2018 Delaware State Infrastructure Report

(January 1, 2018 – December 31, 2018)

May 2019

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Executive Summary

(May 2019)

- **Existing Capacity:** Natural gas represents approximately 63.2 percent of the total installed capacity in Delaware, while oil represents approximately 24.1 percent and coal 12.7 percent. This differs from PJM where natural gas and coal are at 40.2 and 30.7 percent of total installed capacity.
- **Interconnection Requests:** Natural gas represents approximately 55.7 percent of new interconnection requests in Delaware.
- **Deactivations**: Delaware had no generation deactivations or deactivation notifications in 2018.
- **RTEP 2018:** Delaware had no RTEP projects in 2018. There were also no supplemental projects in Delaware in 2018.
- **Load Forecast:** Delaware's load growth is nearly flat, averaging between 0.1 and 0.4 percent per year over the next 10 years. This aligns with PJM RTO load growth projections.

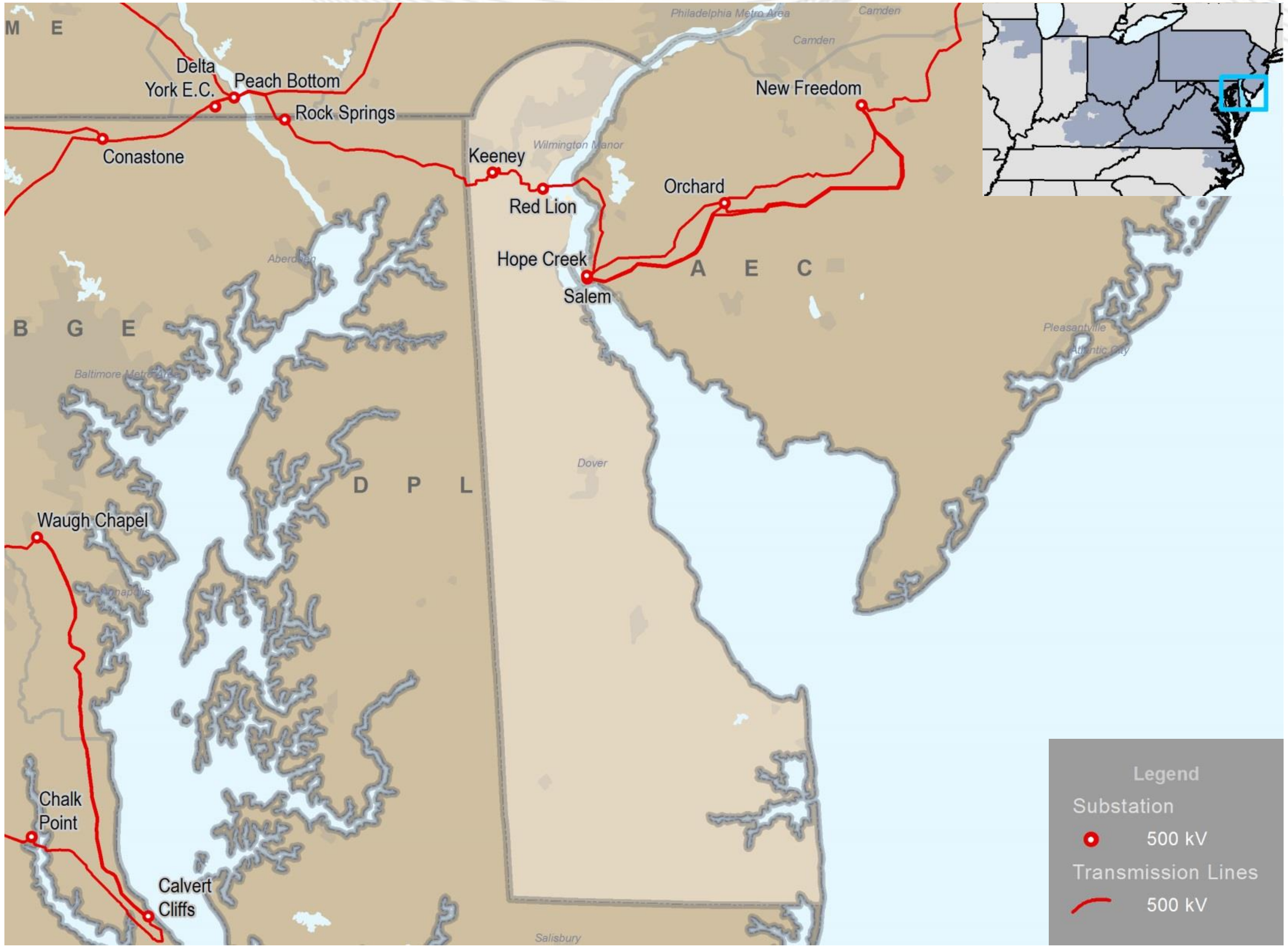
Executive Summary

(May 2019)

- **2021/22 Capacity Market:** Compared to the PJM footprint, Delaware's distribution of cleared generation, demand response and energy efficiency is similar.
- **1/1/18 – 12/31/18 Performance:** Delaware's average locational marginal prices were generally above the PJM average during daytime hours and below the PJM average at night. Natural gas resources represented 38.1 percent of generation produced in Delaware while imports averaged 44.7 percent.
- **Emissions:** 2018 carbon dioxide emissions are slightly up from 2017; sulfur dioxides and nitrogen oxides continue to hold flat from 2014.

PJM Service Area – Delaware

(March 2019)

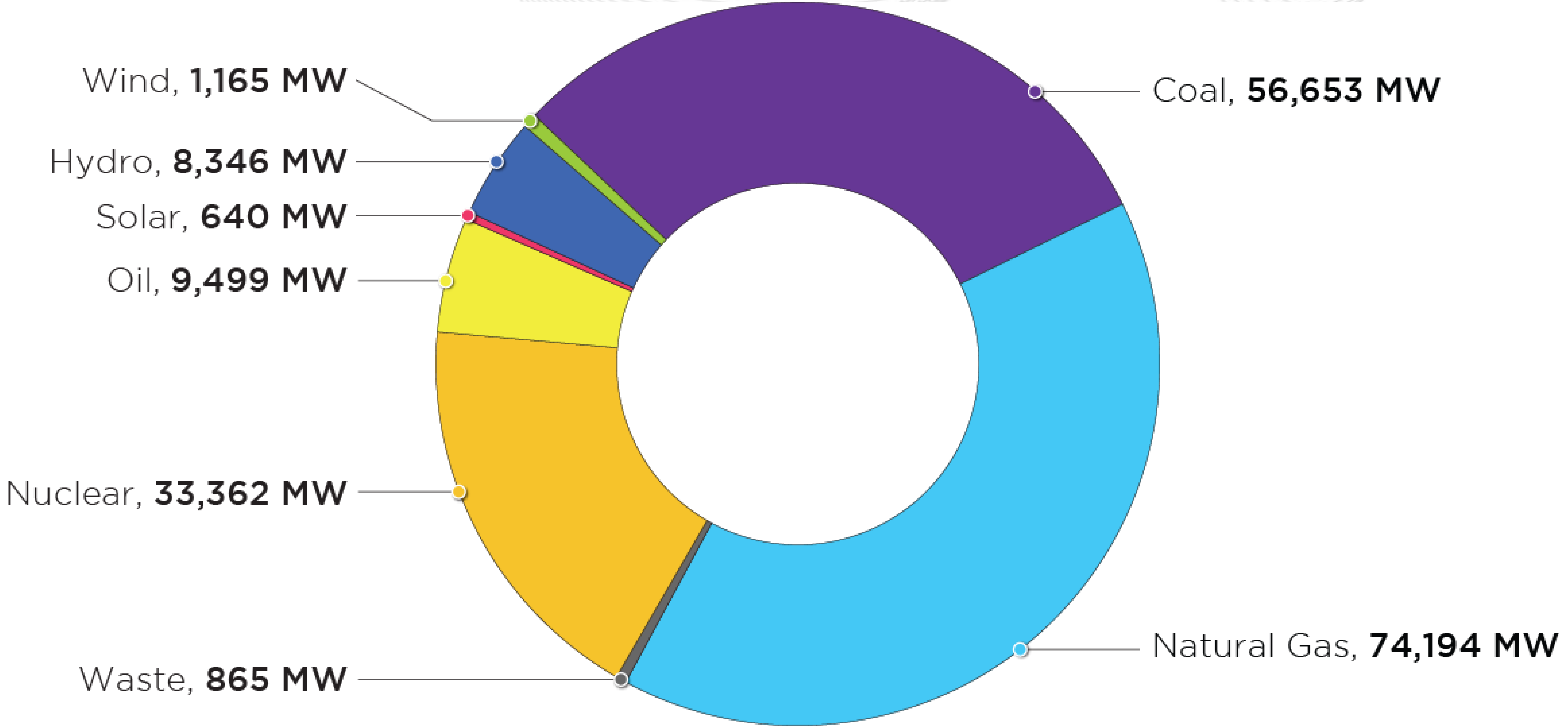


Planning

Generation Portfolio Analysis

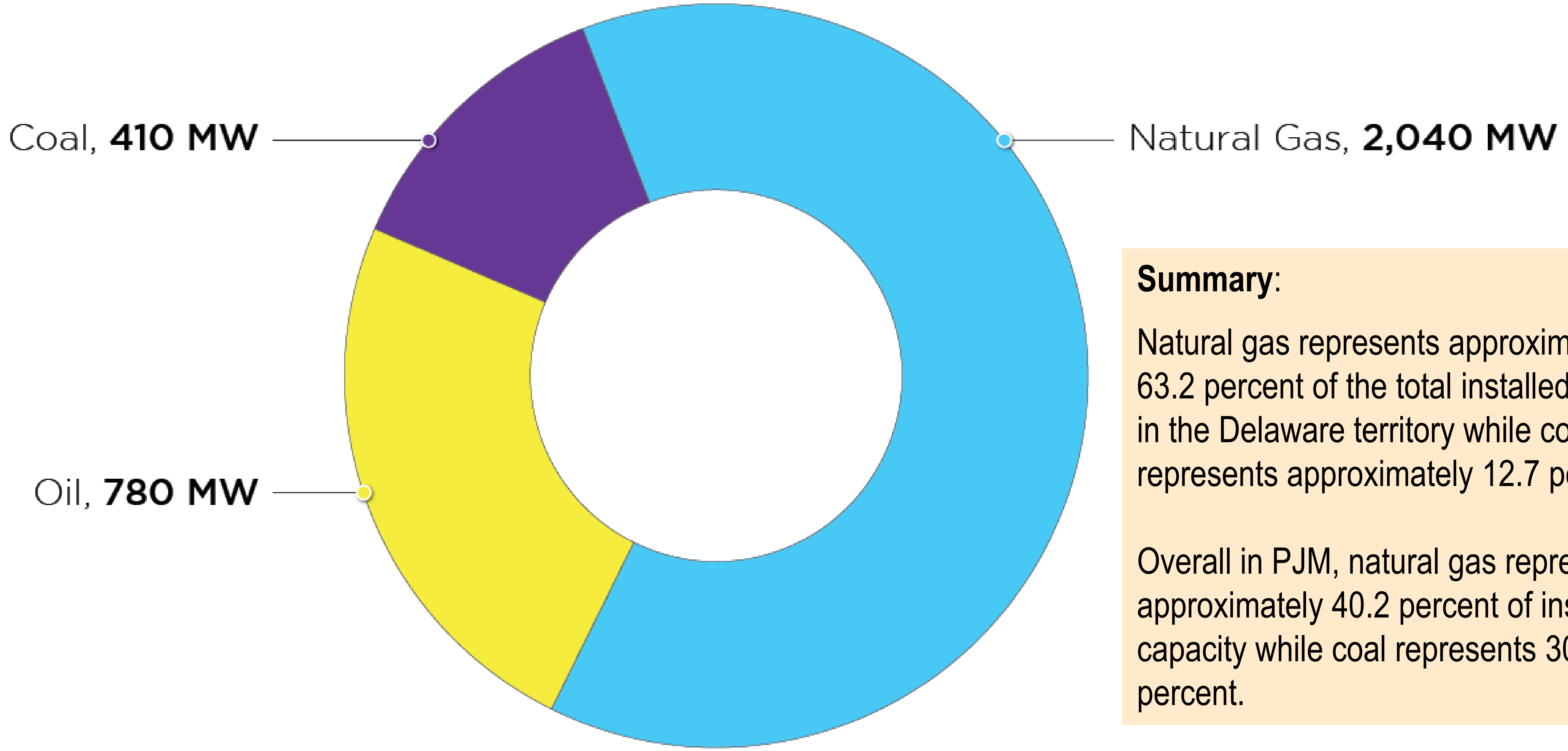
PJM Existing Installed Capacity

(CIRs, December 31, 2018)



Delaware – Existing Installed Capacity

(MW submitted to PJM, December 31, 2018)



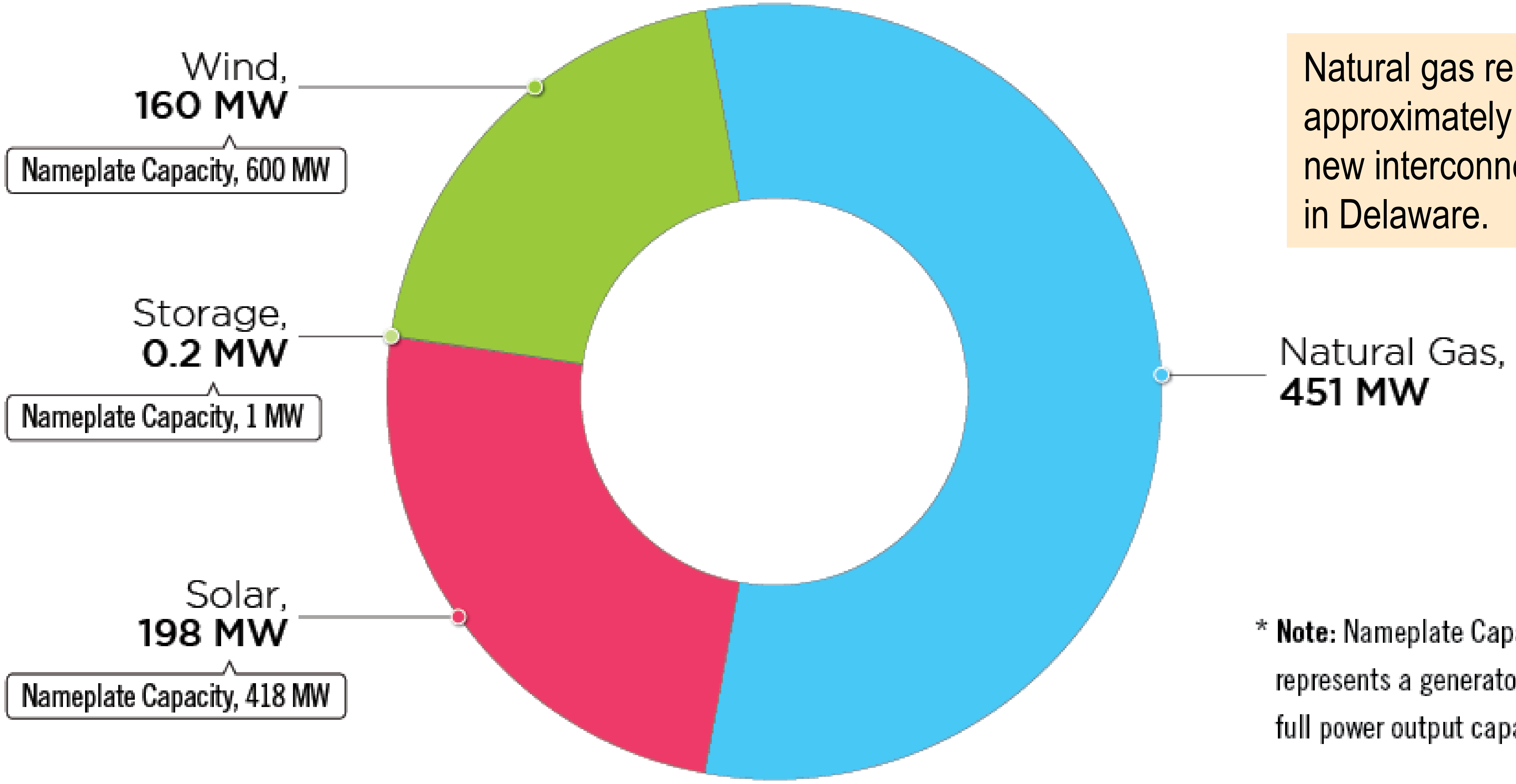
Summary:

Natural gas represents approximately 63.2 percent of the total installed capacity in the Delaware territory while coal represents approximately 12.7 percent.

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

Delaware – Queued Capacity (MW) by Fuel Type

(as of December 31, 2018)

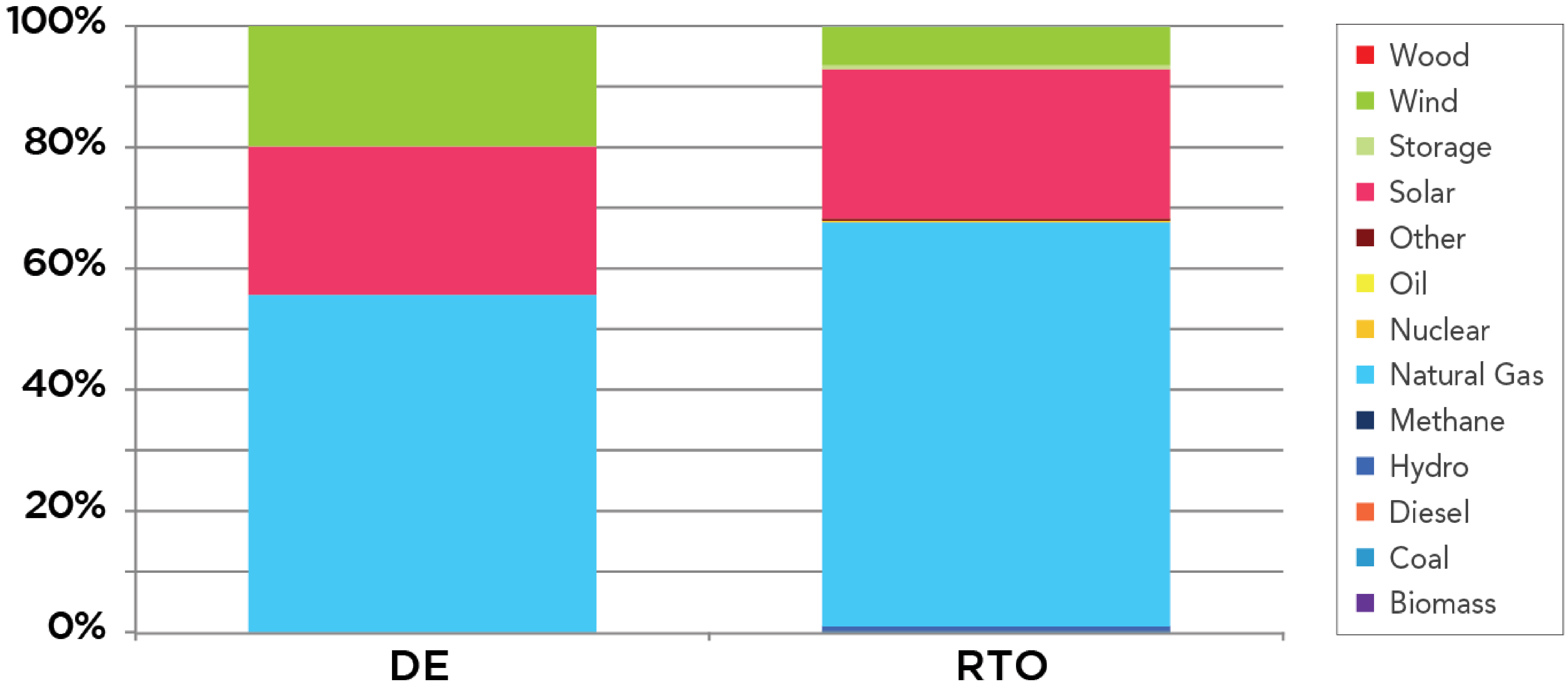


Natural gas represents approximately 55.7 percent of new interconnection requests in Delaware.

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

Delaware – Percentage of Projects in Queue by Fuel Type

(as of December 31, 2018)



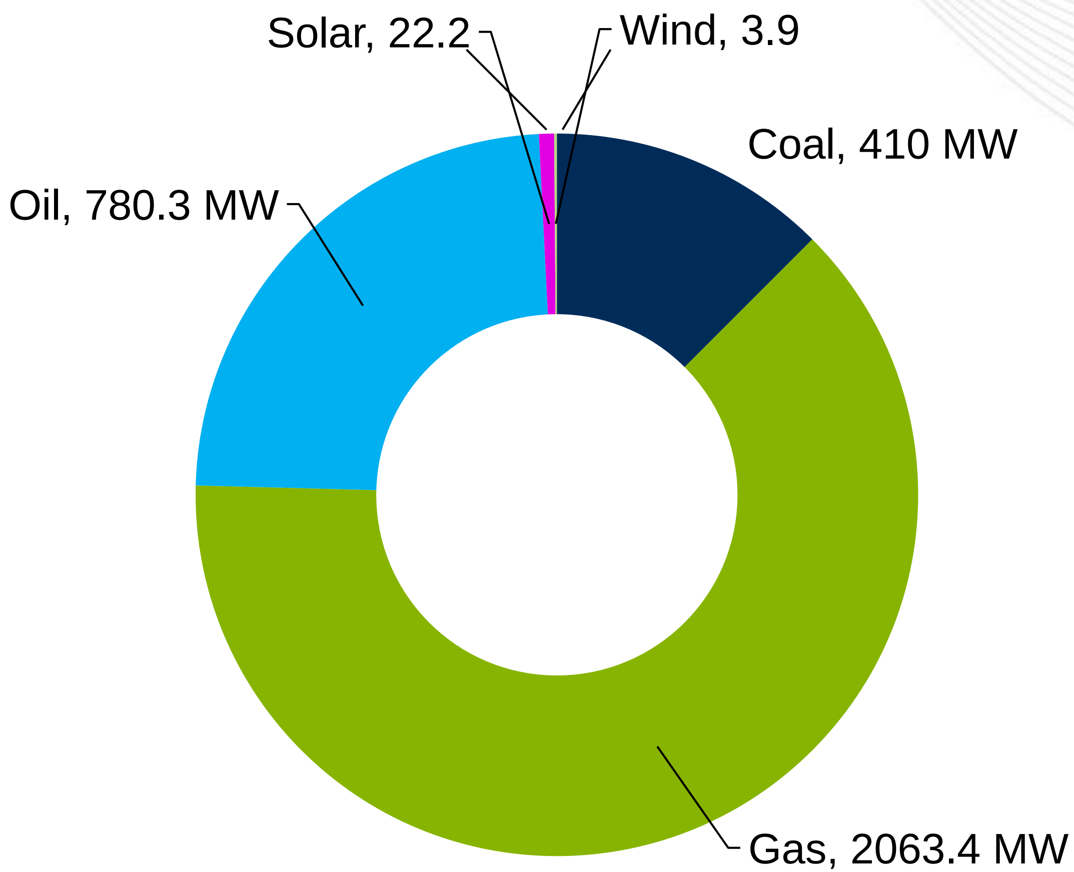
Delaware – Interconnection Requests

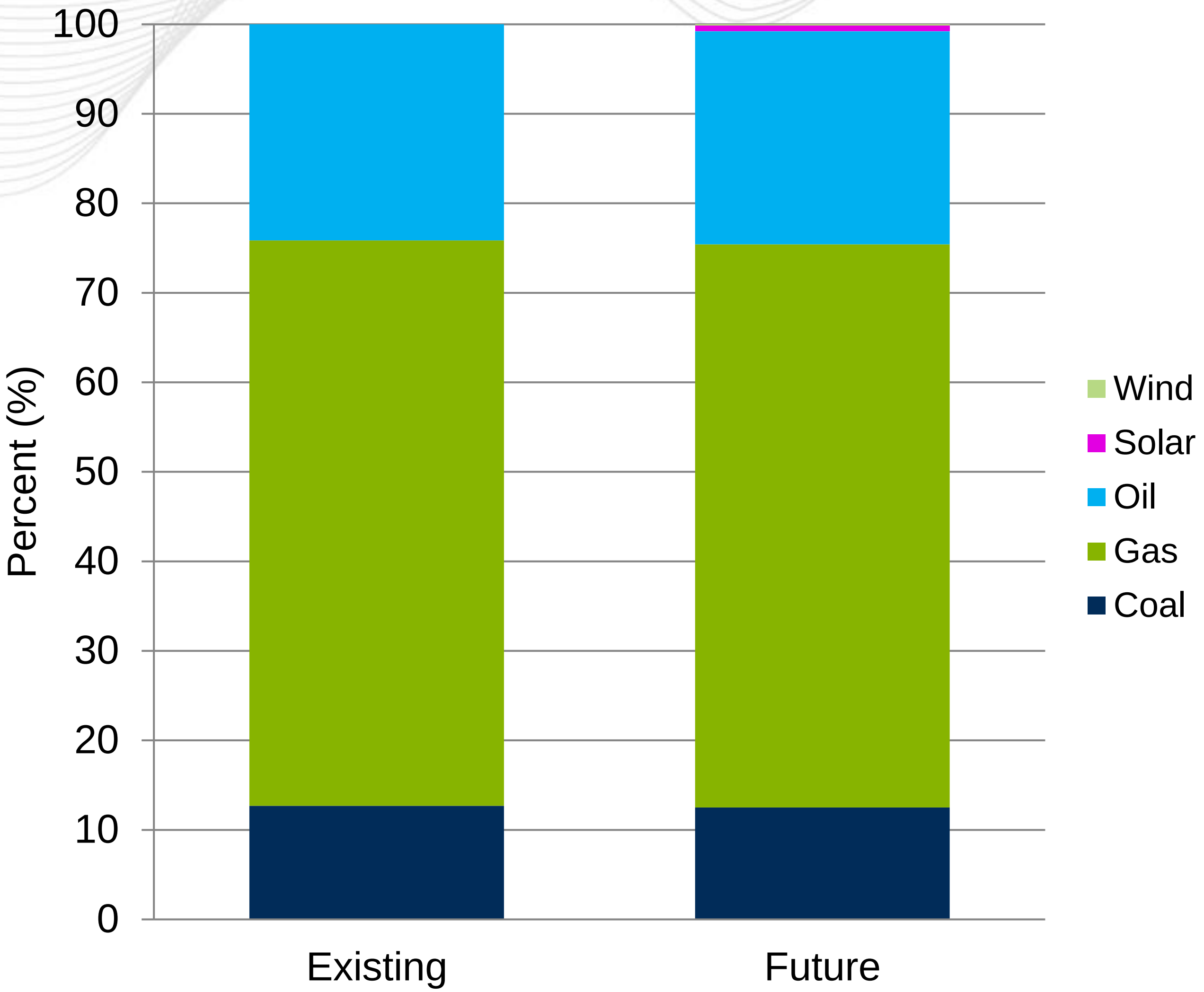
(Unforced Capacity, As of December 31, 2018)

	Complete				In Queue						Grand Total	
	In Service		Withdrawn		Active		Suspended		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	No. of Projects	Capacity, MW
Non-Renewable	**28**	**1,318.3**	**25**	**6,232.4**	**1**	**0.2**	**1**	**451.0**	**0**	**0.0**	**55**	**8,001.9**
Coal	2	23.0	1	630.0	0	0.0	0	0.0	0	0.0	3	653.0
Natural Gas	19	1,097.1	19	5,556.4	0	0.0	1	451.0	0	0.0	39	7,104.5
Oil	5	168.2	1	1.0	0	0.0	0	0.0	0	0.0	6	169.2
Other	2	30.0	0	0.0	0	0.0	0	0.0	0	0.0	2	30.0
Storage	0	0.0	4	45.0	1	0.2	0	0.0	0	0.0	5	45.2
Renewable	**5**	**9.0**	**27**	**586.9**	**18**	**293.6**	**0**	**0.0**	**1**	**64.4**	**51**	**953.9**
Biomass	1	0.0	4	24.0	0	0.0	0	0.0	0	0.0	5	24.0
Methane	4	9.0	3	28.8	0	0.0	0	0.0	0	0.0	7	37.8
Solar	0	0.0	16	178.7	16	197.6	0	0.0	0	0.0	32	376.3
Wind	0	0.0	4	355.4	2	96.0	0	0.0	1	64.4	7	515.8
Grand Total	**33**	**1,327.3**	**52**	**6,819.3**	**19**	**293.8**	**1**	**451.0**	**1**	**64.4**	**106**	**8,955.8**

Delaware – 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.





Delaware – Progression History Interconnection Requests

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

- **Projects withdrawn after final agreement**
  - 3 Interconnection Service Agreements – 420 MW — Nameplate Capacity, 46.9 MW
  - 4 Wholesale Market Participation Agreements –13.3 MW — Nameplate Capacity, 780 MW
- **Percentage of planned capacity and projects reached commercial operation**
  - 15.3 % requested capacity megawatt
  - 37.9 % requested projects

Delaware – Actual Generation Deactivations and Deactivation Notifications Received in 2018

Delaware had no generation deactivations or deactivation notifications in 2018.

Planning

Transmission Infrastructure Analysis

Delaware – RTEP Baseline Projects

(Greater than $5 million)

Delaware had no baseline project upgrades in 2018.

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

Delaware – RTEP Network Projects

(Greater than $5 million)

Delaware had no network project upgrades in 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.

Delaware – TO Supplemental Projects

(Greater than $5 million)

Delaware had no supplemental project upgrades in 2018.

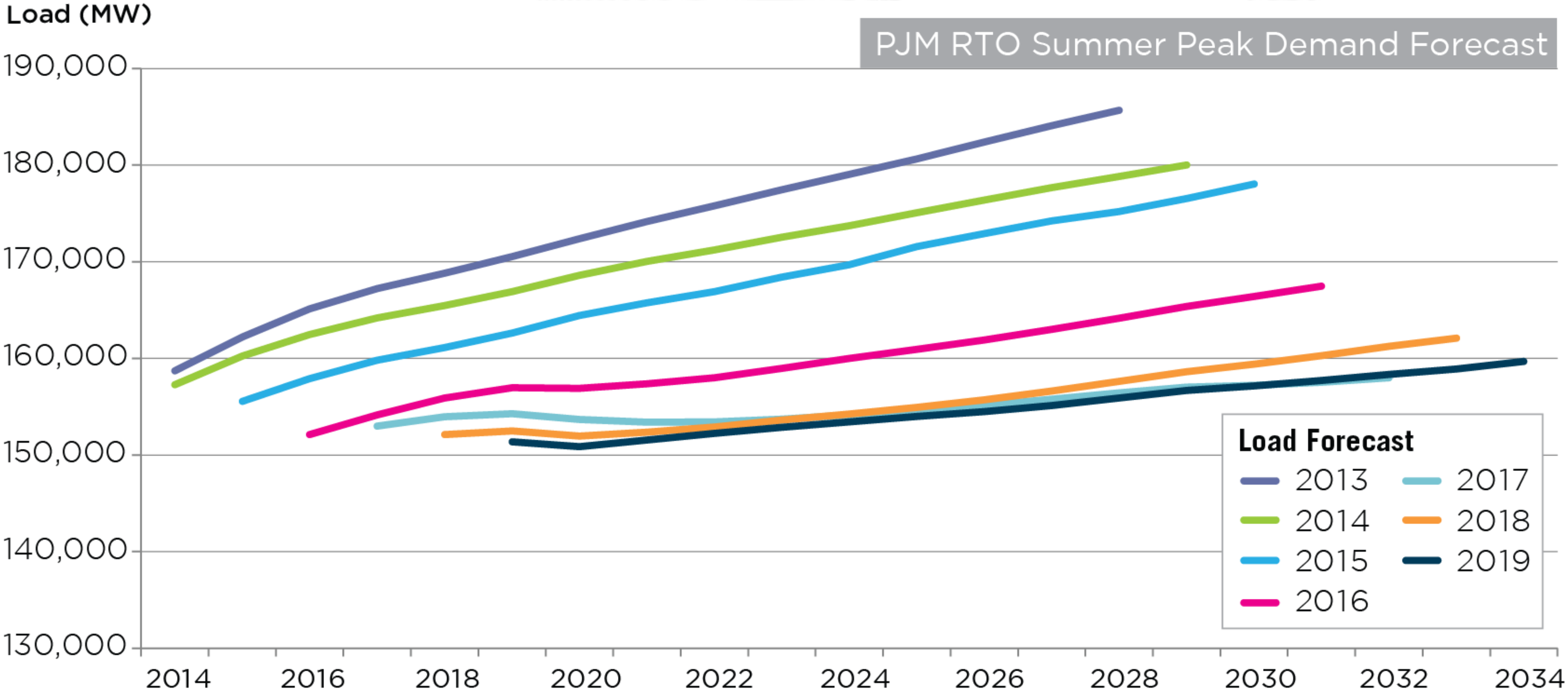
Note: Supplemental projects are transmission expansions or enhancements that are not required for compliance with the following PJM criteria: system reliability, operational performance or economic criteria, pursuant to a determination by the Office of the Interconnection and is not a state public policy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

Planning

Load Forecast

PJM Annual Load Forecasts

(January 2019)



Delaware – 2019 Load Forecast Report

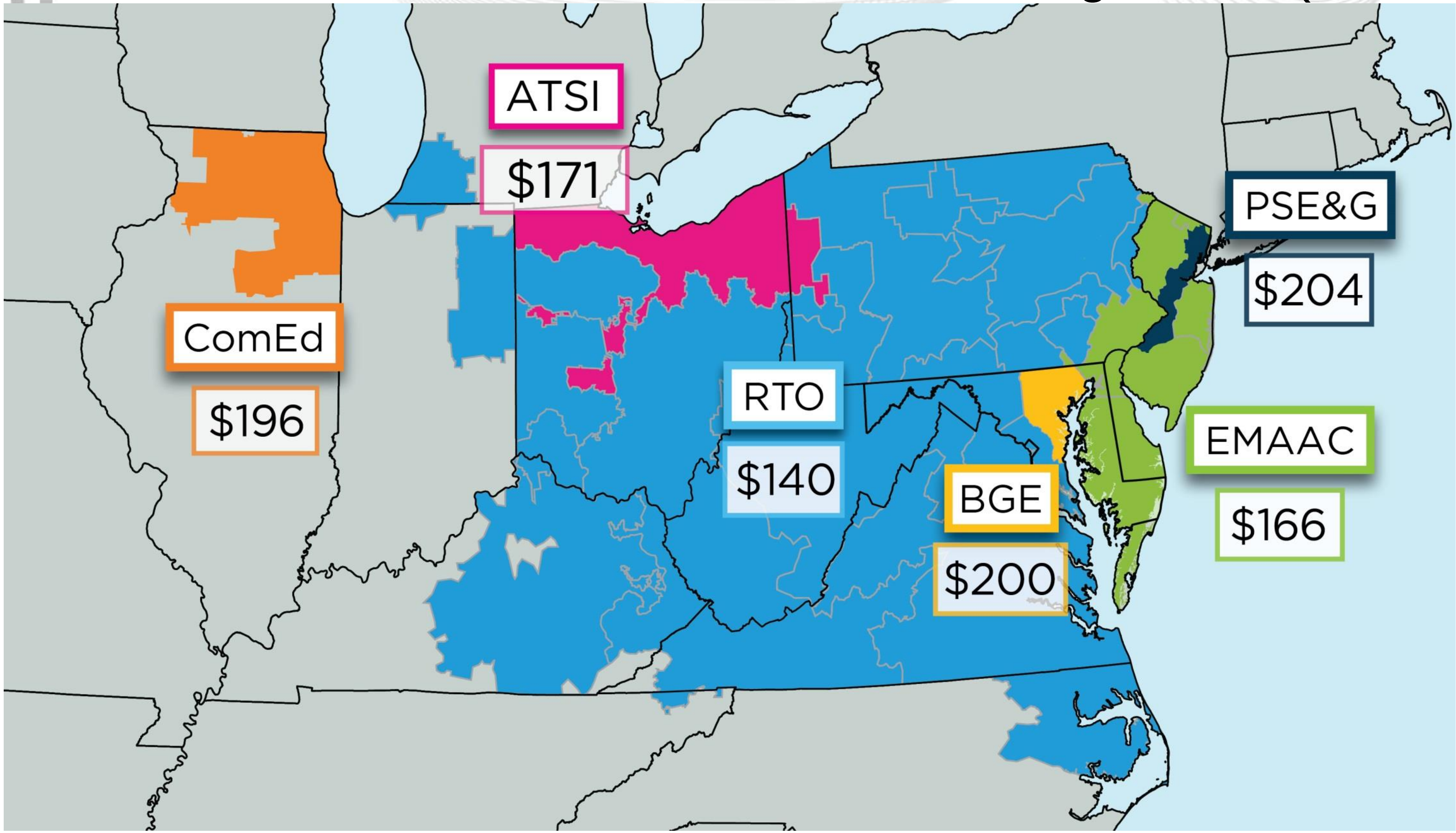
	Summer Peak (MW)			Winter Peak (MW)		
Transmission Owner	**2019**	**2029**	**Growth Rate (%)**	**2018/19**	**2028/29**	**Growth Rate (%)**
Delmarva Power and Light *	2,623	2,642	0.1%	2,109	2,187	0.4%
PJM RTO	151,358	156,689	0.3%	131,082	136,178	0.4%

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

Markets

Capacity Market Results

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



Delaware – Cleared Resources in 2021/22 Auction

(May 23, 2018)

	Cleared MW (Unforced Capacity)	Change from 2020/21 Auction
Generation	2,944	(136)
Demand Response	162	2
Energy Efficiency	29	(6)
Total	3,135	(141)

EMMAC Locational Clearing Price
$166

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

Delaware – Offered and Cleared Resources in 2021/22 Auction

(May 23, 2018)

		Unforced Capacity
Generation	Offered MW	3,058
	Cleared MW	2,944
Demand Response	Offered MW	195
	Cleared MW	162
Energy Efficiency	Offered MW	31
	Cleared MW	29
Total Offered MW		3,284
Total Cleared MW		3,135

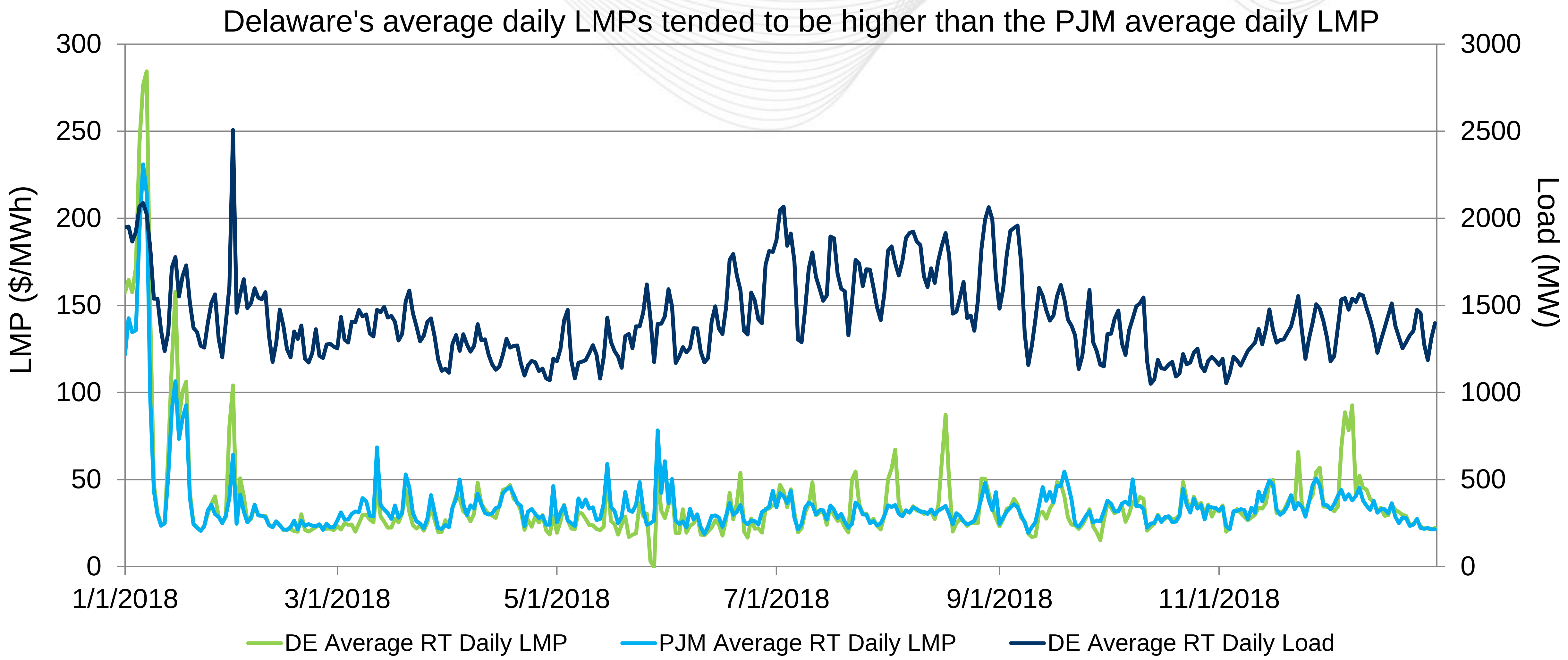
NOTE: Demand Response and Energy Efficiency are reported to PJM by Transmission Zone. The numbers above reflect the state's pro-rata share of cross-state zones for illustrative purposes.

Markets

Market Analysis

Delaware – Average Daily LMP and Load

(January 1, 2018 – December 31, 2018)

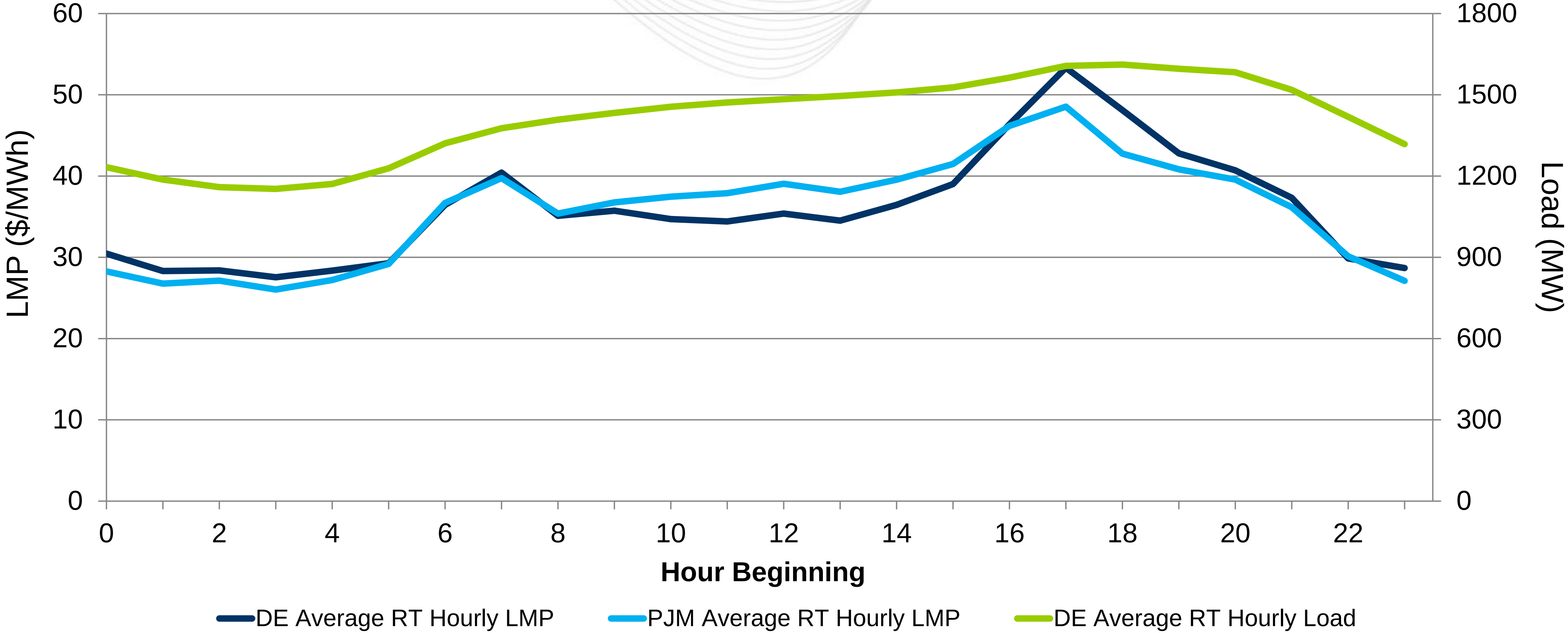


Note: The price spike in January reflects the Cold Snap that lasted from 12/28/17 to 1/7/2018.

Delaware – Average Hourly LMP and Load

(January 1, 2018 – December 31, 2018)

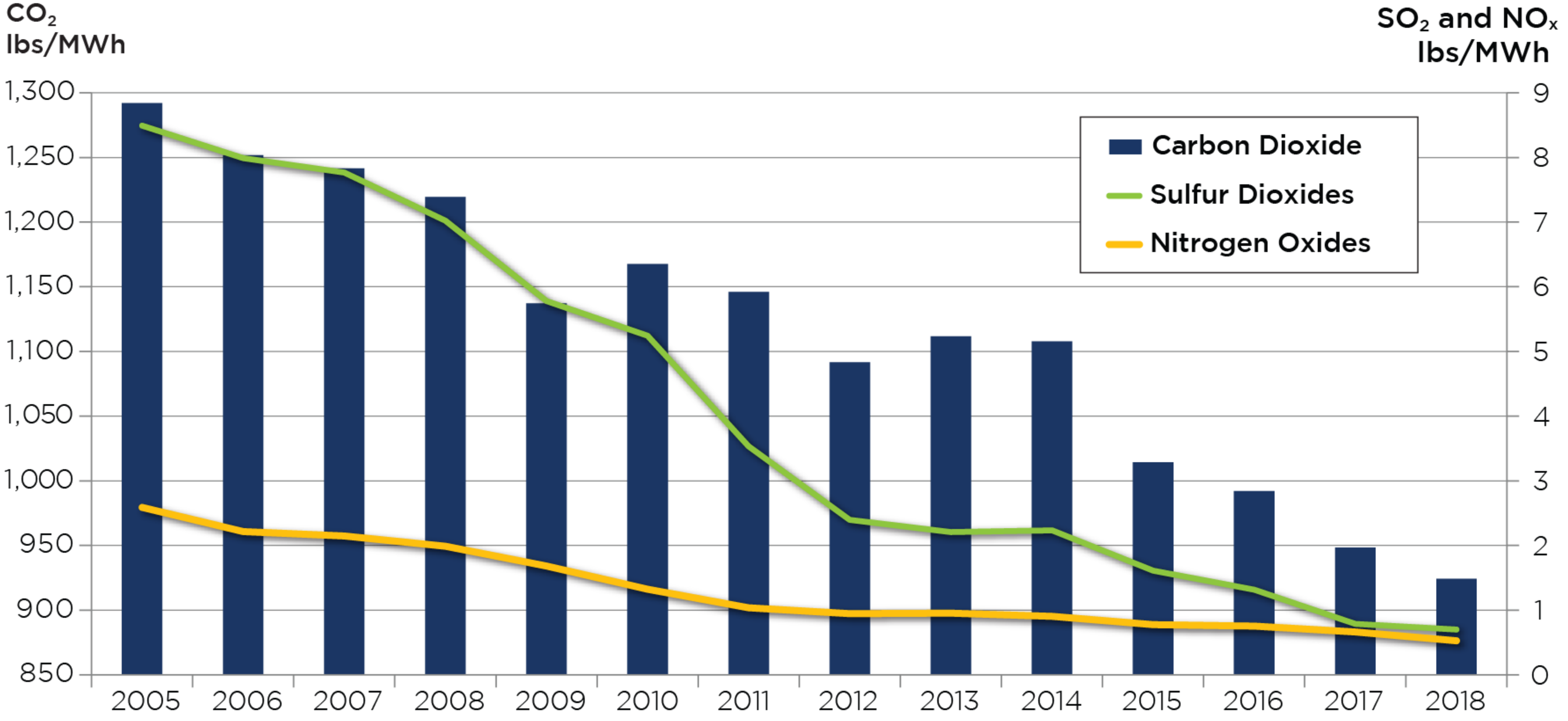
Delaware's hourly LMPs were higher than the PJM average during peak hours



Operations

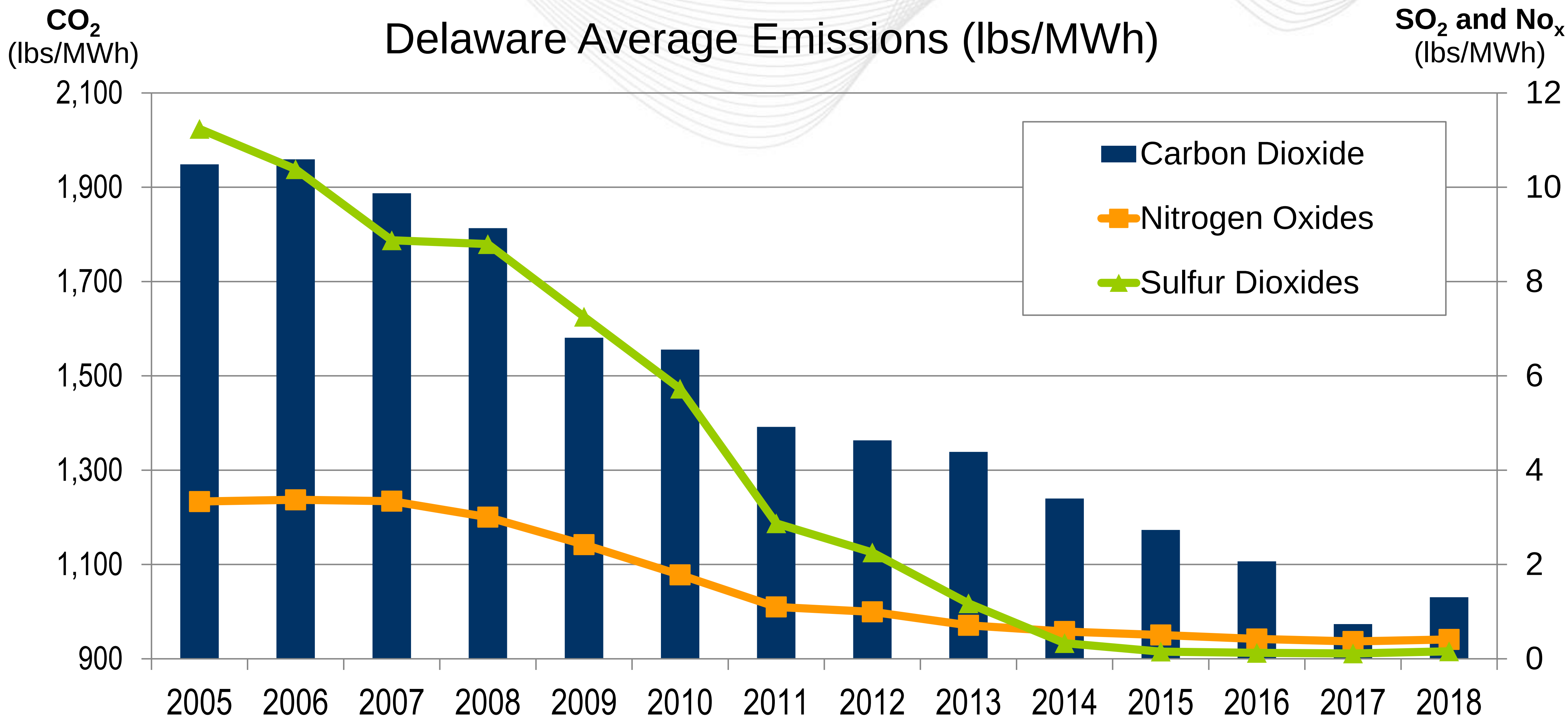
Emissions Data

2005-2018 PJM Average Emissions



Delaware – Average Emissions (lbs/MWh)

(February 4, 2019)



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