ Linear trend based on actual peak demand from 1997 to 2016.

Forecasted Summer Peak Demand[1/]



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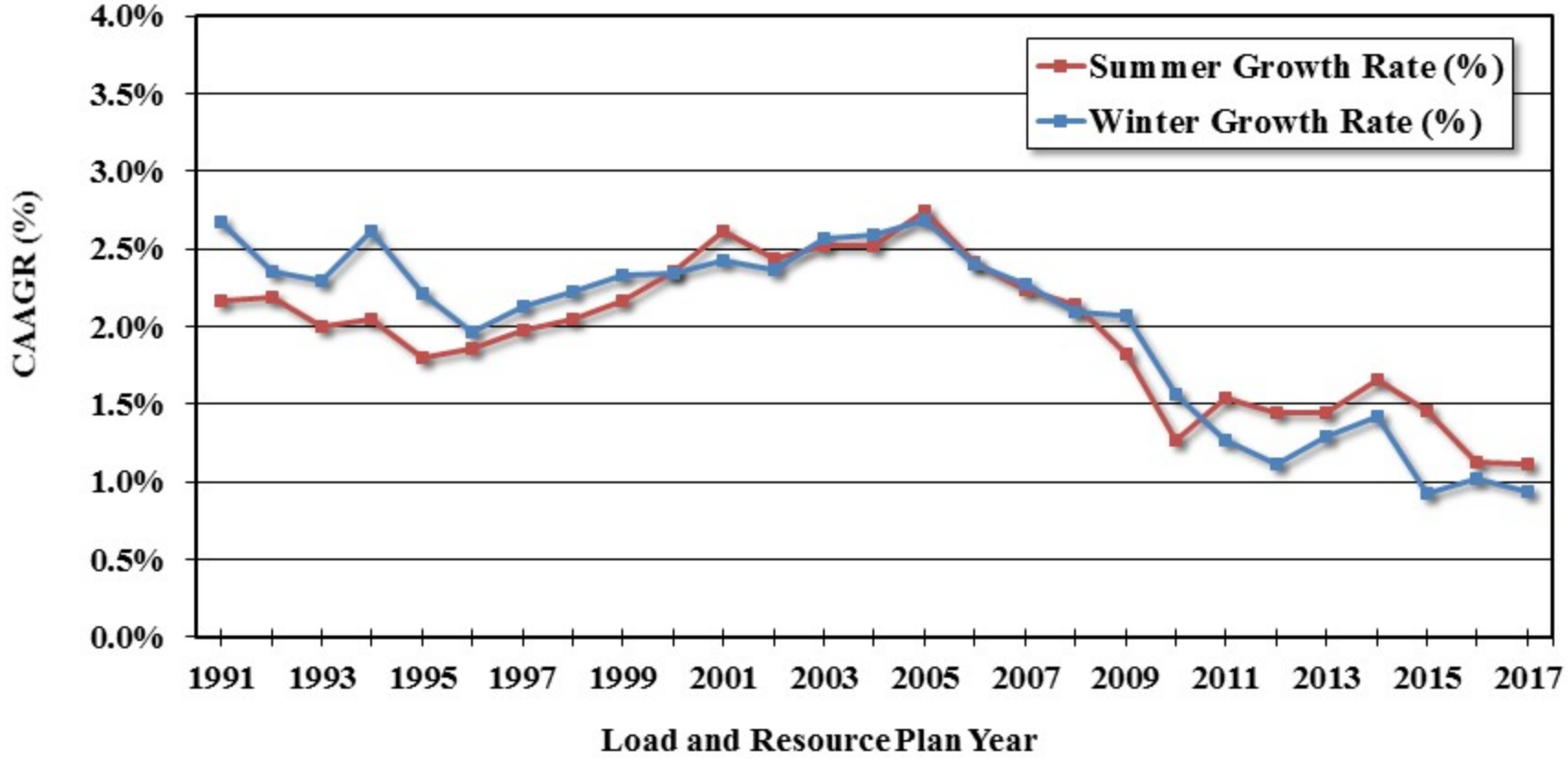
Historical Compound Average Annual Growth Rate[1/] for Firm Peak Demand (MW)

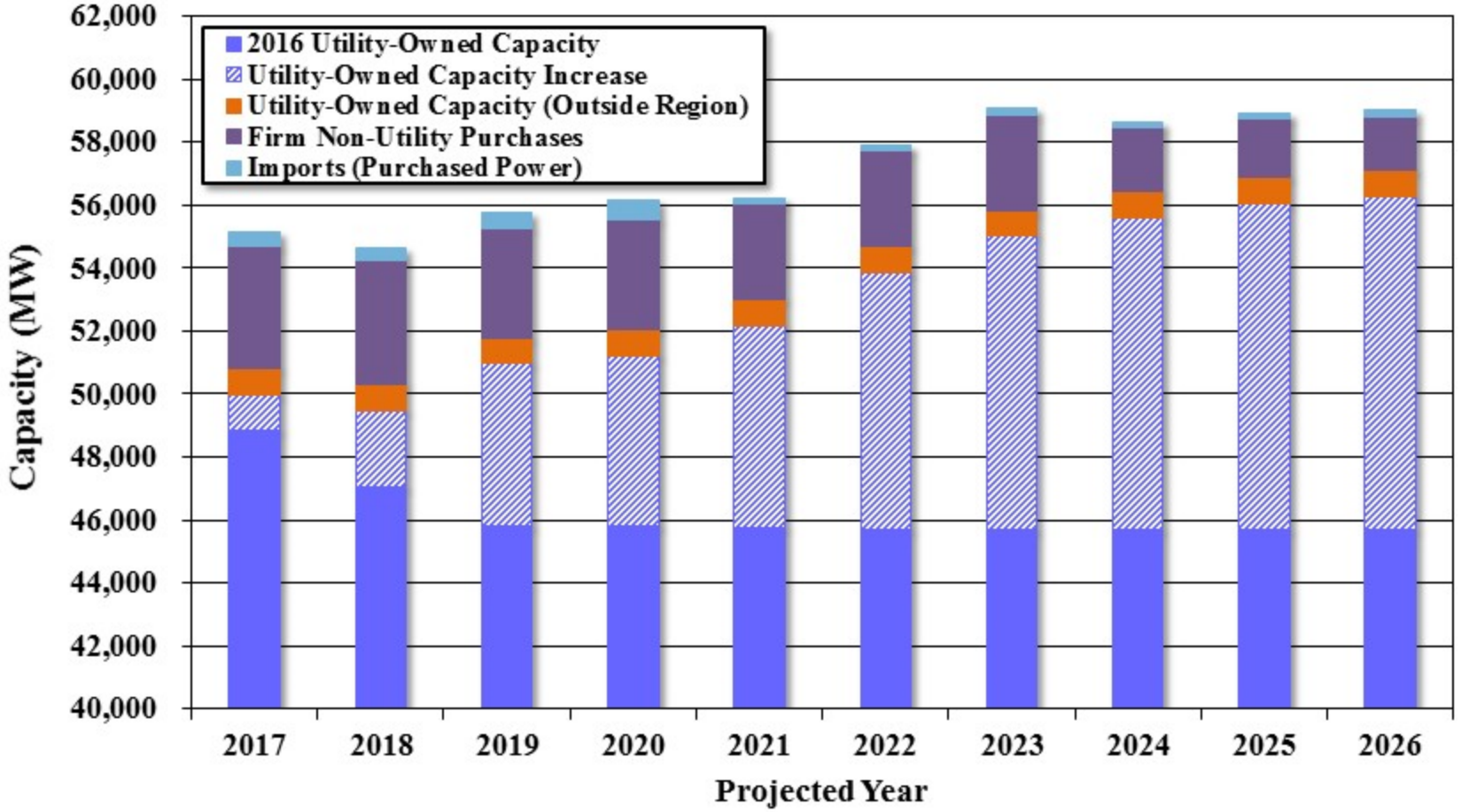


[1/]Projected growth rate from prior forecasts

Generation Additions and Reserve Margins

- 9,200 MW of new generation planned over the forecast horizon
- Planned Reserve Margins at or above 20%
- DSM projected to be a significant component of projected reserves

Projected Total Available Capacity
(Summer)



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
	3,599 MW

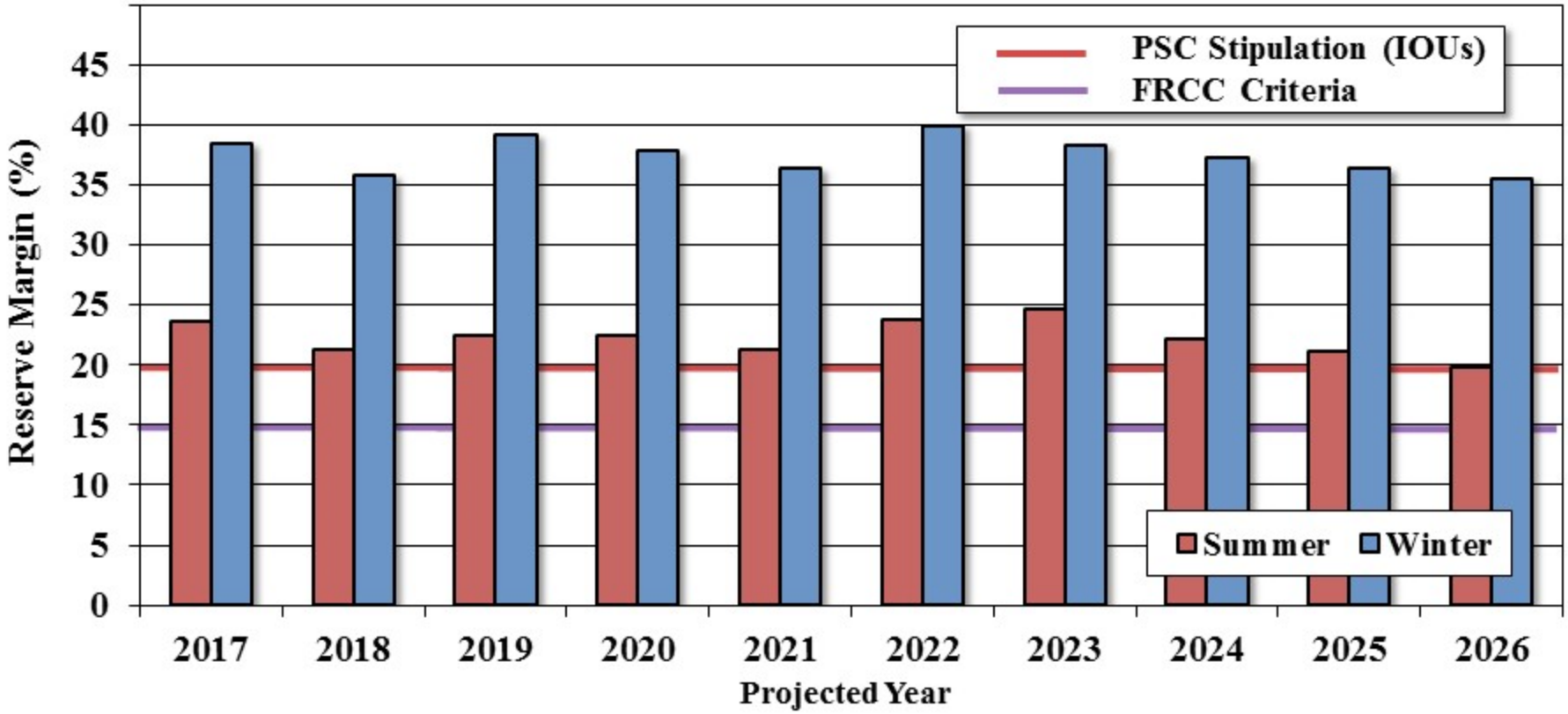
Planned Nuclear Capacity (Summer)

Turkey Point 3 Upgrade	(10/2018)	20 MW
Turkey Point 4 Upgrade	(5/2019)	20 MW
		40 MW

[1/]Existing generation as of December 31, 2016

Planned Reserve Margin[1/ 2/]

(Based on Firm Load)

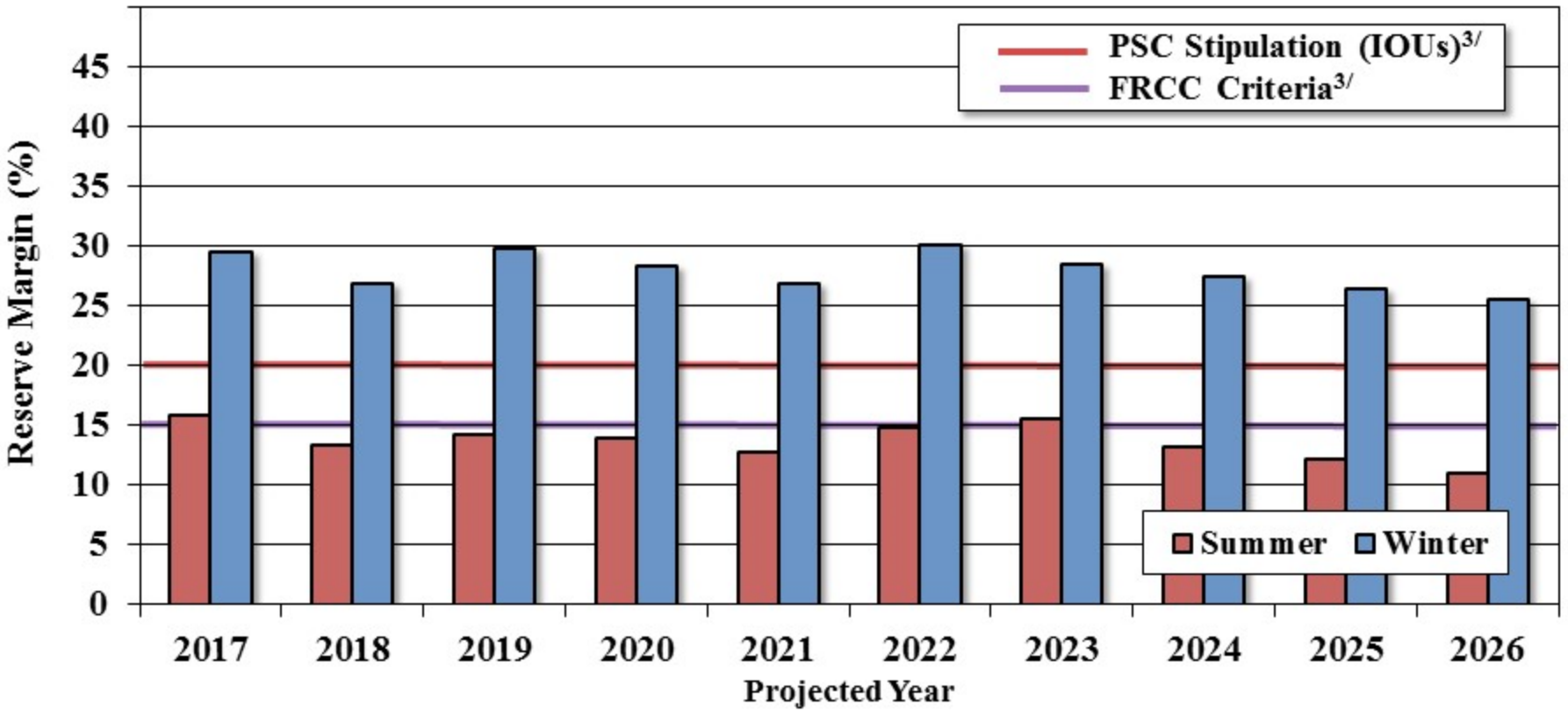


[1/] Projected impacts of Energy Efficiency codes and standards are included in all projections.

[2/] Impacts from cumulative Demand Response (DR) and incremental (2017-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/]



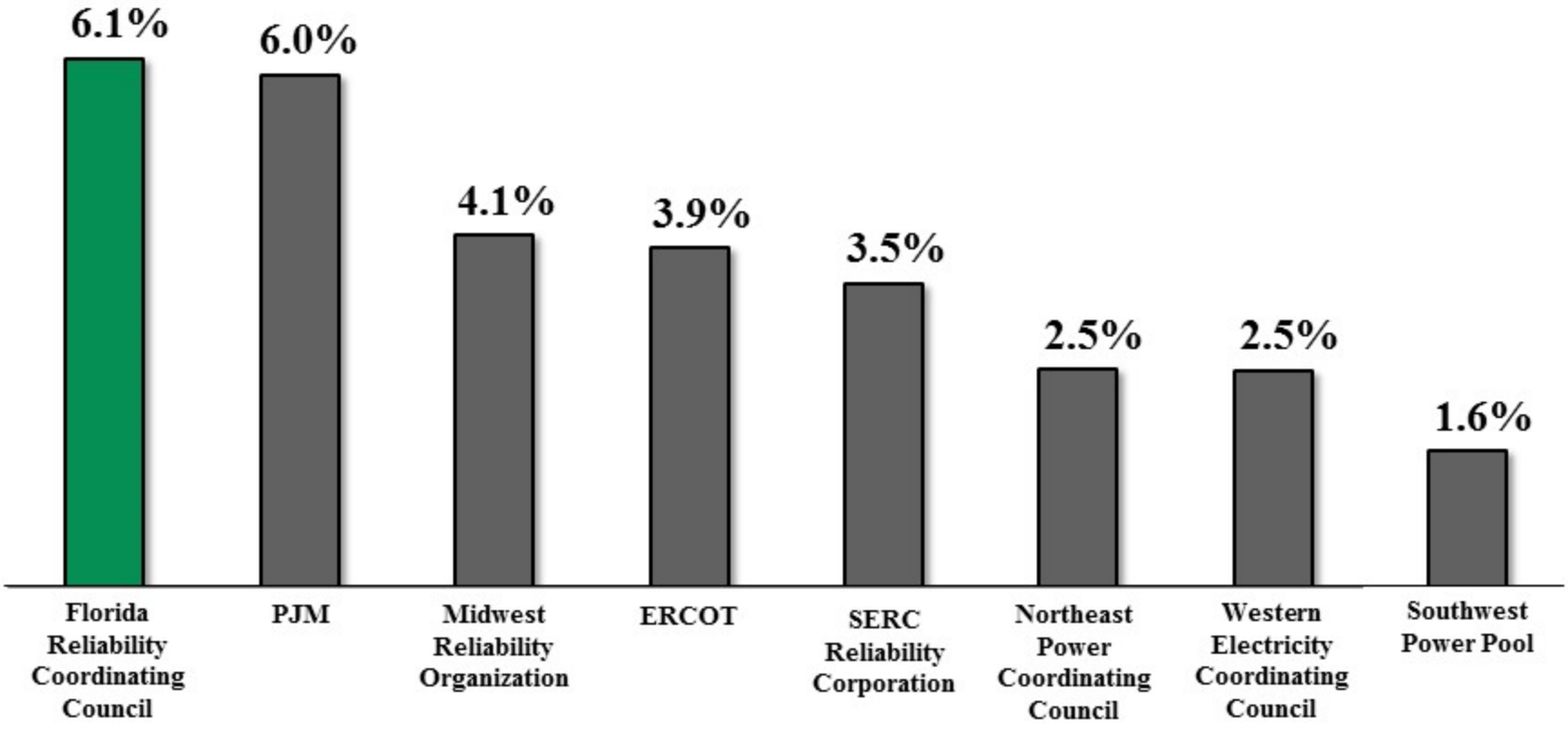
[1/] Projected impacts of Energy Efficiency codes and standards are included in all projections.

[2/] Impacts from cumulative Demand Response (DR) and incremental (2017-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

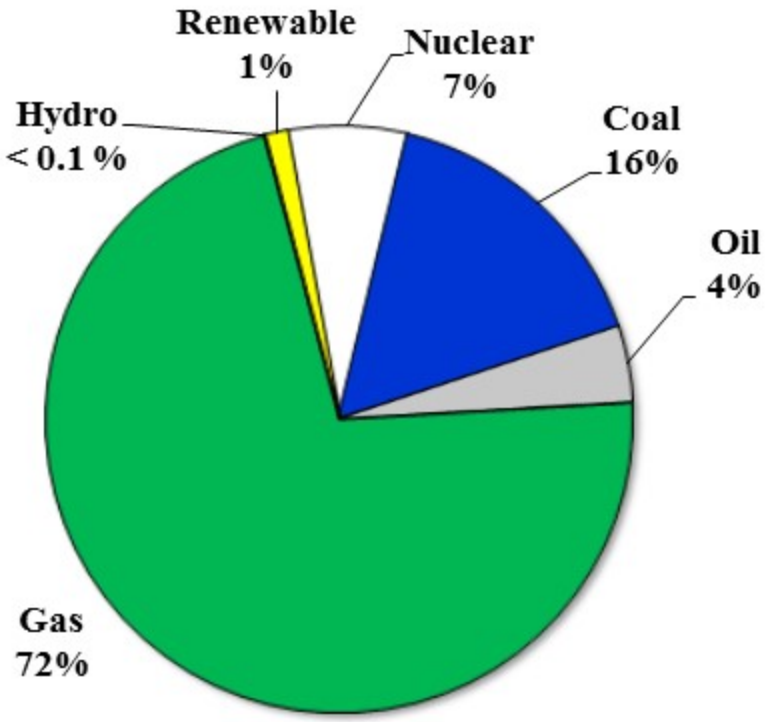
Summer 2017



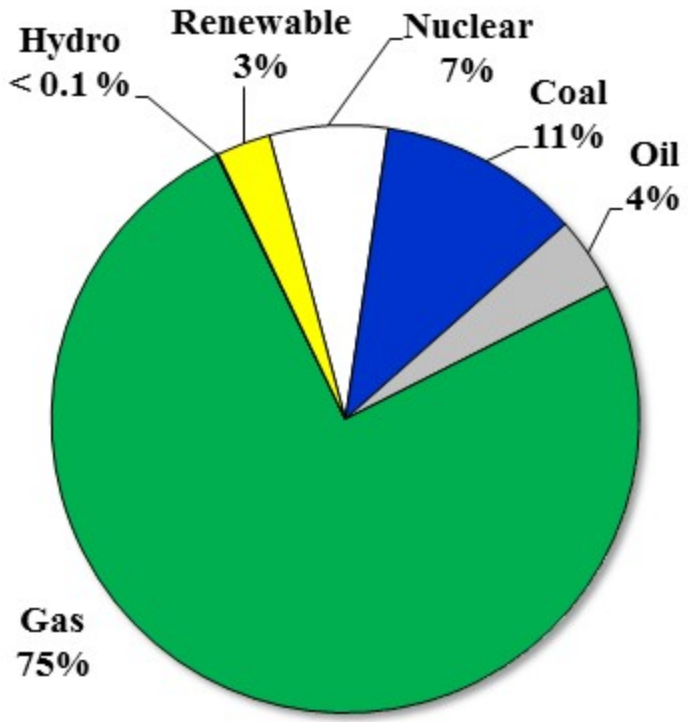
Source: North American Electric Reliability Corporation's (NERC) 2017 Summer Reliability Assessment (http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2017%20Summer%20Assessment.pdf)

Forecasted Fuel Mix

Summer Capacity[1/] (MW)



2017
55,120 MW

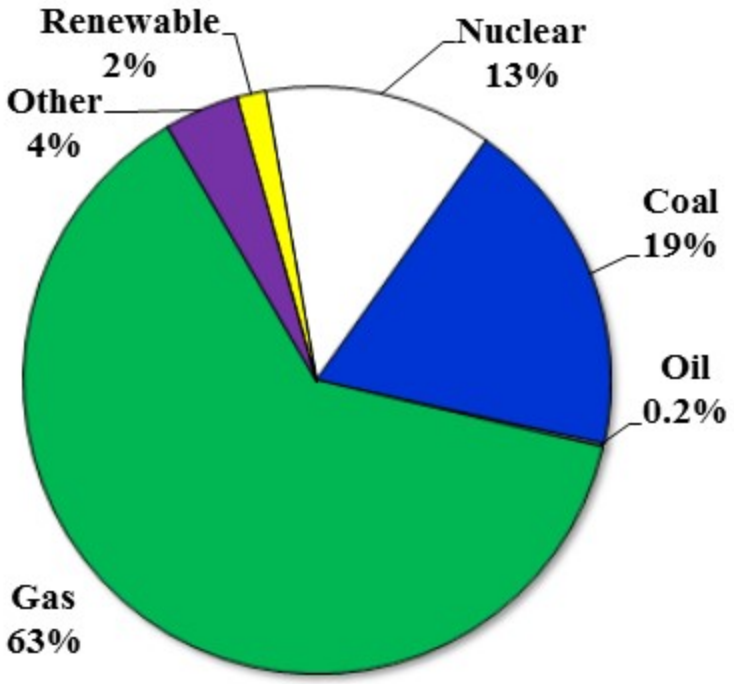


2026
59,028 MW

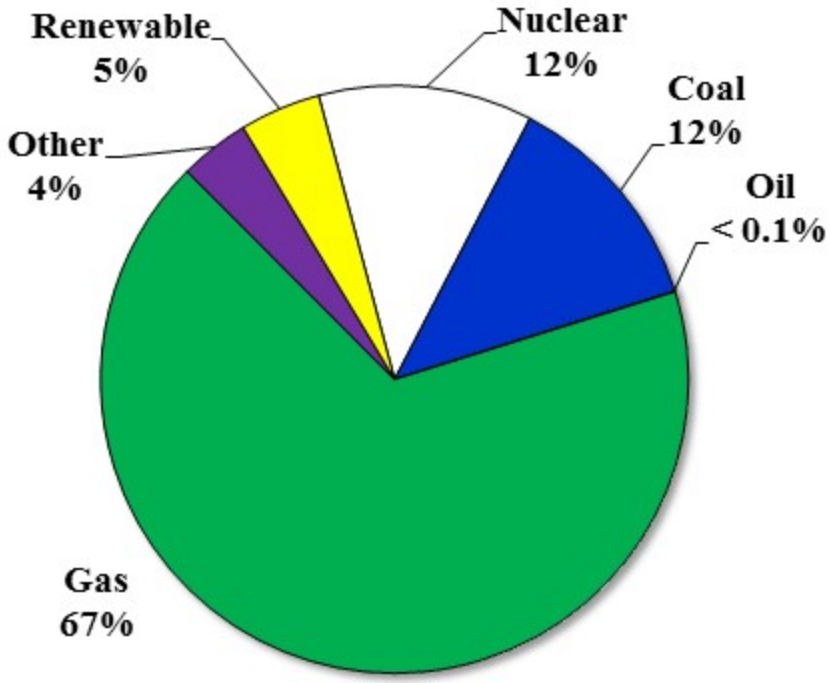
[1/] Only accounts for firm capacity

Forecasted Fuel Mix

Net Energy for Load (GWh)



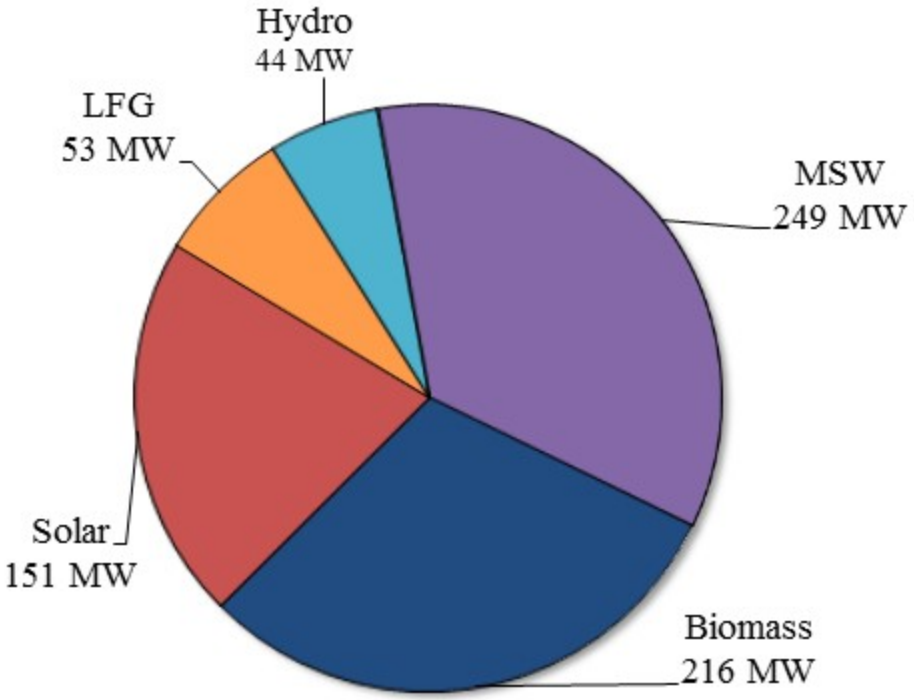
2017
230,868 GWh



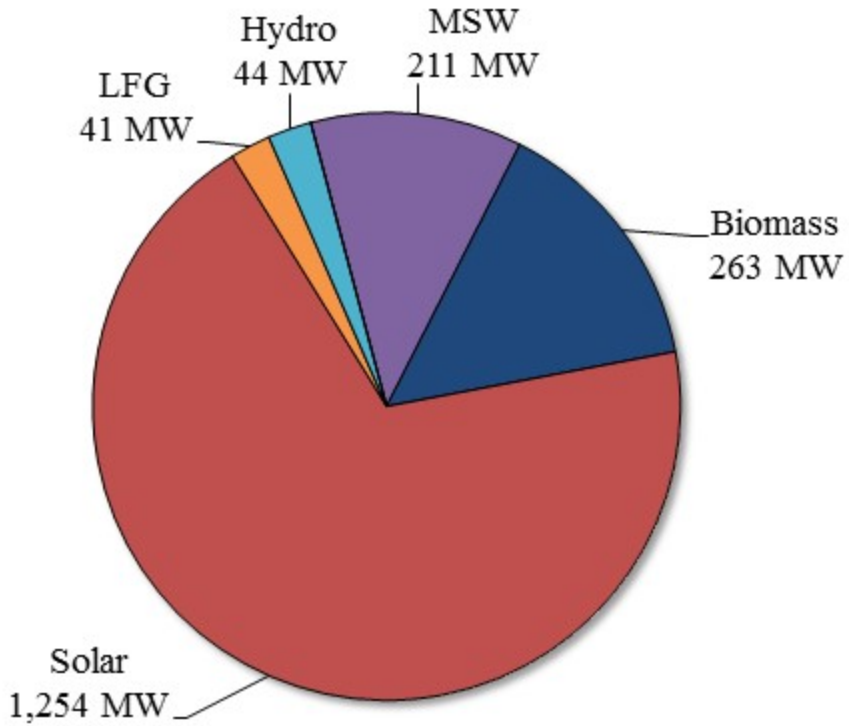
2026
250,948 GWh

Forecasted Renewable Mix

Firm Summer Capacity (MW)



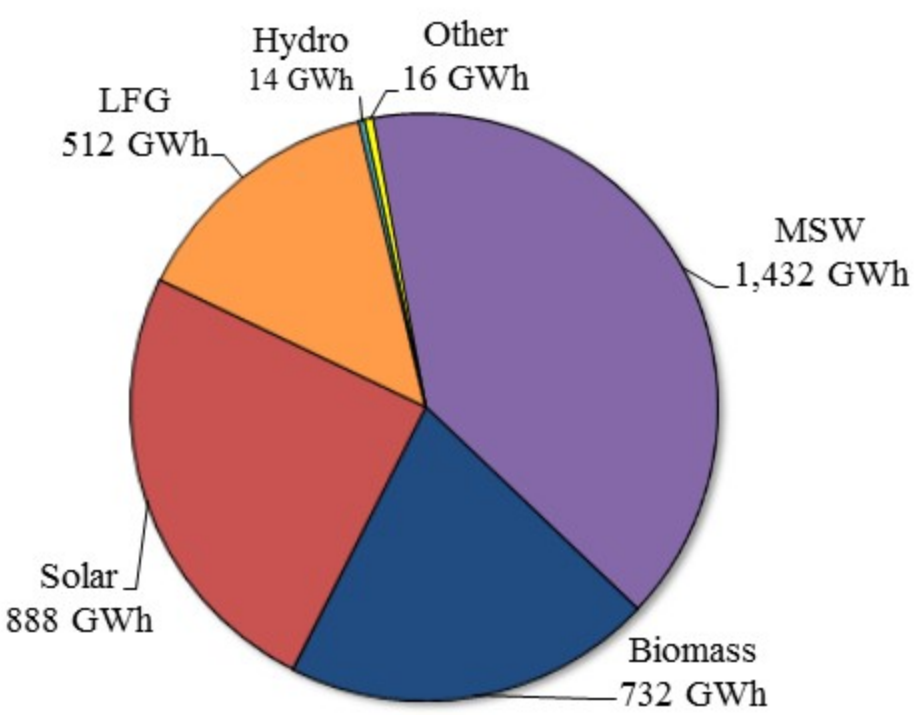
2017
713 MW



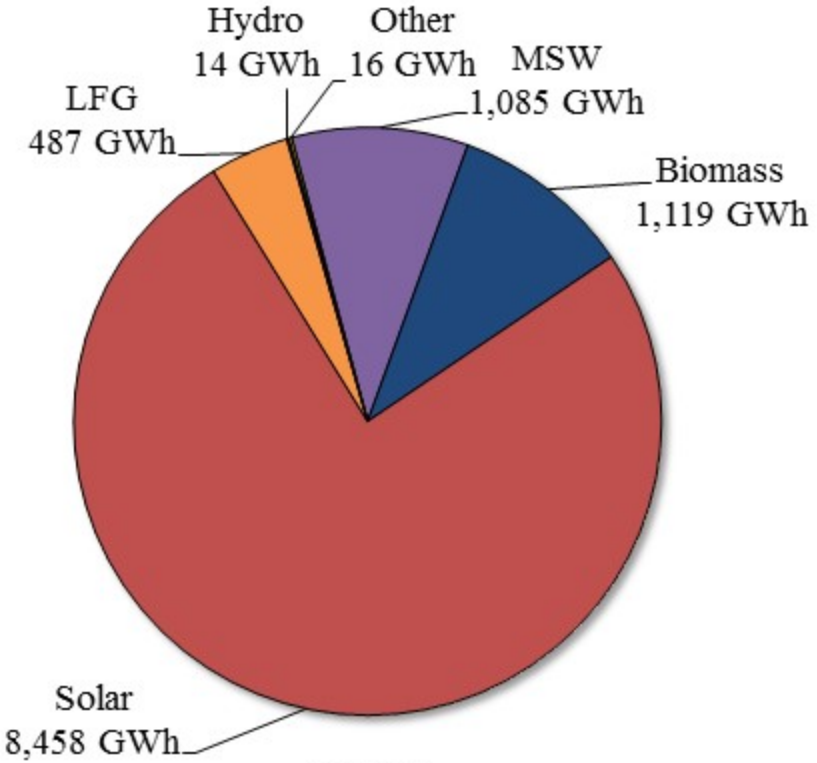
2026
1,813 MW

Forecasted Renewable Mix

Net Energy for Load (GWh)



2017
3,594 GWh



2026
11,179 GWh

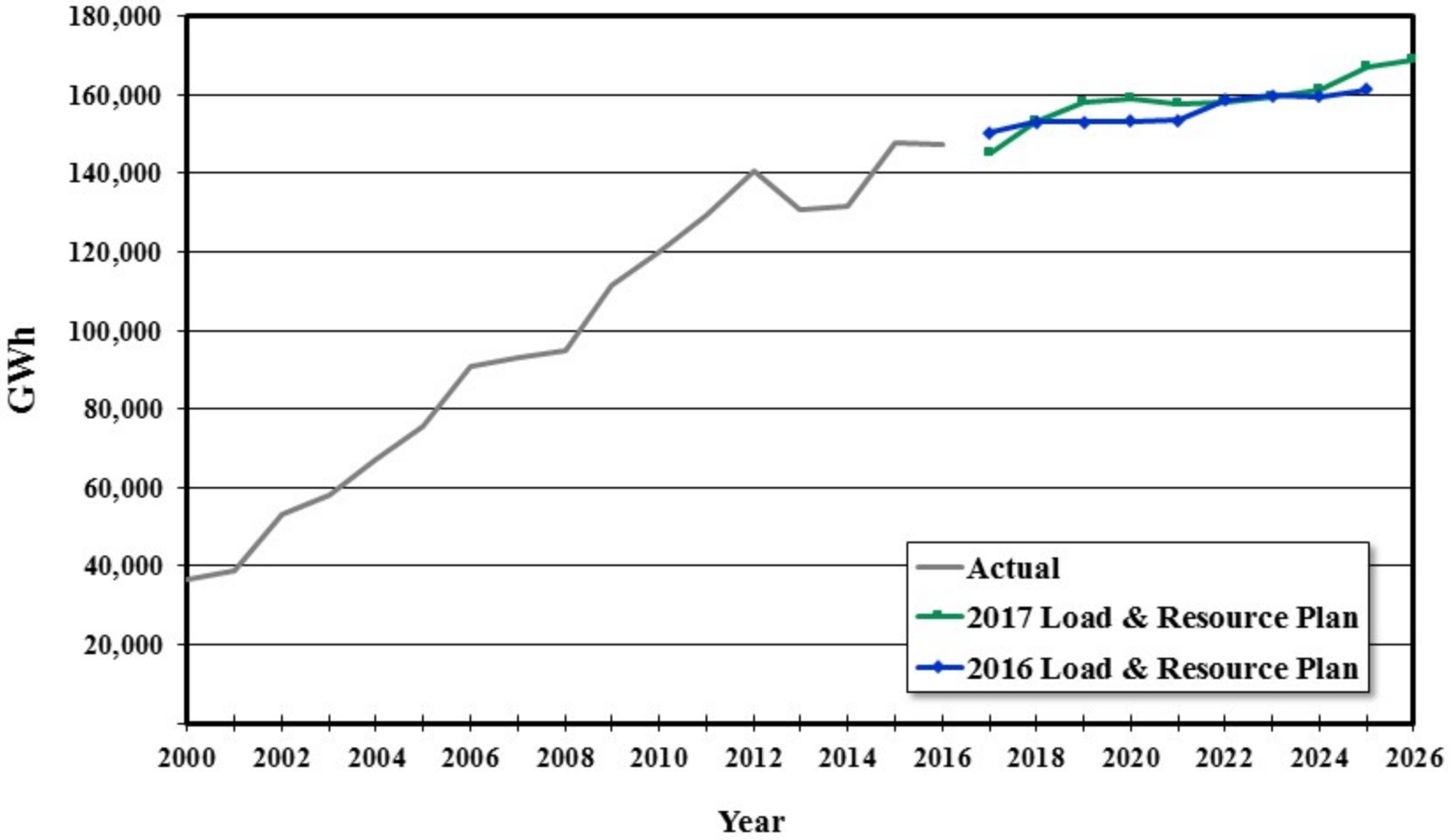
Natural Gas Infrastructure in Florida

- Three major pipelines supply natural gas to the region
  - Florida Gas Transmission
  - Gulfstream
  - Sabal Trail/Florida Southeast Connection
    - Commercial Operation Date: July 2017
- Gas infrastructure expansion and capabilities on pace with generation additions
- Over the 10-year forecast, natural gas generation with alternate fuel capabilities remains between 64-68%

2017 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

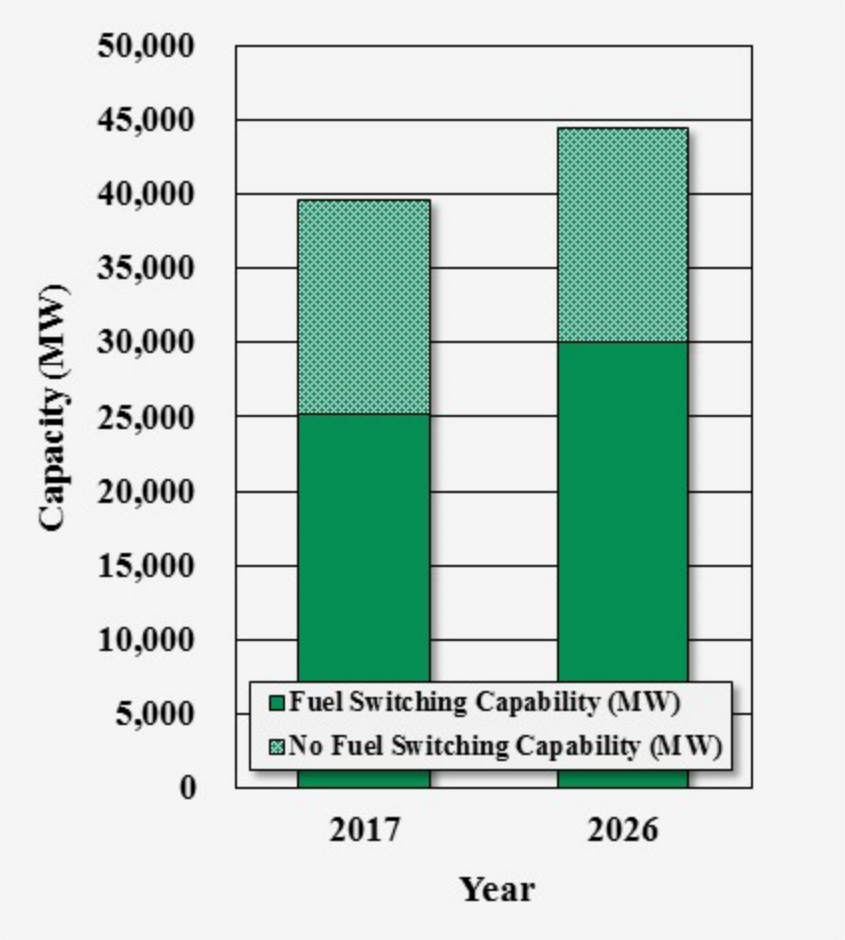
Energy Production from Natural Gas[1/]



[1/] Extended nuclear outages for uprate work resulted in higher gas usage in 2012

Natural Gas Alternate Fuel Capability

Summer Capacity (MW)



Third Gas Pipeline

(Commercial Operation Date: July 2017)

Sabal Trail

Florida Southeast Connection

Natural Gas Storage Outside of Florida

- Florida utilities have contracts with NG storage facilities out of state
  - Currently have rights to approximately 9.4 Bcf of NG storage which can generate a total of 936 GWh of energy
  - Able to withdraw approximately 0.94 Bcf per day which can generate 93 GWh per day
  - Important tool to manage supply disruptions

Data conversions are based on Energy Information Administration's average operating heat rate and average quality of fossil fuel receipts for natural gas units (http://www.eia.gov/tools/faqs/faq.cfm?id=667&t=2)

Reliability Assurance Processes – FRCC

April 2017 Energy Alert

FRCC Generating Capacity Shortage Plan

- Revised Plan was transmitted to Commission staff in November 2016
  - Implemented by FRCC on April 1, 2017 and adopted by Commission rule April 19, 2017
  - Included conceptual and terminology changes regarding generating capacity shortages
  - Incorporated NERC Reliability Standard concept of "Energy Emergency Alerts"
  - Replaced previous plan phases on "Alerts" and "Emergency" declarations and focused "Advisory" declarations on winter conditions only

Generating Capacity Advisory

- Declared by the FRCC RC when:
  a) Low temperatures (Jacksonville $\leq 21^{\circ}F$, Tampa $\leq 31^{\circ}F$, or Miami $\leq 40^{\circ}F$) or
  b) Operating Margin < 2 times the largest generating unit running or
  c) State-wide fuel supply or delivery issues
- Note: A Generating Capacity Advisory does not indicate an imminent threat of an Energy Emergency

Energy Emergency Alerts (EEA)

- EEA range in levels from low (1) to high (3)
- FRCC Operating Entities (OE) may implement the following during an Advisory or EEA to maintain reliability:
  - Awareness programs and public appeals to reduce demand
  - Demand Response (non-firm load)
  - Load conservation measures
  - Firm Load Interruption imminent or in progress to maintain load to generation balance and transmission system integrity
- Other OEs within the region communicate available generation capacity to assist

EEA Alert Levels

- EEA – 1: All available resources in use
- EEA – 2: Load management procedures in effect
- EEA – 3: Firm load interruption imminent or in-progress

April 28, 2017 EEA-1 Declaration

- At 12:43, FRCC RC declared an EEA-1 on behalf of one FRCC entity due to unexpected loss of generation and higher than normal forecasted peak loads
- Although additional generation became available prior to peak, the FRCC RC maintained the EEA-1 declaration over the peak
- At 17:00, the FRCC RC announced a return to normal operations

Conclusion

- Based on 2017 TYSPs, planned Reserve Margins at or above 20% for all peak periods for the next ten years
  - DSM projected to be a significant component of projected reserves
  - Energy Efficiency codes and standards continue to affect demand and energy forecasts

Conclusion (cont.)

- Changes to FRCC's fuel mix over the next ten years (as a % of total energy served):
  - Natural Gas increases from approximately 63% to 67%
  - Renewable increases from approximately 2% to 5%
  - Coal decreases from approximately 19% to 12%
- Gas infrastructure expansion and capabilities on pace with generation additions
- Peninsular Florida's natural gas pipeline capacity has increased to support electric generation

Questions ?