2016 Delaware State Report

July 2017

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Executive Summary

(March 2017)

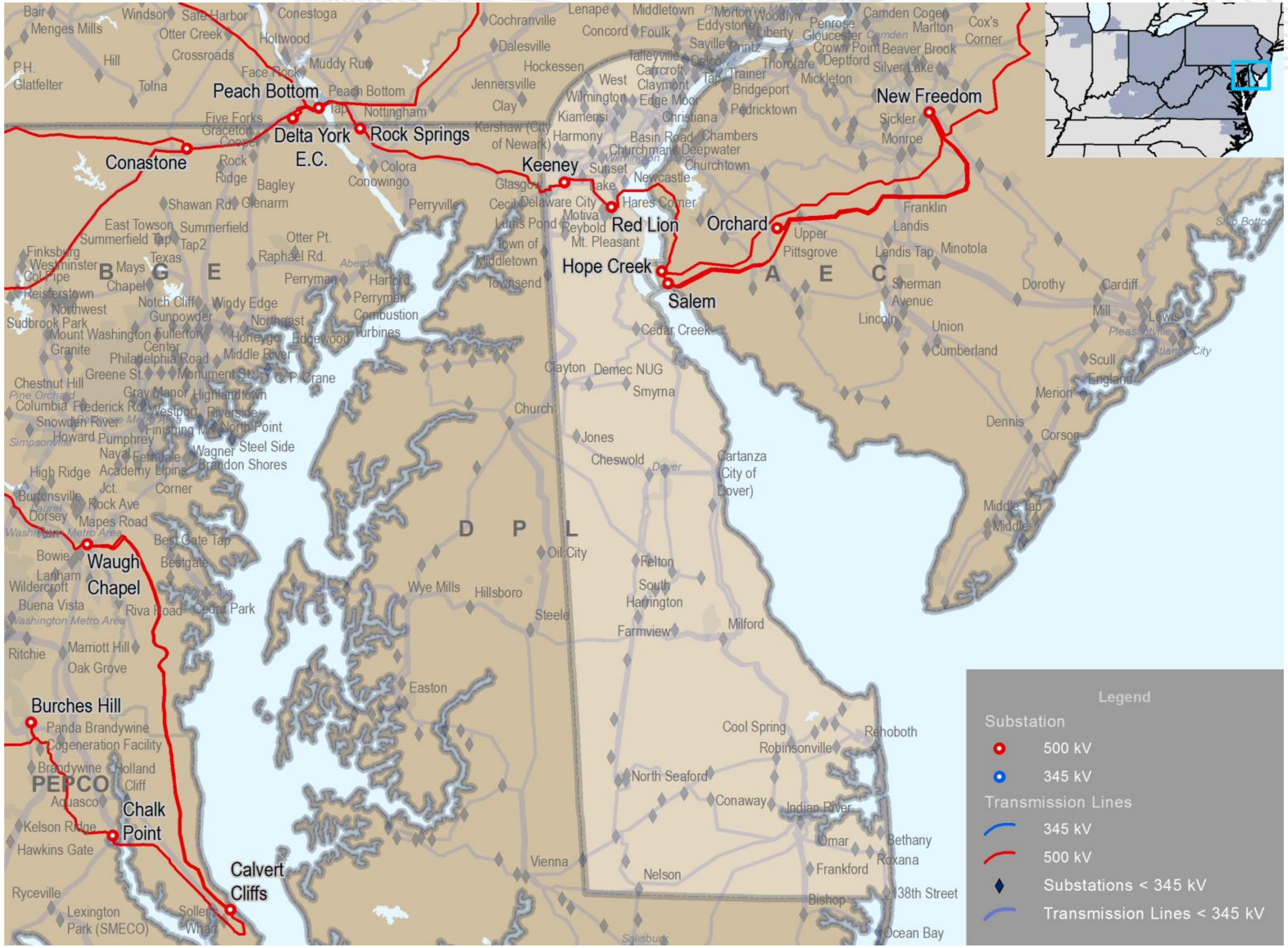
- **Existing Capacity:** Natural gas represents approximately 62 percent of the total installed capacity in Delaware while oil represents approximately 25 percent, and coal 13 percent. This differs from PJM where natural gas and coal are relatively even at 35 and 34 percent respectively.
- **Interconnection Requests:** Natural gas represents more than 75 percent of new interconnection requests in Delaware.
- **Deactivations**: No generation units retired in Delaware in 2016. This compares to 392 MW of capacity retirements PJM-wide in 2016.
- **RTEP 2016:** Delaware had no 2016 RTEP baseline or network projects.
- **Load Forecast:** Delaware load growth is nearly flat, averaging between -0.1 and 0.2 percent per year over the next 10 years. This aligns with PJM RTO load growth projections.

Executive Summary

(March 2017 Contd.)

- **2020/21 Capacity Market:** Compared to the PJM footprint, Delaware's distribution of generation, demand response, and energy efficiency is similar.
- **6/1/2014 – 5/31/2017 Market Performance:** Delaware's average daily locational marginal prices were consistent with the PJM average daily LMPs. Natural Gas resources represented 53 percent of generation used in Delaware while imports averaged 28 percent.
- **Emissions:** 2016 carbon dioxide emissions are slightly down from 2015; sulfur dioxides and nitrogen oxides continue to hold flat from 2015.

PJM Service Area – Delaware



Planning

Generation Portfolio Analysis

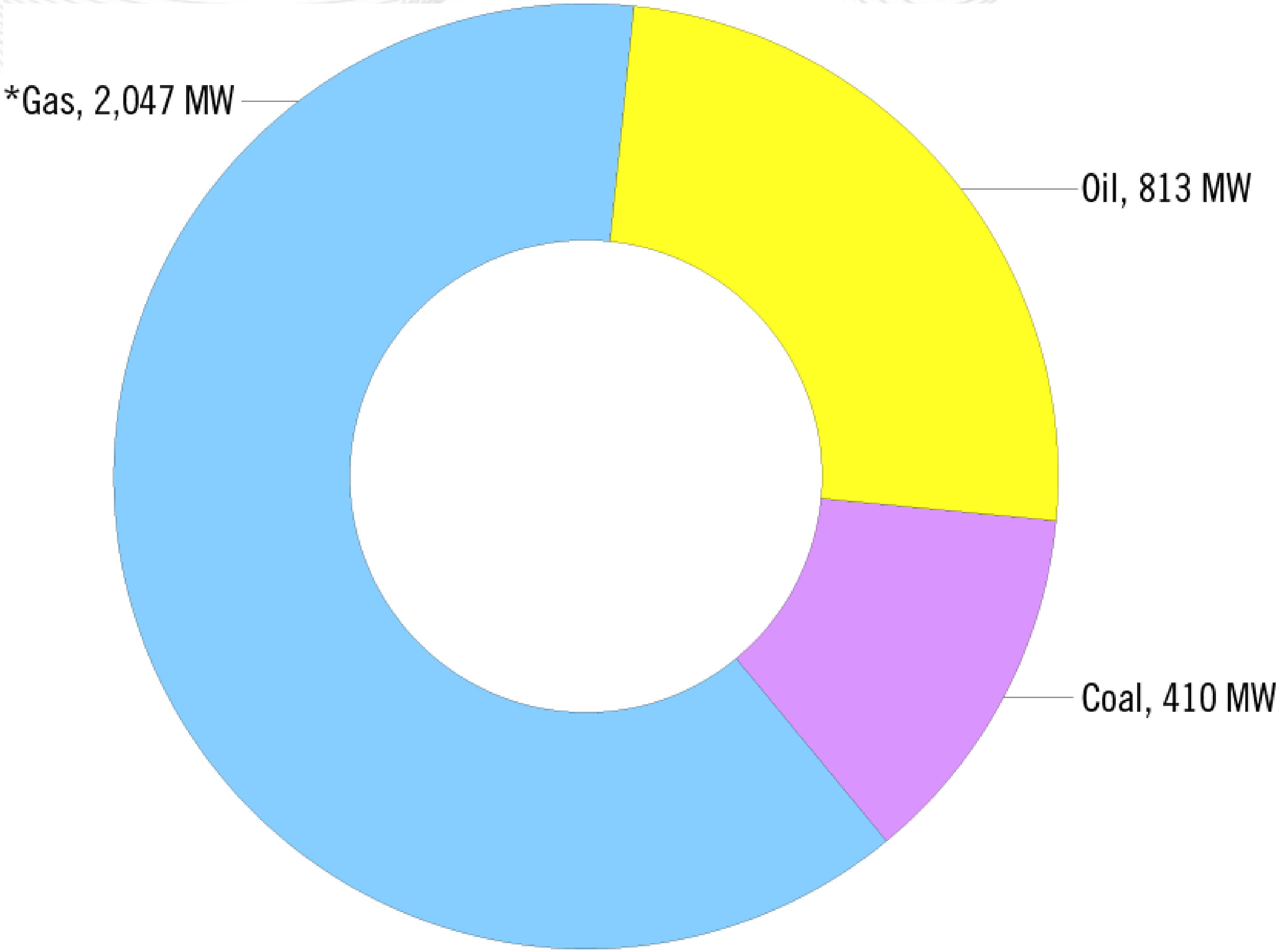
Delaware – Existing Installed Capacity

(Capacity Rights, December 31, 2016)

Summary:
Natural gas represents approximately 62 percent of the total installed capacity in Delaware while coal represents approximately 13 percent.

Overall in PJM, natural gas and coal are relatively even at 35 percent and 34 percent respectively.

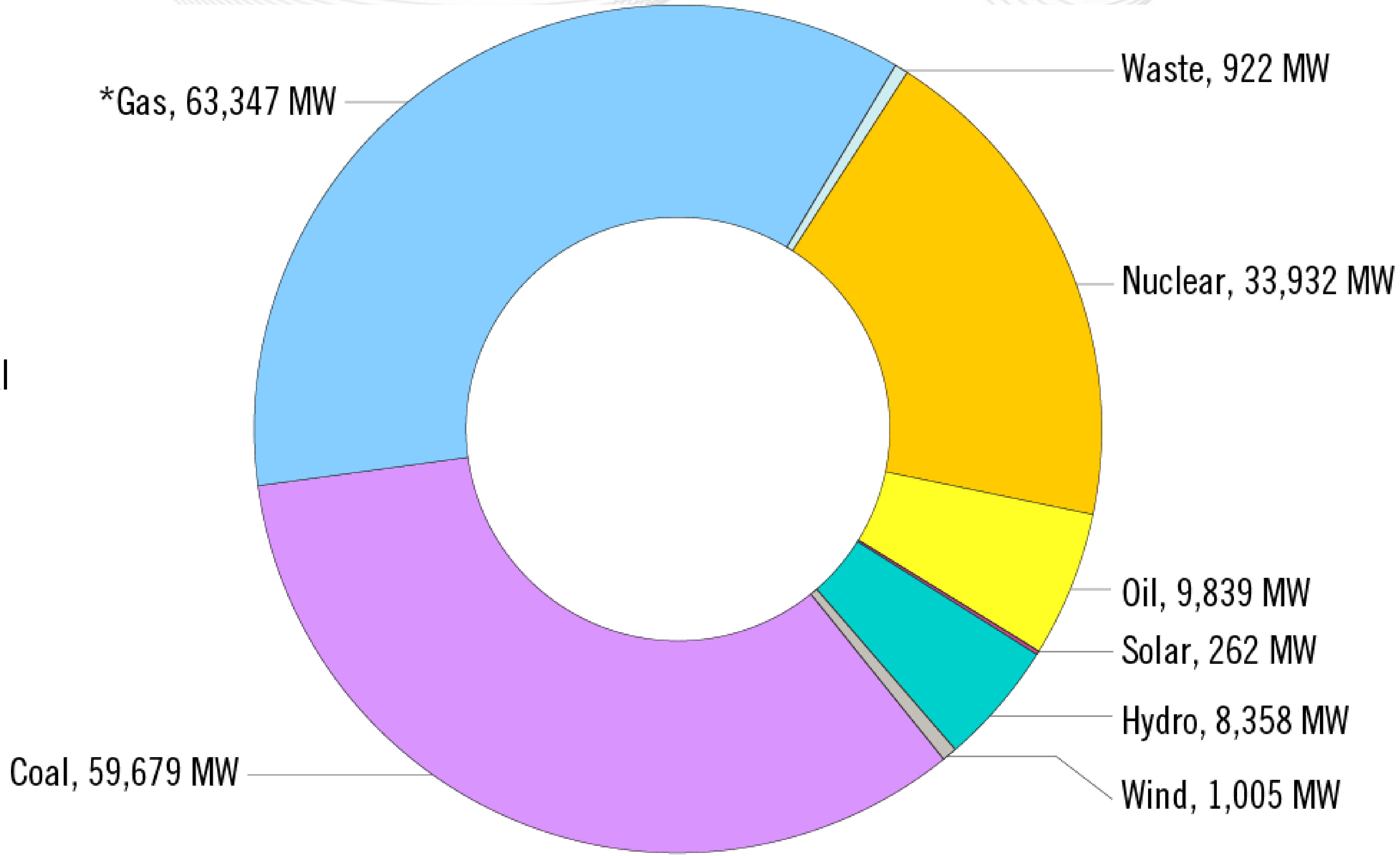
* Gas Contains	
Natural Gas	2,039 MW
Other Gas	8 MW



PJM – Existing Installed Capacity

(Capacity Rights, December 31, 2016)

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



* Gas Contains	
Natural Gas	62,941 MW
Other Gas	405 MW

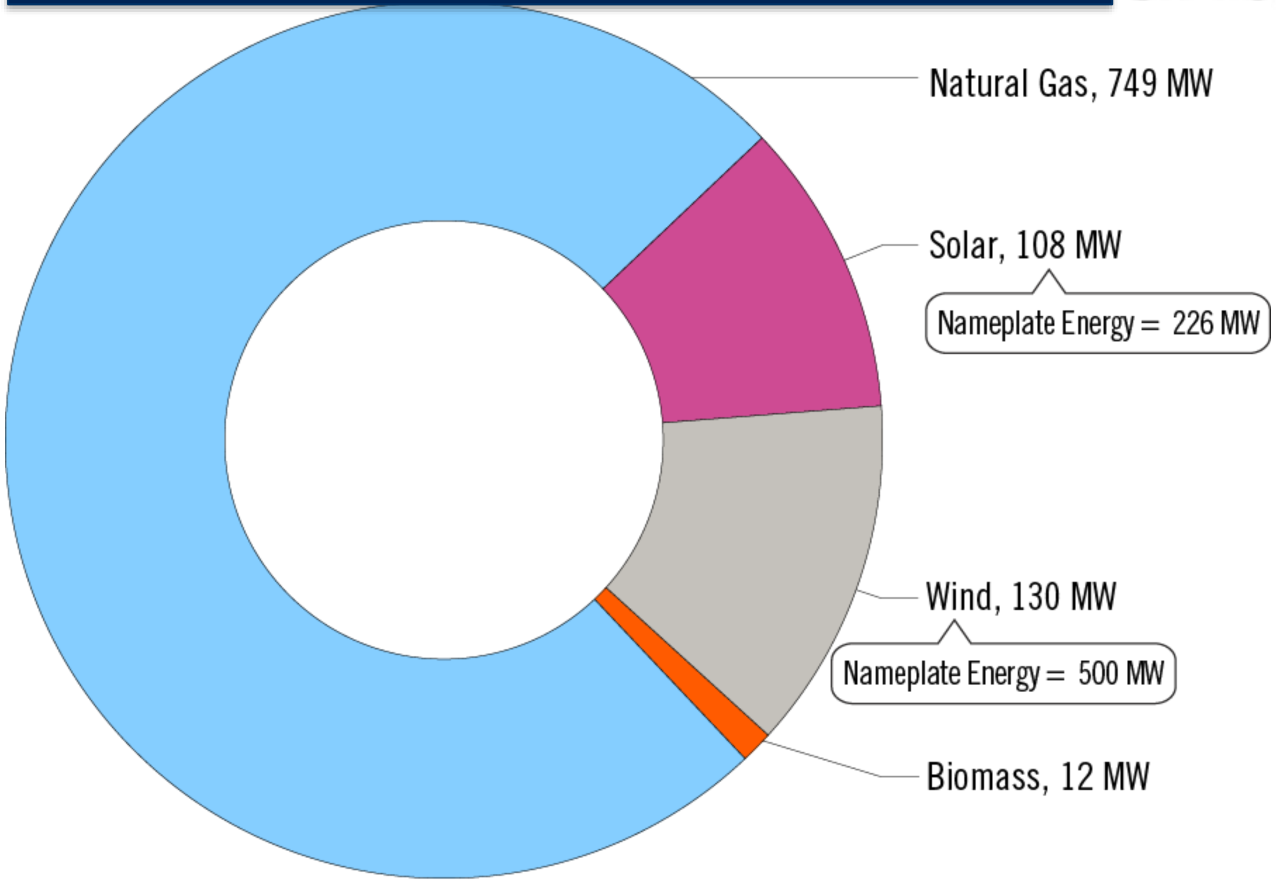
Delaware – Interconnection Requests

(Requested Capacity Rights, December 31, 2016)

Natural gas represents more than 75 percent of new interconnection requests in Delaware.

	MW	# of projects
Active	701	13
Under Construction	7	1
Suspended	291	1
Total	**999**	**15**

Total MW Capacity by Fuel Type



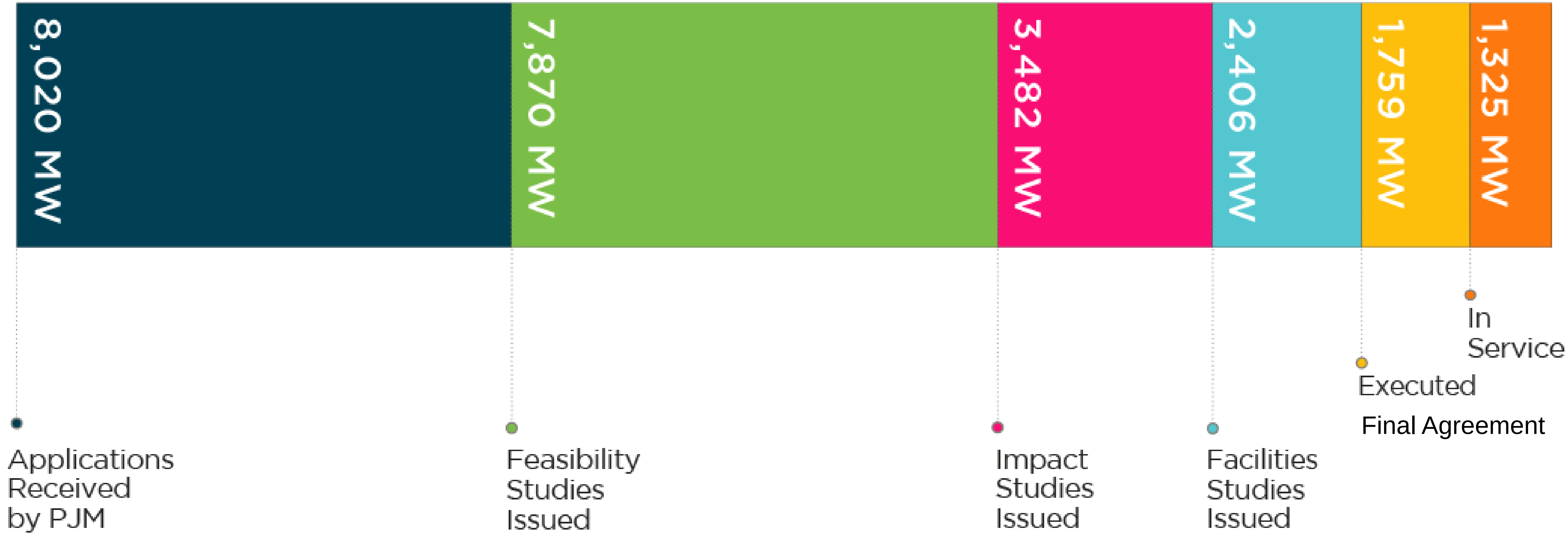
Fuel as a Percentage of Projects in Queue

Delaware – Interconnection Requests

	Active		In Service		Suspended		Under Construction		Withdrawn		Total Sum	
	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects
Biomass	12.0	2	0.0	1					12.0	2	24.0	5
Coal			23.0	2					630.0	1	653.0	3
Methane			9.0	4							9.0	4
Natural Gas	451.0	1	1,088.1	18	291.0	1	7.0	1	5,265.4	18	7,102.5	39
Oil			168.2	5					1.0	1	169.2	6
Solar	108.4	8							160.2	12	268.6	20
Storage									45.0	4	45.0	4
Other			30.0	2							30.0	2
Wind	129.8	2							290.0	3	419.8	5
Total	**701.2**	**13**	**1,318.3**	**32**	**291.0**	**1**	**7.0**	**1**	**6,403.6**	**41**	**8,721.1**	**88**

Delaware – Progression History Interconnection Requests

(Requested Capacity Rights, 2004 - 2016)



Following Final Agreement execution 142 MW of capacity withdrew from PJM's interconnection process. Another 291 MW have executed agreements but were not in service as of December 31, 2015 (*Suspended* or *Under Construction*). Overall, 17% of requested capacity in Delaware reaches commercial operation.

Delaware – 2016 Actual Generation Deactivations

(Capacity, As of December 31, 2016)

Unit	MW Capacity	TO Zone	Age	Actual Deactivation Date
	none			

Summary:

- No generating units in Delaware deactivated in 2016
- Across PJM, 11 generating units totaling 392 MW of capacity deactivated in 2016

Delaware – 2016 Generation Deactivations

(Capacity, As of December 31, 2016)

Unit	MW Capacity	TO Zone	Age	Actual Deactivation Date
	none			

Summary:

- No Delaware generators submitted generator deactivation notifications in 2016
- Across PJM, 23 PJM generating units submitted deactivation notification, ranging in date from 2016 - 2020.

Planning

Transmission Infrastructure Analysis

Delaware – RTEP Baseline Projects

Map ID	Project ID	Project	Delaware Baseline Project Driver: Baseline Load Growth/ Deliverability & Reliability	Congestion Relief - Economic	Operational Performance	Generator Deactivation	TO Criteria Violation	Required Date	Cost ($M)	Designated Entity*	2016 TEAC Review
		None									

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

Delaware – RTEP Network Projects

Map ID	Project ID	Project	Delaware Network Project Drivers: Generation Interconnection	Delaware Network Project Drivers: Merchant Transmission Interconnection	Delaware Network Project Drivers: Long-term Firm Transmission Service	Required Date	Cost ($M)	TO Zone(s)	2016 TEAC Review
		None							

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

			Delaware Supplemental Project Driver			
Map ID	Project ID	Project	Required Date	Cost ($M)	TO Zone(s)	2016 TEAC Review
		None				

Note: Supplemental projects are transmission expansions or enhancements that are used as inputs to RTEP models, but are not required for reliability, economic efficiency or operational performance criteria, as determined by PJM.

Delaware – Merchant Transmission Project Requests

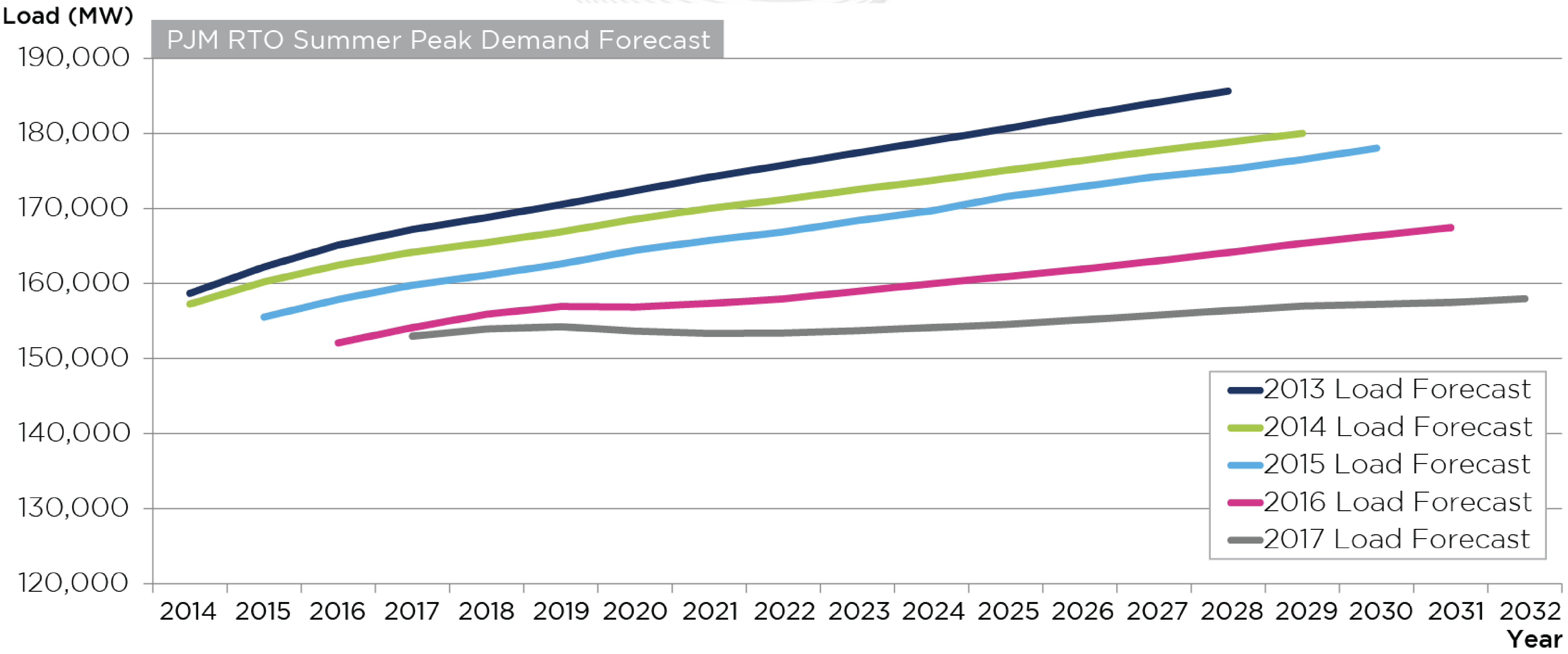
Queue	Project Name	MFO	Status	In Service Date	TO
	None				

Planning

Load Forecast

PJM Annual Load Forecasts

(January 9, 2017)



Delaware – 2017 Load Forecast Report

	Summer Peak (MW)			Winter Peak (MW)		
Transmission Owner	**2017**	**2027**	**Growth Rate (%)**	**2016/17**	**2026/27**	**Growth Rate (%)**
Delmarva Power and Light *	2,681	2,651	-0.1%	2,126	2,171	0.2%
PJM RTO	**152,999**	**155,773**	**0.2%**	**131,391**	**134,915**	**0.3%**

*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.

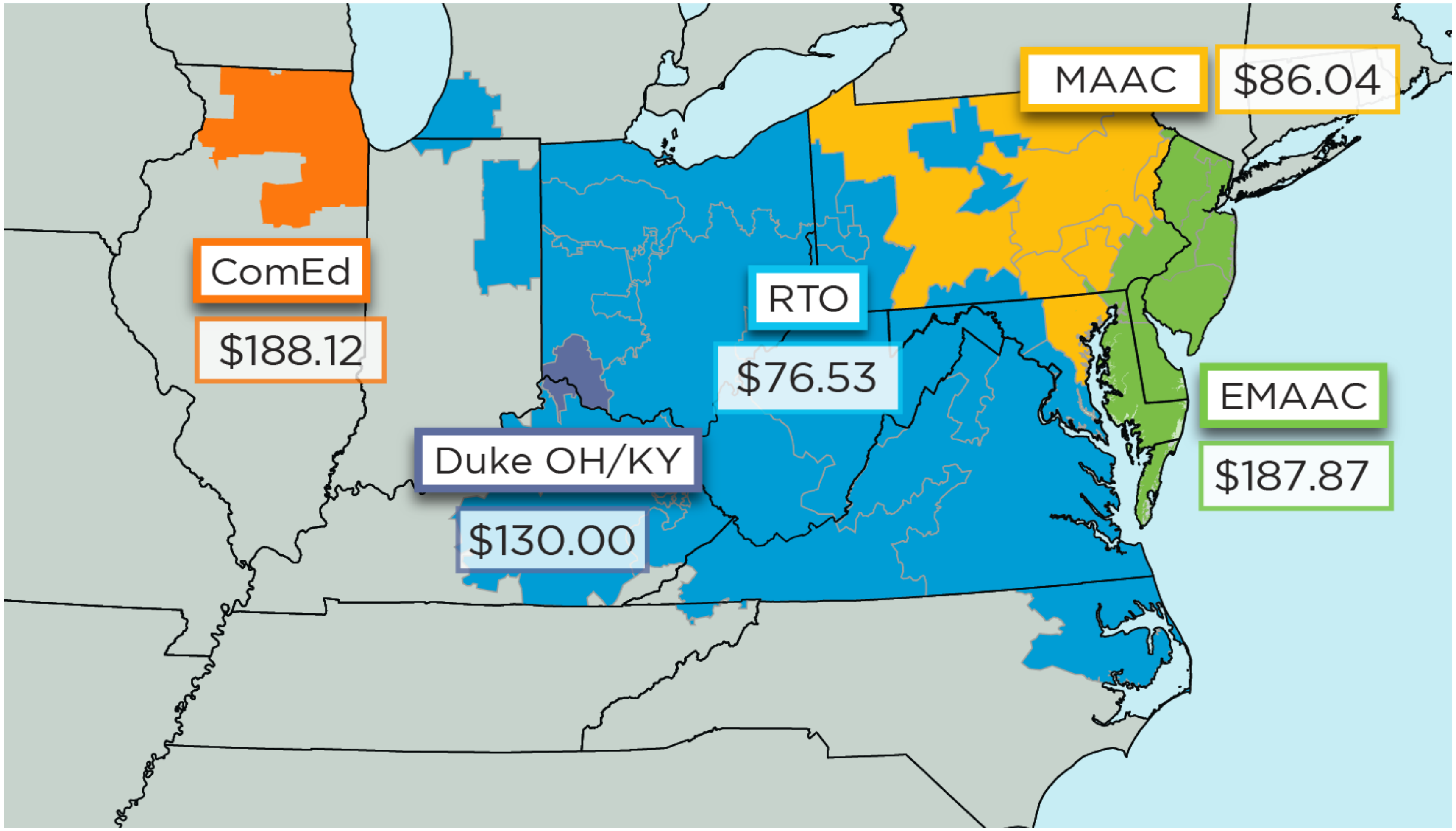
*PJM's 2017 forecast reflects methodology improvements implemented in 2016: variables to account for equipment and appliance saturation and efficiency, distributed solar generation adjustments and more refined treatment of weather data.

Markets

Capacity Market Results

PJM 2020/21 Auction Clearing Prices

(May 23, 2017)



Delaware - Cleared Resources in 2020/21 Auction

(May 23, 2017)

	Cleared MW (Unforced Capacity)	Change from 2019/20 Auction
Generation	3,080	562
Demand Response	160	(119)
Energy Efficiency	36	19
Total	3,276	462

EMMAC Locational Clearing Price
$187.87

PJM - Cleared Resources in 2020/21 Auction

(May 23, 2017)

	Cleared MW (Unforced Capacity)	Change from 2019/20 Auction
Generation	155,976	882
Demand Response	7,820	(2,528)
Energy Efficiency	1,710	195
Total	165,506	(1,450)

Delaware – Offered and Cleared Resources in 2020/21 Auction

(May 23, 2017)

		Unforced Capacity
Generation	Offered MW	3,080
	Cleared MW	3,080
Demand Response	Offered MW	248
	Cleared MW	160
Energy Efficiency	Offered MW	43
	Cleared MW	36
Total Offered MW		3,371
Total Cleared MW		3,276

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.

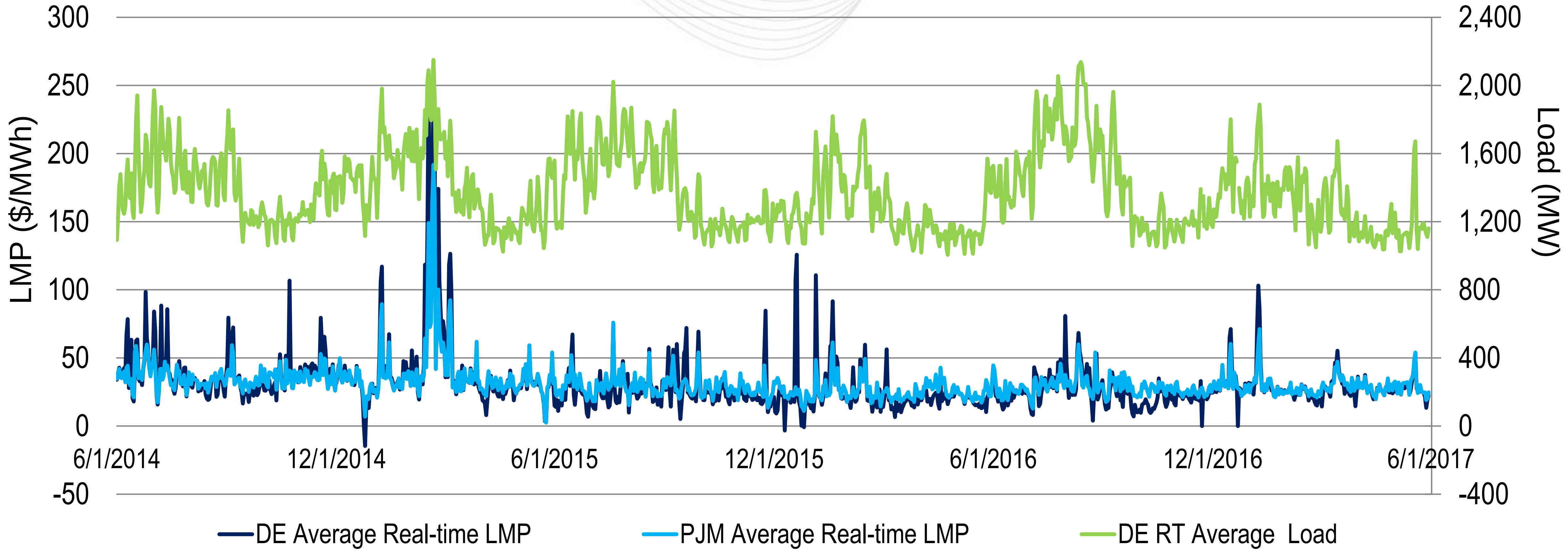
Markets

Market Analysis

Delaware - Average Daily Load and LMP

(June 1, 2014 - May 31, 2017)

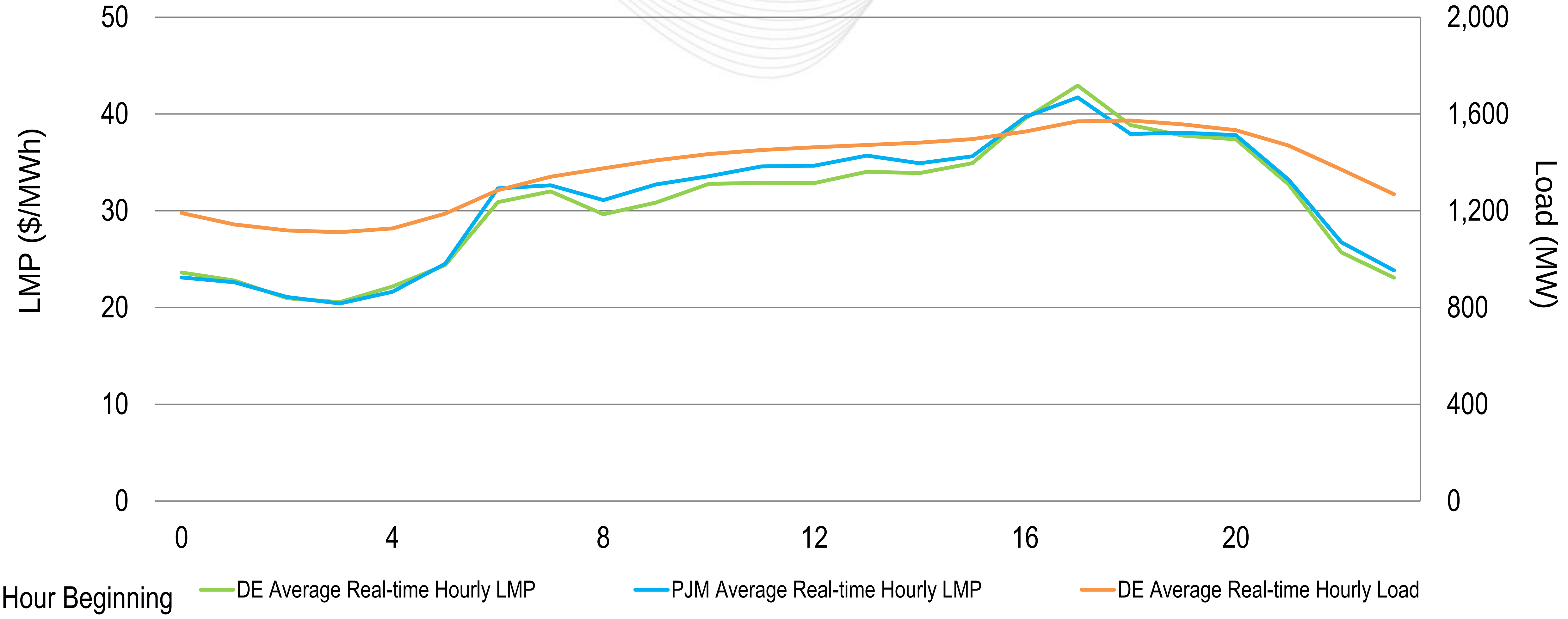
Delaware's average daily LMPs generally align with the PJM average daily LMP



Delaware – Hourly Average LMP and Load

(June 1, 2014 – May 31, 2017)

Delaware's hourly LMPs were similar to the PJM average.

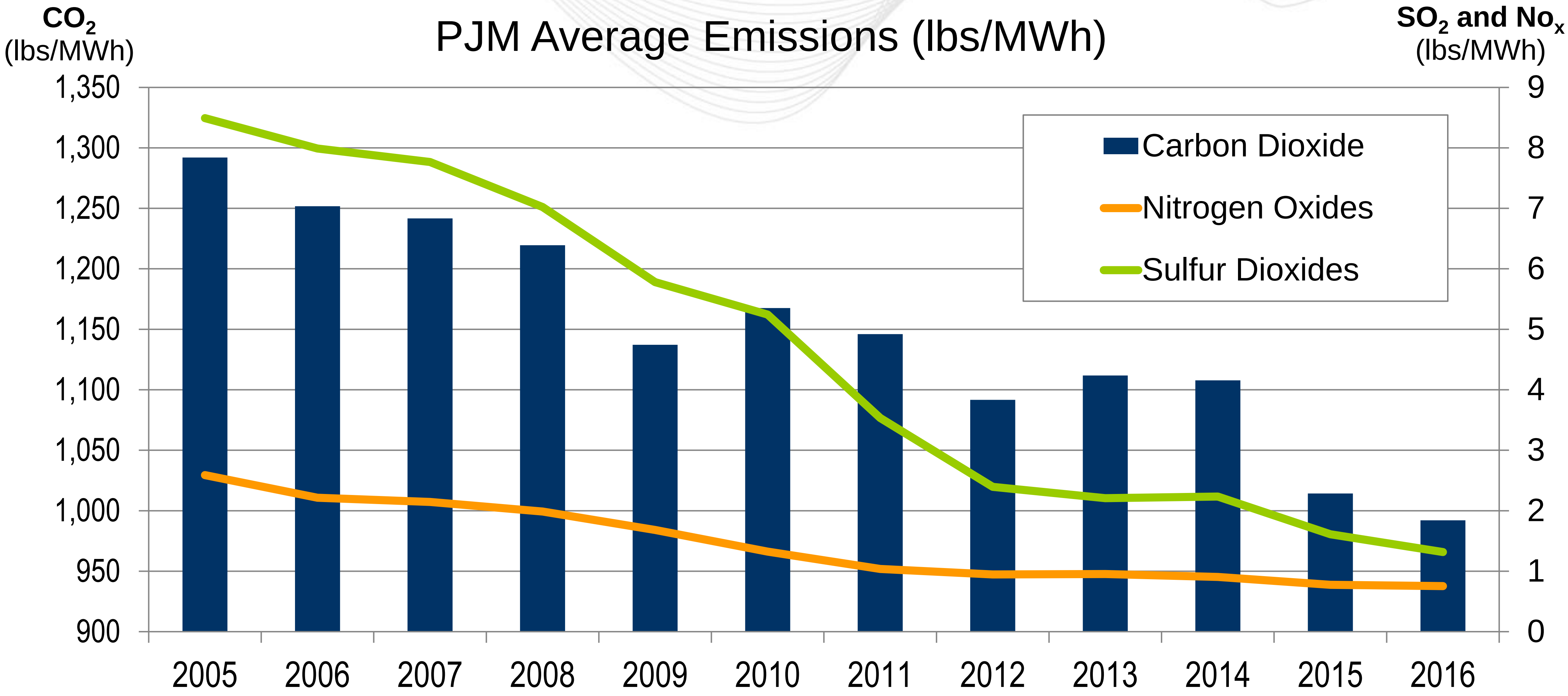


Operations

Emissions Data

PJM - Average Emissions (lbs/MWh)

(December 31, 2016)



Delaware - Average Emissions (lbs/MWh)

(December 31, 2016)