2021 Maryland and District of Columbia State Infrastructure Report

(January 1, 2021 – December 31, 2021)

May 2022

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- **Existing Capacity:** Natural gas represents approximately 43.8 percent of the total installed capacity in the Maryland service territory while coal represents approximately 24.1 percent. Comparatively, across PJM natural gas and coal are at 44.2 and 26.6 percent of total installed capacity.

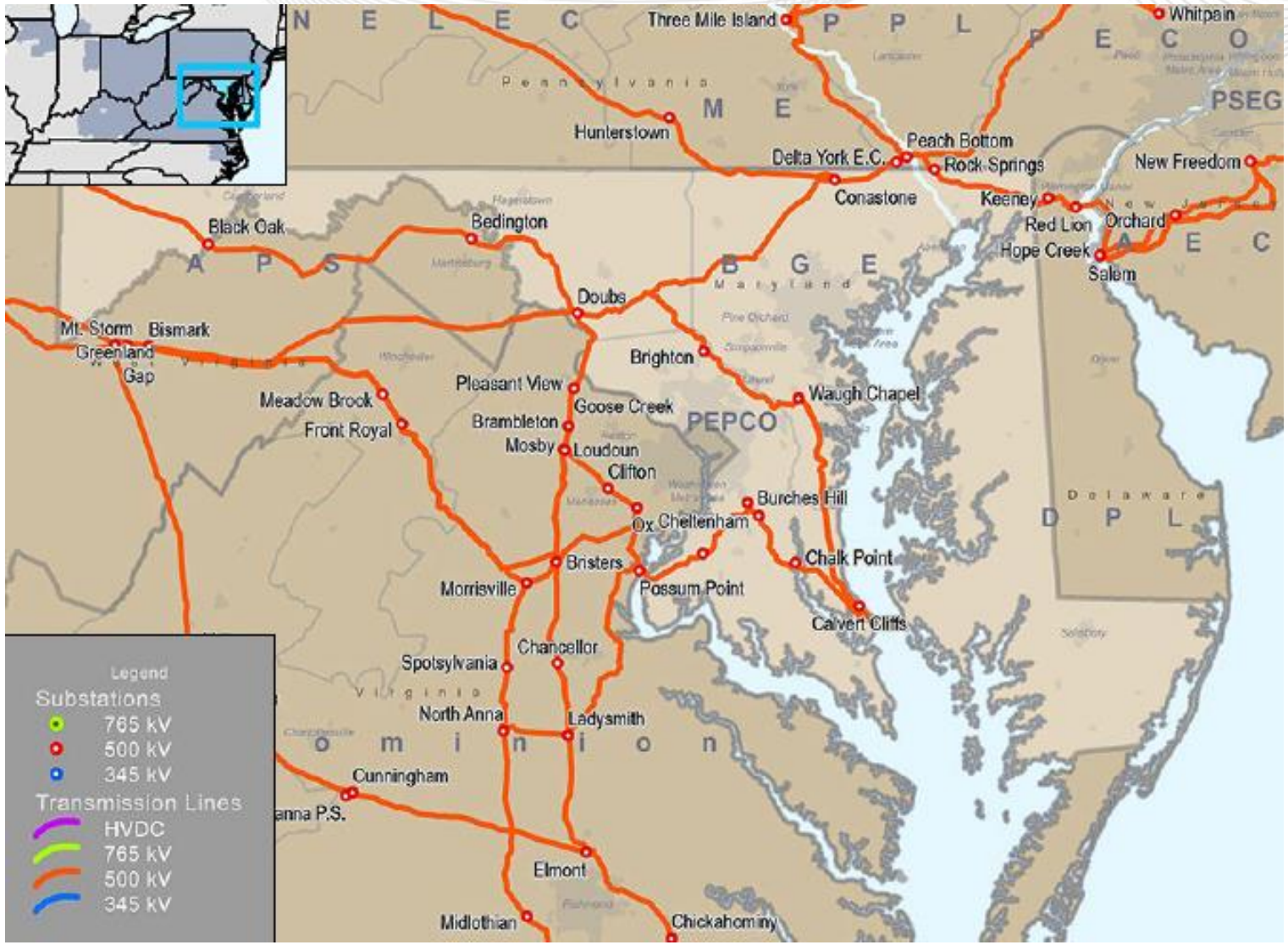
- **Interconnection Requests:** Solar represents 69.5 percent of new interconnection requests in Maryland, while storage represents approximately 27.7 percent of new requests. Because Maryland's offshore wind projects are proposed to interconnect into Delaware, they are captured as Delaware's queued capacity in PJM's RTEP.

- **Deactivations:** 1,234.9 MW in Maryland provided notification of deactivation in 2021.

- **RTEP 2021:** Maryland's 2021 RTEP project total represents approximately $48.9 million in investment.

- **Load Forecast:** Maryland and Washington, D.C.'s projected summer peak load growth is relatively flat, averaging between -0.2 and 0.1 percent annually over the next 10 years depending on the service territory. Comparatively, the overall PJM RTO projected summer load growth rate is 0.4 percent.
- **2022/23 Capacity Market:** 10,631 MW in Maryland cleared in the 2022/23 Base Residual Auction.
- **1/1/21 – 12/31/21 Market Performance:** Maryland and D.C.'s average hourly LMPs were higher than the PJM average hourly LMP.
- **Emissions:** Maryland's average CO2 emissions increased in 2021 compared to 2020 levels.

PJM Service Area – Maryland & D.C.

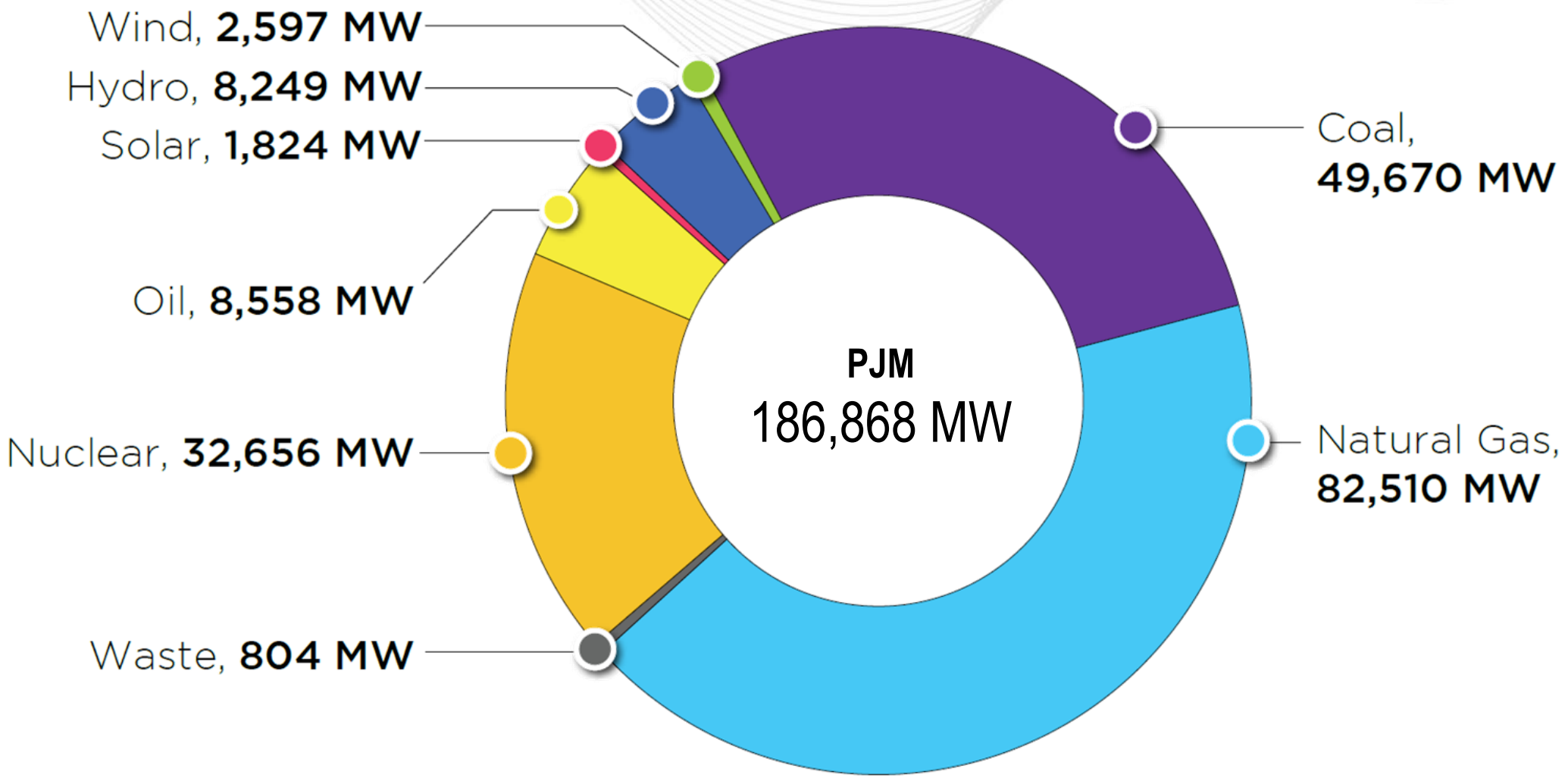


Planning

Generation Portfolio Analysis

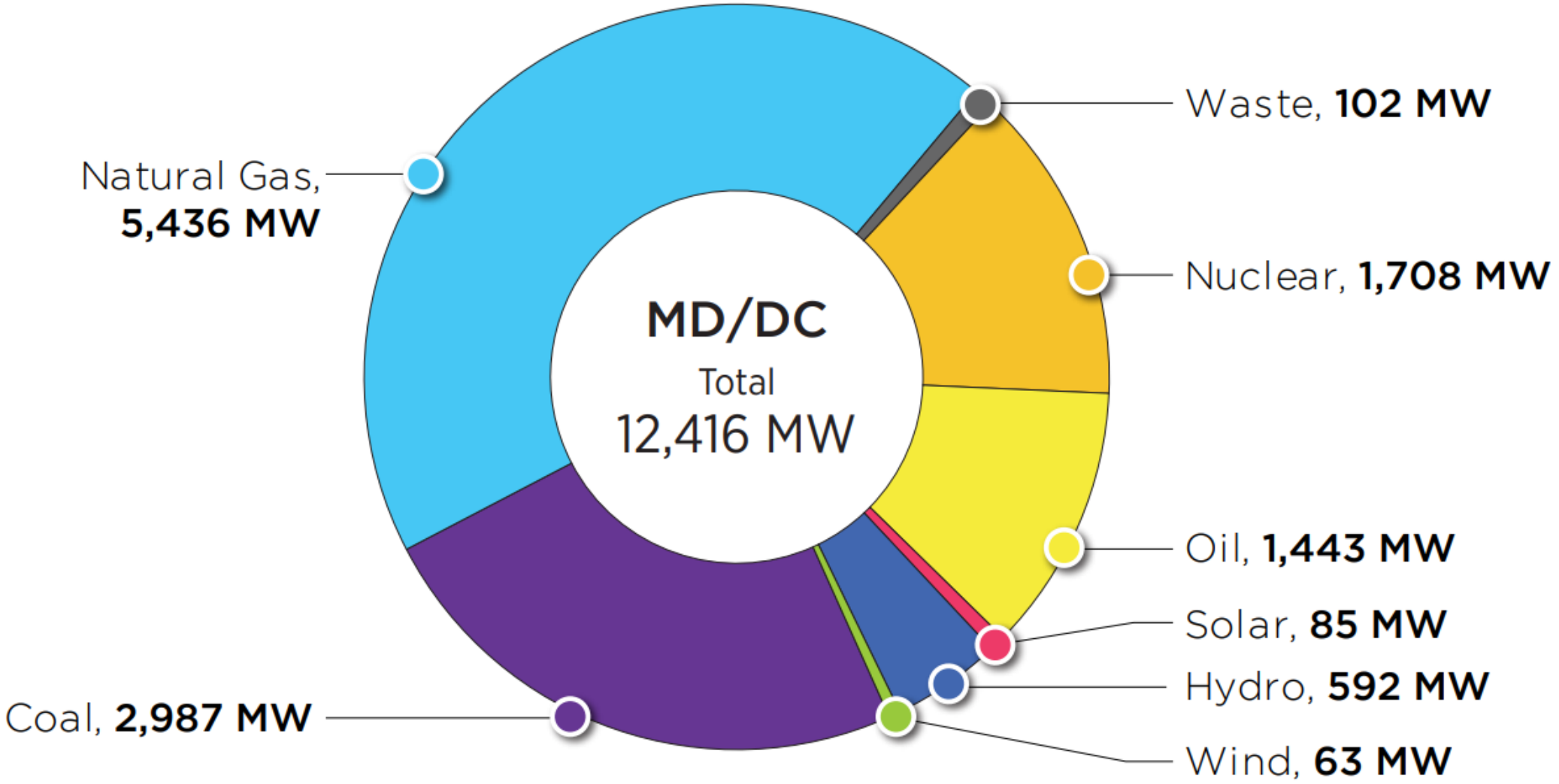
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



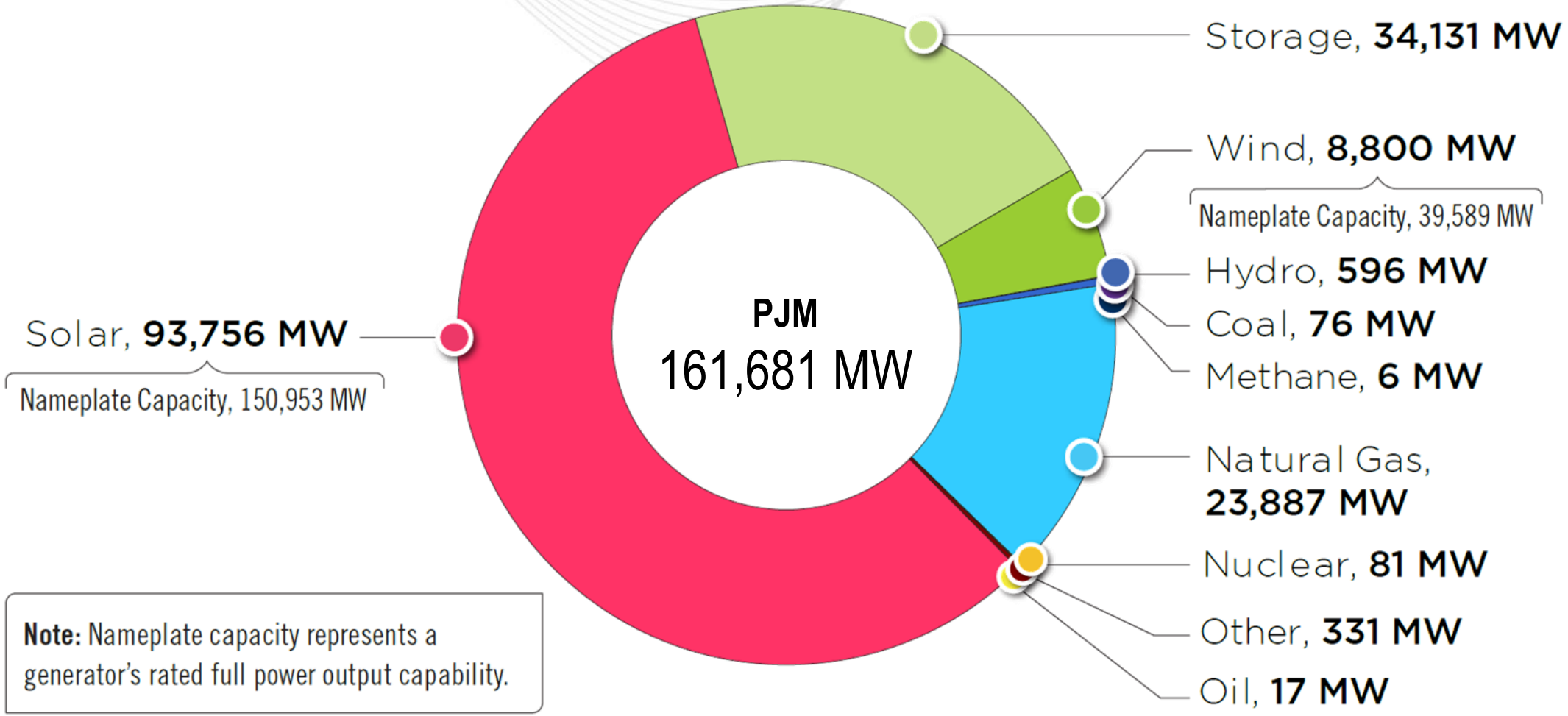
Maryland – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



PJM – Queued Capacity (MW) by Fuel Type

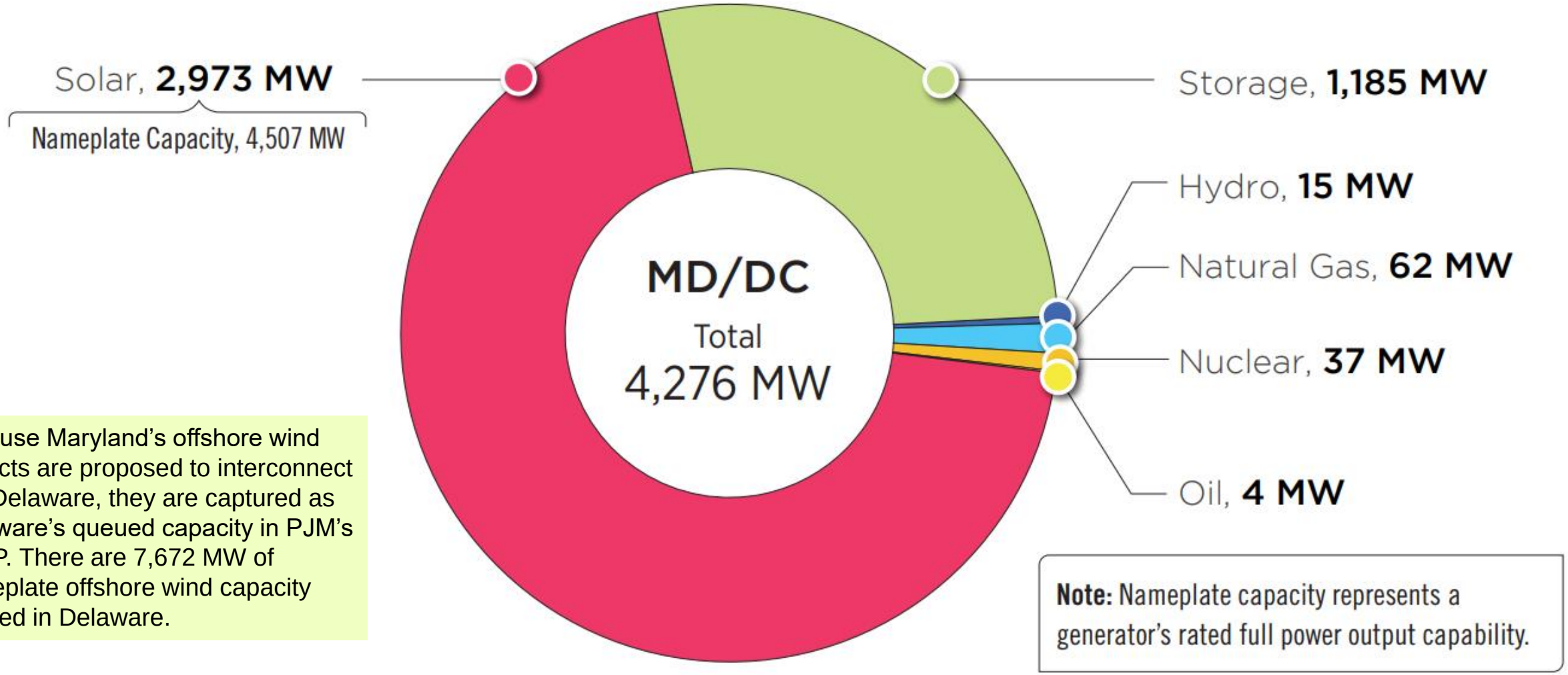
(Requested CIRs – as of Dec. 31, 2021)



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

Maryland – Queued Capacity (MW) by Fuel Type

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



Because Maryland's offshore wind projects are proposed to interconnect into Delaware, they are captured as Delaware's queued capacity in PJM's RTEP. There are 7,672 MW of nameplate offshore wind capacity queued in Delaware.

Maryland – Historical Interconnection Requests by Fuel Type

(as of Dec. 31, 2021)

		In Queue						Complete					
		Active		Suspended		Under Construction		In Service		Withdrawn		Grand Total	
		Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)
Non-Renewable	Coal	0	0.0	0	0.0	0	0.0	1	10.0	0	0.0	1	10.0
	Diesel	0	0.0	0	0.0	0	0.0	1	0.0	1	5.0	2	5.0
	Natural Gas	8	62.3	0	0.0	0	0.0	34	3,827.2	66	33,005.1	108	36,894.6
	Nuclear	3	37.4	0	0.0	0	0.0	1	0.0	4	4,955.0	8	4,992.4
	Oil	2	4.0	0	0.0	0	0.0	2	5.0	2	16.0	6	25.0
	Other	0	0.0	0	0.0	0	0.0	0	0.0	4	132.0	4	132.0
	Storage	18	1,168.0	0	0.0	5	17.3	0	0.0	39	454.2	62	1,639.5
Renewable	Biomass	0	0.0	0	0.0	0	0.0	0	0.0	12	227.6	12	227.6
	Hydro	1	15.0	0	0.0	0	0.0	3	60.0	4	88.4	8	163.4
	Methane	0	0.0	0	0.0	0	0.0	5	14.5	6	18.3	11	32.8
	Solar	48	2,502.5	3	90.8	34	379.3	14	43.0	196	1,623.8	295	4,639.4
	Wind	0	0.0	0	0.0	0	0.0	5	40.3	10	265.6	15	305.9
	Grand Total	**80**	**3,789.2**	**3**	**90.8**	**39**	**396.6**	**66**	**4,000.0**	**344**	**40,791.0**	**532**	**49,067.5**

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

Maryland – Progression History of Interconnection Requests

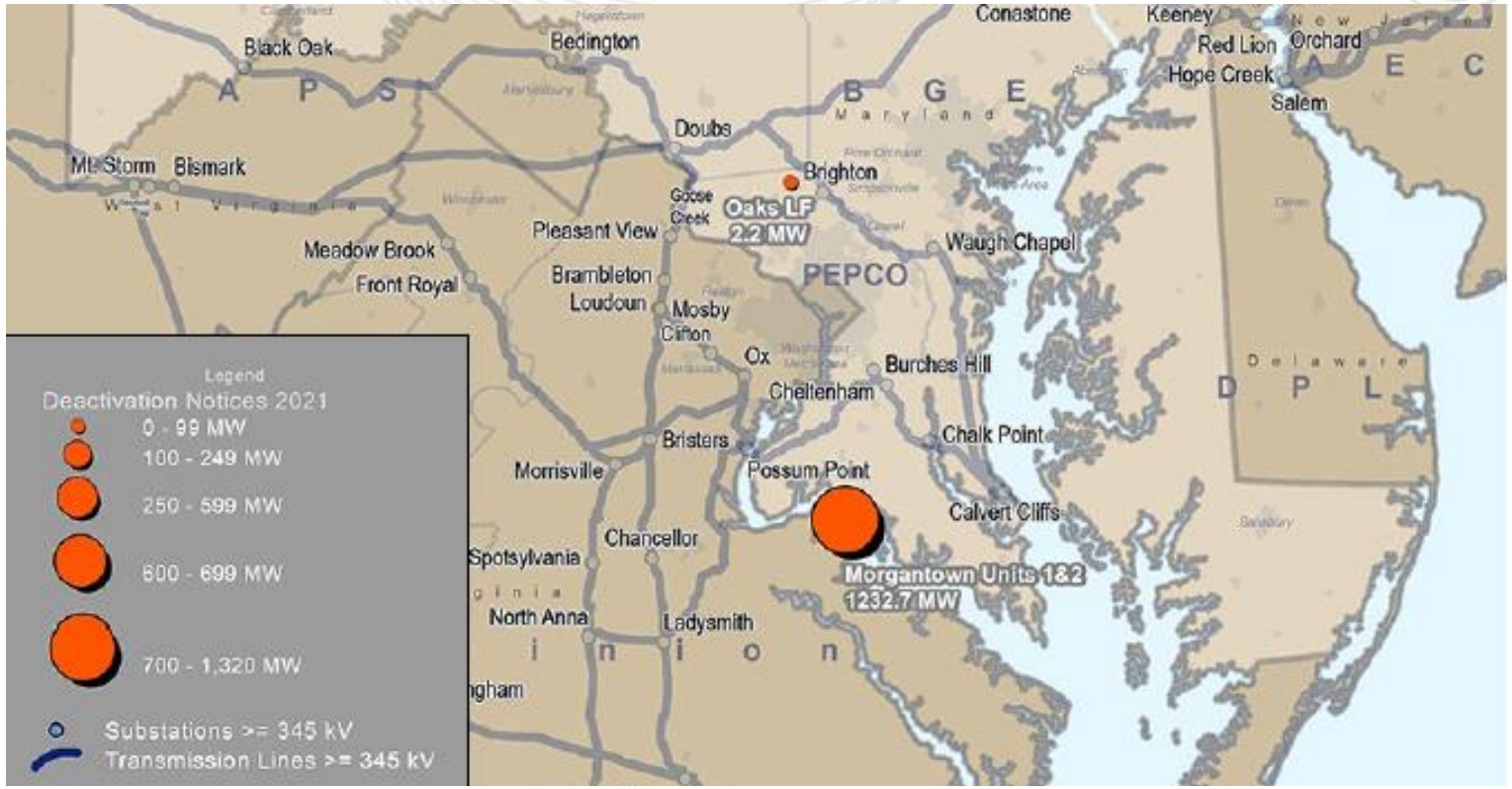
Percentage of planned capacity and projects that have reached commercial operation

9%	Requested capacity megawatts
15.4%	Requested projects

			Capacity	Nameplate
Projects withdrawn after final agreement	28	Interconnection Service Agreements	5,668 MW	6,164 MW
	48	Wholesale Market Participation Agreements	114 MW	229 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.

Maryland – Generation Deactivation Notifications Received in 2021



Unit	TO Zone	Fuel Type	Request Received to Deactivate	Actual or Projected Deactivation Date	Age (Years)	Capacity (MW)
Morgantown Unit 2	PEPCO	Coal	6/9/2021	5/31/2022	50	619.4
Morgantown Unit 1			6/9/2021		51	613.3
Oaks Landfill		Methane	4/16/2021	7/1/2021	11	2.2

Planning

Transmission Infrastructure Analysis

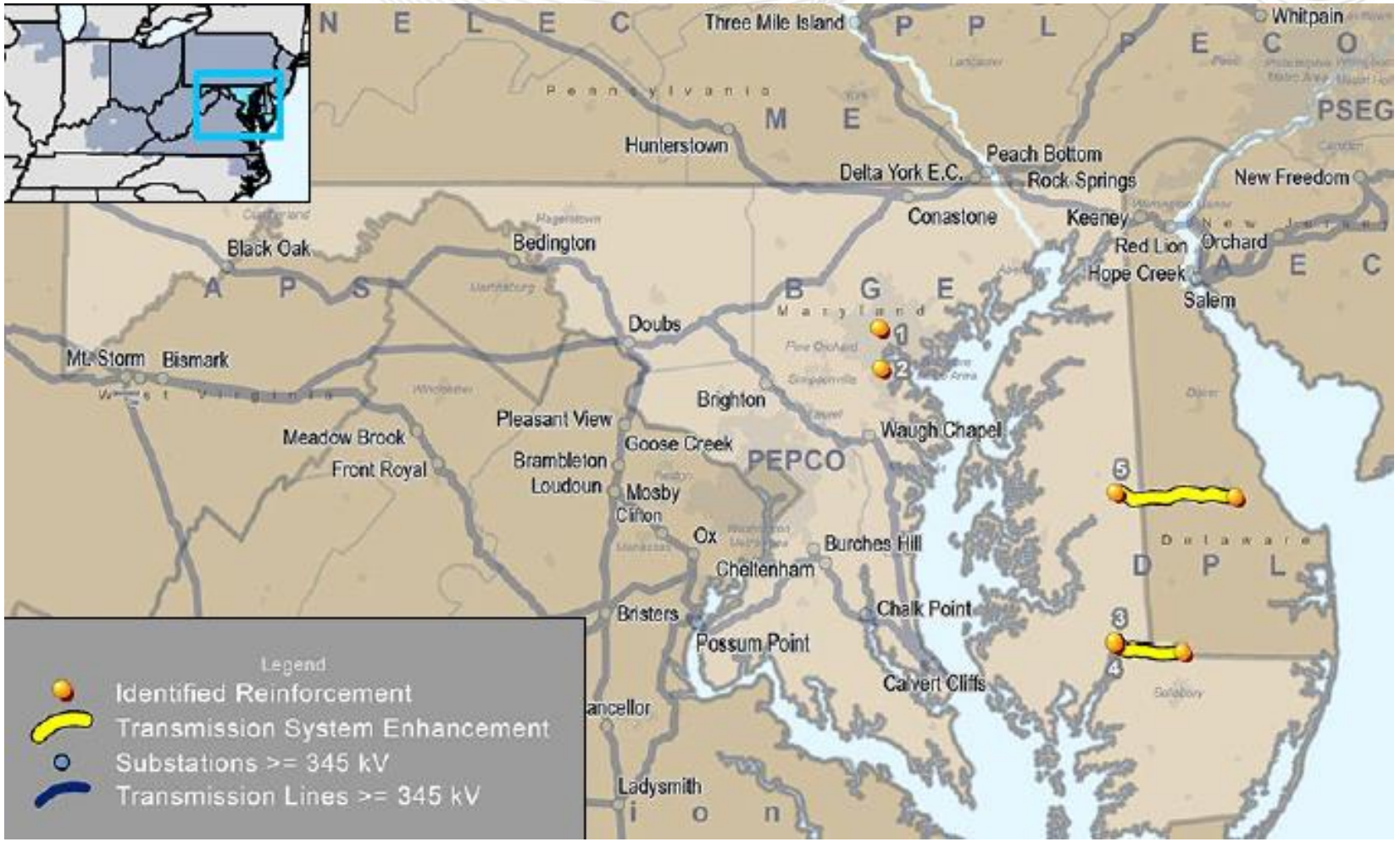
Please note that PJM is now listing all transmission projects in its Annual RTEP and state infrastructure reports, beginning with this year's 2021 Annual RTEP. In previous years only projects above a $10 million threshold were listed in the Annual RTEP Report and projects above a $5 million threshold 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

Maryland – RTEP Baseline Projects

(No baseline projects were planned in Washington, D.C. in the 2021 RTEP)



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

Maryland – RTEP Baseline Projects

(No baseline projects were planned in Washington, D.C. in the 2021 RTEP)

Map ID	Project	Description	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	b3228	Replace two relays at Center substation to increase ratings on the 110552 circuit.	6/1/2025	$0.03	BGE	11/18/2020
2	b3305	Replace Pumphrey 230/115 kV transformer.		$4.69		12/1/2020
3	b3326	Rebuild the 13707 Vienna-Nelson 138 kV line.	6/1/2022	$38.50	DPL	8/10/2021
4	b3328	Upgrade the disconnect switch (13710-L1) and CT at Vienna.		$0.25		8/31/2021
5	b3332	Rerate the 23076 Steel-Milford 230 kV line.		$0.60		

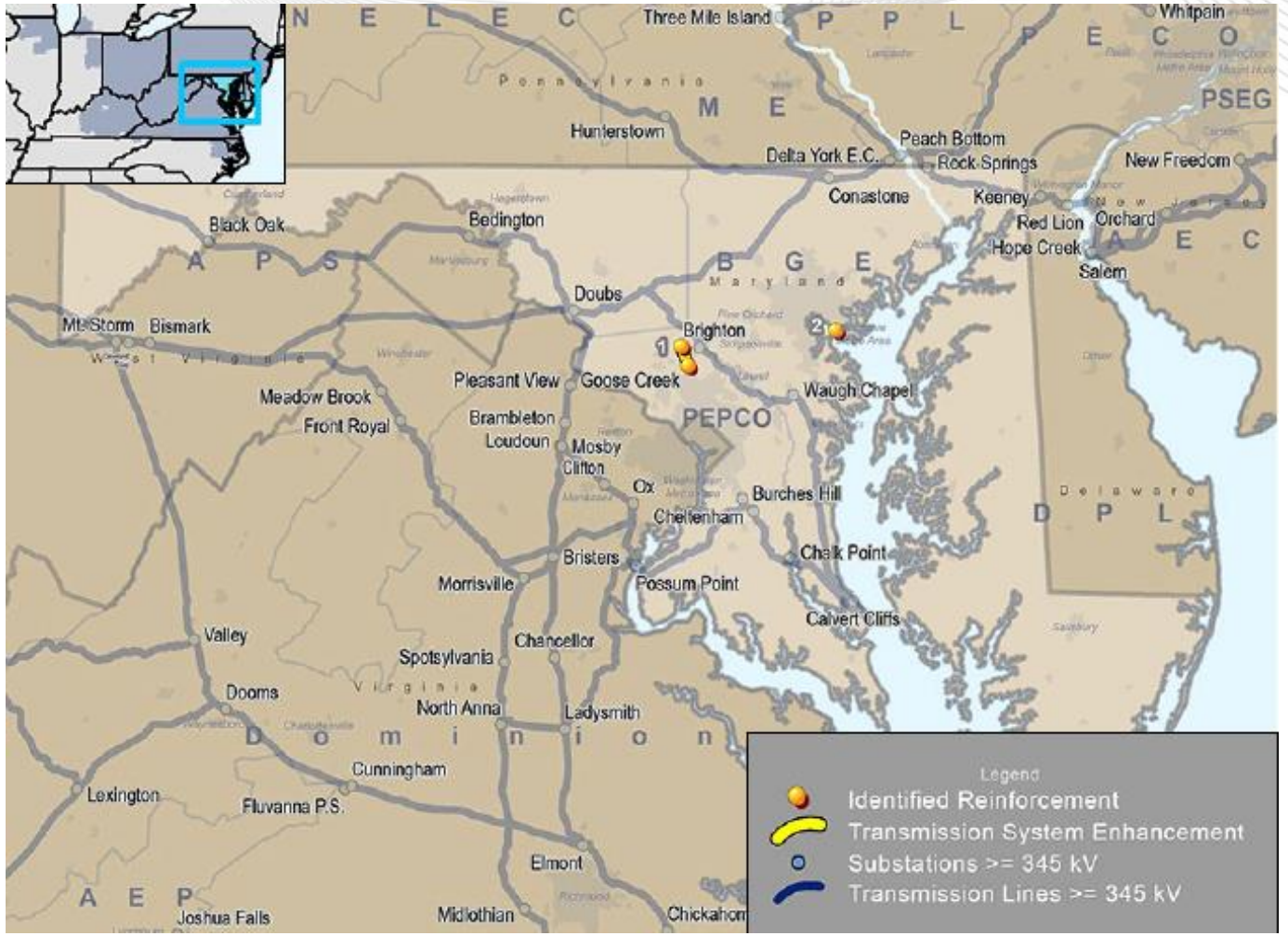
Note: Figures represent total project costs. This does not indicate final cost allocation for projects in zones that traverse state lines.

Maryland & D.C. – RTEP Network Projects

Maryland & D.C. had no network project upgrades in 2021.

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.

Maryland & D.C. – 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.

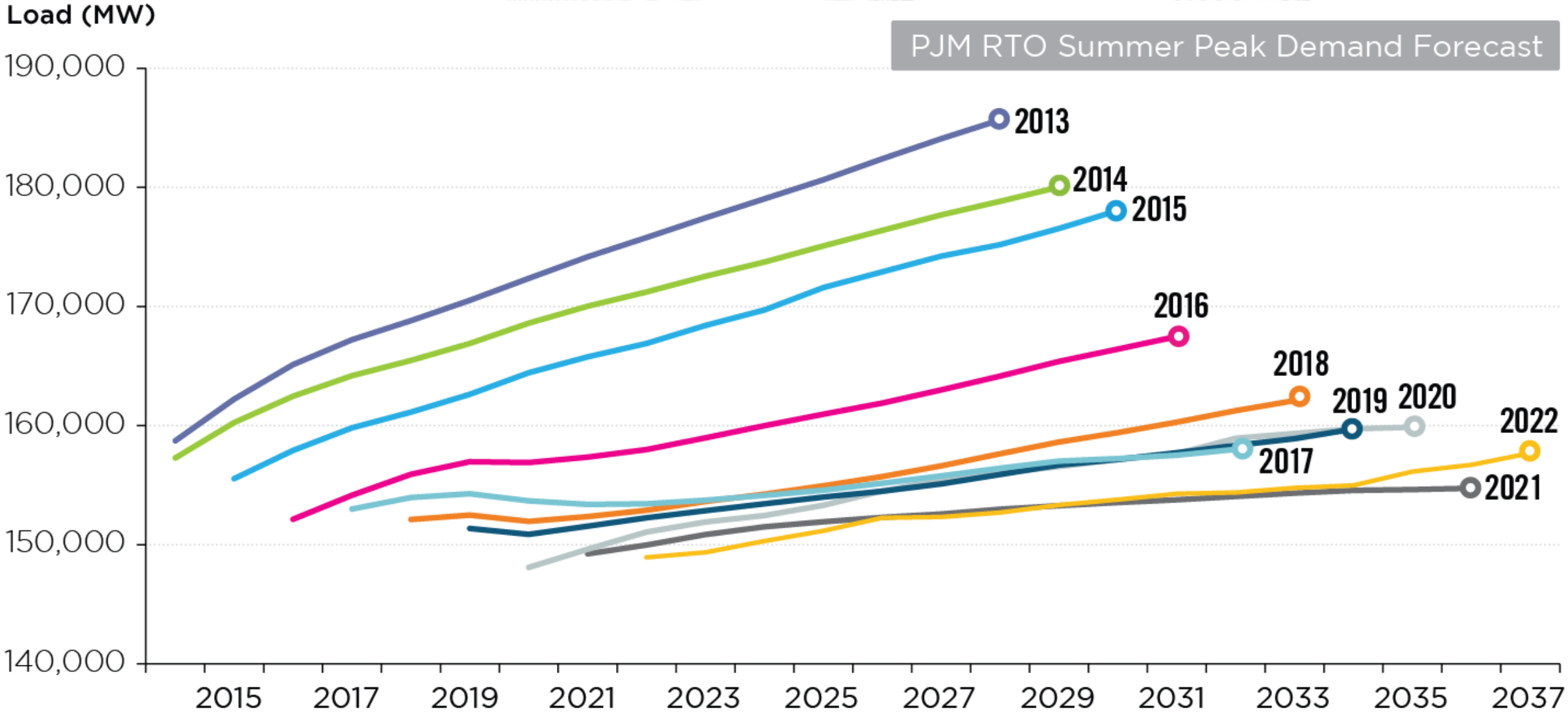
Maryland & D.C. – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	s2563	Reconductor transmission line 23009 from Mount Zion to Norbeck (4.5 miles) with E3X coated conductor.	6/1/2022	$3.60	PEPCO	3/9/2021
2	s2587	Replace Riverside 230 kV circuit breaker No. B51.	11/30/2021	$1.25	BGE	7/13/2021

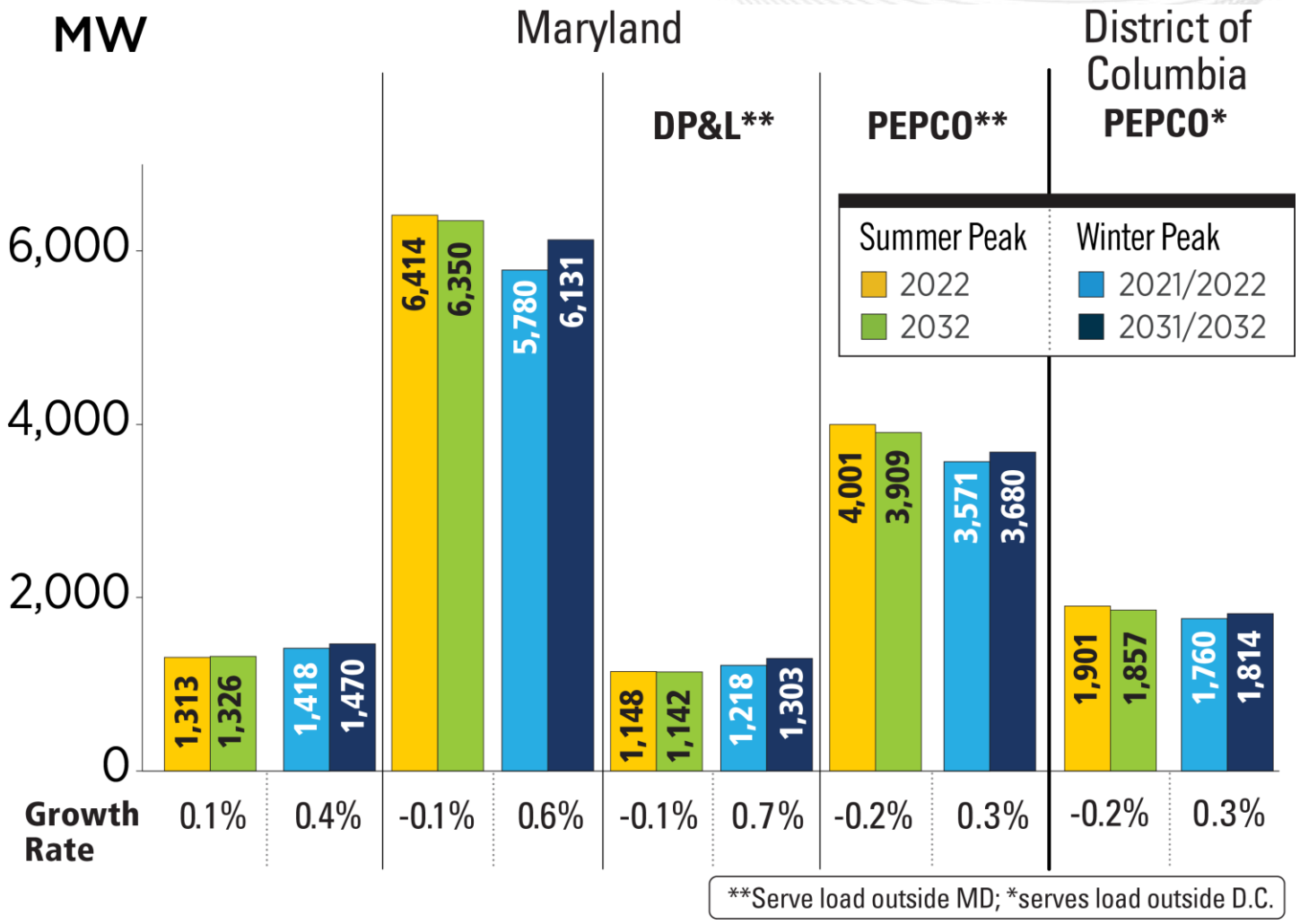
Planning
Load Forecast

PJM Annual Load Forecasts

(Jan. 2022)



Maryland & D.C. – 2022 Load Forecast Report



PJM RTO Summer Peak

2022	2032
149,938 MW	154,381 MW

Growth Rate 0.4%

PJM RTO Winter Peak

2021/2022	2031/2032
132,102 MW	141,516 MW

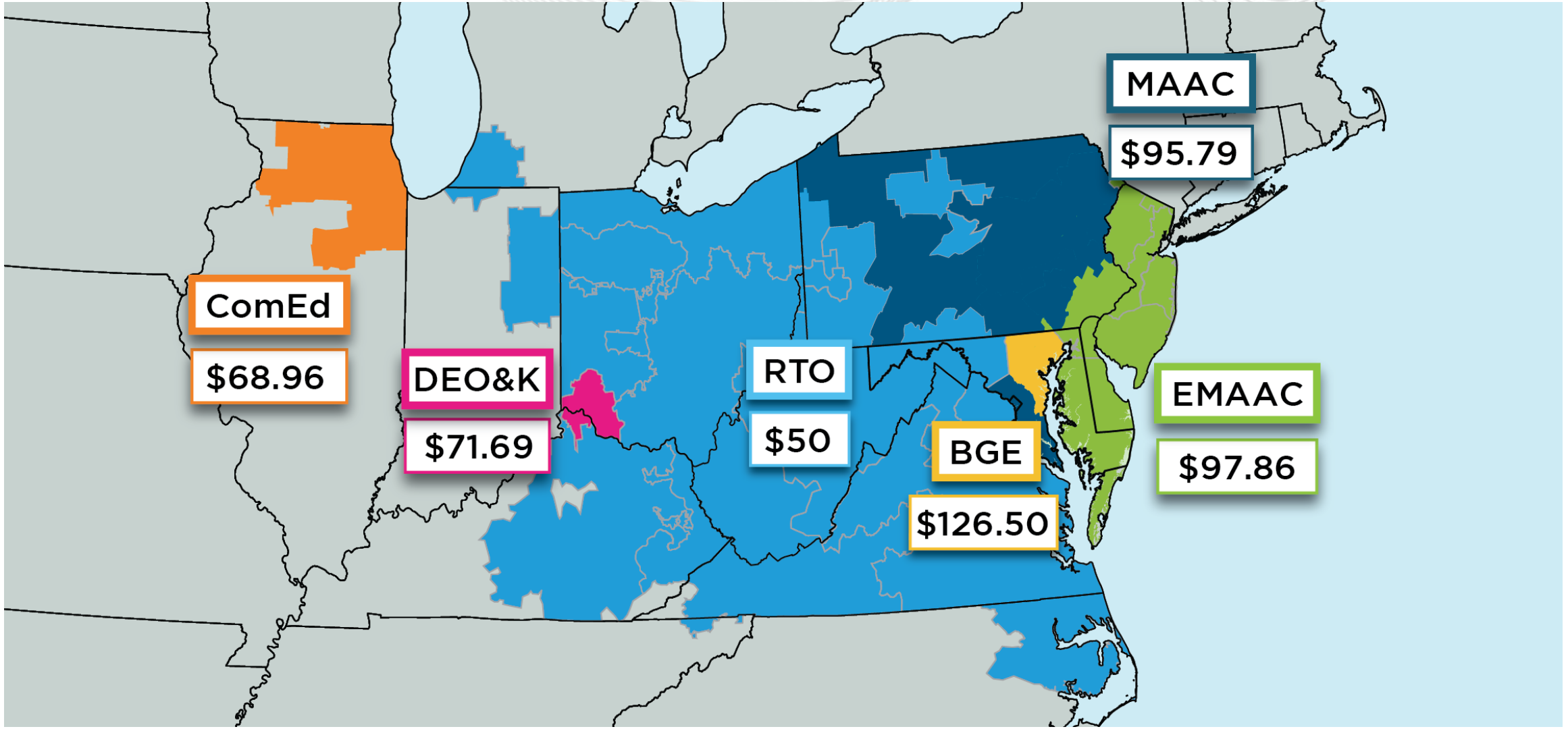
Growth Rate 0.7%

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	

Maryland – Cleared Resources in 2022/23 Auction

(June 2, 2021)

	Cleared MW (Unforced Capacity)	Change from 2021/22 Auction
Generation	9,620	-2,050
Demand Response	562	-228
Energy Efficiency	449	+246
Total	10,631	-2,032

RTO Locational Clearing Price	EMAAC Locational Clearing Price	MAAC Locational Clearing Price	BGE Locational Clearing Price
$50	$97.86	$95.79	$126.50

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.

Maryland – Offered and Cleared Resources in 2022/23 Auction

(June 2, 2021)

		Unforced Capacity
Generation	Offered MW	11,570
	Cleared MW	9,620
Demand Response	Offered MW	630
	Cleared MW	562
Energy Efficiency	Offered MW	454
	Cleared MW	449
Total Offered MW		12,654
Total Cleared MW		10,631

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.

Washington, D.C. – Cleared Resources in 2022/23 Auction

(June 2, 2021)

	Cleared MW (Unforced Capacity)	Change from 2021/22 Auction
Generation	-	-
Demand Response	104	0
Energy Efficiency	85	+54
Total	189	+54

MAAC Locational Clearing Price
$95.79

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.

Washington, D.C. – Offered and Cleared Resources in 2022/23 Auction

(June 2, 2021)

		Unforced Capacity
Generation	Offered MW	-
	Cleared MW	-
Demand Response	Offered MW	109
	Cleared MW	104
Energy Efficiency	Offered MW	87
	Cleared MW	85
Total Offered MW		196
Total Cleared MW		189

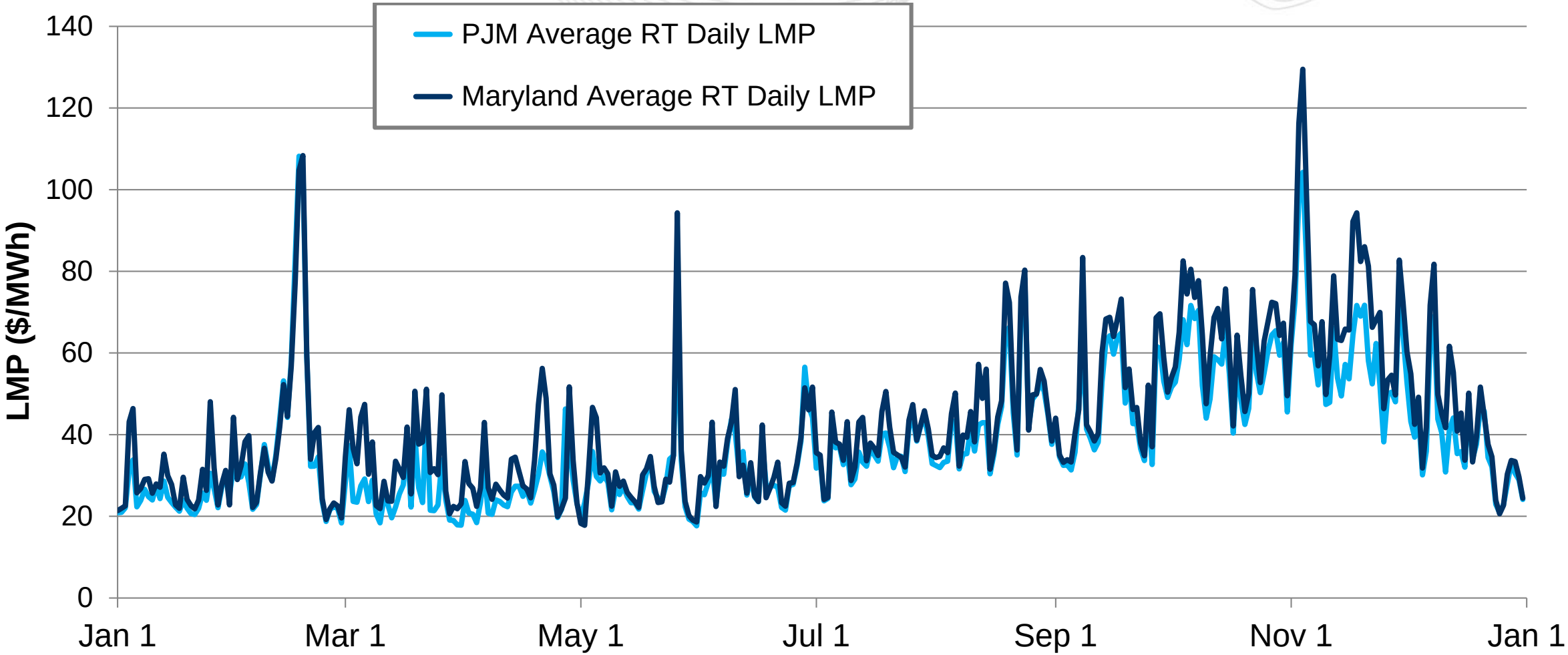
NOTE: Demand Response and Energy Efficiency are reported to PJM by Transmission Zone.
The numbers above reflect the state's pro-rata share of cross-state zones for illustrative purposes.

Markets

Market Analysis

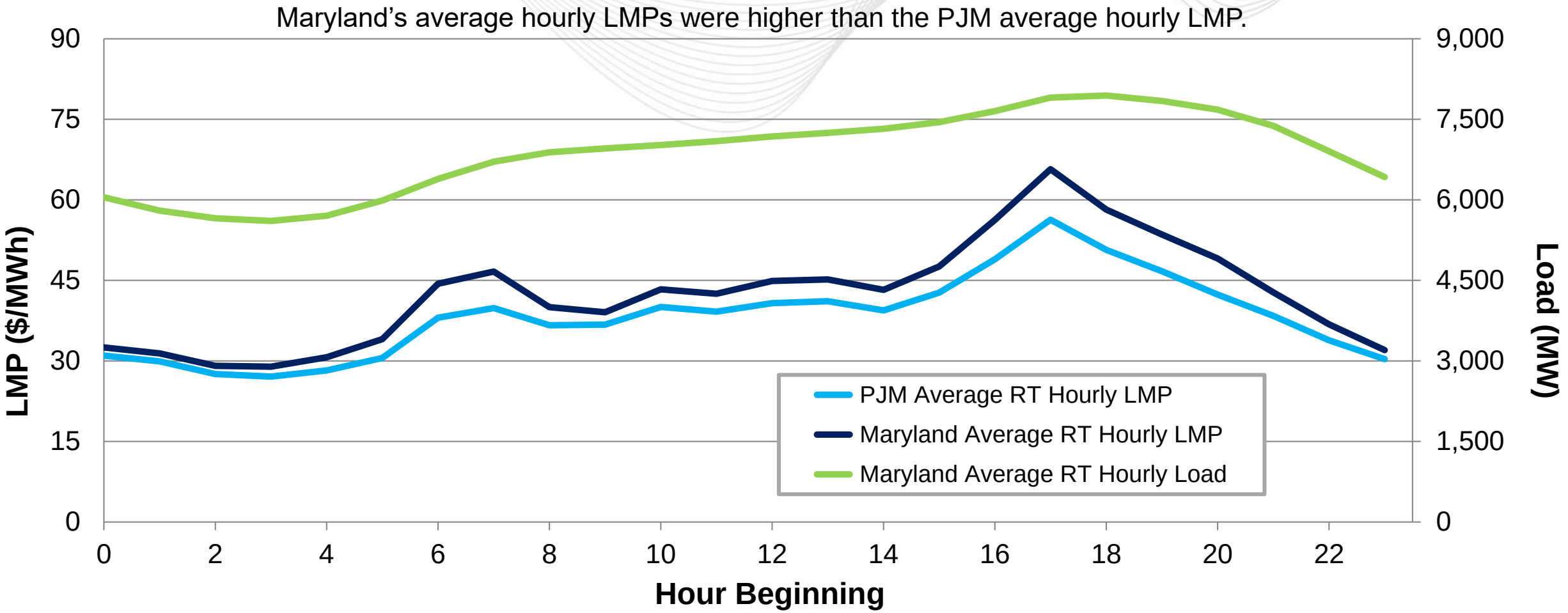
Maryland – Average Daily LMP

(Jan. 1, 2021 – Dec. 31, 2021)



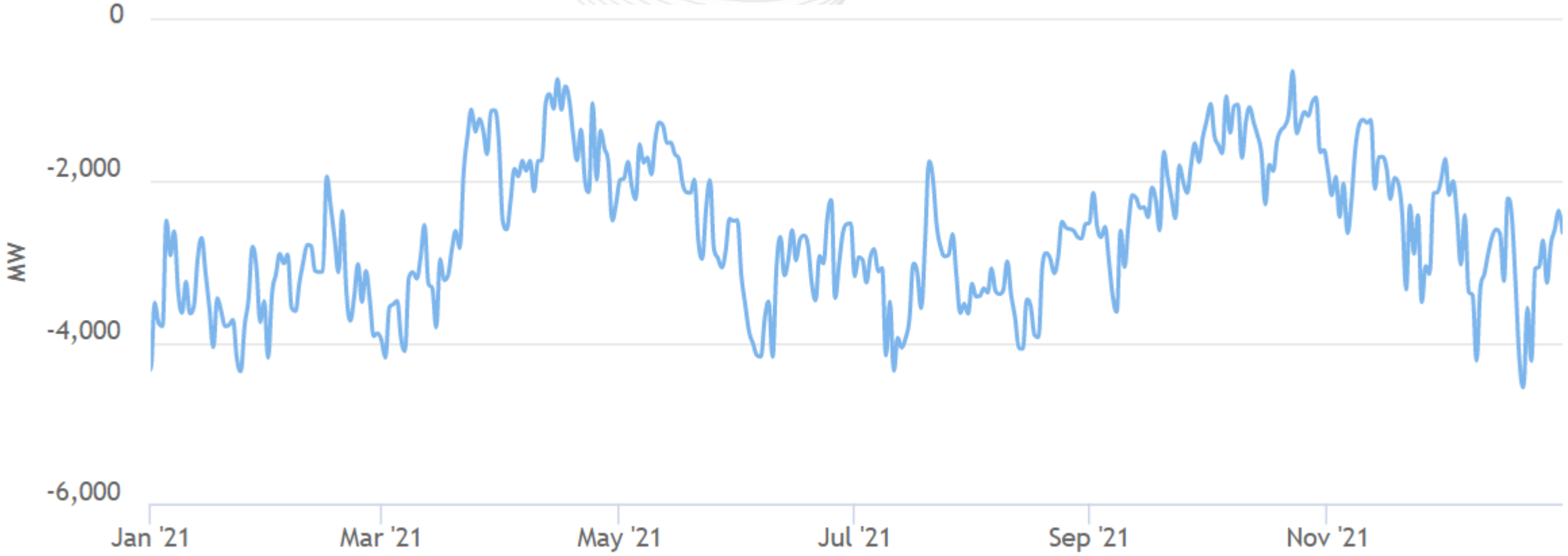
Maryland – Average Hourly LMP and Load

(Jan. 1, 2021 – Dec. 31, 2021)



Maryland – Net Energy Import/Export Trend

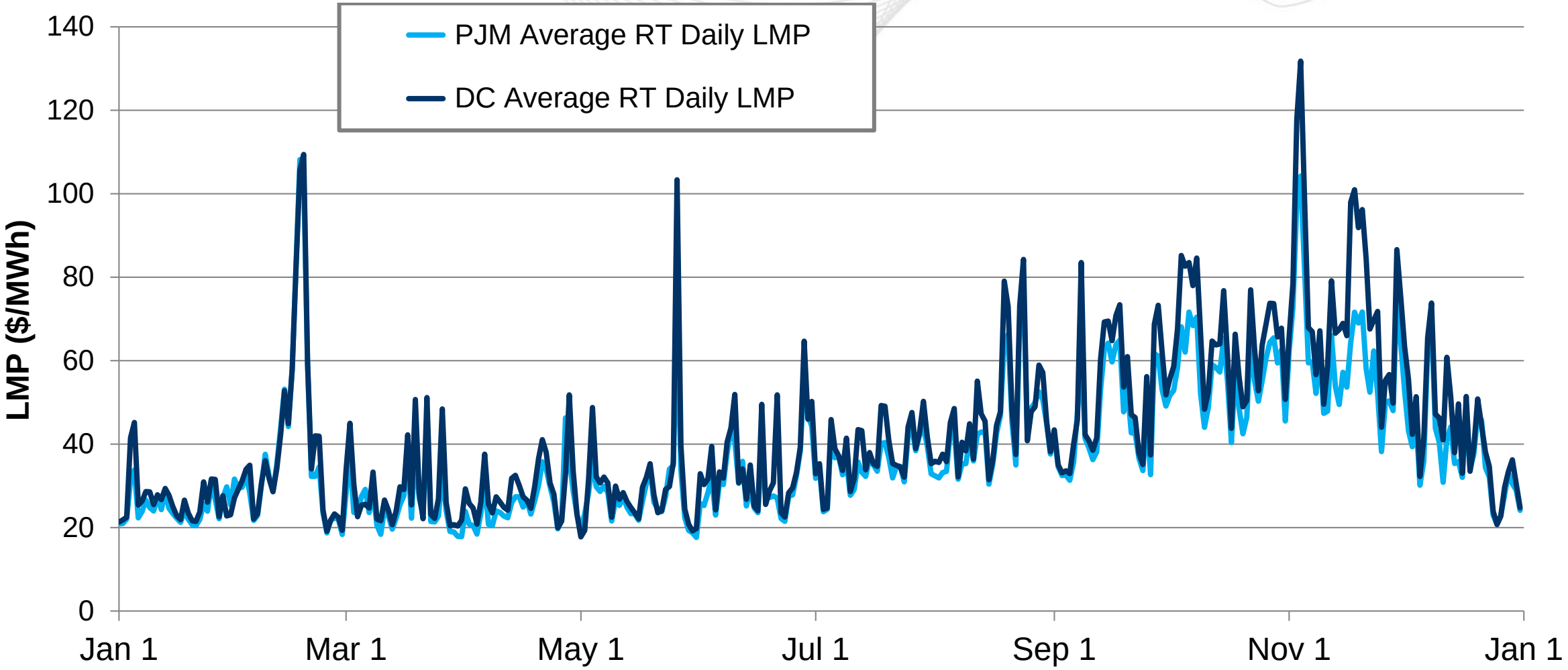
(Jan. 2021 – Dec. 2021)



Positive values represent exports and negative values represent imports.

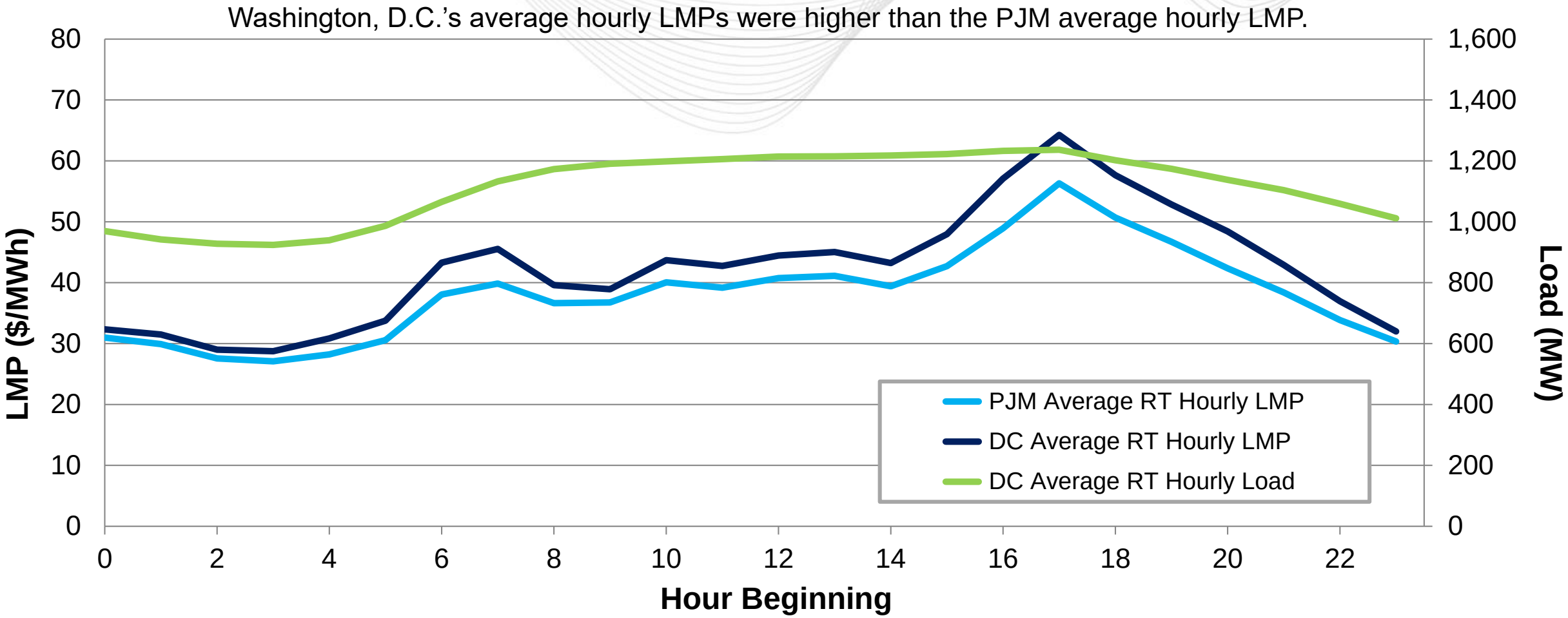
Washington, D.C. – Average Daily LMP

(Jan. 1, 2021 – Dec. 31, 2021)



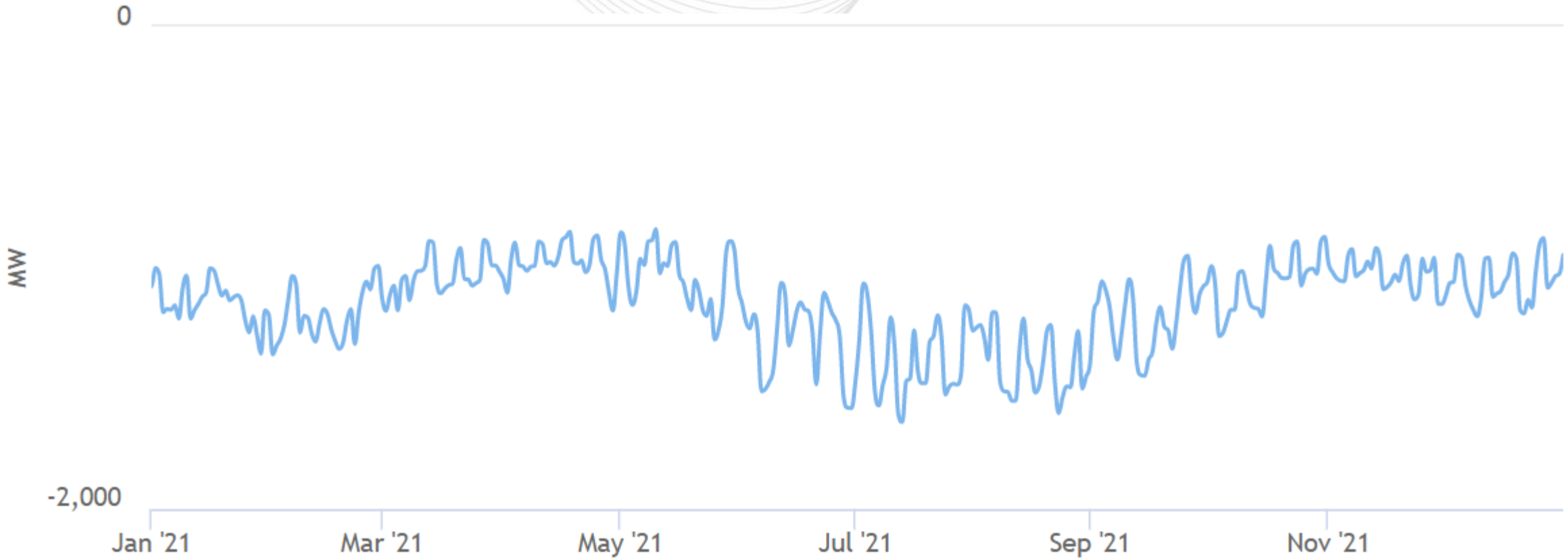
Washington, D.C. – Average Hourly LMP and Load

(Jan. 1, 2021 – Dec. 31, 2021)



Washington, D.C. – Net Energy Import/Export Trend

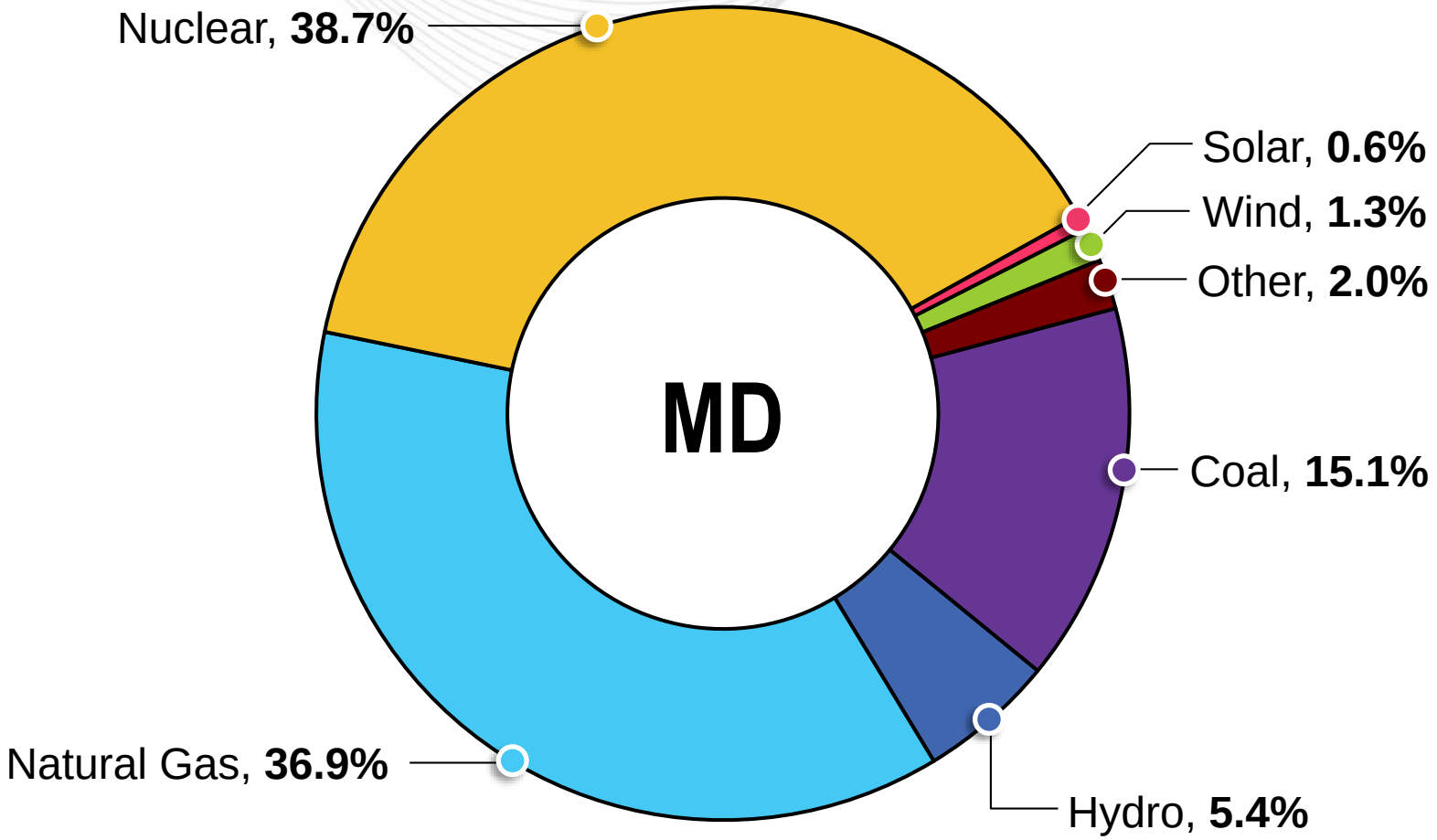
(Jan. 2021 – Dec. 2021)



Positive values represent exports and negative values represent imports.

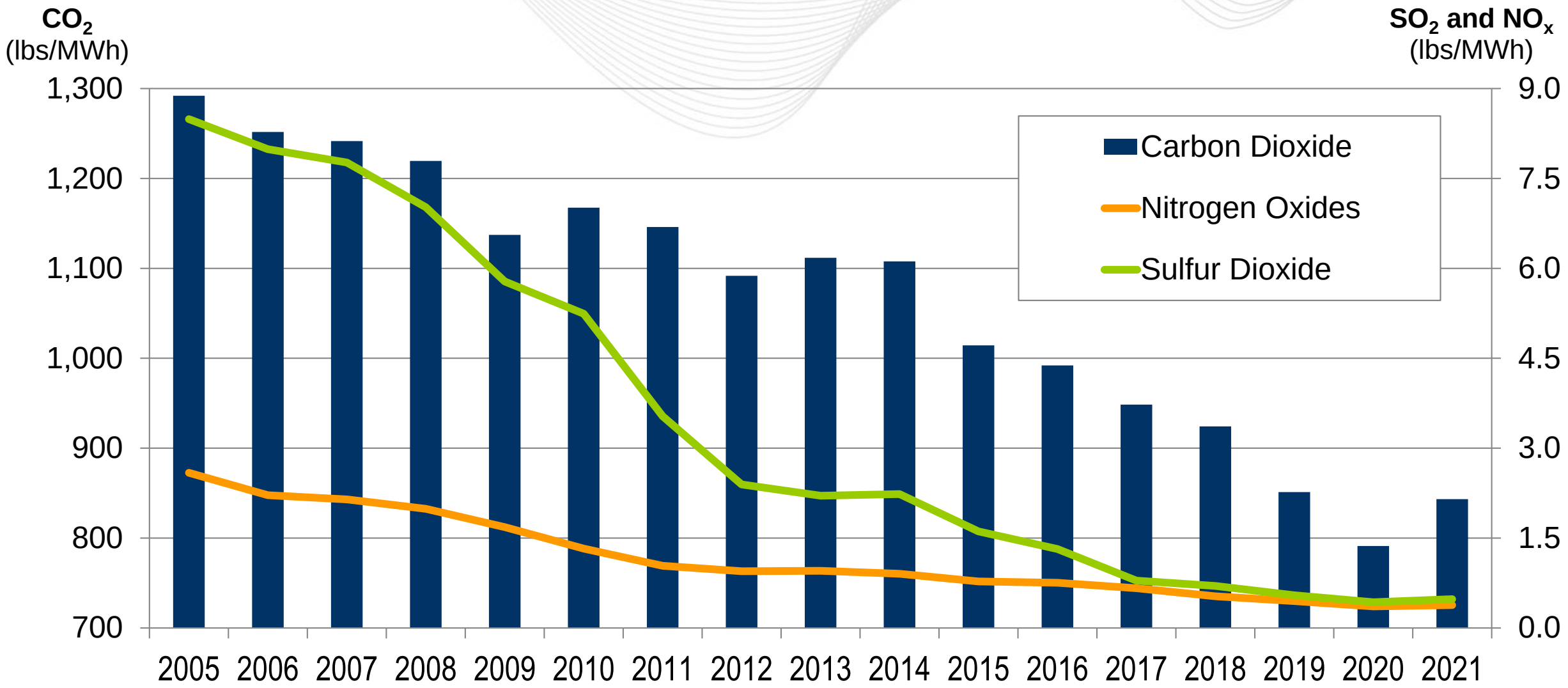
Operations

Maryland – 2021 Generator Production



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

2005 – 2021 PJM Average Emissions



Maryland – Average Emissions (lbs/MWh)

(Feb. 2022)