



2017 Tennessee State Infrastructure Report

(January 1, 2017 – December 31, 2017)

May 2018

This report reflects information for the portion of Tennessee within the PJM service territory.

1. Planning

- Generation Portfolio Analysis
- Transmission Analysis
- Load Forecast

2. Markets

- Capacity Market Results
- Market Analysis

3. Operations

- Emissions Data

- **Existing Capacity:** There is no installed capacity in the part of Tennessee served by PJM.
- **Interconnection Requests:** There are no interconnection requests in Tennessee.
- **Deactivations:** Tennessee had no generation deactivations or deactivation notifications in 2017.
- **RTEP 2017:** Tennessee RTEP 2017 projects total \$13 million in investment. There were no supplemental projects in Tennessee in 2017.
- **Load Forecast:** Tennessee load growth is nearly flat, averaging .5 percent per year over the next 10 years. This aligns with PJM RTO load growth projections.

- **2021/22 Capacity Market:** Compared to the RTO footprint, Tennessee's distribution of generation is less than PJM, demand response is higher, and energy efficiency is similar to PJM.
- **6/1/14 – 5/31/17 Performance:** Tennessee's average daily locational marginal prices were consistently at or below PJM average daily LMPs. Imported resources represent 84.6 percent of generation produced in the PJM region of Tennessee.



PJM Service Area – Tennessee

(December 31, 2017)



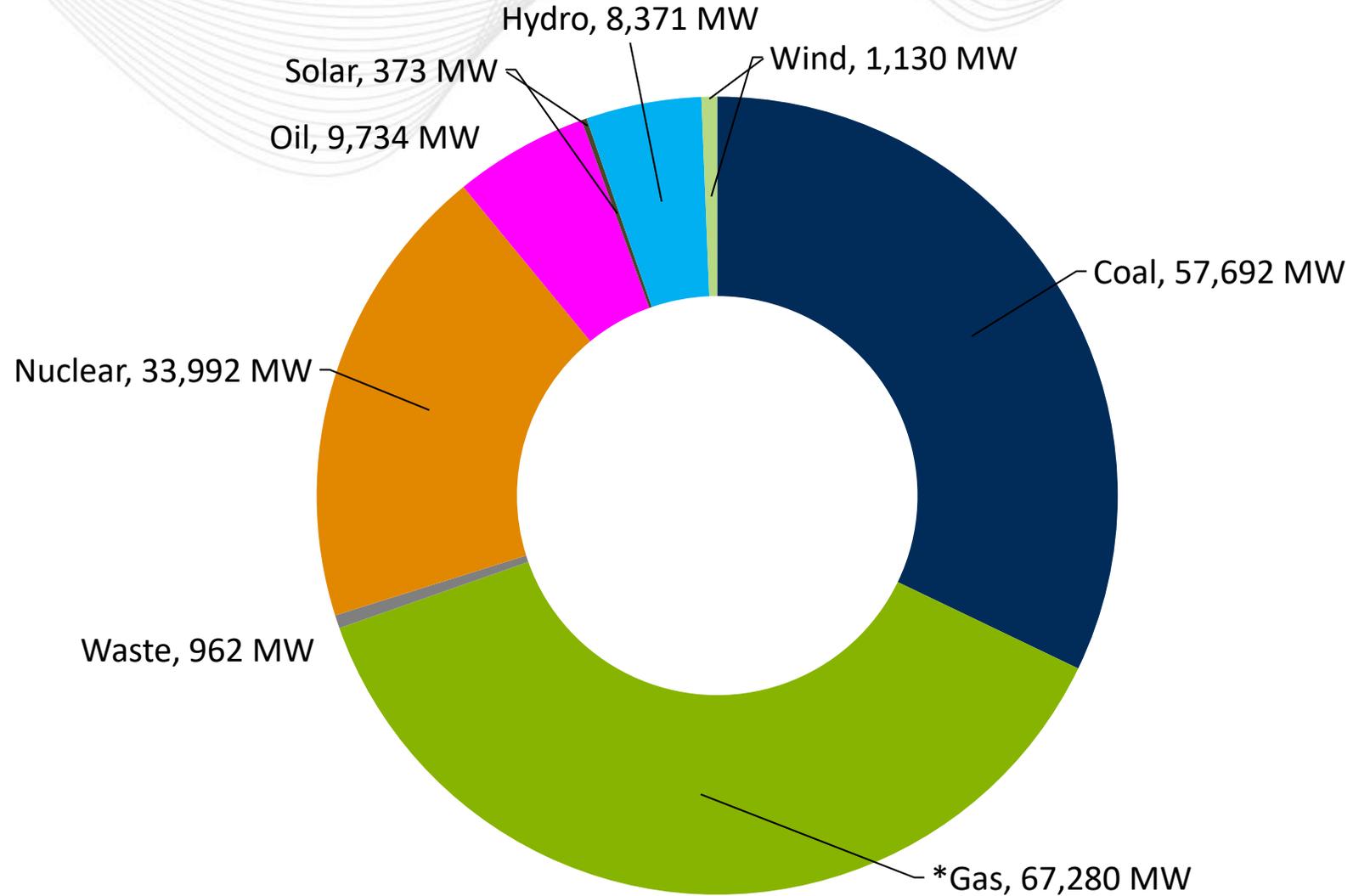
Planning

Generation Portfolio Analysis

PJM – Existing Installed Capacity

(MW submitted to PJM, December 31, 2017)

In PJM, natural gas and coal make up nearly 70 percent total installed capacity. Nuclear represents another 18.9 percent.



* Gas Contains	
Natural Gas	66,836.3 MW
Other Gas	443.8 MW



Tennessee – Existing Installed Capacity

(MW submitted to PJM, December 31, 2017)

Summary:

There is no installed capacity in the part of Tennessee served by PJM.

Overall in PJM, natural gas represents approximately 37 percent of installed capacity while coal represents 32 percent.

	Complete				Grand Total	
	In Service		Withdrawn*			
	MW	# of Projects	MW	# of Projects	MW	# of Projects
Non-Renewable			75	1	75	1
Coal			75	1	75	1
Renewable	90	2			90	2
Biomass	90	2			90	2
Grand Total	90	2	75	1	165	3

There are no interconnection requests in the queue in the part of Tennessee served by PJM.



Tennessee – Progression History Interconnection Requests

Projects under construction, suspended, in service, or withdrawn – As of December 31, 2017



Projects that withdrew after a final agreement

None

54.5% of requested capacity megawatt and 66.7% of projects reaches commercial operation

Tennessee – Actual Generation Deactivations and Deactivation Notifications Received in 2017

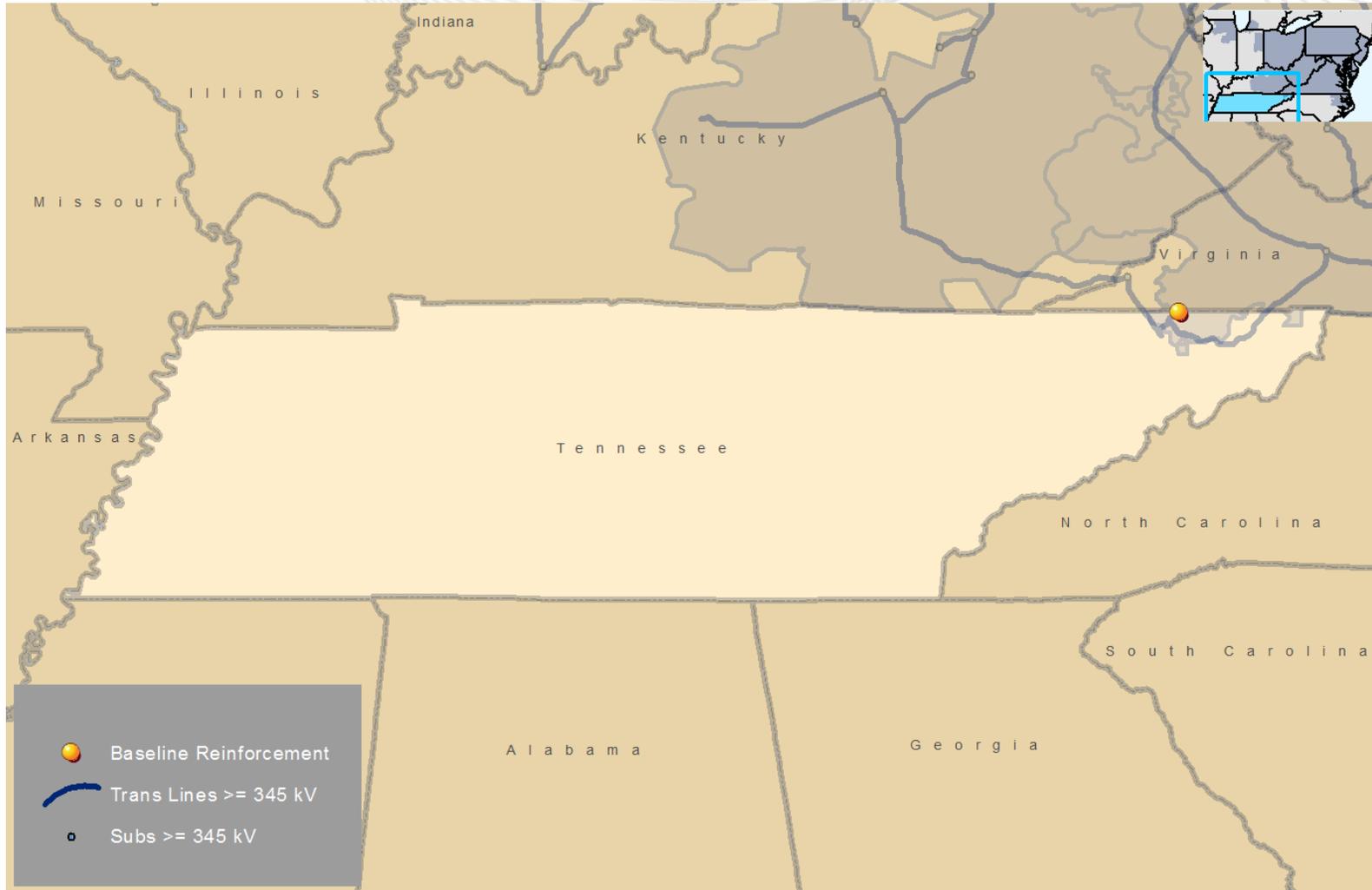
Tennessee had no generation deactivations or deactivation notifications in 2017.

Planning

Transmission Infrastructure Analysis

Tennessee – RTEP Baseline Projects

(Greater than \$5 million)



Note: Baseline upgrades are those that resolve a system reliability criteria violation.



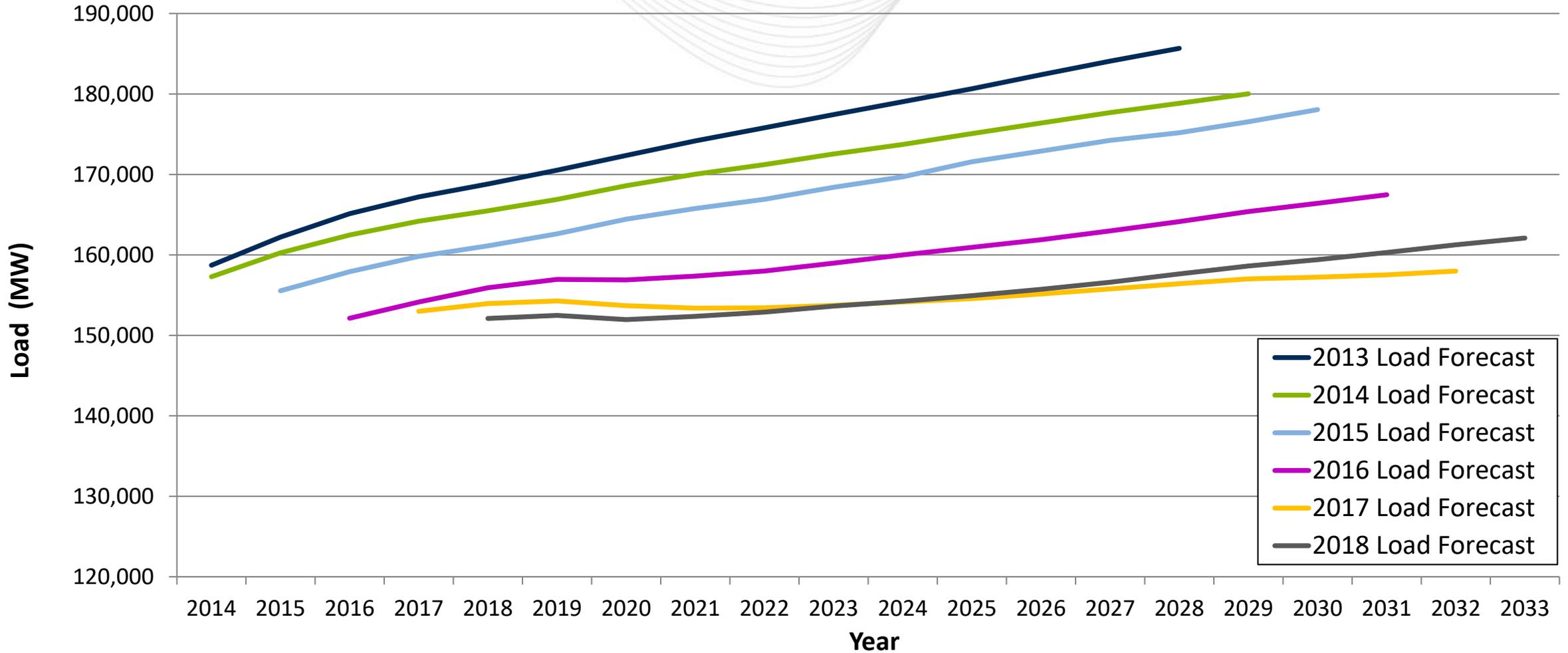
Tennessee – RTEP Baseline Projects

(Greater than \$5 million)

Project ID	Project	Project Driver	Required In Service Date	Project Cost (\$M)	TO Zone(s)	2017 TEAC Review
b2884	Install a second transformer at Nagel station, comprised of 3 single phase 250MVA 500/138kV transformers. Presently, TVA operates their end of the Boone Dam – Holston 138 kV interconnection as normally open preemptively for the loss of the existing Nagel	TO Criteria Violation	6/1/2021	\$ 13.0	AEP	5/31/2017

Planning Load Forecast

PJM RTO Summer Peak Demand Forecast





Tennessee – 2018 Load Forecast Report

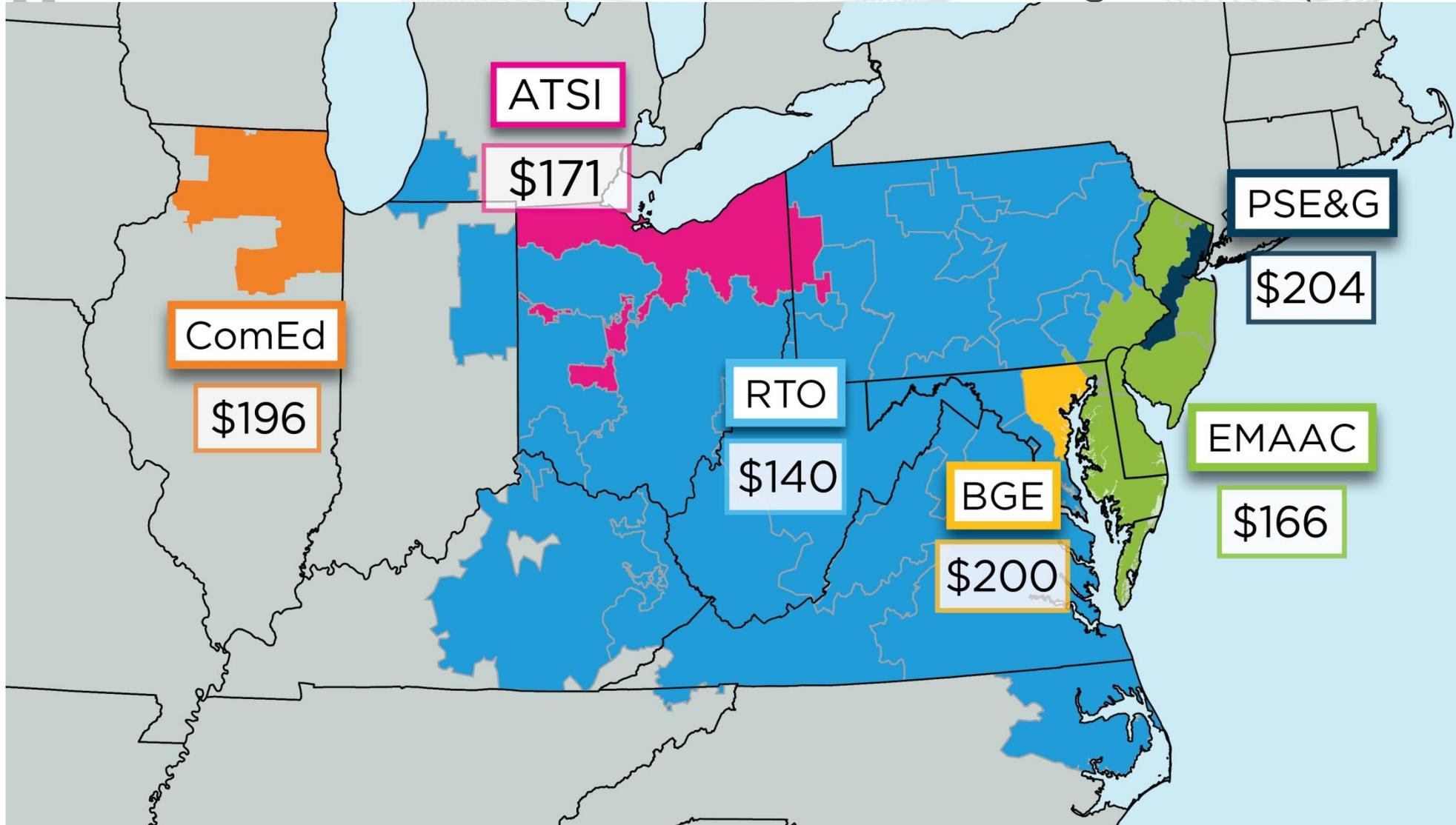
Transmission Owner	Summer Peak (MW)			Winter Peak (MW)		
	2018	2028	Growth Rate (%)	2017/18	2027/28	Growth Rate (%)
American Electric Power Company *	344	361	0.5%	440	462	0.5%
PJM RTO	152,108	157,635	0.4%	131,463	136,702	0.4%

* PJM notes that American Electric Power Company serves load other than in Tennessee. The Summer Peak and Winter Peak MW values in this table each reflect the estimated amount of forecasted load to be served by American Electric Power Company solely in Tennessee. Estimated amounts were calculated based on the average share of American Electric Power Company's real-time summer and winter peak load located in Tennessee over the past five years.

Markets

Capacity Market Results

2021/22 Base Residual Auction Clearing Prices (\$/MW-Day)





Tennessee - Cleared Resources in 2021/22 Auction

(May 23, 2018)

	Cleared MW (Unforced Capacity)	Change from 2020/21 Auction
Generation	43	0
Demand Response	27	14
Energy Efficiency	3	1
Total	73	15

RTO Locational Clearing Price

\$140

NOTE: Demand Response and Energy Efficiency are reported to PJM by Transmission Zone. The numbers above reflect the state's pro-rata share of cross-state zones for illustrative purposes.



PJM - 2021/2022 Cleared MW (UCAP) by Resource Type

	Annual	Summer	Winter	Total
Generation	149,616 MW	54 MW	716 MW	150,385 MW
DR	10,674 MW	452 MW	- MW	11,126 MW
EE	2,623 MW	209 MW	- MW	2,832 MW
Total	162,912 MW	716 MW	716 MW	164,343 MW



Tennessee – Offered and Cleared Resources in 2021/22 Auction

(May 23, 2018)

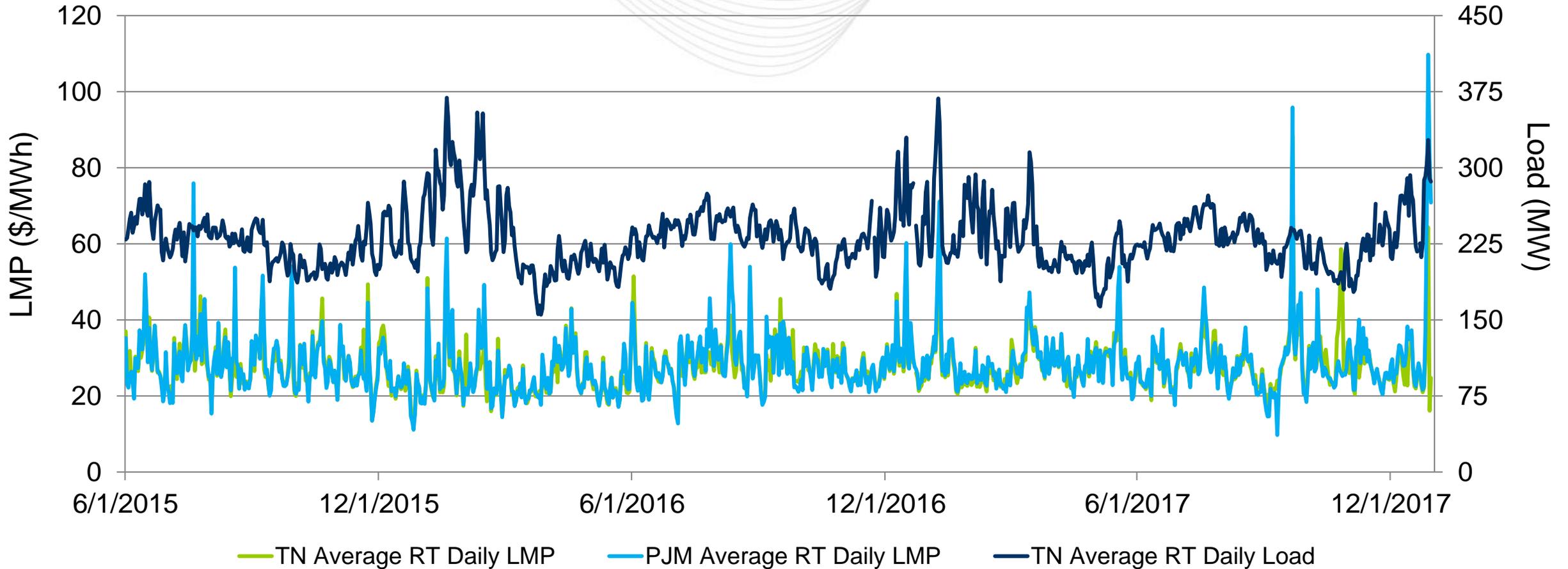
		Unforced Capacity
Generation	Offered MW	43
	Cleared MW	43
Demand Response	Offered MW	29
	Cleared MW	27
Energy Efficiency	Offered MW	3
	Cleared MW	3
Total Offered MW		76
Total Cleared MW		73

NOTE: Demand Response and Energy Efficiency are reported to PJM by Transmission Zone. The numbers above reflect the state's pro-rata share of cross-state zones for illustrative purposes.

Markets

Market Analysis

Tennessee's average daily LMPs generally align with the PJM average daily LMP



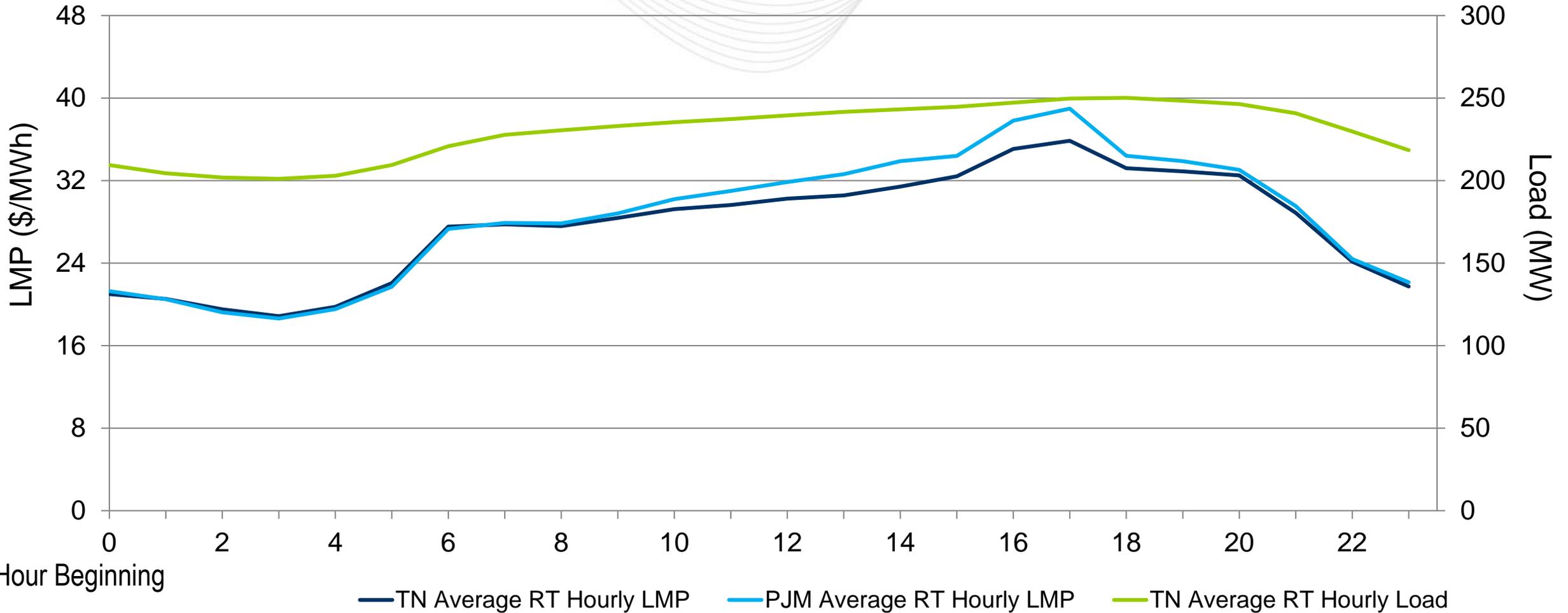
Note: The price spike on 9/21/2017 reflects the PJM shortage pricing event. The price spike starting 12/28/2017 reflects the beginning of the Cold Snap.



Tennessee – Hourly Average LMP and Load

(June 1, 2015 – December 31, 2017)

Tennessee's average hourly LMPs are generally equal to or lower than the PJM average.



Operations Emissions Data

CO₂
(lbs/MWh)

PJM Average Emissions (lbs/MWh)

SO₂ and No_x
(lbs/MWh)

