2018 North Carolina State Infrastructure Report
(January 1, 2018 – December 31, 2018)

May 2019

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

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Executive Summary

(May 2019)

- **Existing Capacity:** Natural gas represents approximately 21.0 percent of the total installed capacity in the North Carolina service territory while hydro and solar represent approximately 41.4 percent and 31.0 percent, respectively. This differs from PJM where natural gas and coal are at 40.2 and 30.7 percent of total installed capacity.
- **Interconnection Requests:** Solar represents approximately 92.6 percent of new interconnection requests in North Carolina.
- **Deactivations**: North Carolina had no deactivations or deactivation notifications in 2018.
- **RTEP 2018:** North Carolina RTEP 2018 projects total more than $10 million in investment. North Carolina had no supplemental projects in 2018. These investment figures only represent RTEP projects that cost at least $5 million.
- **Load Forecast**: North Carolina load growth is nearly flat, averaging between 0.9 and 1.1 percent per year over the next 10 years. This is slightly higher than the PJM RTO load growth projections of 0.4 percent over the next 10 years.

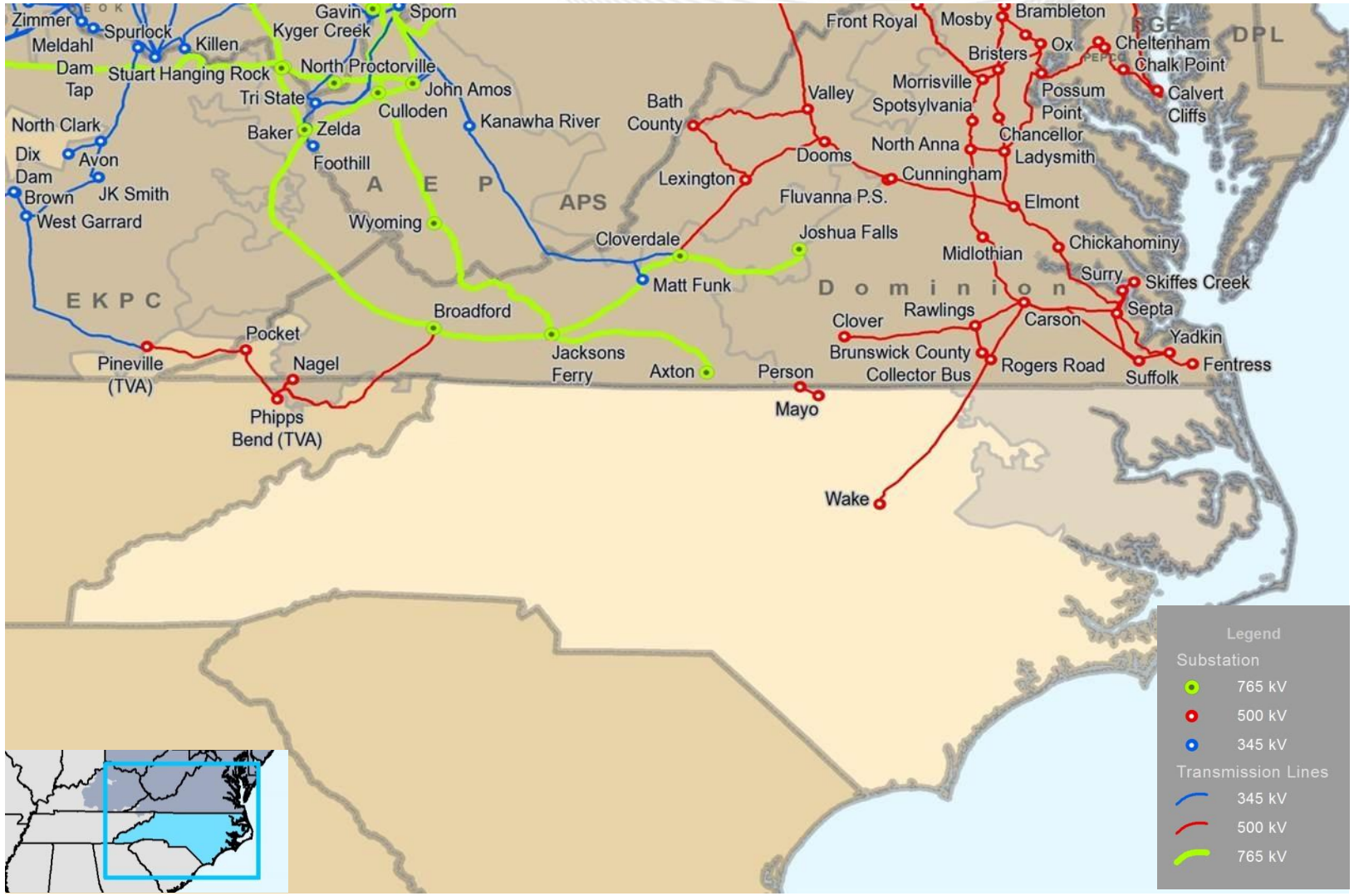
Executive Summary

(May 2019)

- **2021/22 Capacity Market:** North Carolina cleared 48 MW more Demand Response and Energy Efficiency resources than in the prior auction.
- **1/1/18 – 12/31/18 Performance:** North Carolina's average locational marginal prices were consistently at or above PJM average LMPs. Imported resources represented 54.9 percent of generation produced in the Dominion region of North Carolina.

North Carolina – PJM Service Area

(March 2019)



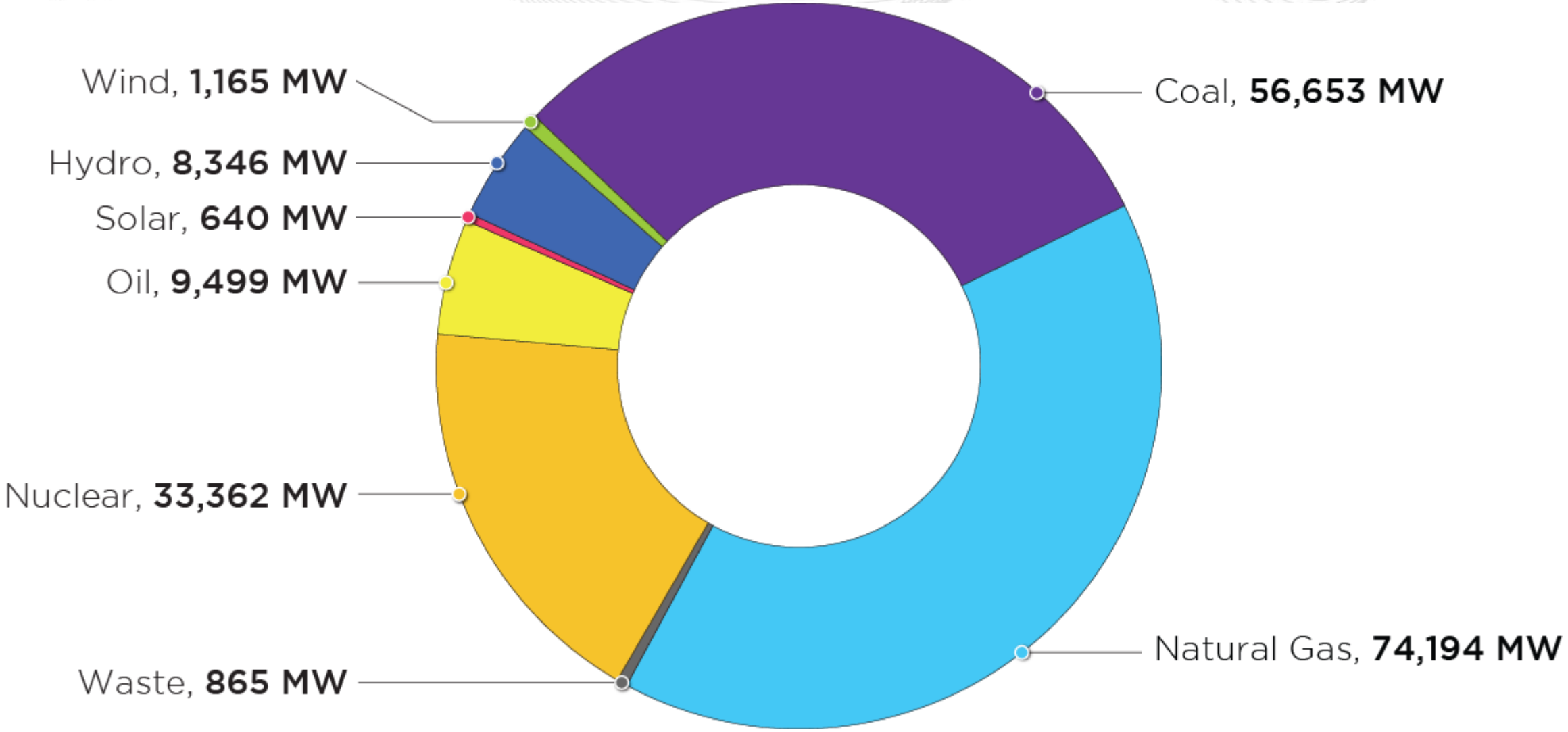
PJM operates bulk electric system facilities (and others monitored at lower voltages), in Northeastern North Carolina including those of Dominion North Carolina Power (DOM). These transmission facilities deliver power to customers from native generation resources and those throughout the RTO – arising out of PJM market operations – as well as power imported interregionally from systems outside PJM.

Planning

Generation Portfolio Analysis

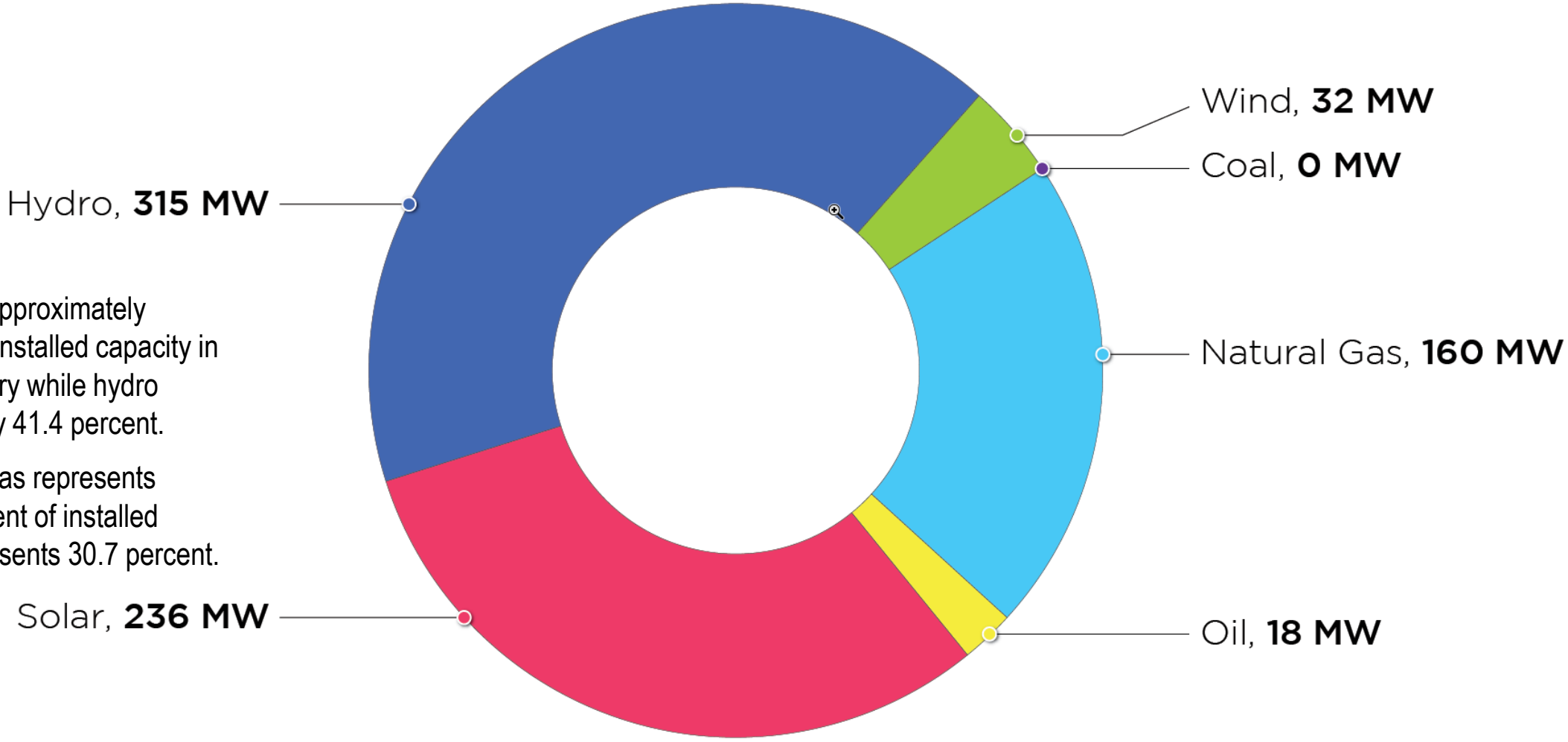
PJM – Existing Installed Capacity

(CIRs, December 31, 2018)



North Carolina – Existing Installed Capacity

(MW submitted to PJM, December 31, 2018)



Summary:

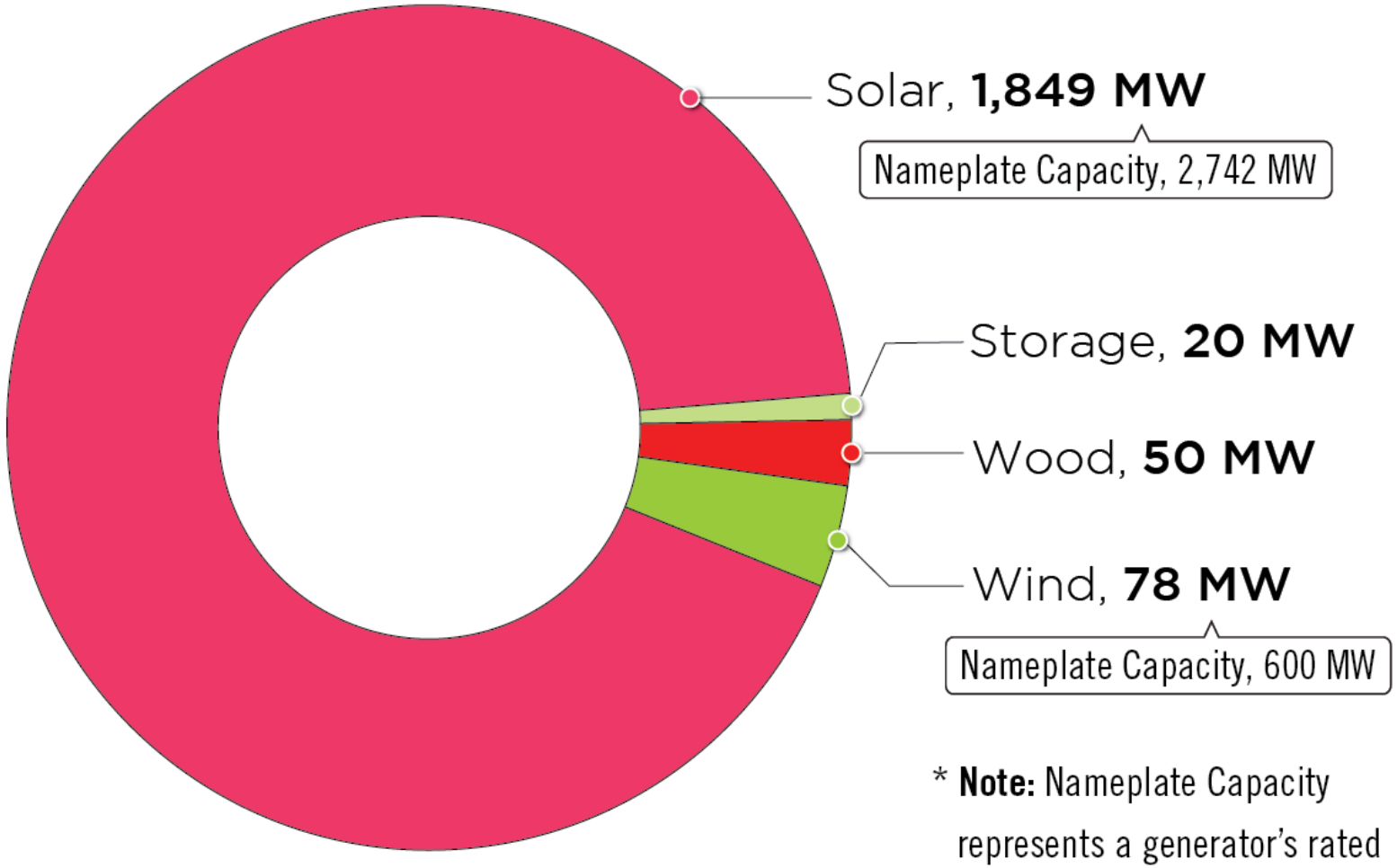
Natural gas represents approximately 21.0 percent of the total installed capacity in the North Carolina territory while hydro represents approximately 41.4 percent.

Overall in PJM, natural gas represents approximately 40.2 percent of installed capacity while coal represents 30.7 percent.

North Carolina – Queued Capacity (MW) by Fuel Type

(as of December 31, 2018)

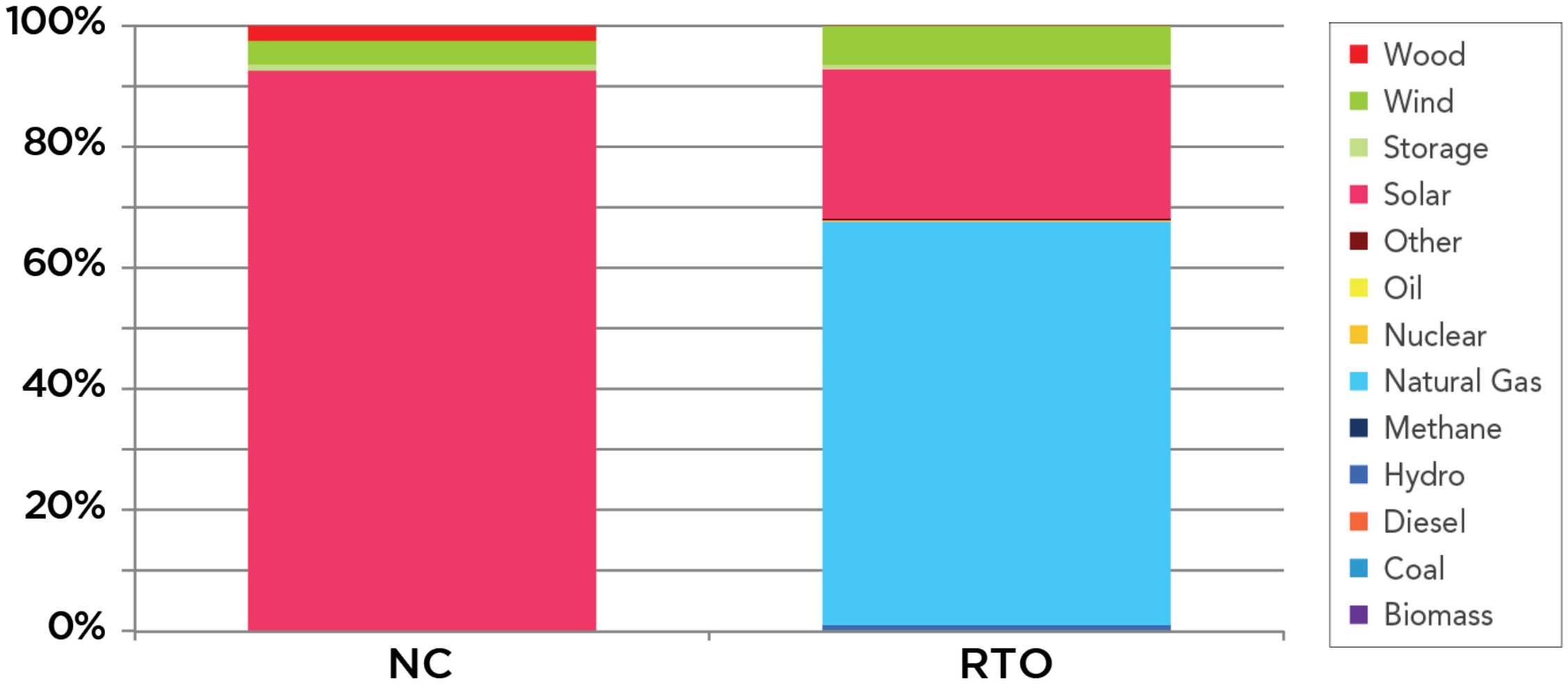
Solar represents approximately 92.6 percent of new interconnection requests in North Carolina.



* **Note:** Nameplate Capacity represents a generator's rated full power output capability.

North Carolina – Percentage of Projects in Queue by Fuel Type

(as of December 31, 2018)



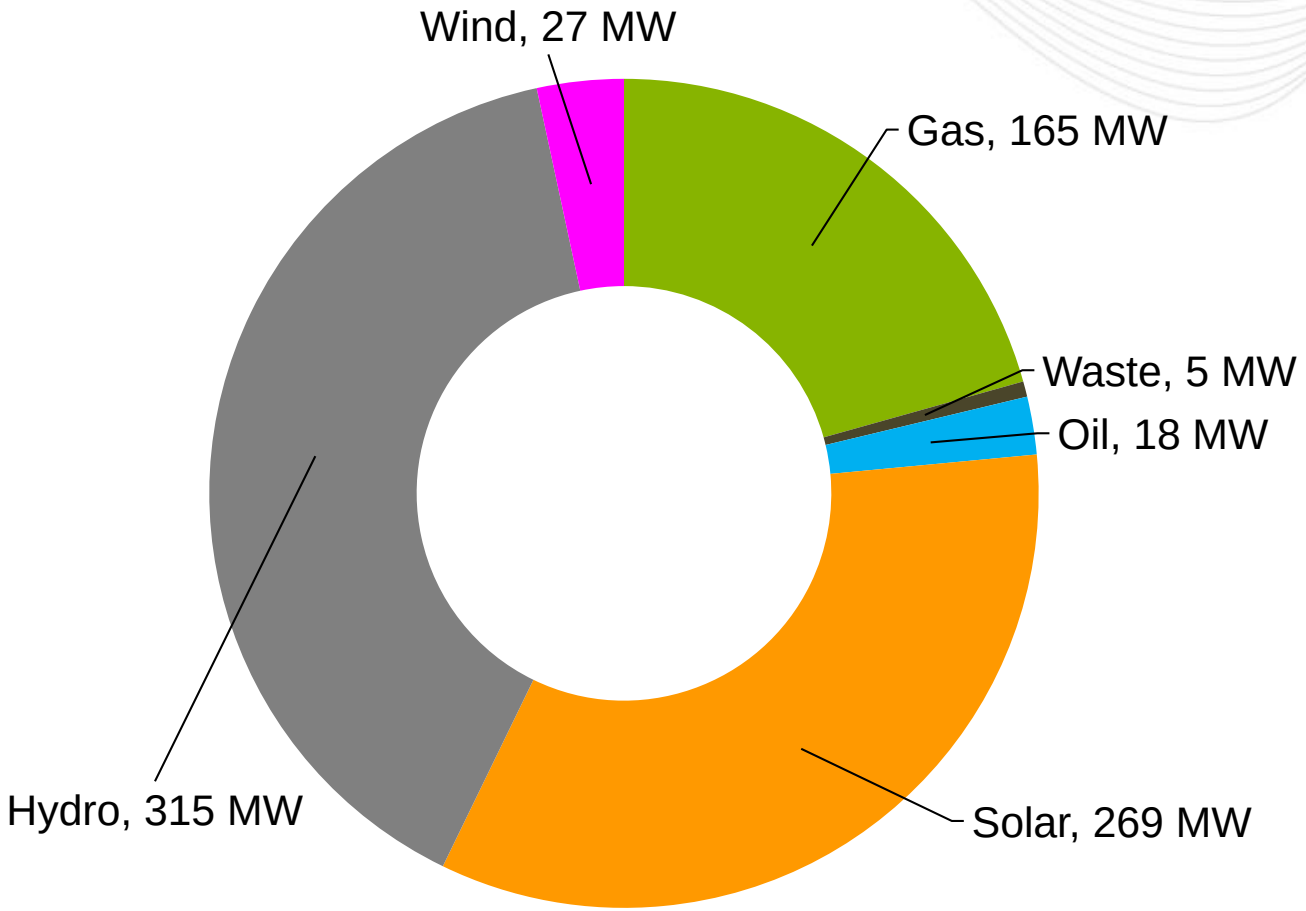
North Carolina – Interconnection Requests

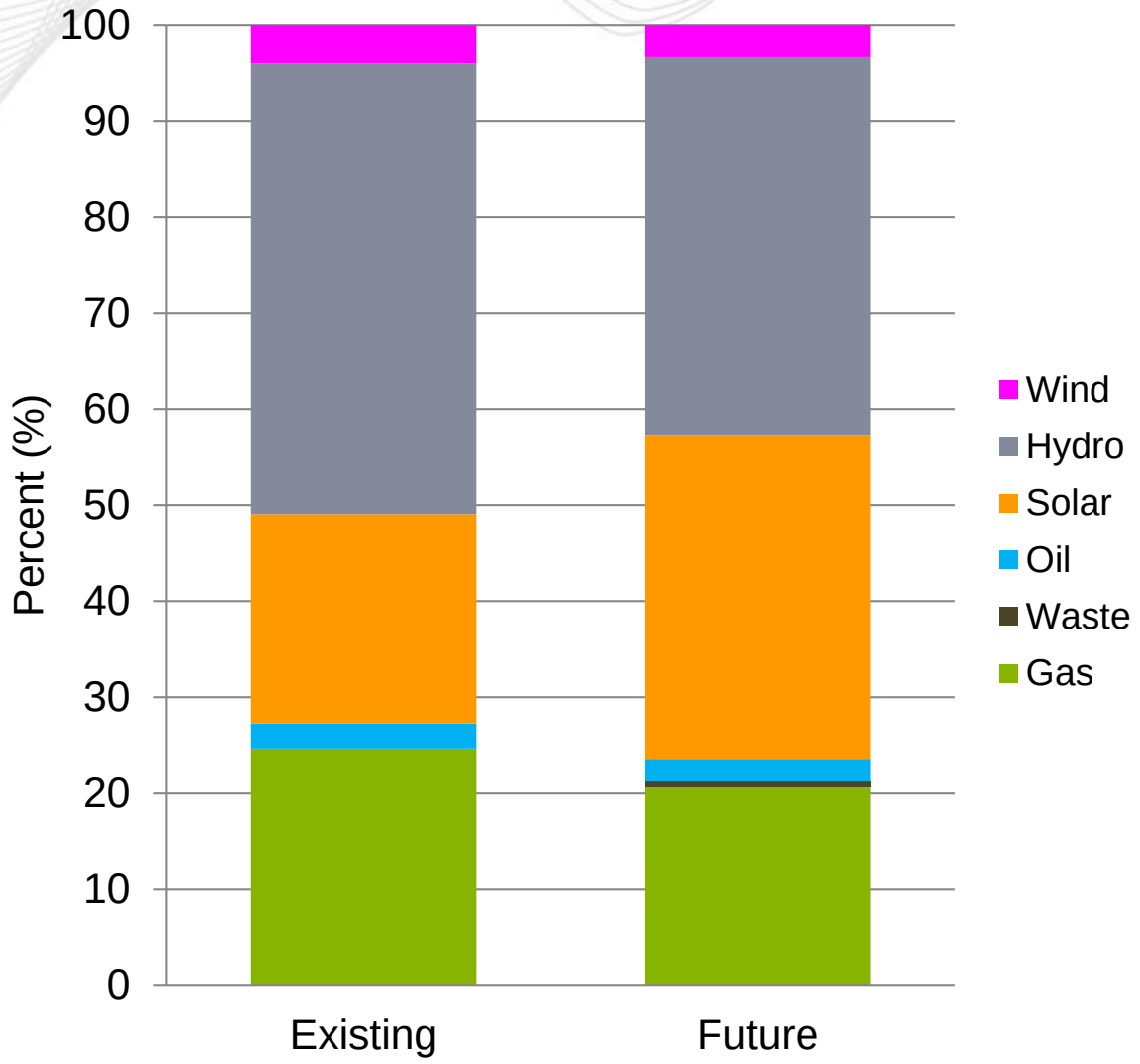
(Unforced Capacity, As of December 31, 2018)

	Complete				In Queue				Grand Total	
	In Service		Withdrawn		Active		Under Construction			
	No. of Projects	Capacity, MW	No. of Projects	Capacity, MW	No. of Projects	Capacity, MW	No. of Projects	Capacity, MW	No. of Projects	Capacity, MW
Non-Renewable	**0**	**0.0**	**2**	**32.0**	**1**	**20**	**0**	**0.0**	**3**	**52.0**
Storage	0	0.0	2	32.0	1	20.0	0	0.0	3	52.0
Renewable	**11**	**250.7**	**73**	**2,710.5**	**29**	**1376.6**	**14**	**600.4**	**127**	**4,938.18**
Methane	0	0.0	1	12.0	0	0.0	0	0.0	1	12.0
Solar	11	250.7	62	2,423.2	29	1,376.6	11	472.4	113	4,522.9
Wind	0	0.0	9	195.3	0	0.0	2	78.0	11	273.3
Wood	0	0.0	1	80.0	0	0.0	1	50.0	2	130.0
Grand Total	**11**	**250.7**	**75**	**2,742.5**	**30**	**1,396.6**	**14**	**600.4**	**130**	**4,990.2**

North Carolina – Future Capacity Mix

Based on known queued interconnection requests and deactivation notices through December 31, 2022, adjusted to reflect the probability of commercialization as indicated by historical trends specific to an interconnection request's state/zonal location and fuel type.





North Carolina – Progression History Interconnection Requests

Projects under construction, suspended, in service, or withdrawn (as of December 31, 2018)

- **Projects withdrawn after final agreement**
  - 7 Interconnection Service Agreements – 234.5 MW (Nameplate Capacity, 743.6 MW)
  - 3 Wholesale Market Participation Agreements – 34.2 MW (Nameplate Capacity, 50.0 MW)
- **Percentage of planned capacity and projects reached commercial operation**
  - 8.1 % requested capacity megawatt
  - 11.9 % requested projects

North Carolina – Actual Generation Deactivations and Deactivation Notifications Received in 2018

North Carolina had no generation deactivations or deactivation notifications in 2018.

Planning

Transmission Infrastructure Analysis

North Carolina – RTEP Baseline Projects

(Greater than $5 million)

North Carolina had no baseline project upgrades in 2018.

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

North Carolina – RTEP Network Projects

(Greater than $5 million)

Map ID	Project	Description	Project Driver	Queue	Required In-Service Date	Project Cost ($M)	TO Zone	2018 TEAC Review
	n5620	Build a three breaker ring at the new AB2-169 substation	Generation	AB2-169 (Solar)	12/31/2018	$5.45	Dominion	9/13/2018
	n5719	Queue AB2-059 switching station: Build new three circuit breaker ring switchyard	Generation	AB2-059 (Solar)	6/1/2018	$5.26	Dominion	9/13/2018

Note: Network upgrades are new or upgraded facilities required primarily to eliminate reliability criteria violations caused by proposed generation, merchant transmission or long term firm transmission service requests.

North Carolina – TO Supplemental Projects

(Greater than $5 million)

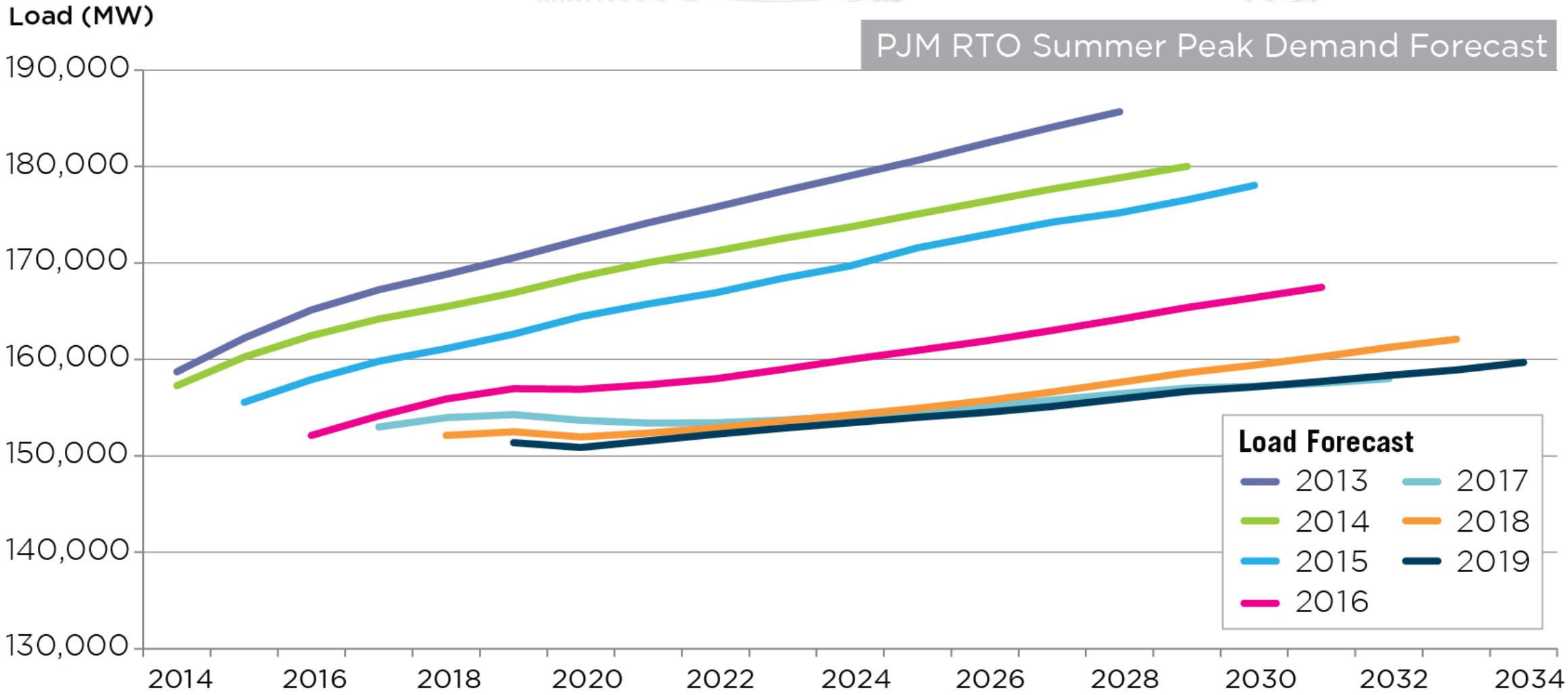
North Carolina had no supplemental project upgrades in 2018.

Note: Supplemental projects are transmission expansions or enhancements that are not required for compliance with the following PJM criteria: system reliability, operational performance or economic criteria, pursuant to a determination by the Office of the Interconnection and is not a state public policy project.

Planning
Load Forecast

PJM Annual Load Forecasts

(January 2019)



North Carolina – 2019 Load Forecast Report

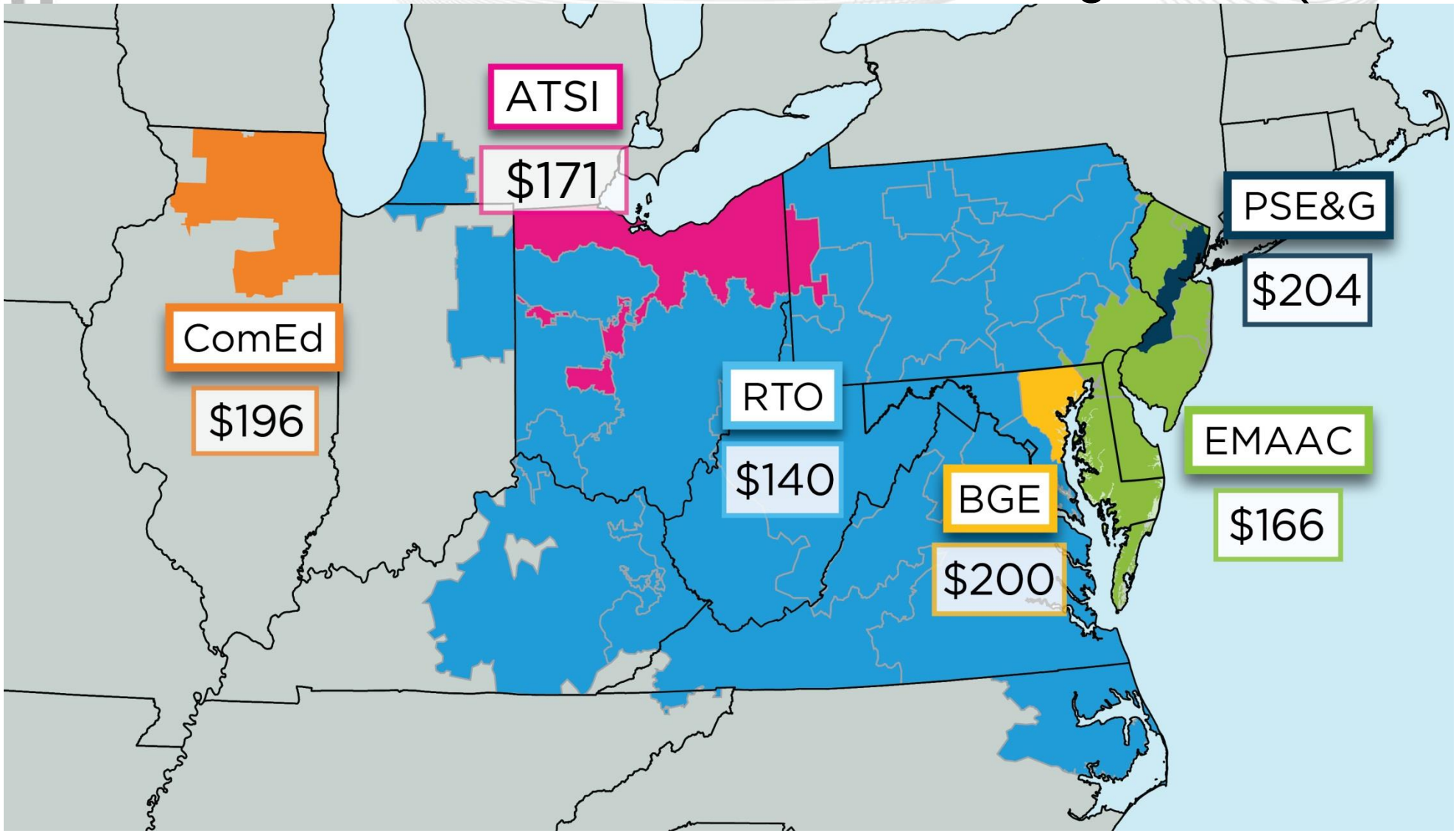
	Summer Peak (MW)			Winter Peak (MW)		
Transmission Owner	2019	2029	Growth Rate (%)	2018/19	2028/29	Growth Rate (%)
Dominion Virginia Power *	954	1,045	0.9%	1,025	1,141	1.1%
PJM RTO	151,358	156,689	0.3%	131,082	136,178	0.4%

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

Markets

Capacity Market Results

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



North Carolina – Cleared Resources in 2021/22 Auction

(May 23, 2018)

	Cleared MW (Unforced Capacity)	Change from 2020/21 Auction
Generation	646	88
Demand Response	57	28
Energy Efficiency	28	20
Total	731	136

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

North Carolina – Offered and Cleared Resources in 2021/22 Auction

(May 23, 2018)

		Unforced Capacity
Generation	Offered MW	682
	Cleared MW	646
Demand Response	Offered MW	59
	Cleared MW	57
Energy Efficiency	Offered MW	28
	Cleared MW	28
Total Offered MW		769
Total Cleared MW		731

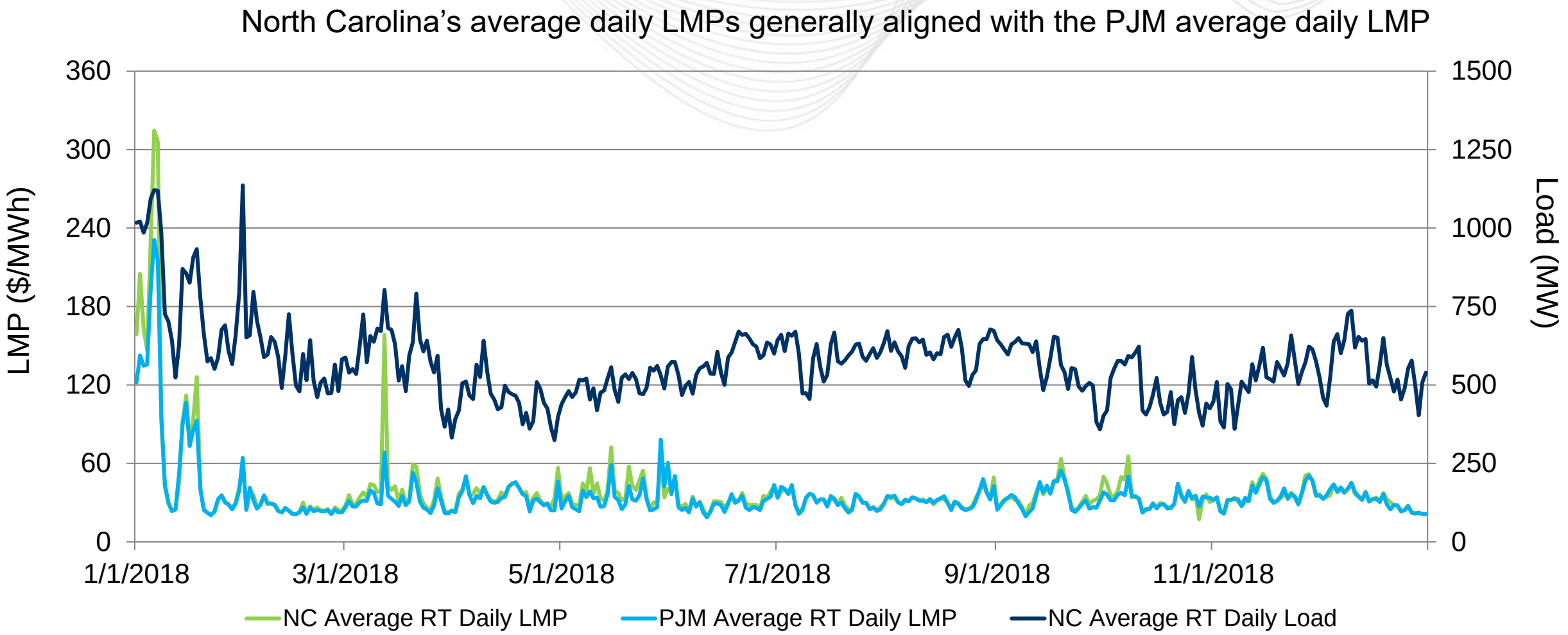
NOTE: Demand Response and Energy Efficiency are reported to PJM by Transmission Zone. The numbers above reflect the state's pro-rata share of cross-state zones for illustrative purposes.

Markets

Market Analysis

North Carolina – Average Daily LMP and Load

(January 1, 2018 – December 31, 2018)

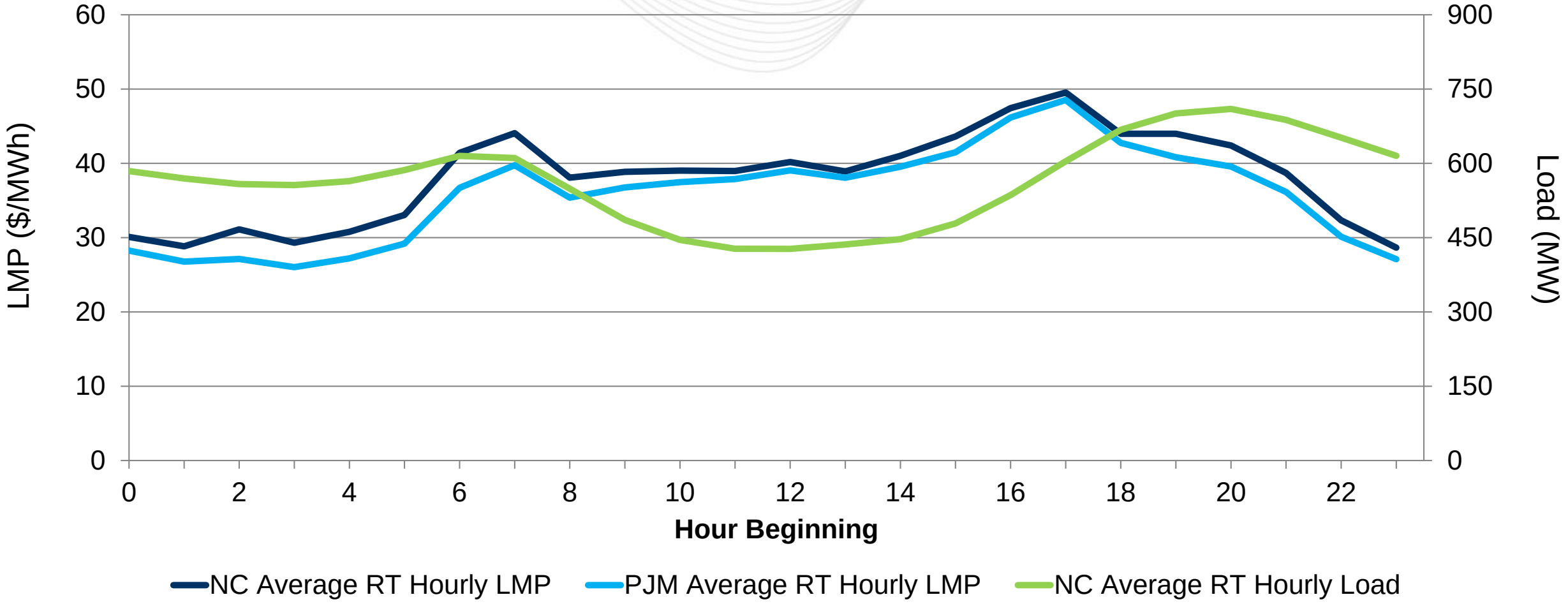


Note: The price spike in January reflects the Cold Snap that lasted from 12/28/17 to 1/7/2018.

North Carolina – Average Hourly LMP and Load

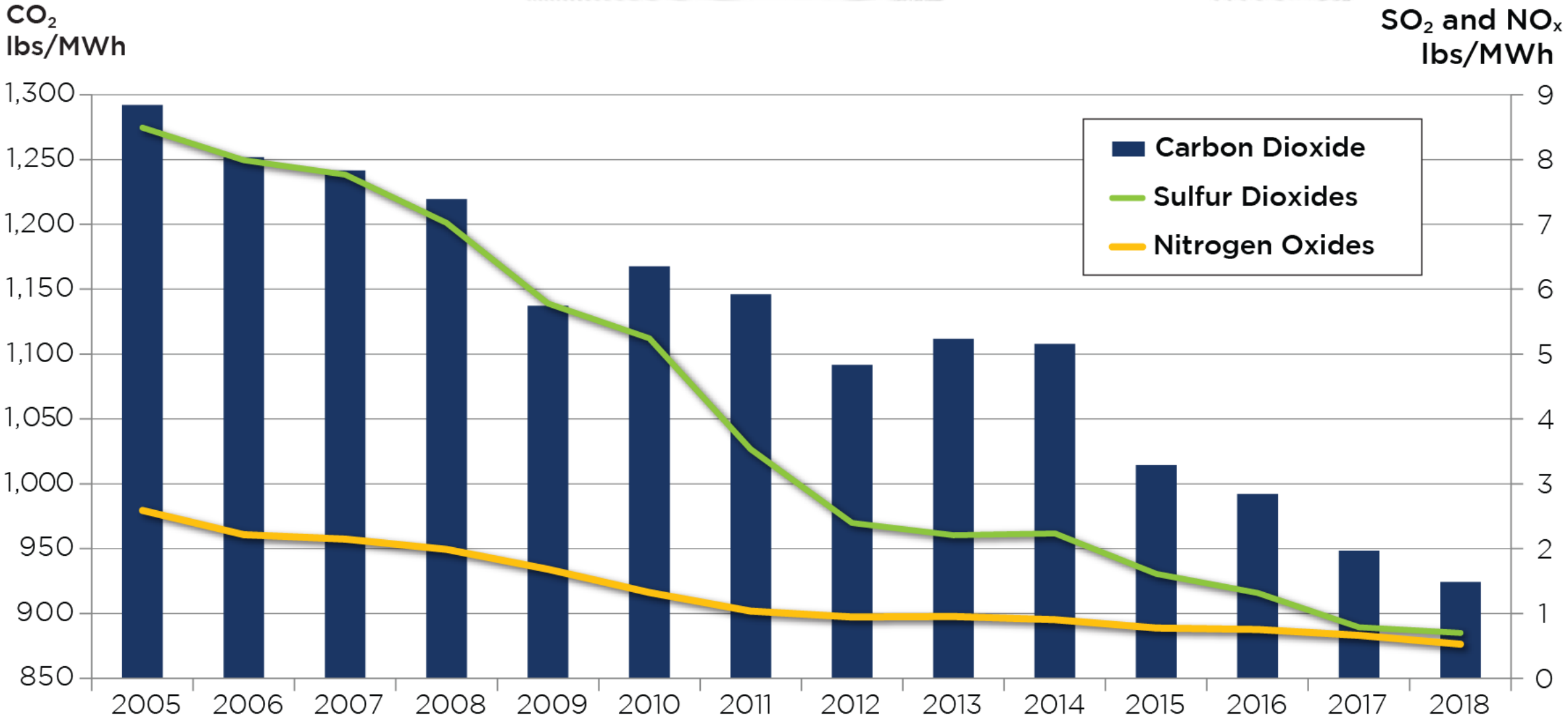
(January 1, 2018 – December 31, 2018)

North Carolina's average hourly LMPs were higher than the PJM average



Operations
Emissions Data

2005-2018 PJM Average Emissions



Appendix

Please note that PJM has historically used $5 million as the threshold for listing projects in the RTEP report. Beginning in 2018, it was decided to increase this cutoff to $10 million. All RTEP projects with costs totaling at least $5 million are still included in this state report.

For a complete list of all RTEP projects, including those below the RTEP threshold of $10 million, please visit the “RTEP Upgrades & Status – Transmission Construction Status” page on pjm.com.

https://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx