2021 Delaware State Infrastructure Report

(January 1, 2021 – December 31, 2021)

May 2022

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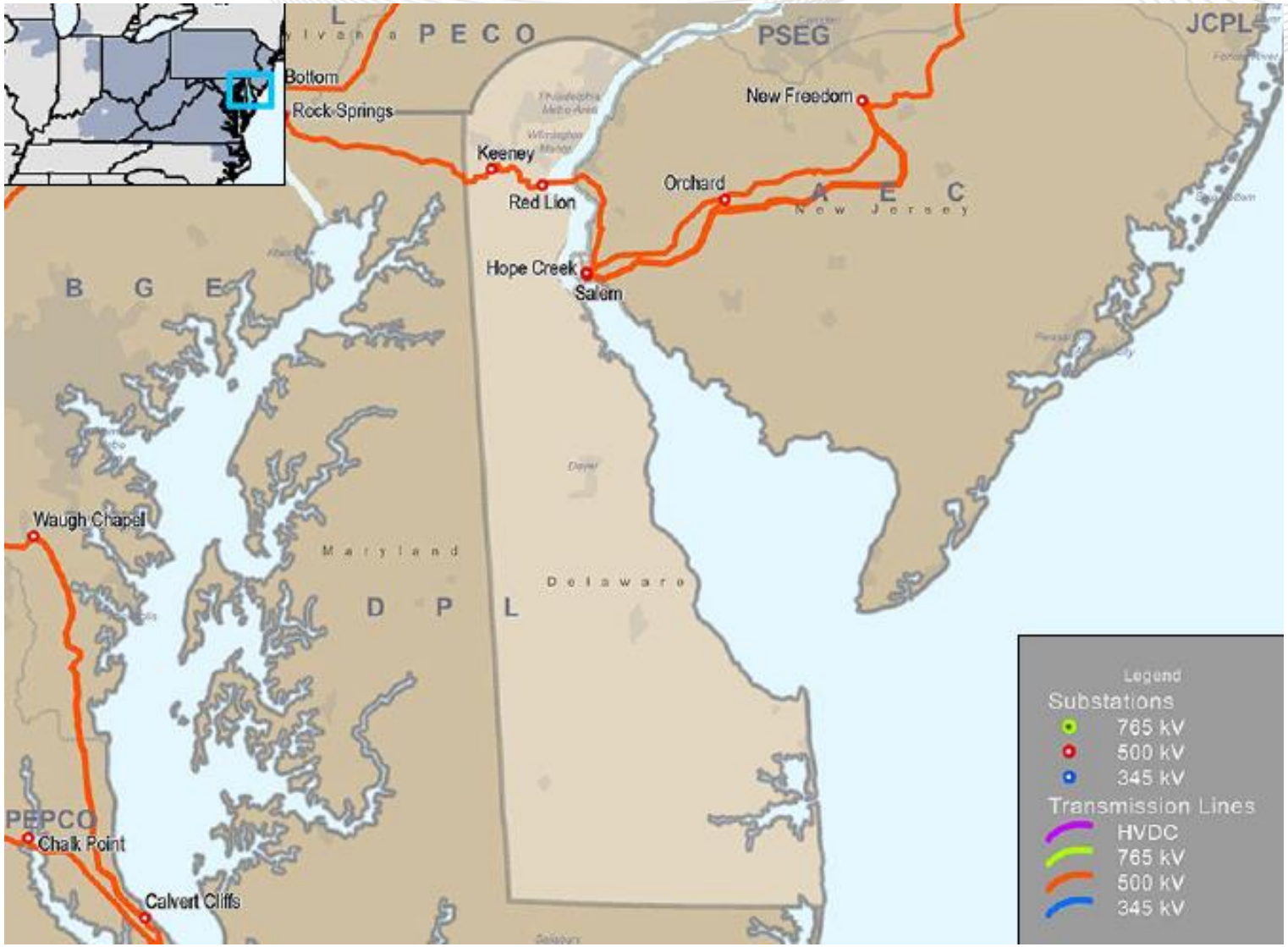
- **Existing Capacity:** Natural gas represents approximately 65.2 percent of the total installed capacity in the Delaware service territory while oil represents approximately 21.7 percent and coal 13.1 percent. Comparatively across PJM, natural gas and oil are at 44.4 and 4.6 percent of total installed capacity, while coal represents 26.6 percent.

- **Interconnection Requests:** Wind represents 64 percent of new interconnection requests in Delaware, while solar represents approximately 14.9 percent of new requests and natural gas 13.9 percent. Wind generation listed in the queue for Delaware includes offshore wind projects that are Maryland public policy projects but are physically located in Delaware.

- **Deactivations:** 412 MW of generation in Delaware gave a notice of deactivation in 2021.

- **RTEP 2021:** Delaware's 2021 RTEP project total represents $65.8 million in investment.
- **Load Forecast:** Delaware's summer peak load is projected to decrease by 0.1 percent annually over the next ten years, while the winter peak is projected to increase by 0.7 percent.
- **2022/23 Capacity Market:** 2,695 MW in Delaware cleared in the 2022/23 Base Residual Auction.
- **1/1/21 – 12/31/21 Market Performance:** Delaware's average hourly LMPs were generally lower than the PJM average hourly LMP.
- **Emissions:** Delaware's average CO2 emissions slightly increased in 2021 compared to 2020 levels.

PJM Service Area – Delaware

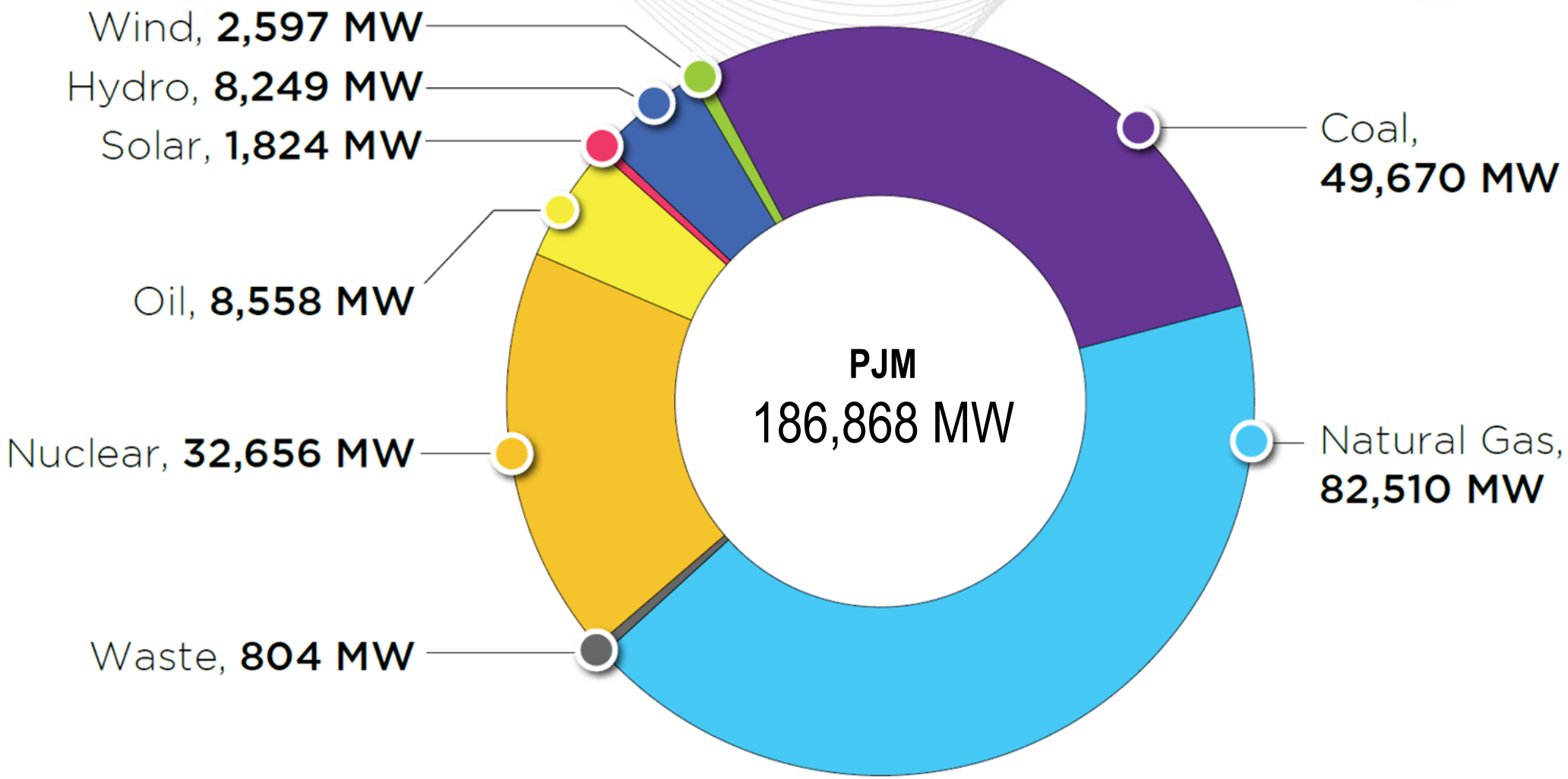


Planning

Generation Portfolio Analysis

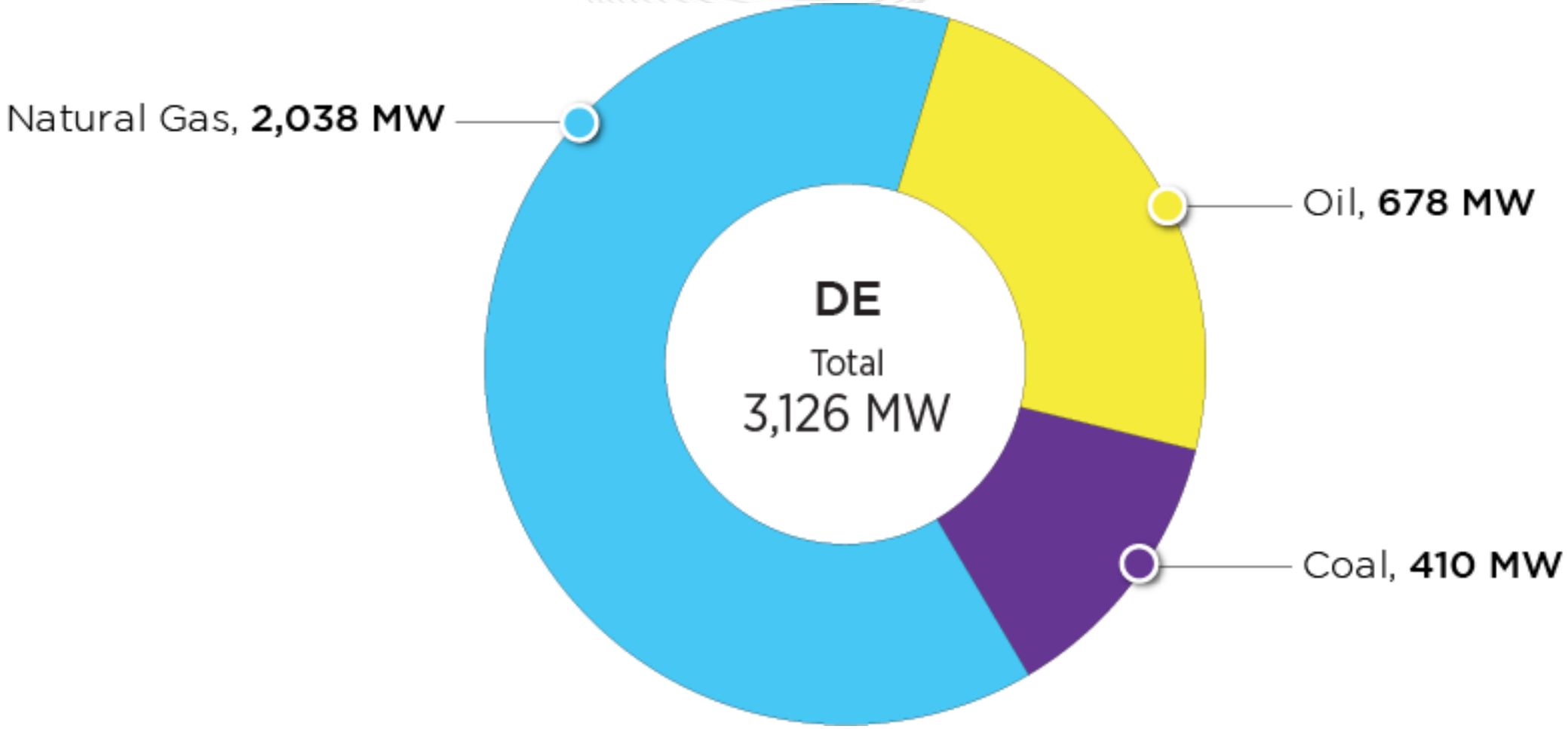
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



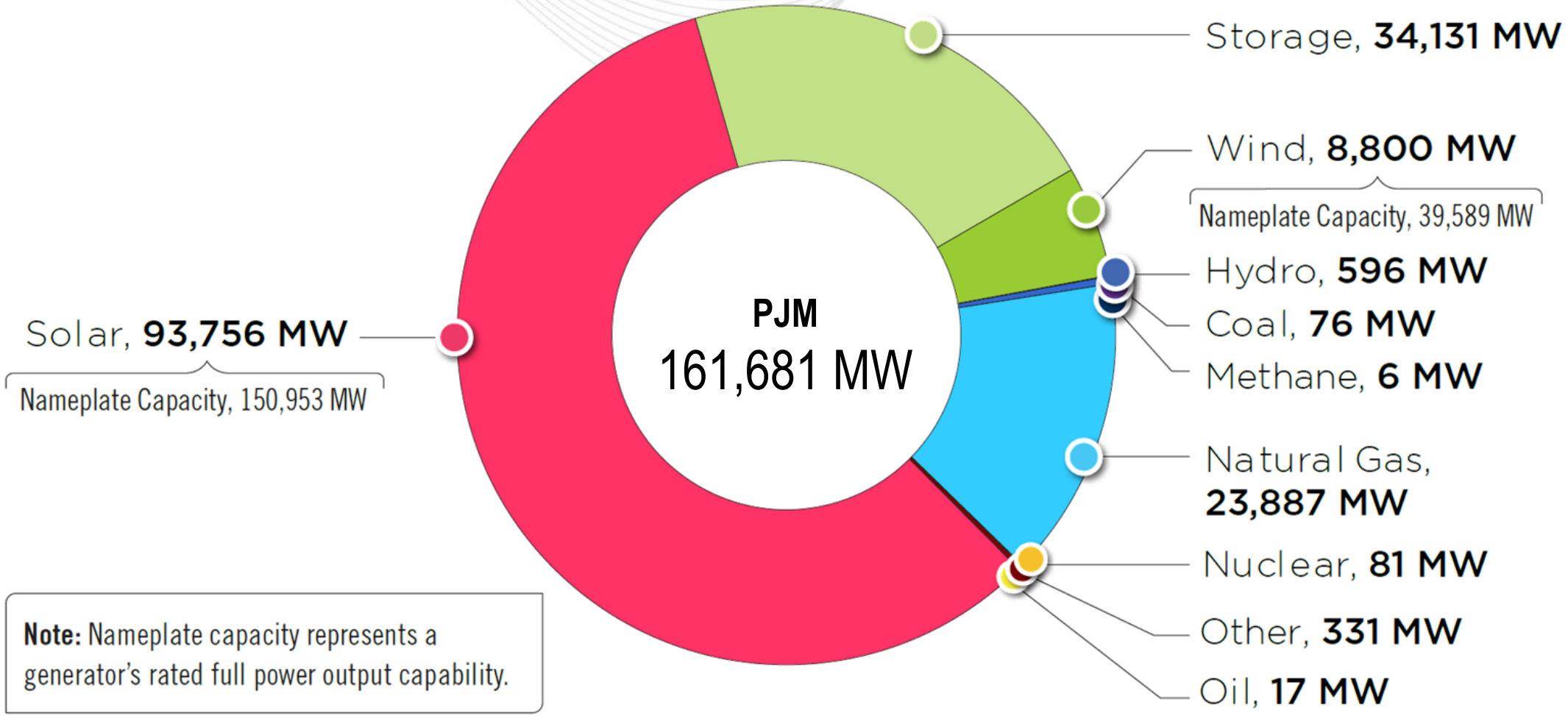
Delaware – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



PJM – Queued Capacity (MW) by Fuel Type

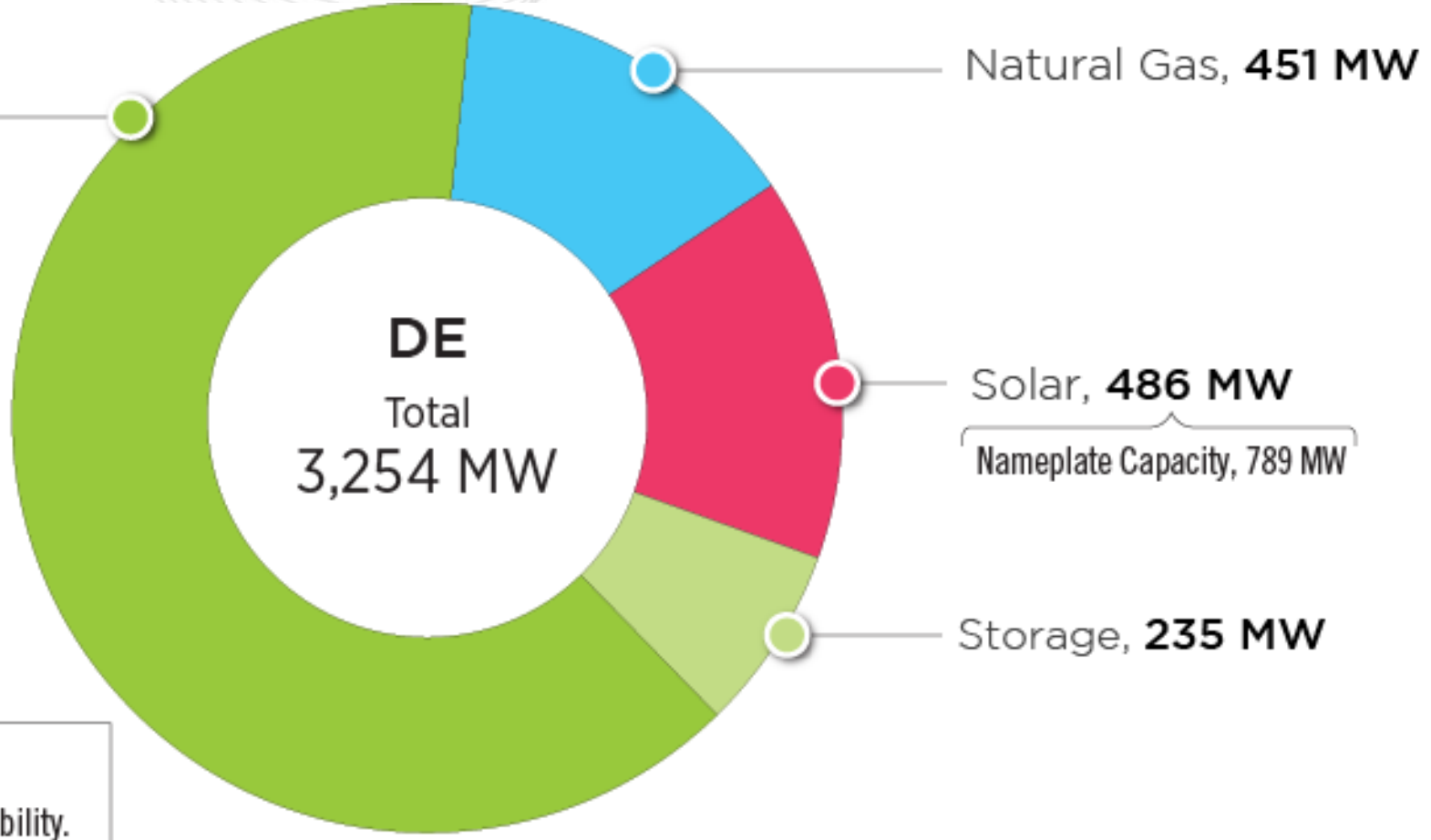
(Requested CIRs – as of Dec. 31, 2021)



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

Delaware – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2021)



The wind generation listed in the queue for Delaware includes offshore wind projects that are Maryland public policy projects but are physically located in Delaware.

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

Delaware – Historical Interconnection Requests by Fuel Type

(as of Dec. 31, 2021)

		In Queue				Complete					
		Active		Under Construction		In Service		Withdrawn		Grand Total	
		Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)
Non-Renewable	Coal	0	0.0	0	0.0	2	23.0	1	630.0	3	653.0
	Natural Gas	0	0.0	1	451.0	18	1,281.1	19	5,556.4	38	7,288.5
	Oil	0	0.0	0	0.0	5	168.2	1	1.0	6	169.2
	Other	0	0.0	0	0.0	2	30.0	0	0.0	2	30.0
	Storage	6	235.2	0	0.0	0	0.0	4	45.0	10	280.2
Renewable	Biomass	0	0.0	0	0.0	1	0.0	4	24.0	5	24.0
	Methane	0	0.0	0	0.0	4	9.0	3	28.8	7	37.8
	Solar	15	386.1	10	99.9	0	0.0	30	341.6	55	827.6
	Wind	15	2,017.8	1	64.4	0	0.0	5	396.9	21	2,479.1
	Grand Total	**36**	**2,639.1**	**12**	**615.3**	**32**	**1,511.3**	**67**	**7,023.7**	**147**	**11,789.4**

Note: The ”Under Construction” column includes both “Engineering and Procurement” and “Under Construction” project statuses.

Delaware – Progression History of Interconnection Requests

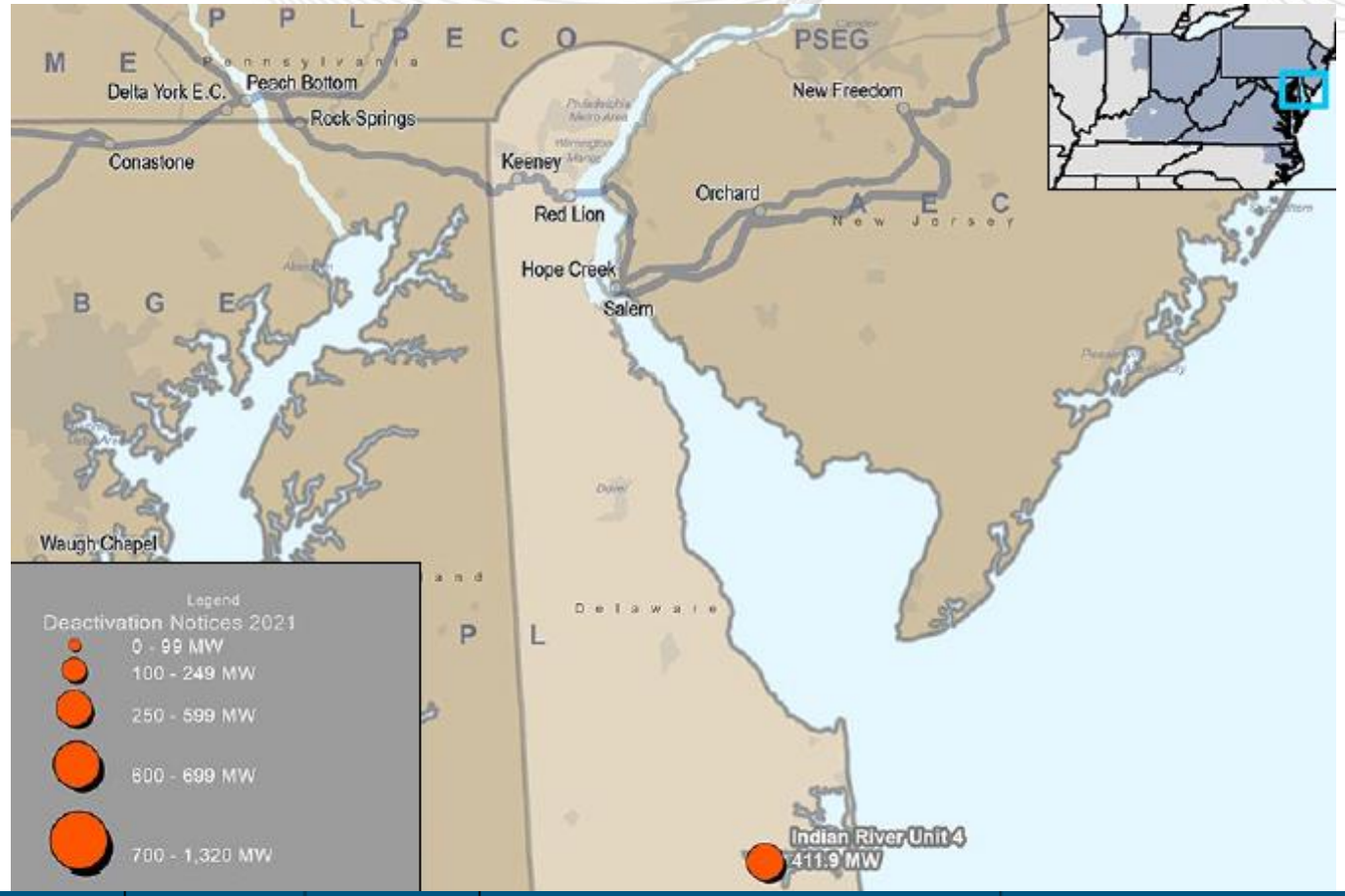
Percentage of planned capacity and projects that have reached commercial operation

16.5%	Requested capacity megawatts
28.8%	Requested projects

			Capacity	Nameplate
Projects withdrawn after final agreement	3	Interconnection Service Agreements	420 MW	780 MW
	6	Wholesale Market Participation Agreements	17 MW	54 MW

This graphic shows the final state of generation submitted to the PJM queue that completed the study phase as of Dec. 31, 2021, meaning the generation reached in-service operation, began construction, or was suspended or withdrawn. It does not include projects considered active in the queue as of Dec. 31, 2021.

Delaware – Generation Deactivation Notifications Received in 2021



Unit	TO Zone	Fuel Type	Request Received to Deactivate	Actual or Projected Deactivation Date	Age (Years)	Capacity (MW)
Indian River 4	DP&L	Coal	6/30/2021	5/31/2022	41	411.9

Planning

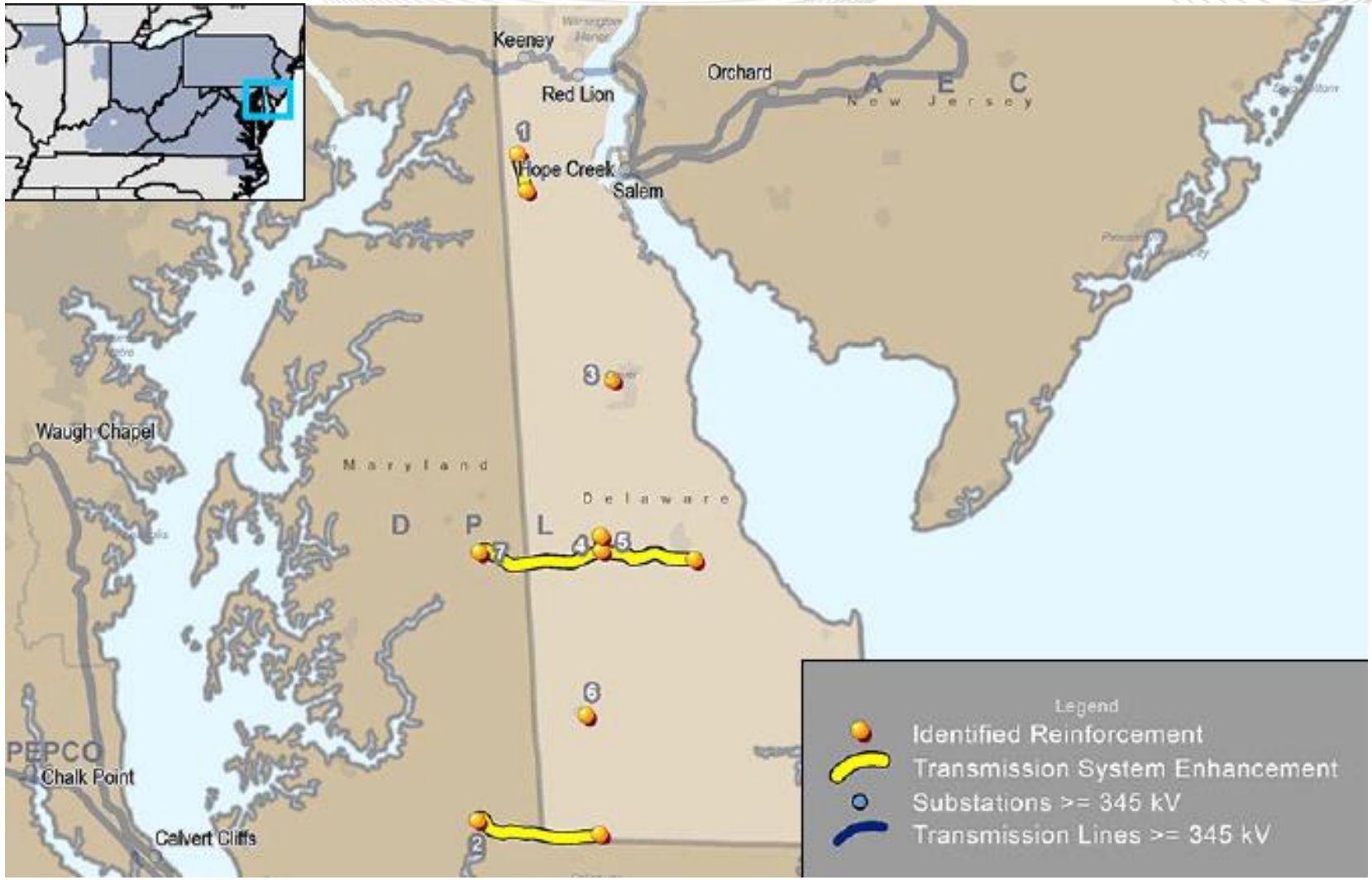
Transmission Infrastructure Analysis

Please note that PJM is now listing all transmission projects in its Annual RTEP and state infrastructure reports, beginning with this year's 2021 Annual RTEP. In previous years only projects above a $10 million threshold were listed in the Annual RTEP Report and projects above a $5 million threshold were listed in the state infrastructure reports. This change may increase the amount of projects listed in these reports going forward now that smaller projects below the previous $5 million cutoff are being included.

The complete list of all RTEP projects in PJM, including those from prior years, can be found at the "RTEP Upgrades & Status – Transmission Construction Status" page on pjm.com.

https://www.pjm.com/planning/project-construction

Delaware – RTEP Baseline Projects

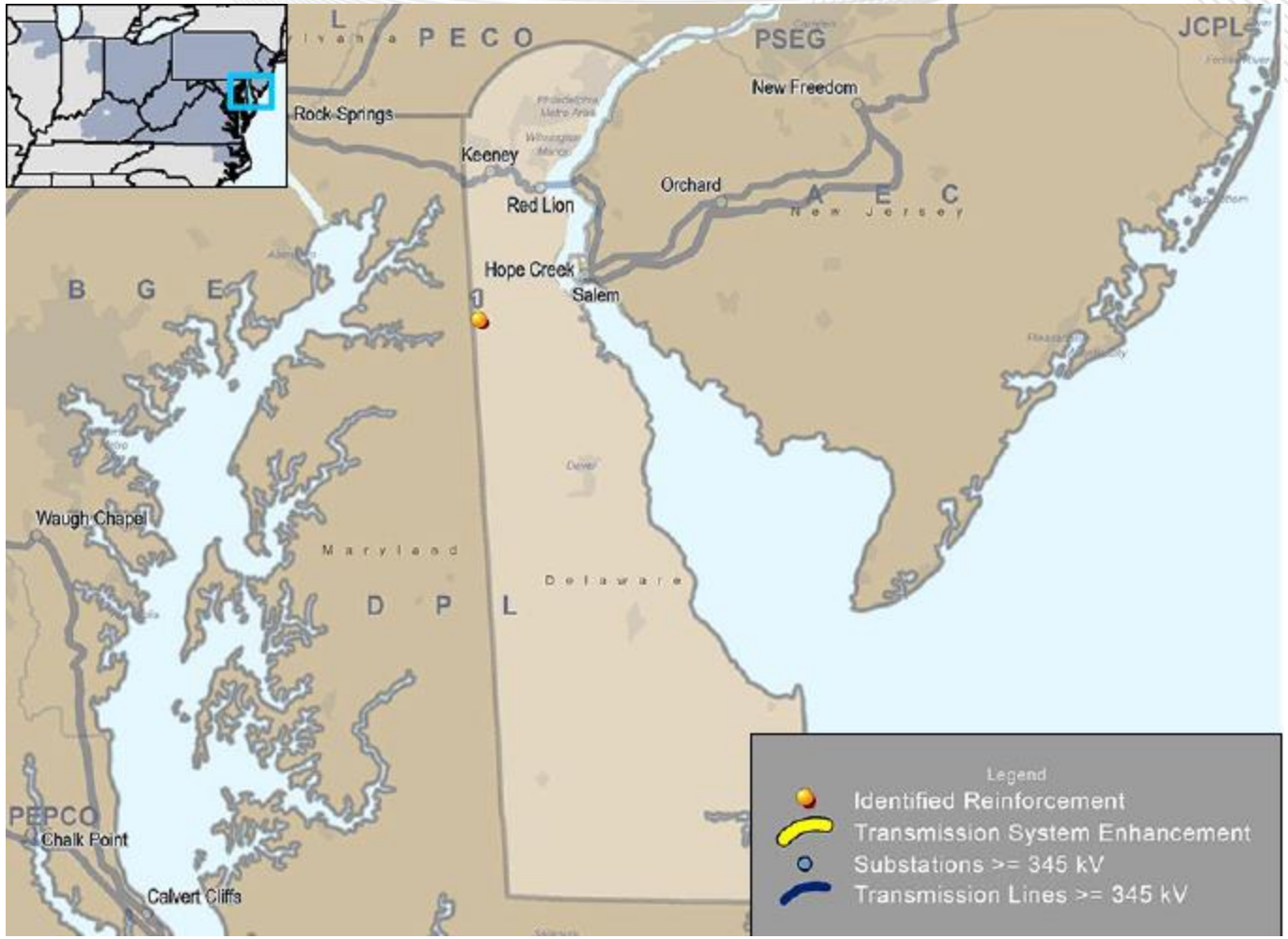


Note: Baseline upgrades are those that resolve a system reliability criteria violation.

Delaware – RTEP Baseline Projects

Map ID	Project	Description	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	b3224	Replace a disconnect switch and reconductor a short span of Mt. Pleasant-Middletown tap line.	6/1/2025	$0.43	DPL	11/18/2020
2	b3326	Rebuild the 13707 Vienna-Nelson 138 kV line.	6/1/2022	$38.50		8/10/2021
3	b3327	Upgrade the disconnect switch (6784-L1) at Kent.		$0.25		8/31/2021
4	b3329	Rerate the 13773 Farmview-Milford 138 kV line.		$0.30		
5	b3330	Rerate the 13774 Farmview-S. Harrington 138 kV line.		$0.25		
6	b3331	Upgrade bus conductor and relay at Seaford 138 kV.		$0.50		
7	b3332	Rerate the 23076 Steel-Milford 230 kV line.		$0.60		

Delaware – RTEP Network Projects

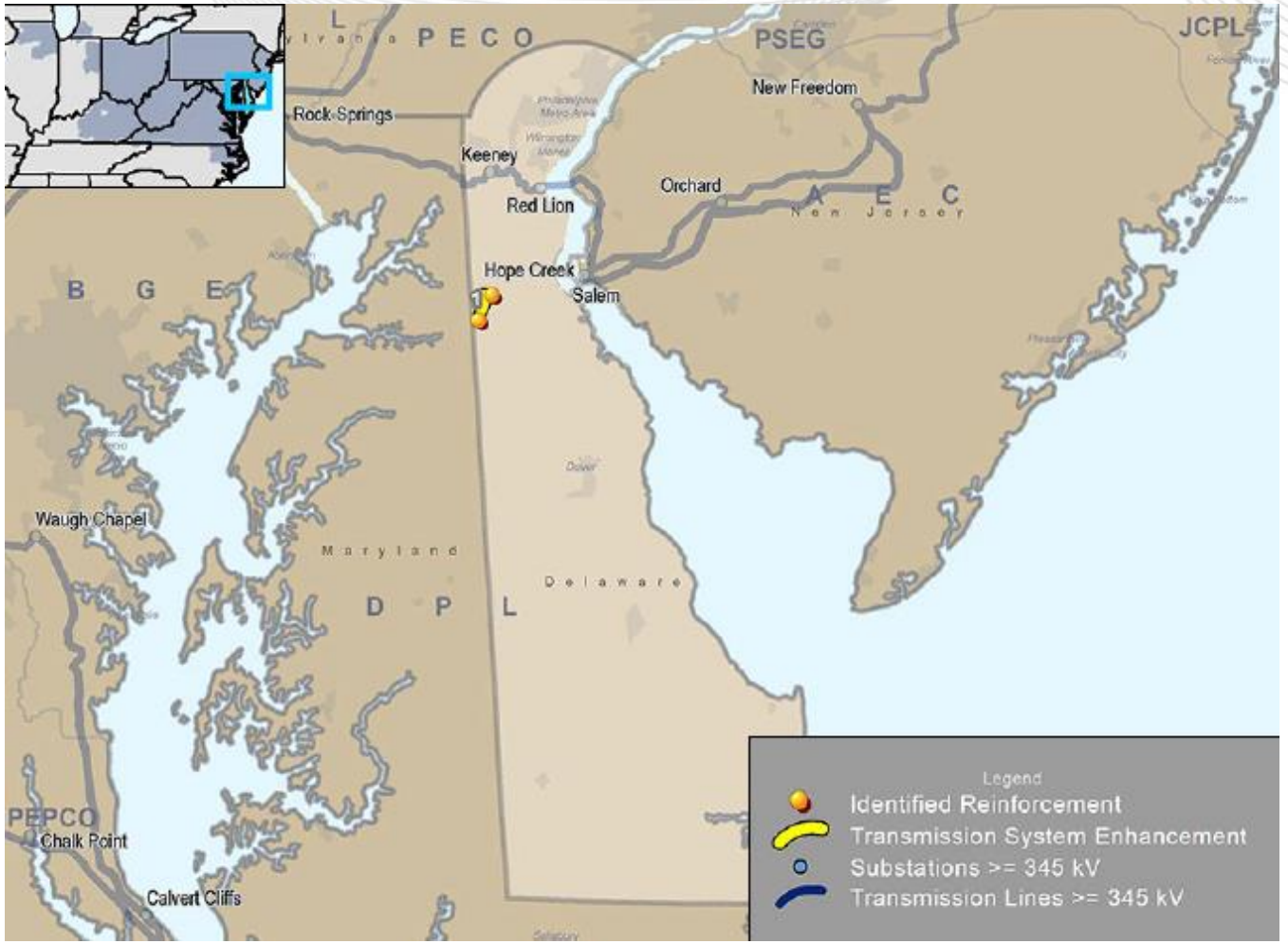


Note: Network upgrades are new or upgraded facilities required primarily to eliminate reliability criteria violations caused by proposed generation, merchant transmission or long term firm transmission service requests, as well as certain direct connection facilities required to interconnect proposed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

Delaware – RTEP Network Projects

Map ID	Project	Description	Generation	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	**n6974**	Construct a new seventh breaker position onto the 138 kV, six-breaker position ring bus at Townsend substation. Install metering control cable and meter cabinets, secondary wiring connections at the metering enclosure, primary and backup. Solid state multifunction meters for the new metering position, protective relays and perform relay setting changes as required.	AC1-203	10/1/2022	$1.94	DPL	11/30/2021

Delaware – TO Supplemental Projects



Note: Supplemental projects are transmission expansions or enhancements that are not required for compliance with PJM criteria and are not state public policy projects according to the PJM Operating Agreement. These projects are used as inputs to RTEP models, but are not required for reliability, economic efficiency or operational performance criteria, as determined by PJM.

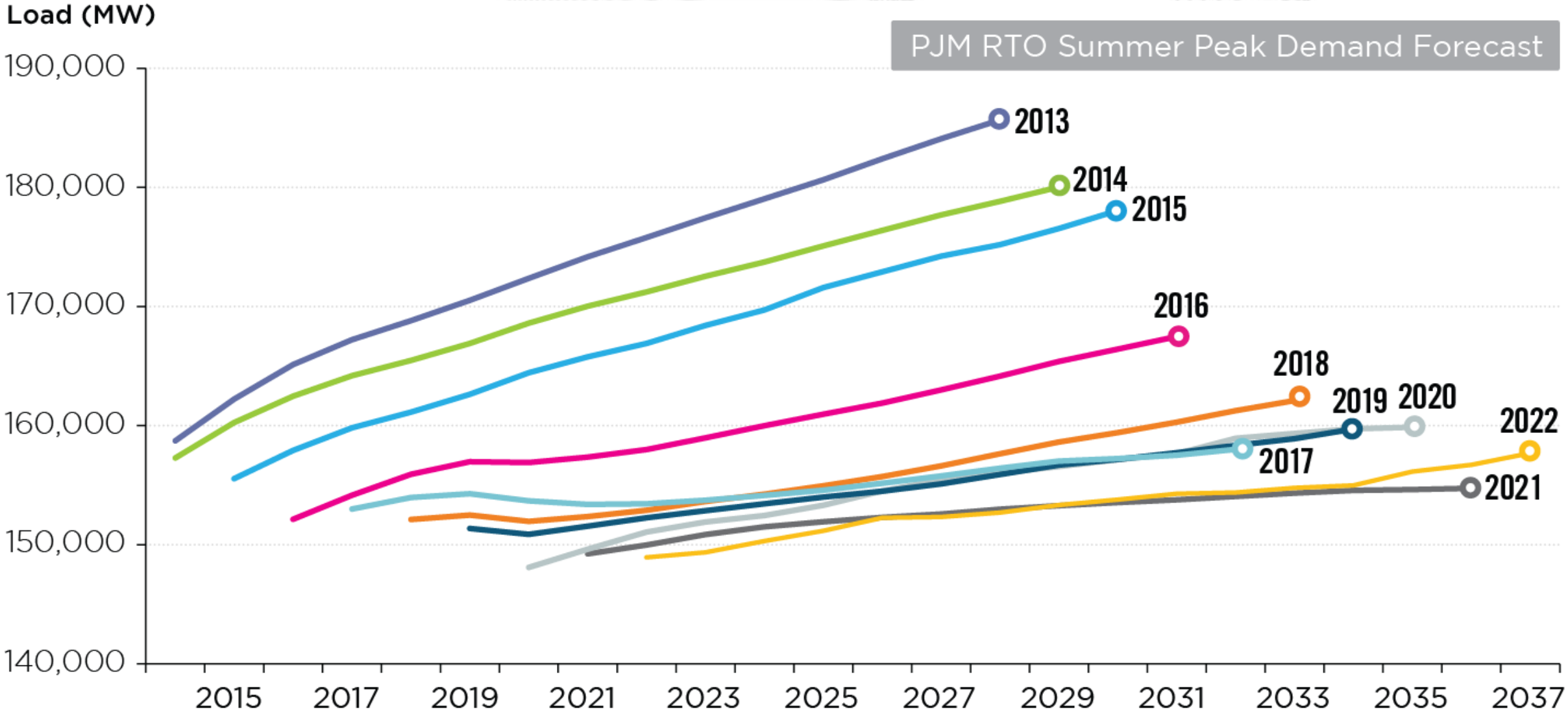
Delaware – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	s2489	Construct new 138 kV feed (~4 miles) out of Townsend substation, utilizing an open terminal position, to a new four-breaker ring bus adjacent to customer's existing substation. De-energize remainder of line from existing Middletown Tap to Townsend.	5/31/2025	$23.00	DPL	2/16/2021

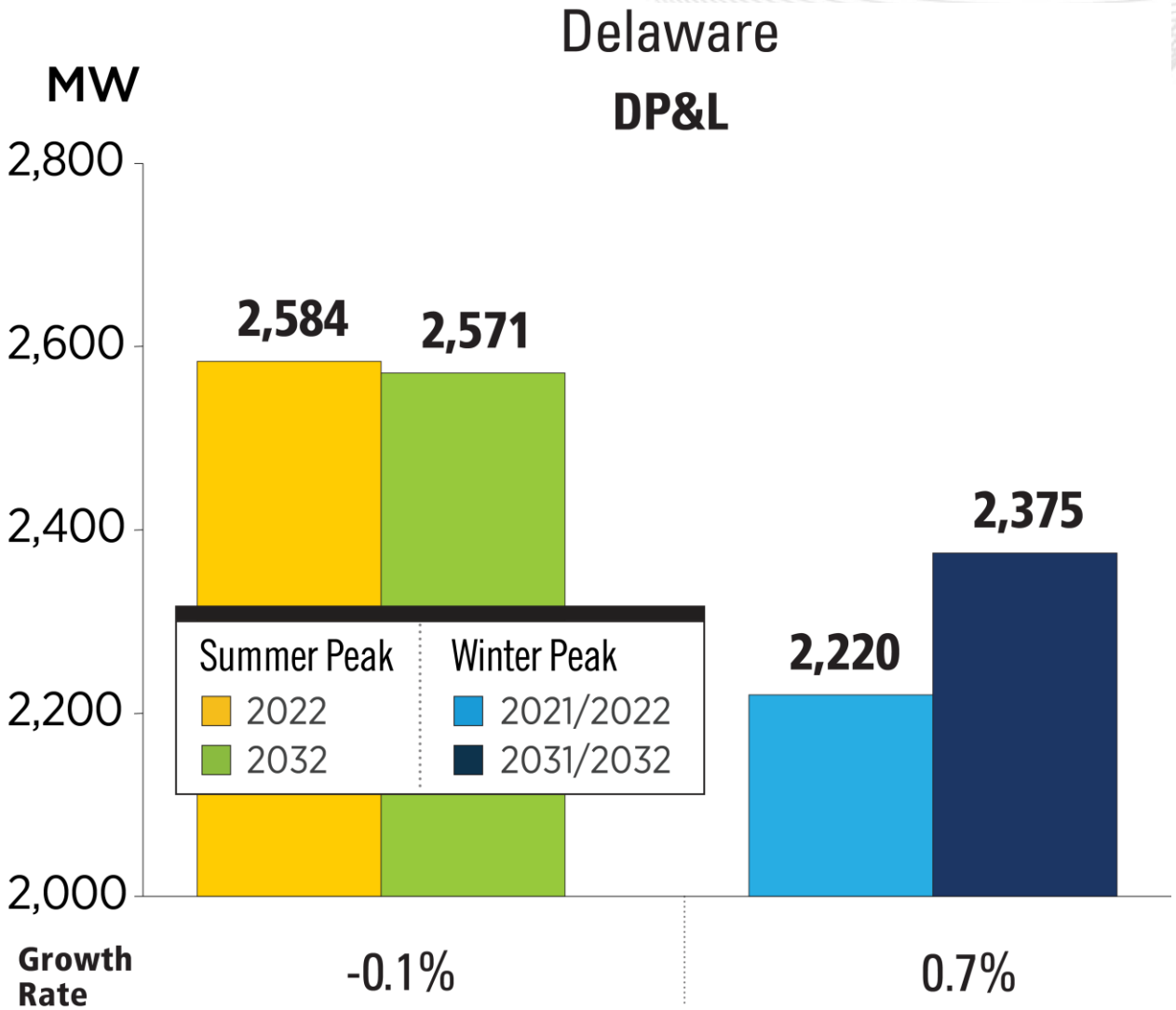
Planning
Load Forecast

PJM Annual Load Forecasts

(Jan. 2022)



Delaware – 2022 Load Forecast Report



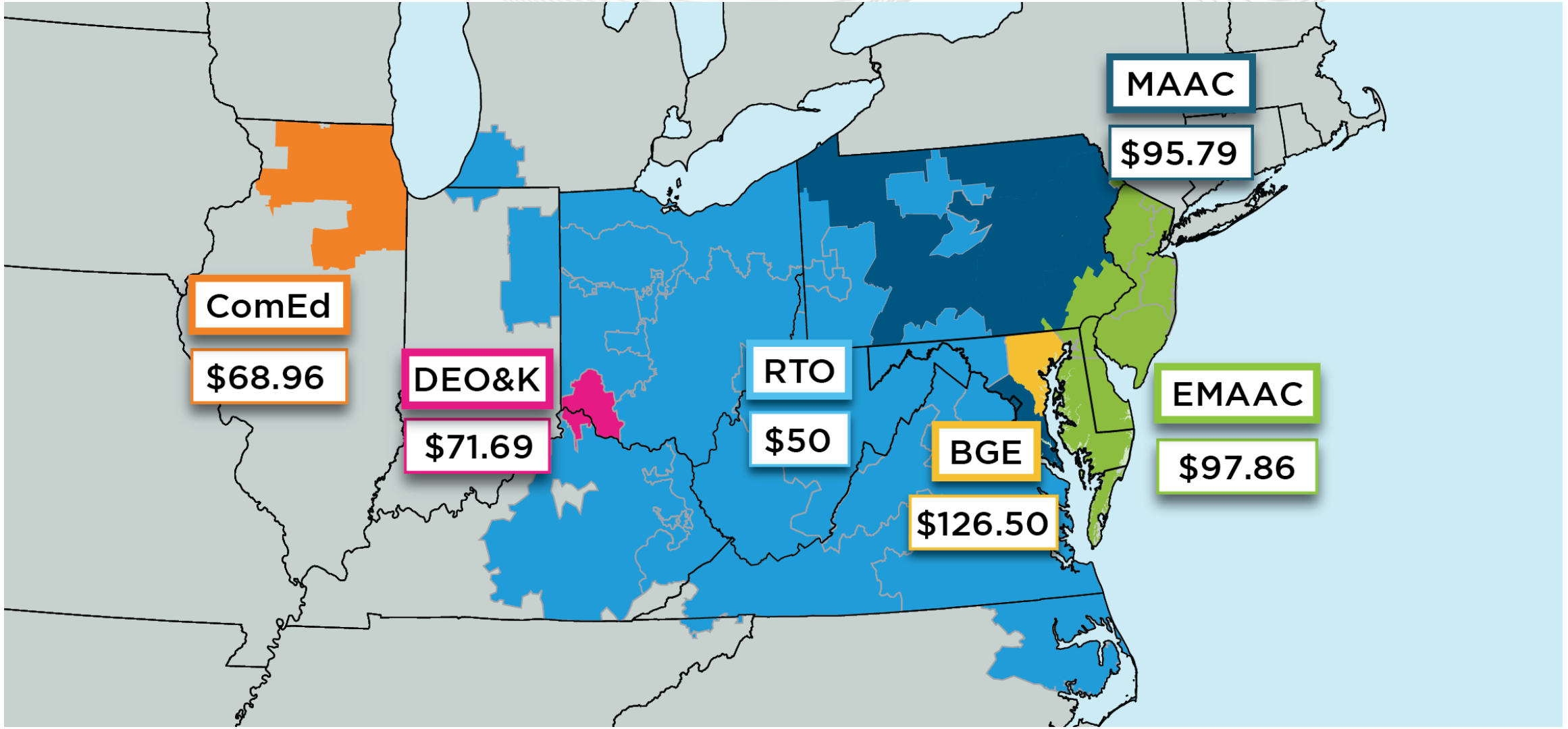
PJM RTO Summer Peak		PJM RTO Winter Peak	
2022	2032	2021/2022	2031/2032
149,938 MW	154,381 MW	132,102 MW	141,516 MW
Growth Rate 0.4%		Growth Rate 0.7%	

The summer and winter peak megawatt values reflect the estimated amount of forecasted load to be served by each transmission owner in the noted state/district. Estimated amounts were calculated based on the average share of each transmission owner's real-time summer and winter peak load in those areas over the past five years.

Markets

Capacity Market Results

2022/2023 Base Residual Auction Clearing Prices ($/MW-Day)



PJM – 2022/2023 Cleared MW (UCAP) by Resource Type

	ANNUAL	SUMMER	WINTER	Total (MW)
Generation	130,844.9	9.9	686.8	131,541.6
DR	8,369.9	442.0	0.0	8,811.9
EE	4,575.7	234.9	0.0	4,810.6
Total (MW)	143,790.5	686.8	686.8	

Delaware – Cleared Resources in 2022/23 Auction

(June 2, 2021)

	Cleared MW (Unforced Capacity)	Change from 2021/22 Auction
Generation	2,432	-512
Demand Response	180	+18
Energy Efficiency	83	+54
Total	2,695	-440

EMAAC Locational Clearing Price
$97.86

Delaware – Offered and Cleared Resources in 2022/23 Auction

(June 2, 2021)

		Unforced Capacity
Generation	Offered MW	2,956
	Cleared MW	2,432
Demand Response	Offered MW	186
	Cleared MW	180
Energy Efficiency	Offered MW	83
	Cleared MW	83
Total Offered MW		3,225
Total Cleared MW		2,695

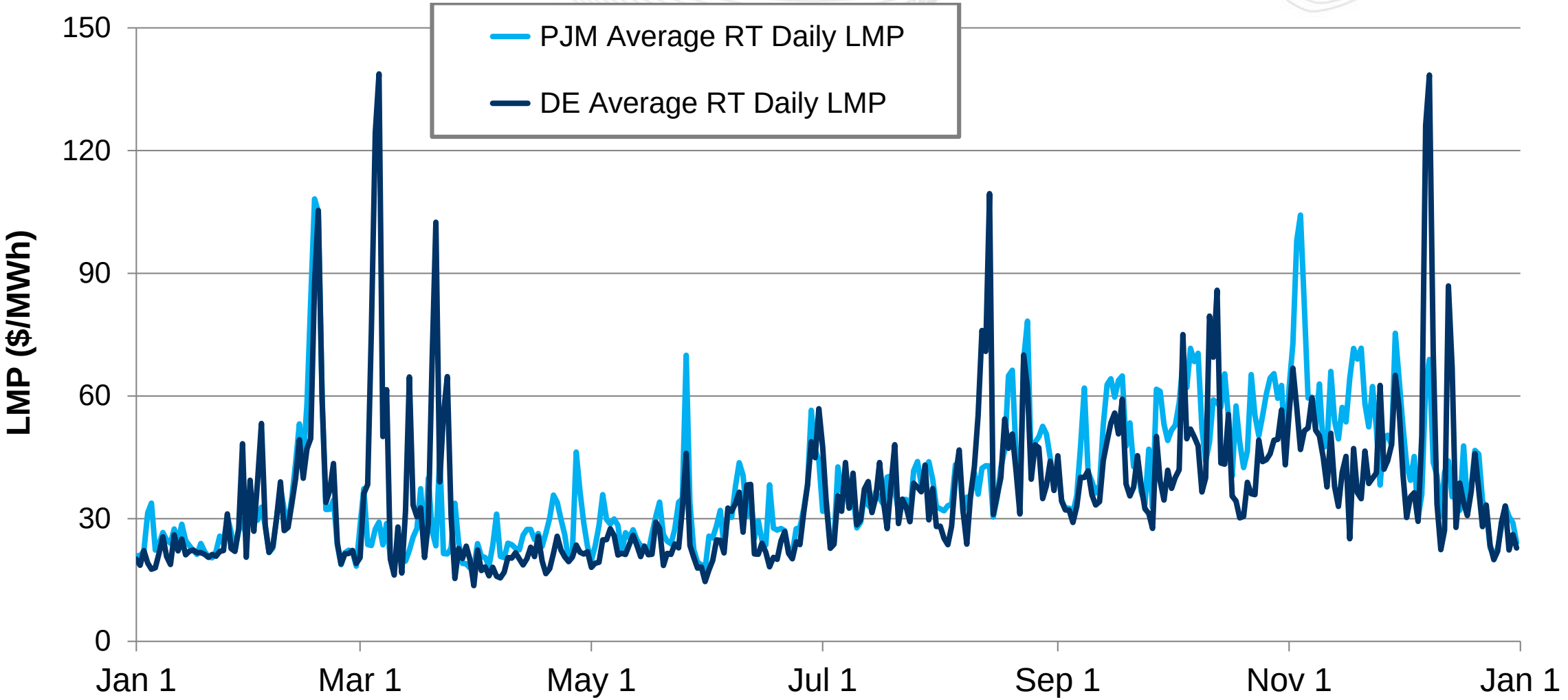
NOTE: Demand Response and Energy Efficiency are reported to PJM by Transmission Zone. The numbers above reflect the state's pro-rata share of cross-state zones for illustrative purposes.

Markets

Market Analysis

Delaware – Average Daily LMP

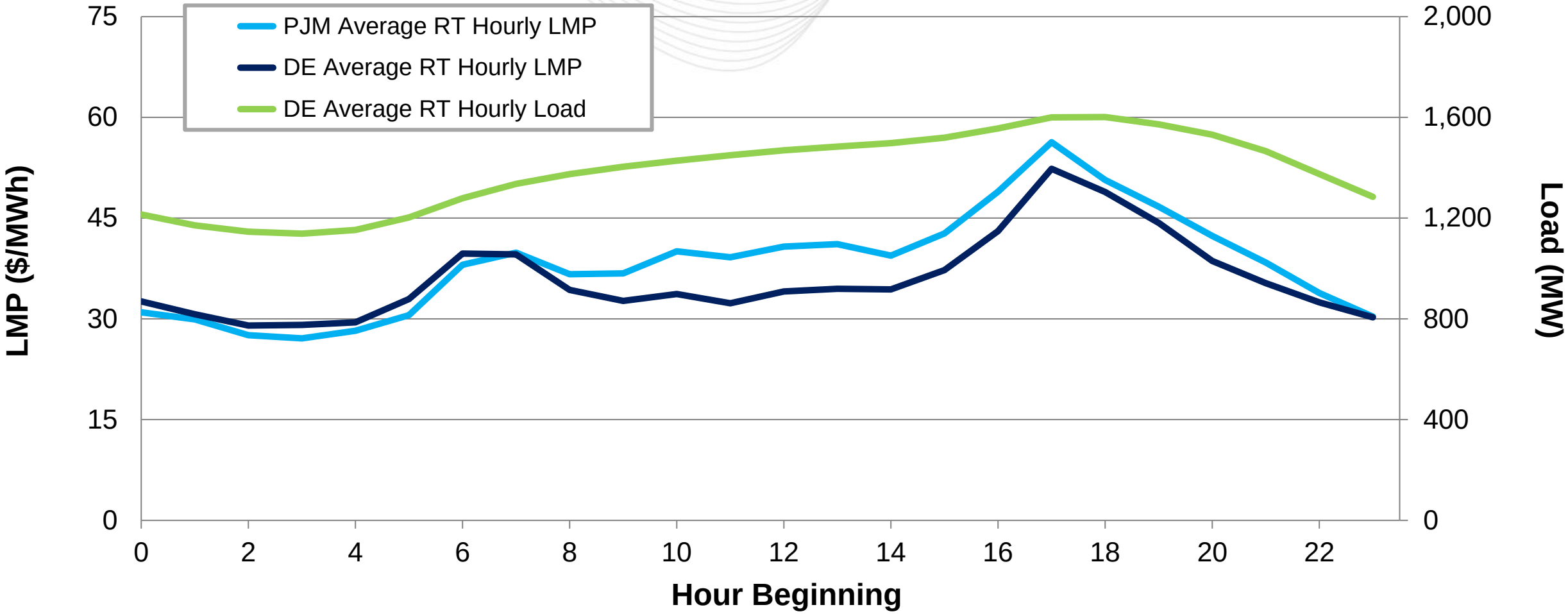
(Jan. 1, 2021 – Dec. 31, 2021)



Delaware – Average Hourly LMP and Load

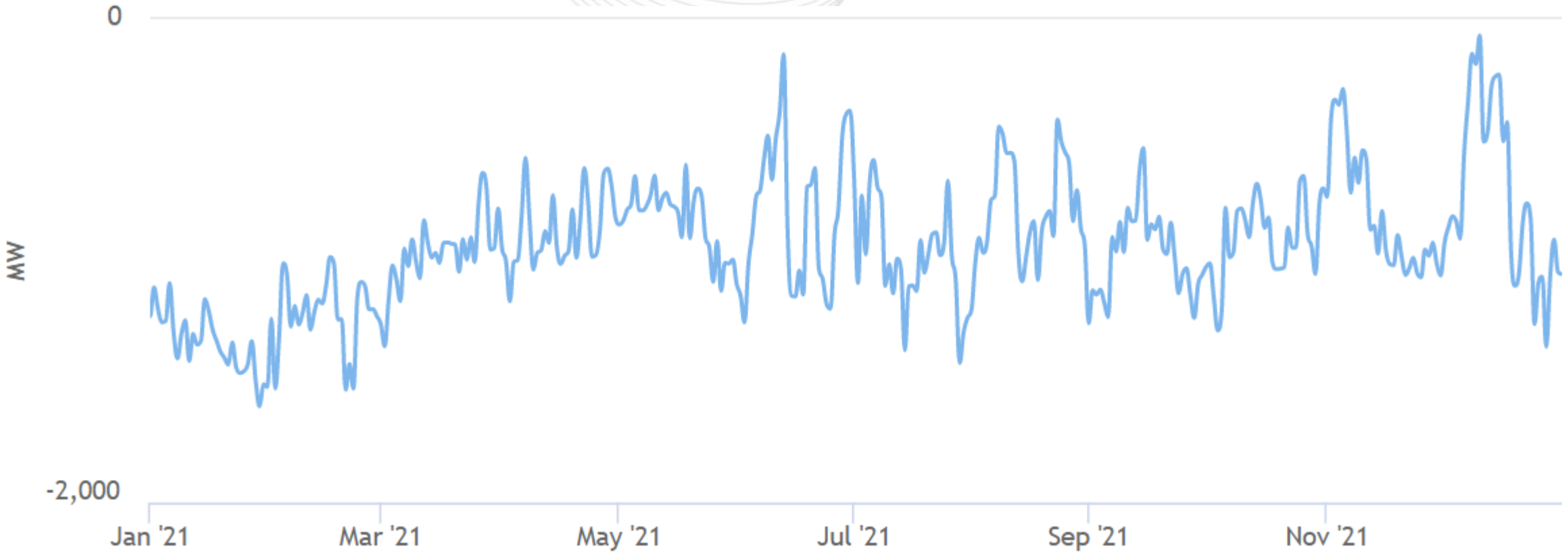
(Jan. 1, 2021 – Dec. 31, 2021)

Delaware's average hourly LMPs were generally lower than the PJM average hourly LMP.



Delaware – Net Energy Import/Export Trend

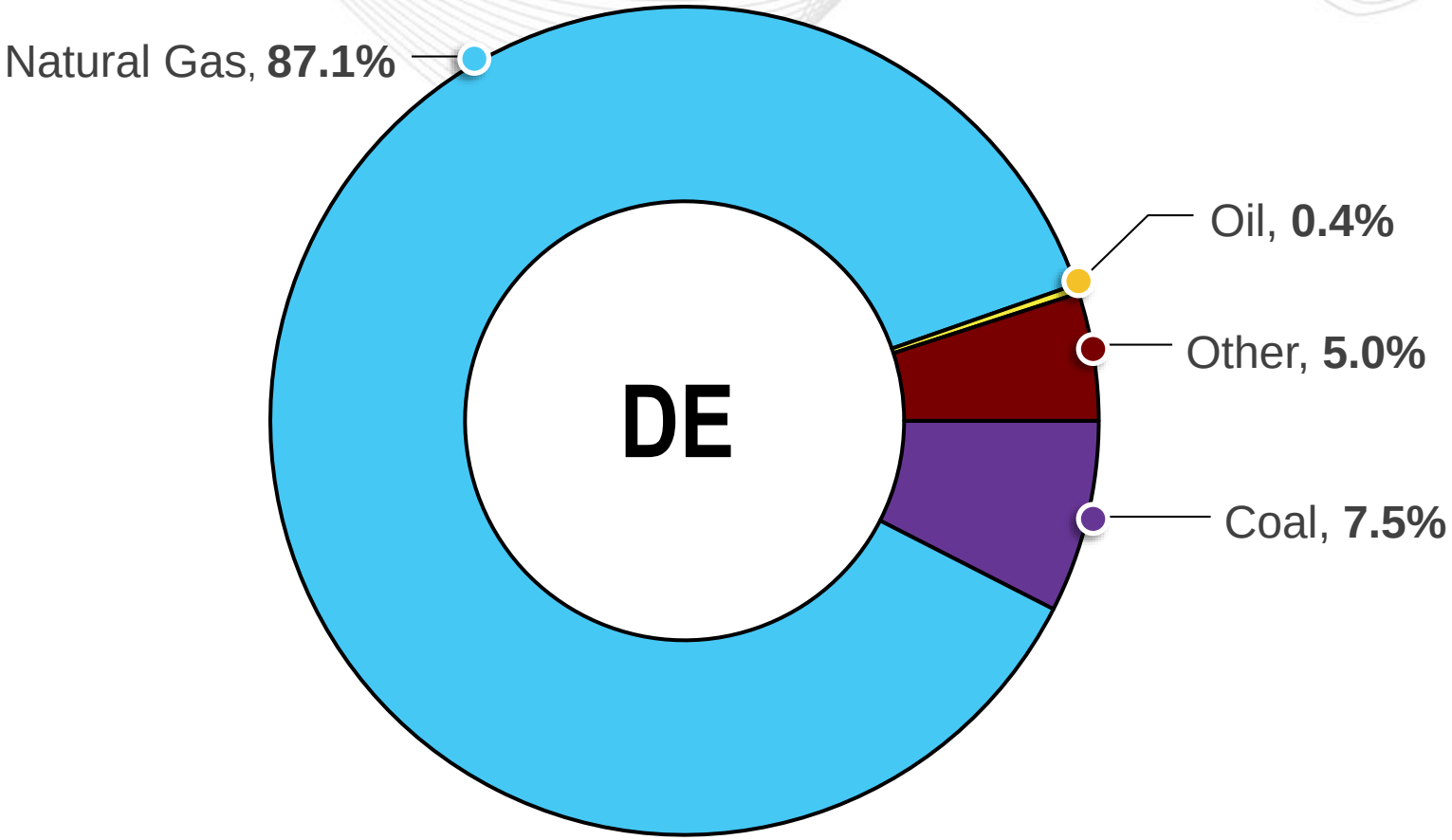
(Jan. 2021 – Dec. 2021)



Positive values represent exports and negative values represent imports.

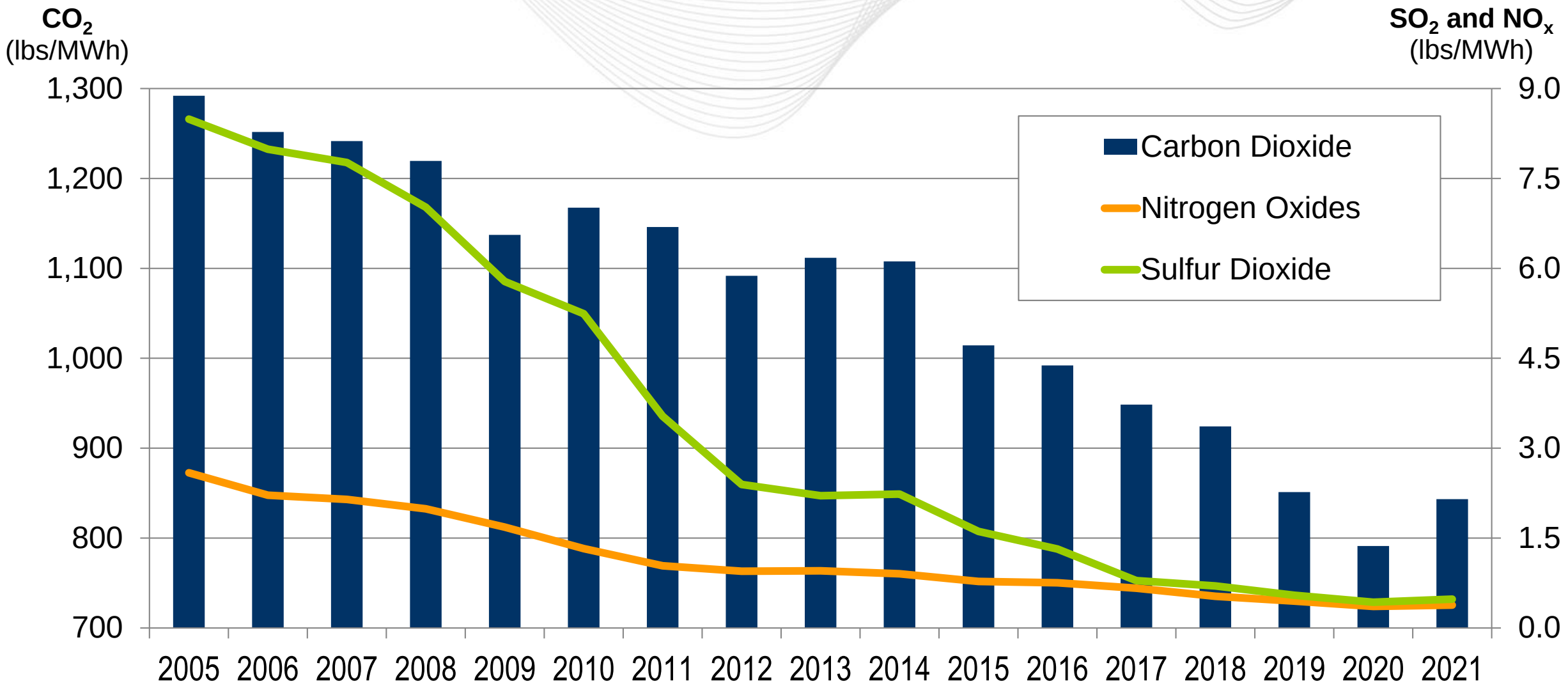
Operations

Delaware – 2021 Generator Production



The data in this chart comes from EIA Form 923 (2021).

2005 – 2021 PJM Average Emissions



Delaware – Average Emissions (lbs/MWh)

(Feb. 2022)