2021 New Jersey State Infrastructure Report

(January 1, 2021 – December 31, 2021)

May 2022

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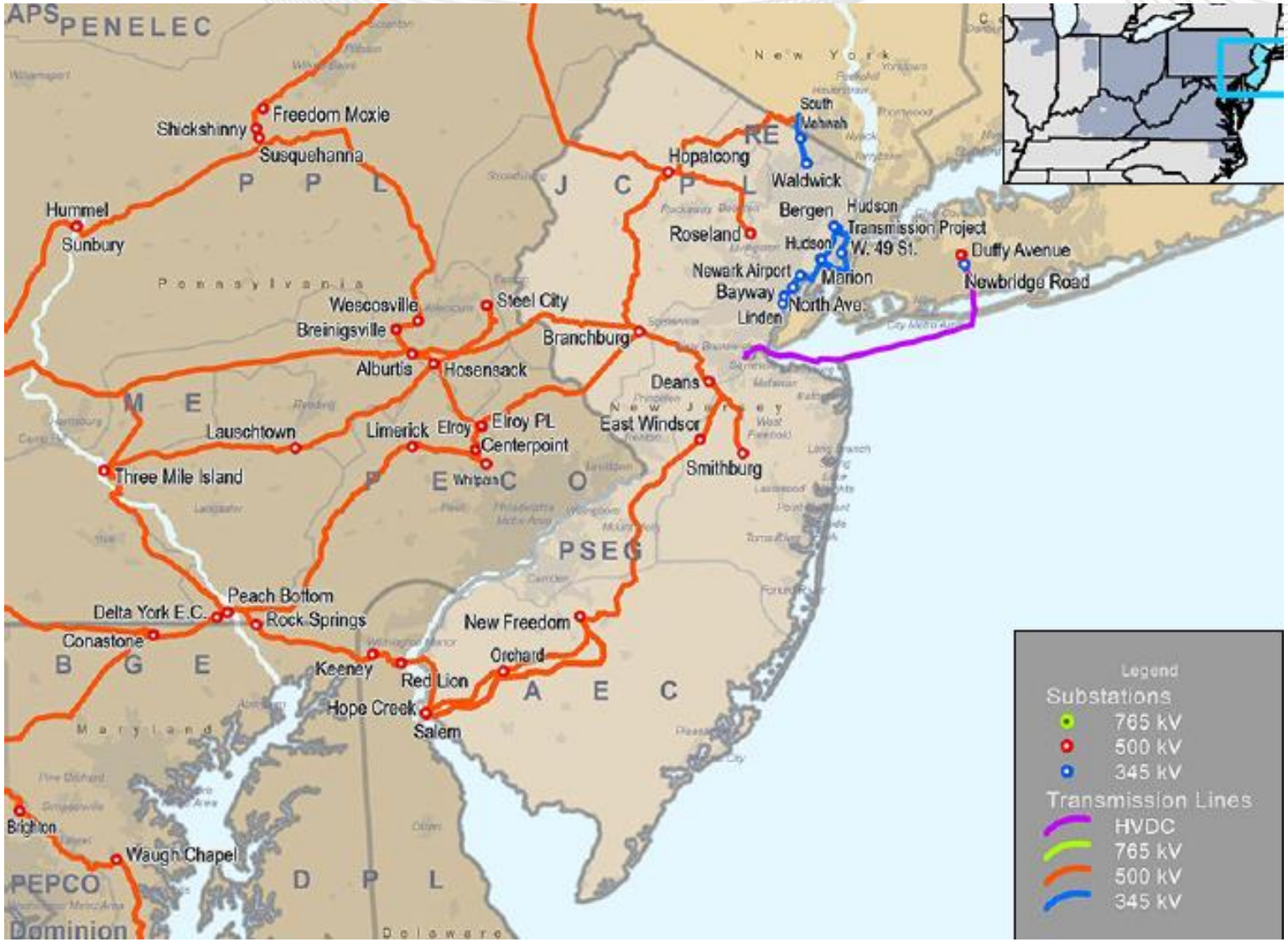
- **Existing Capacity:** Natural gas represents approximately 66.6 percent of the total installed capacity in the New Jersey service territory while nuclear represents approximately 23.5 percent. This differs from PJM where natural gas and nuclear are at 44.2 and 17.5 percent of total capacity.
- **Interconnection Requests:** Wind represents 42.1 percent of new interconnection requests in New Jersey, while storage and natural gas represent approximately 27.6 and 16.6 percent of new requests.
- **Deactivations:** 695.8 MW in New Jersey provided notification of deactivation to PJM in 2021.
- **RTEP 2021:** New Jersey's 2021 RTEP project total represents approximately $670.27 million in investment.

- **Load Forecast:** New Jersey's summer peak load is projected to grow between -0.1 and 0.3 percent annually over the next ten years, depending on the individual transmission zone. Comparatively, the overall PJM RTO projected summer peak load growth rate is 0.4 percent.
- **2022/23 Capacity Market:** 13,384 MW in New Jersey cleared in the 2022/23 Base Residual Auction.
- **1/1/21 – 12/31/21 Market Performance:** New Jersey's average hourly LMPs were below the PJM average hourly LMP.
- **Emissions:** New Jersey's average CO2 emissions slightly decreased in 2021 compared to 2020 levels.

PJM Service Area – New Jersey

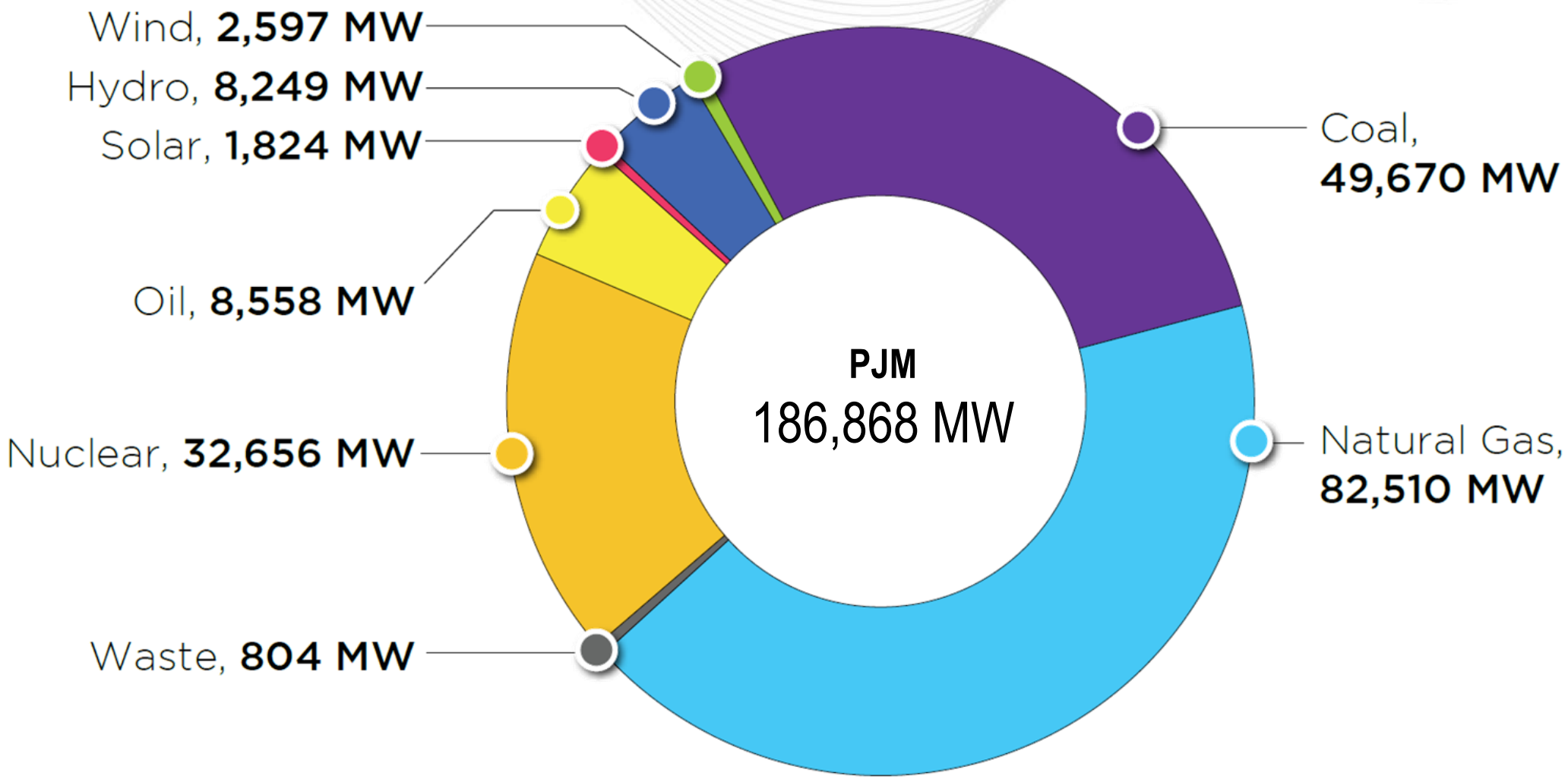


Planning

Generation Portfolio Analysis

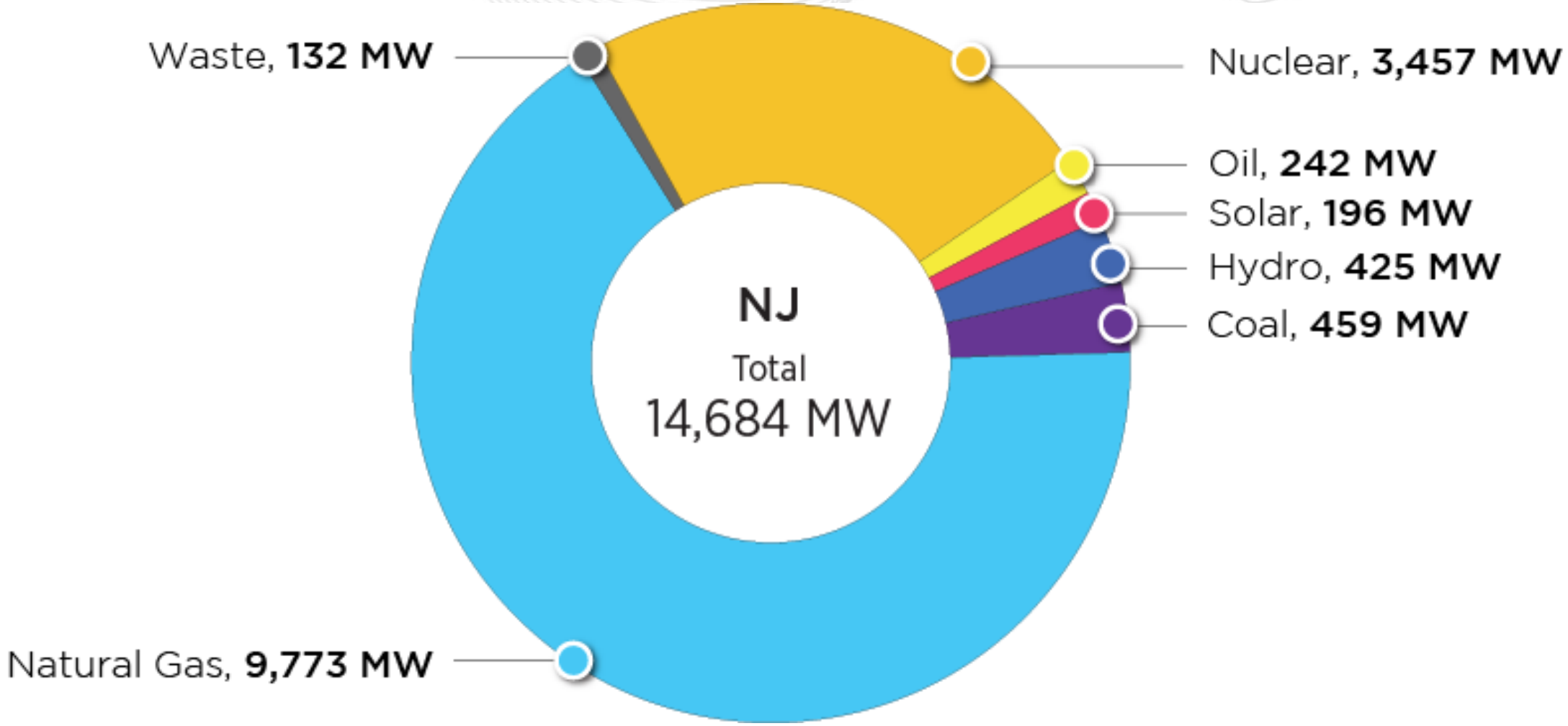
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



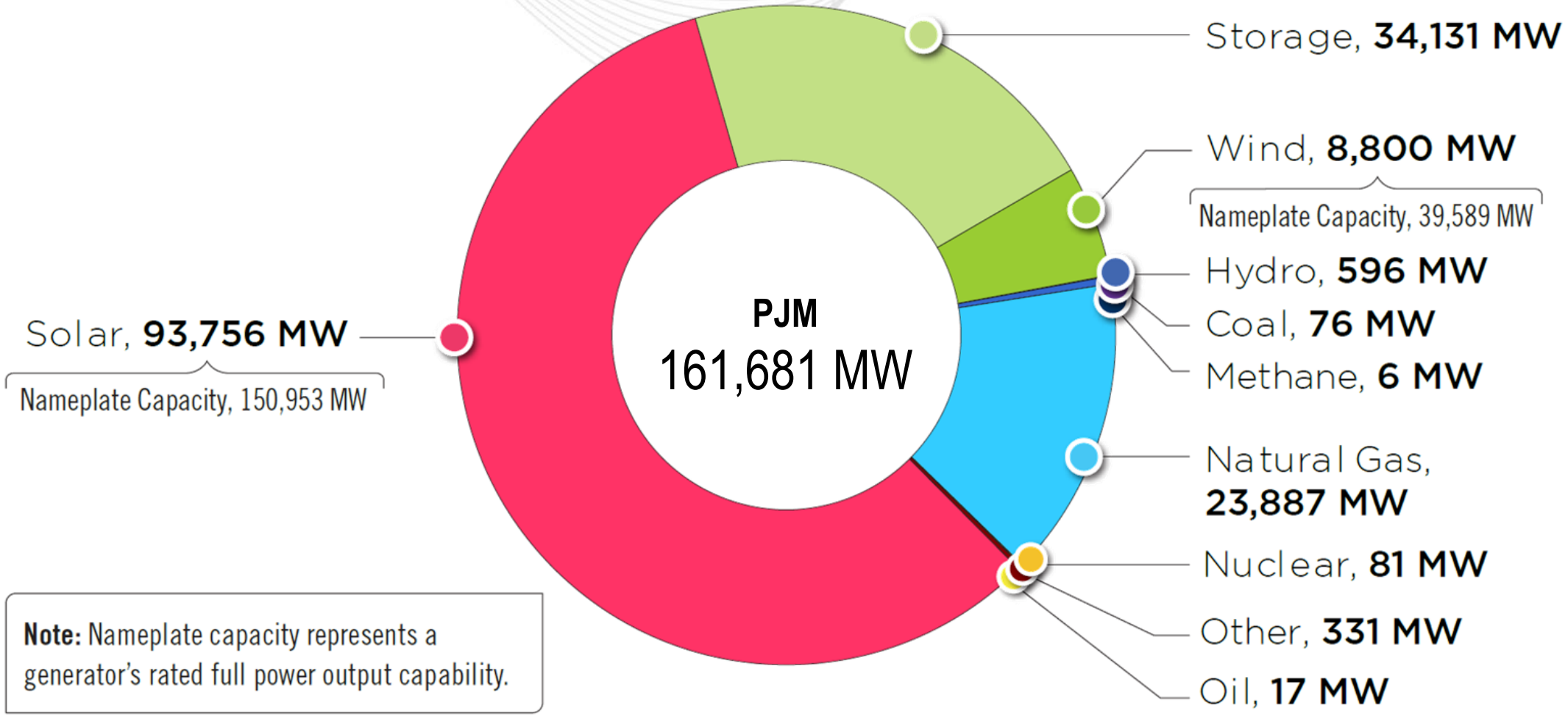
New Jersey – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



PJM – Queued Capacity (MW) by Fuel Type

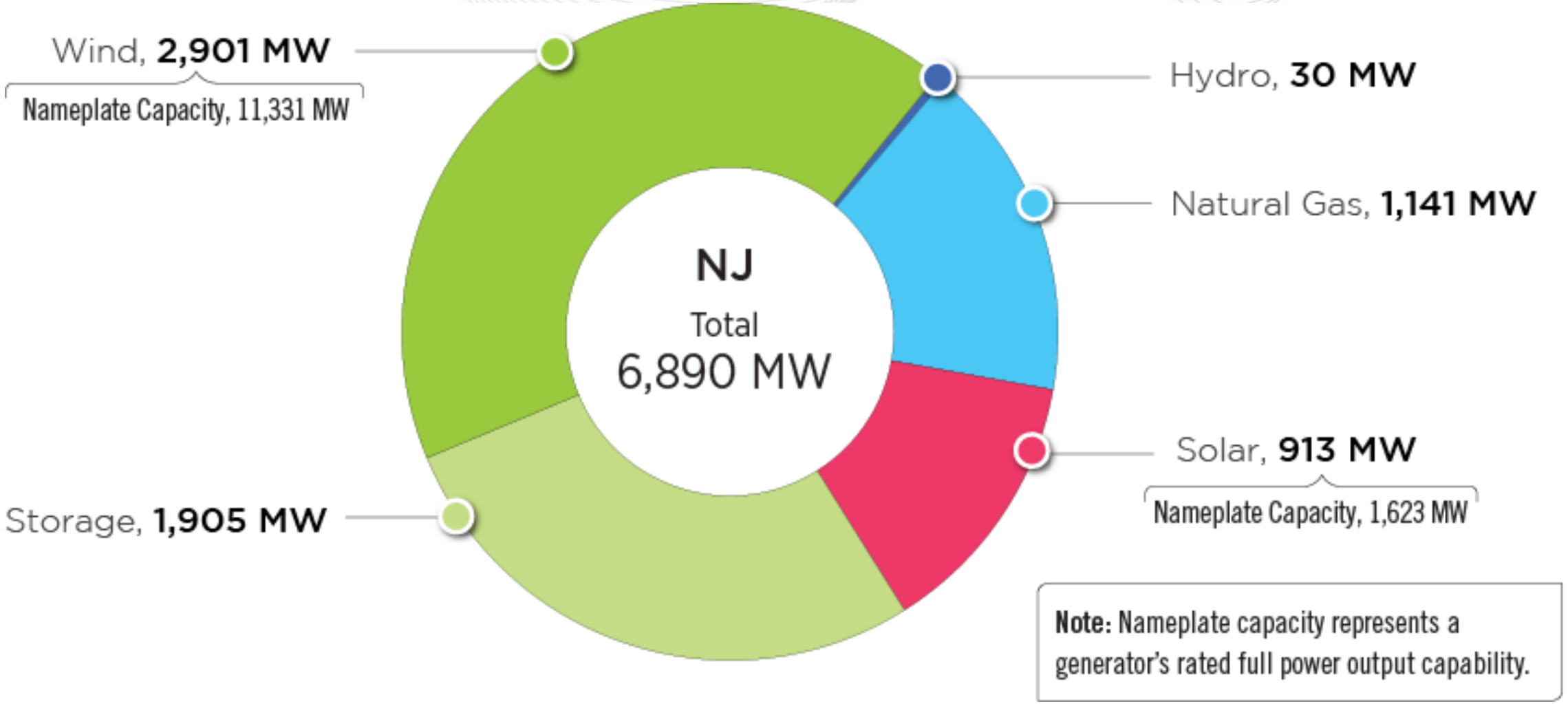
(Requested CIRs – as of Dec. 31, 2021)



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

New Jersey – Queued Capacity (MW) by Fuel Type

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



New Jersey – 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	0	0.0	1	15.0	1	15.0
	Natural Gas	5	336.1	2	746.0	4	59.2	79	8,017.9	181	51,838.5	271	60,997.7
	Nuclear	0	0.0	0	0.0	0	0.0	6	381.0	0	0.0	6	381.0
	Oil	0	0.0	0	0.0	0	0.0	2	35.0	8	945.0	10	980.0
	Other	0	0.0	0	0.0	0	0.0	0	0.0	7	45.5	7	45.5
	Storage	52	1,903.0	2	0.0	6	2.0	6	4.0	49	244.0	115	2,152.9
Renewable	Biomass	0	0.0	0	0.0	0	0.0	0	0.0	3	17.3	3	17.3
	Hydro	1	30.0	0	0.0	0	0.0	2	20.5	2	1,001.1	5	1,051.6
	Methane	0	0.0	0	0.0	0	0.0	15	43.3	9	40.6	24	83.9
	Solar	65	873.0	2	8.7	20	31.7	118	257.1	496	1,735.6	701	2,906.1
	Wind	15	2,779.5	0	0.0	1	121.4	1	0.0	21	908.1	38	3,809.0
	Grand Total	**138**	**5,921.5**	**6**	**754.7**	**31**	**214.3**	**229**	**8,758.8**	**777**	**56,790.7**	**1,181**	**72,440.2**

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

New Jersey – Progression History of Interconnection Requests

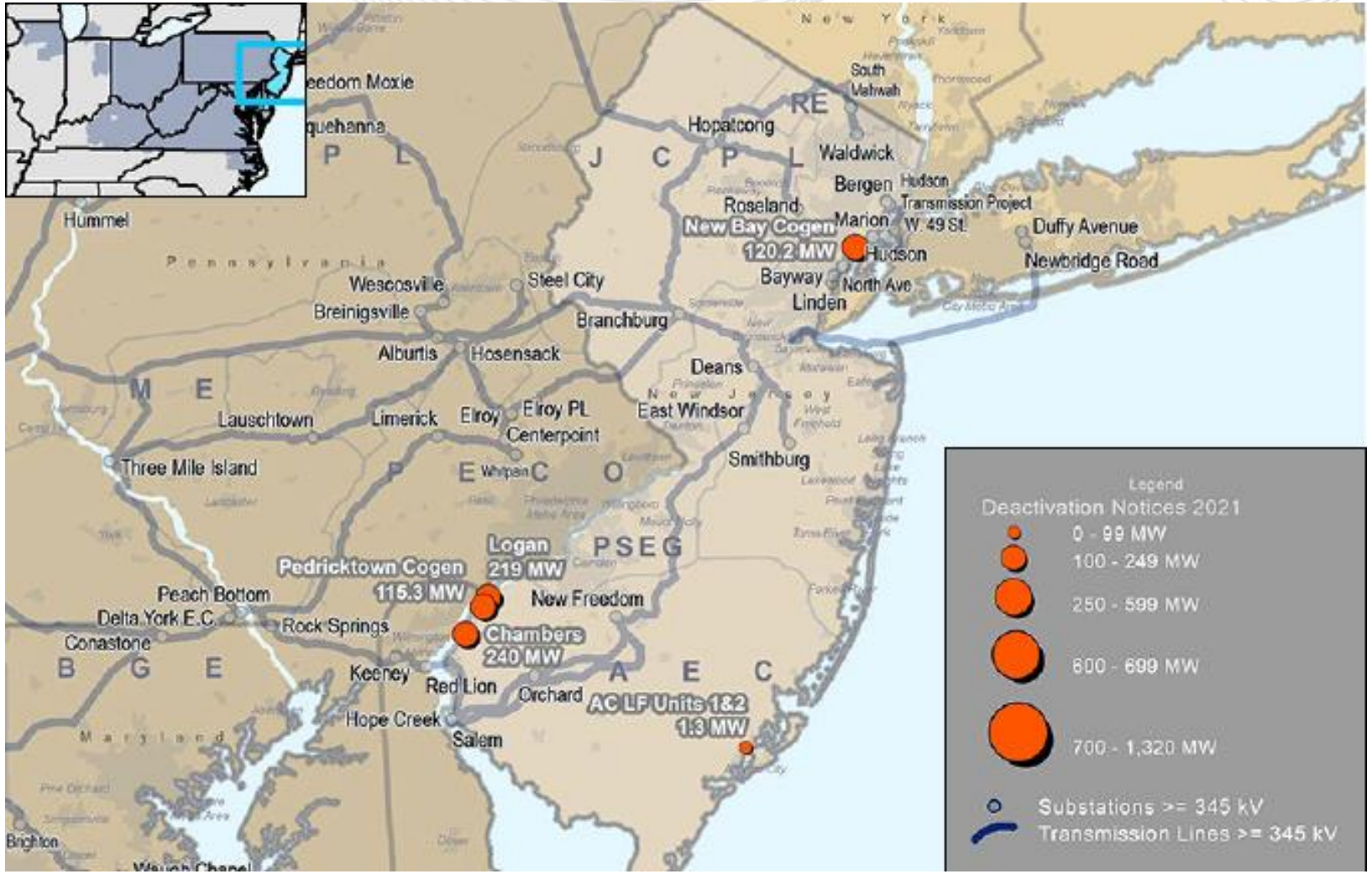
Percentage of planned capacity and projects that have reached commercial operation

13.3%	Requested capacity megawatts
23.2%	Requested projects

			Capacity	Nameplate
Projects withdrawn after final agreement	24	Interconnection Service Agreements	2,595 MW	3,067 MW
	149	Wholesale Market Participation Agreements	376 MW	1,075 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.

New Jersey – Generation Deactivation Notifications Received in 2021



New Jersey – Generation Deactivation Notifications Received in 2021

Unit	TO Zone	Fuel Type	Request Received to Deactivate	Actual or Projected Deactivation Date	Age (Years)	Capacity (MW)
Logan	AE	Coal	12/29/2021	4/1/2022	27	219
Chambers CCLP					27	240
AC Landfill Units 1 and 2		Methane	9/10/2021	12/9/2021	16	1.3
New Bay Cogen CC	PSEG	Natural Gas	7/15/2021	5/31/2022	28	120.2
Pedricktown Cogen CC	AE				29	115.3

Planning

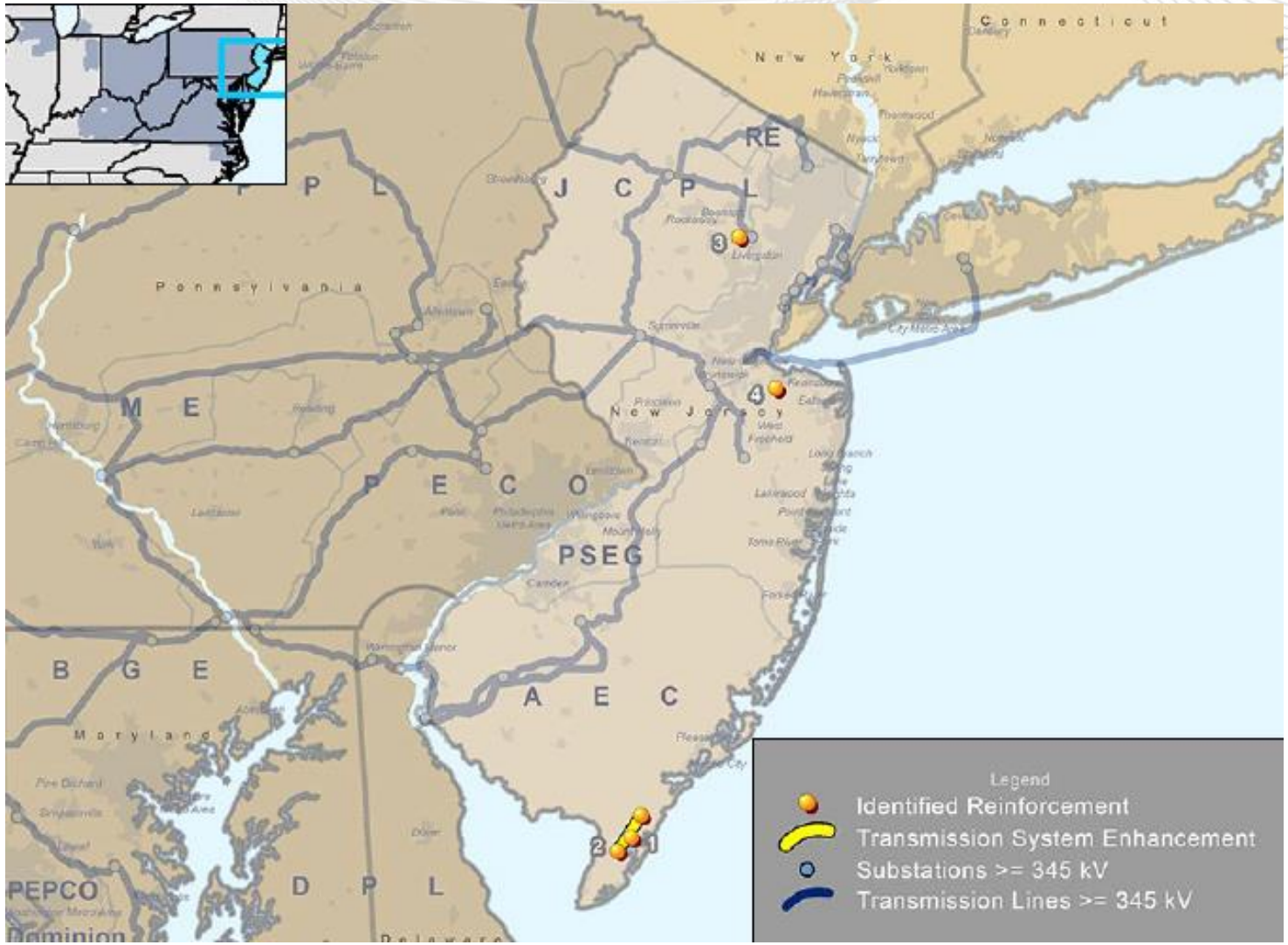
Transmission Infrastructure Analysis

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

New Jersey – RTEP Baseline Projects



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

New Jersey – RTEP Baseline Projects

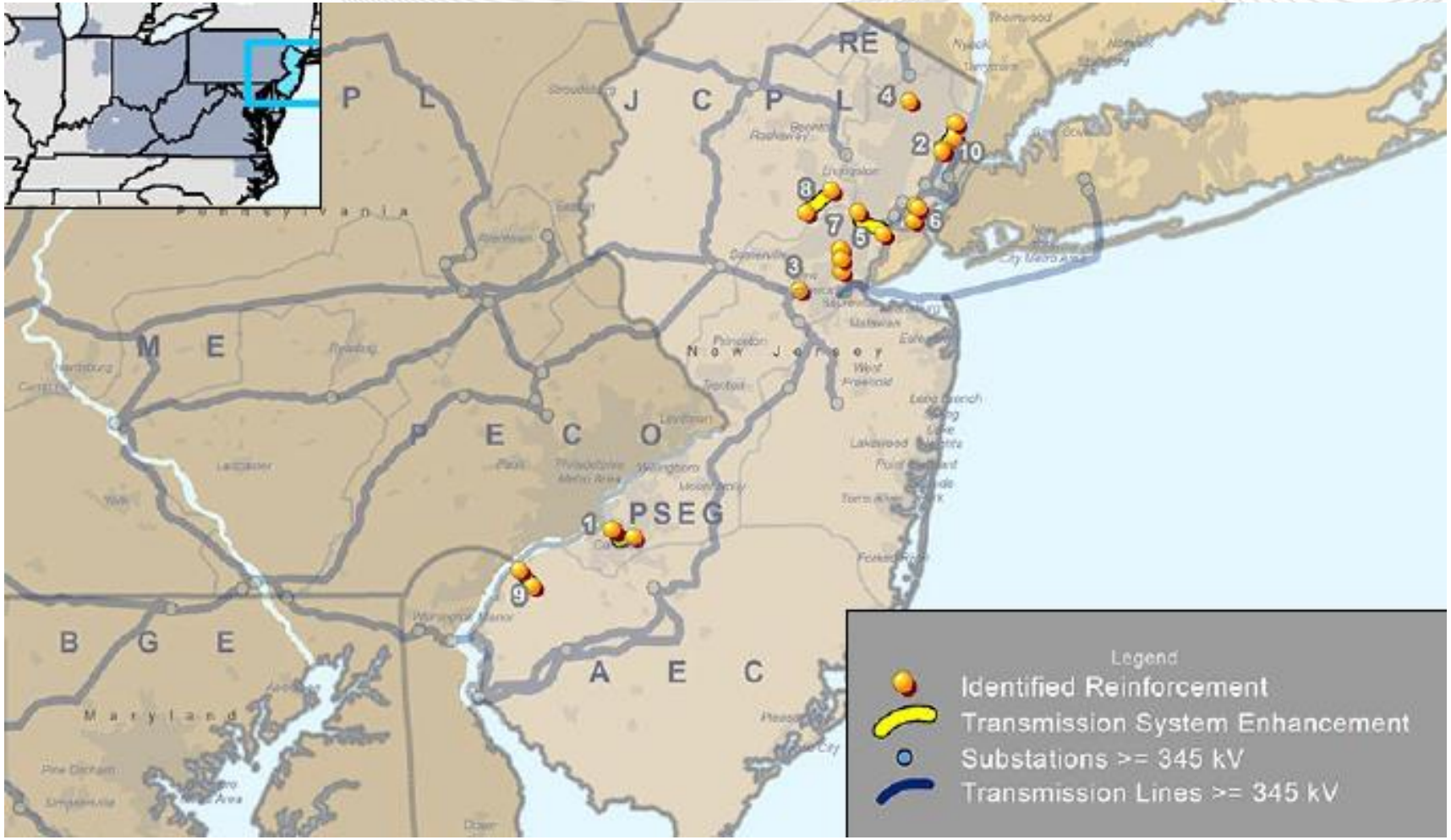
Map ID	Project	Description	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	b3226	Add 10 MVAR 69 kV capacitor bank at Swainton substation.	6/1/2025	$2.90	AEC	11/18/2020
2	b3227	Rebuild the Corson-Court 69 kV line to achieve ratings equivalent to 795 ACSR conductor or better.		$13.20		
3	b3238	Replace seven overdutied 34.5 kV breakers with 50 kA rated equipment at the Whippany substation.		$8.67	JCPL	
4	b3239	Replace 14 overdutied 34.5 kV breakers with 63 kA rated equipment.		$5.70		

New Jersey – RTEP Network Projects

New Jersey 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.

New Jersey – 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.

New Jersey – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	s2413	Build new 69/13 kV station in Audubon area.	5/31/2025	$48.60	PSEG	11/18/2020
	s2413.1	Purchase property to accommodate new 69/13 kV station (Nickolson) in Audubon area, and install a 69 kV station with two 69/13 kV transformers.				
	s2413.2	Loop in the Gloucester-Lawnside 69 kV into the new station (Nicholson), and build a new 69 kV from Woodlynne-Nicholson.				
2	s2415	Build new 69/13 kV station in Eastern Bergen County area.	4/10/2025	$112.80		
	s2415.1	Eliminate Hudson Terrace 26 kV substation, and construct a 69 kV station with two 69/13 kV transformers on existing substation property.				
	s2415.2	Loop in the new 69 kV station (Cliffs) into the Bergen-Englewood and Bergenfield-Englewood 69 kV circuits.				
3	s2482	Eliminate Albany St. 26 kV station and modify North Brunswick Station to pick up existing loads. Add three 69/26 kV transformers at North Brunswick station.	5/31/2024	$29.20		1/14/2021
4	s2483	Convert existing Spring Valley Rd. 69/4 kV substation to a 69/13 kV substation. Replace three 69/4 kV transformers with two 69/13 kV transformers at Spring Valley Rd.	12/31/2024	$13.20		
5	s2491	Convert existing Elizabeth 26/4 kV substation to a 69/4 kV substation.	5/31/2025	$85.80		2/16/2021
	s2491.1	Purchase property to accommodate new construction and install 69 kV substation (Elizabeth) with three 69/4 kV transformers.				
	s2491.2	Cut and loop Linden-Vauxhall 69 kV circuit into new location (Elizabeth).				
	s2491.3	Construct a new circuit from new station (Elizabeth) to NYE Ave. 69 kV.				

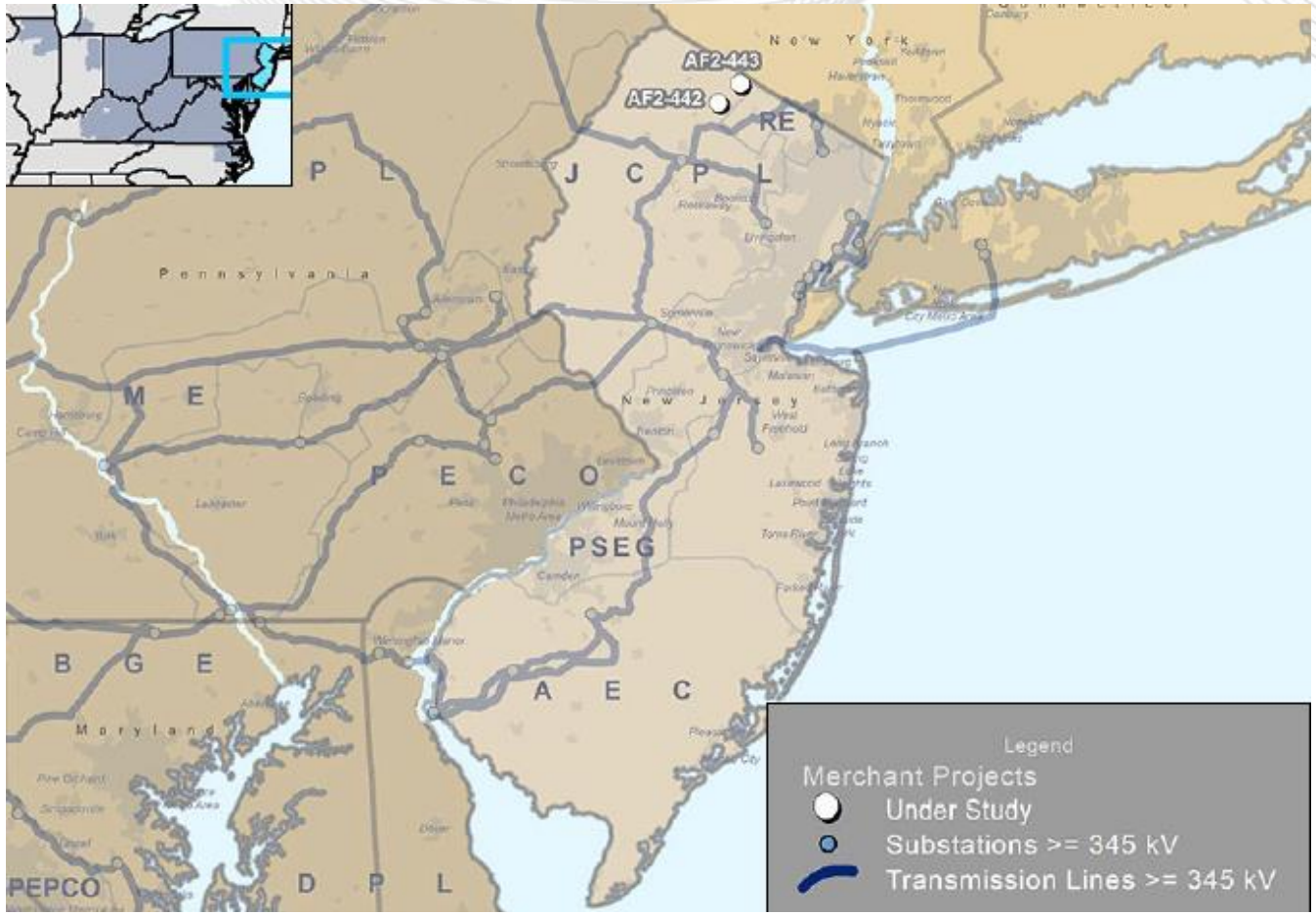
New Jersey – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
6	s2537	Construct a new Constable Hook 69/13 kV substation in the Bergen Neck area to feed Bergen Point load and provide for future load growth.	5/30/2026	$116.00	PSEG	4/14/2021
	s2537.1	Eliminate 26 kV and 4 kV equipment at Bergen Point.				
	s2537.2	Construct 69 kV ring bus Class H on new property (Constable Hook) with two 69/13 kV transformers.				
	s2537.3	Construct a primarily underground 69 kV network between Greenville, Bayonne, Fairmount and Constable Hook. Loop in the Greenville-Bayonne 69 kV into Constable Hook, and build a new 69 kV circuit from Fairmount to Constable Hook.				
7	s2564	Install a new 230 kV substation (Oak Tree Road) with two 230/13 kV transformers. Cut and loop the New Dover-Metuchen 230 kV line in to the 230 kV bus, and transfer load from heavily loaded New Dover and Kilmer to the new station.	5/1/2025	$92.90		3/9/2021
8	s2565	Gillette 230 kV substation – Replace line relaying, line trap, CCVT and substation conductor on the Gillette-Traynor 230 kV line.	6/1/2021	$2.00	JCPL	5/11/2021
	s2565.1	Traynor 230 kV substation – Replace line relaying, line trap, CCVT and substation conductor on the Gillette-Traynor 230 kV line.				
9	s2567	Upgrade Beckett substation area and retire Carney's Point, Pennsgrove, Oldman substations.	12/31/2024	$39.50	ACE	5/20/2021
	s2567.1	Upgrade Beckett substation to line bus configuration by installing four 69 kV circuit breakers.	5/31/2023			
	s2567.2	Construct new seven-breaker 69 kV ring bus substation on Churchtown-Monsanto line.	12/31/2024			
	s2567.3	Construct new 5.6 mile 69 kV line from Beckett to new substation.				

New Jersey – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
10	s2568	Build new 69-13 kV station at new property in Fairview, NJ.	5/30/2026	$99.80	PSEG	5/20/2021
	s2568.1	Purchase property to accommodate new construction, and install a new 69 kV station with two 69-13 kV transformers. Transfer load from heavily loaded Ridgefield to the new station.				
	s2568.2	Construct a 69 kV network in the Southeastern Bergen County area by cutting and looping two existing lines (Bergen-River Rd. and Bergen-Tonnelle Ave. 69 kV circuits) into the new station.				

New Jersey – Merchant Transmission Project Requests

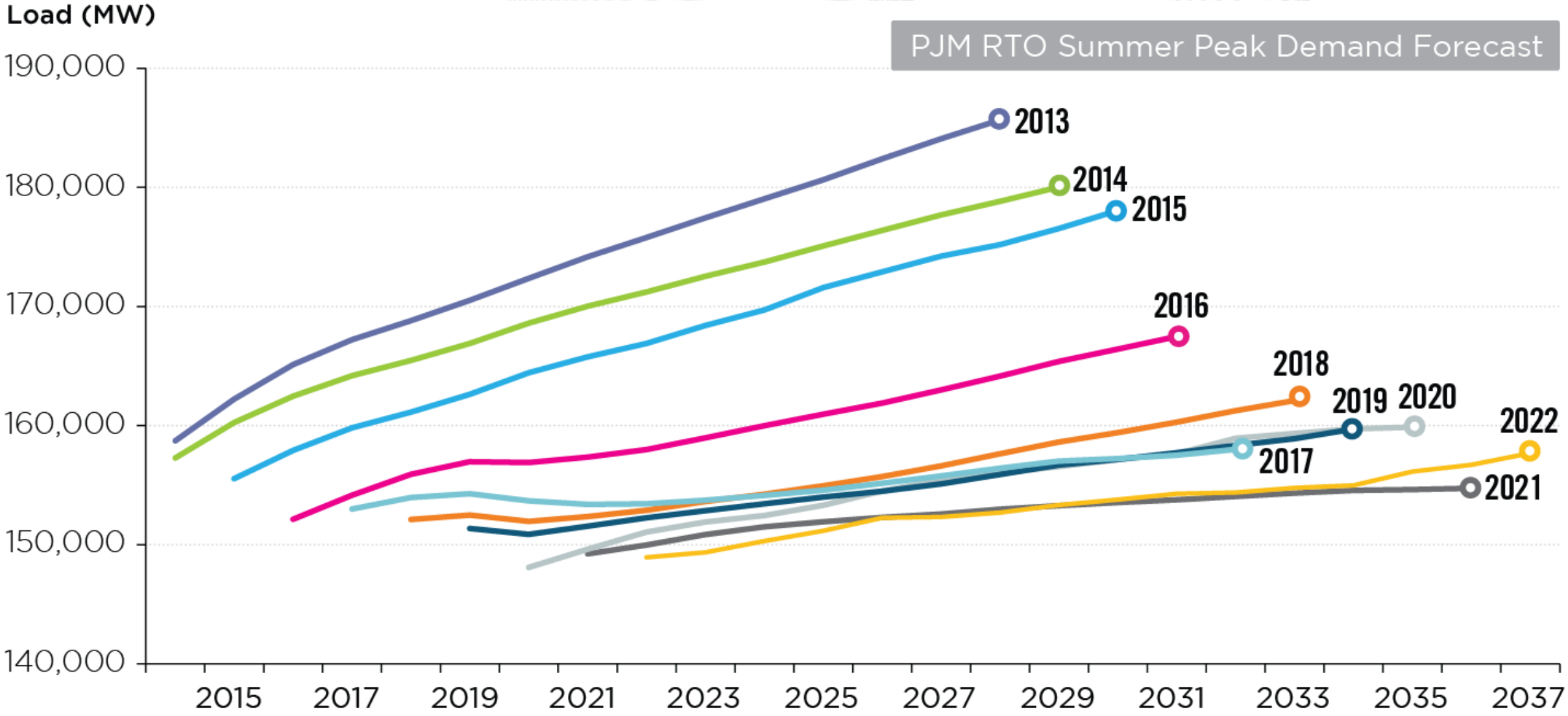


Queue Number	Queue Name	TO Zone	Status	Actual or Requested In-Service Date	Maximum Output (MW)
AF2-443	Vernon 115 kV	JCP&L	Active	5/31/2023	84
AF2-442					

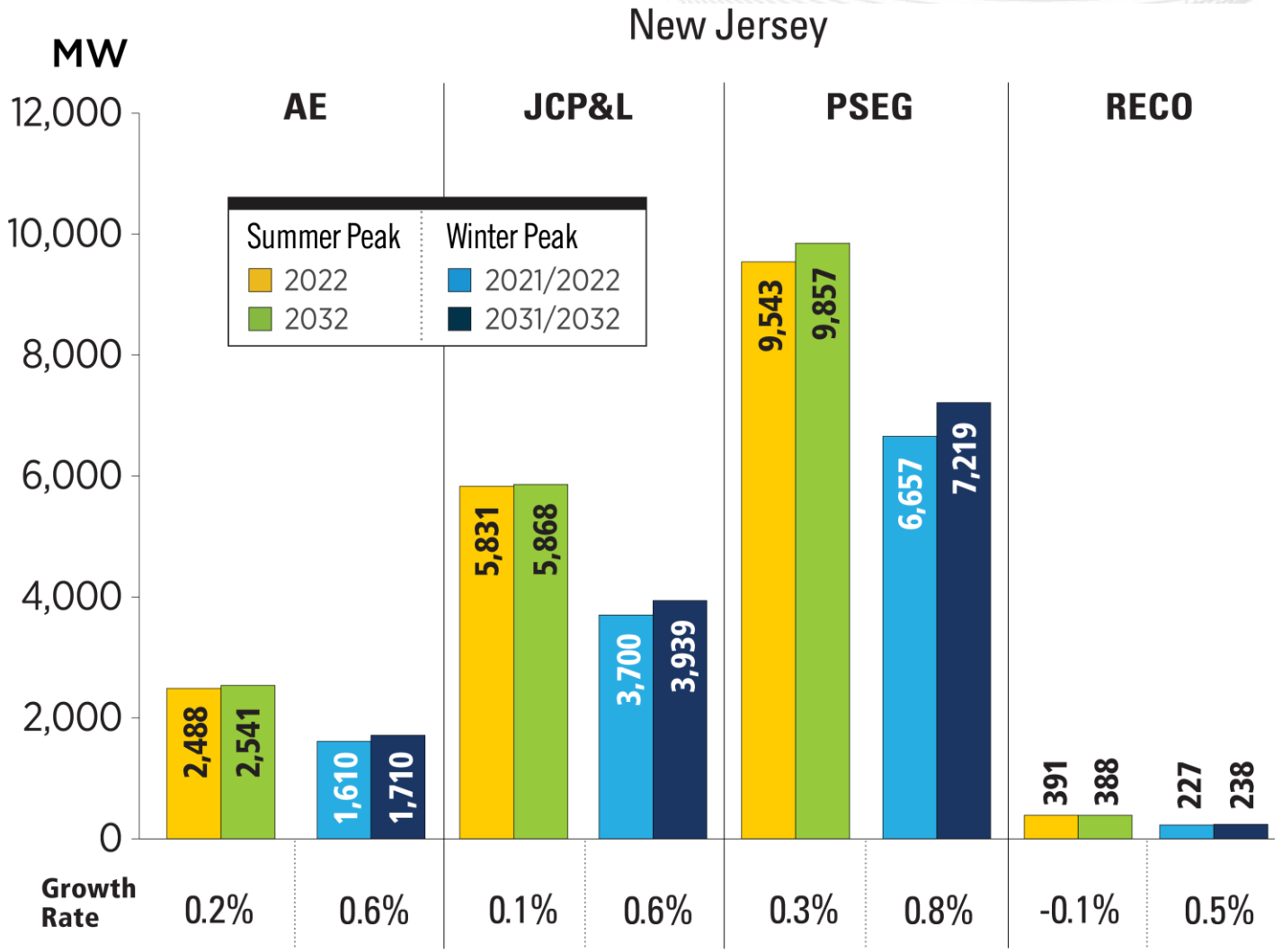
Planning
Load Forecast

PJM Annual Load Forecasts

(Jan. 2022)



New Jersey – 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

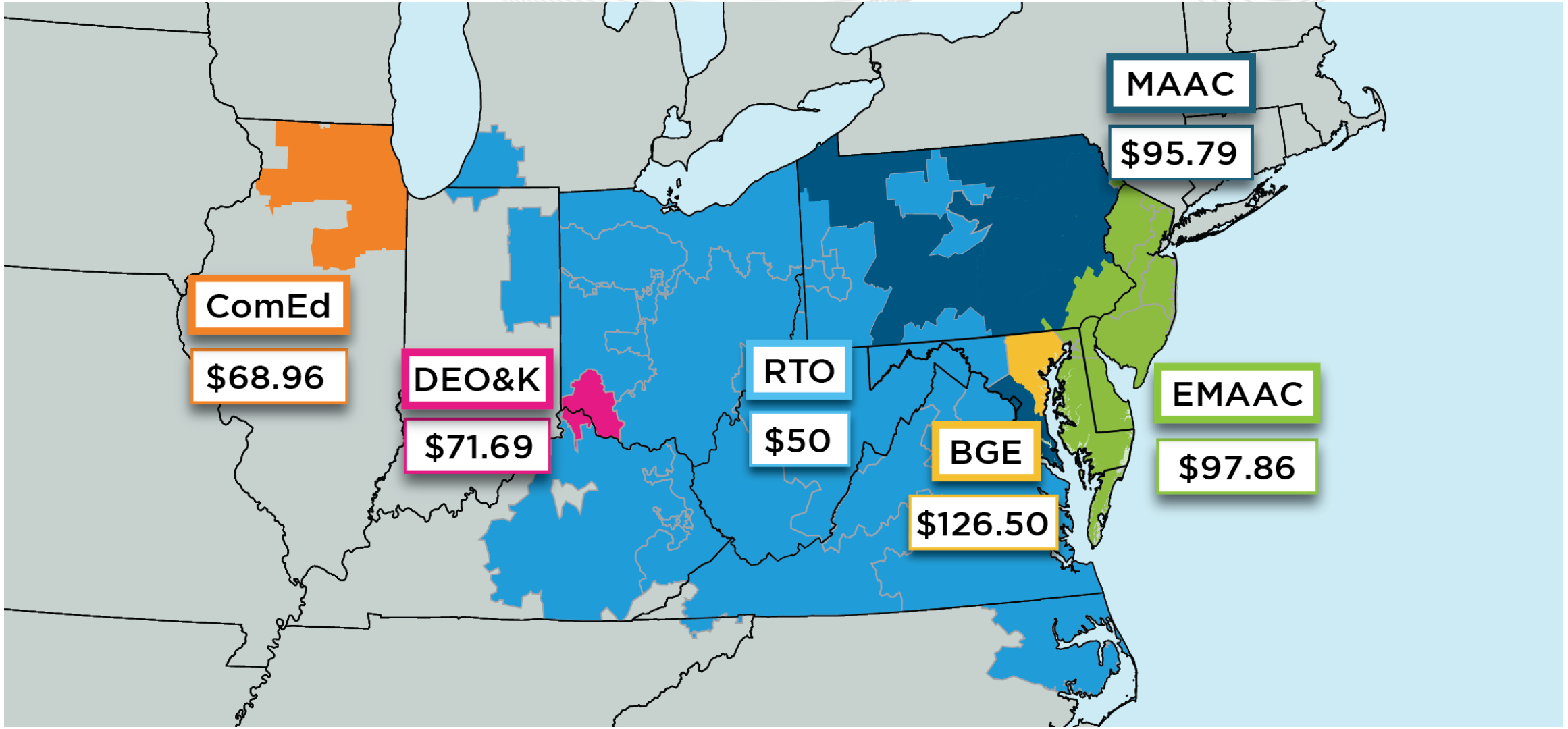
Growth Rate 0.7%

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	

New Jersey – Cleared Resources in 2022/23 Auction

(June 2, 2021)

	Cleared MW (Unforced Capacity)	Change from 2021/22 Auction
Generation	12,230	+136
Demand Response	506	-161
Energy Efficiency	648	+180
Total	13,384	+155

EMAAC Locational Clearing Price
$97.86

New Jersey – Offered and Cleared Resources in 2022/23 Auction

(June 2, 2021)

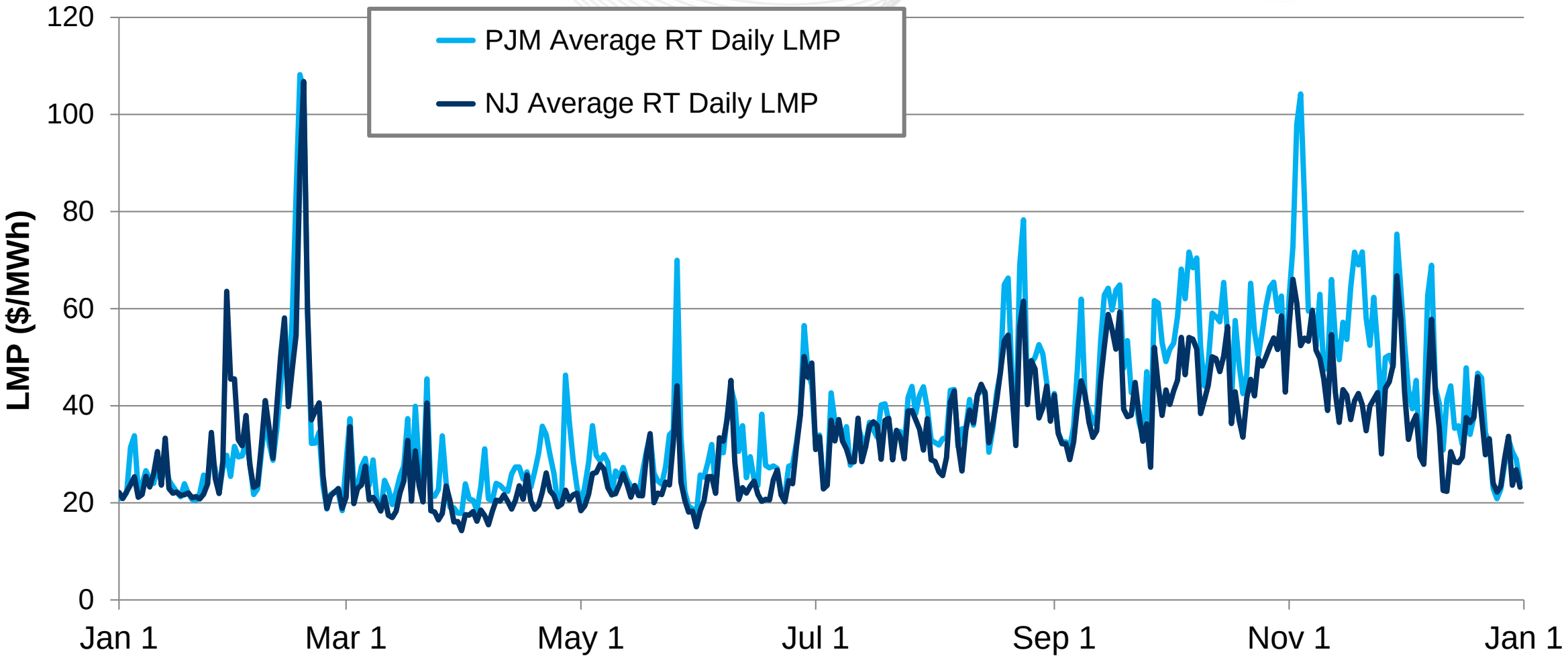
		Unforced Capacity
Generation	Offered MW	14,139
	Cleared MW	12,230
Demand Response	Offered MW	641
	Cleared MW	506
Energy Efficiency	Offered MW	650
	Cleared MW	648
Total Offered MW		15,430
Total Cleared MW		13,384

Markets

Market Analysis

New Jersey – Average Daily LMP

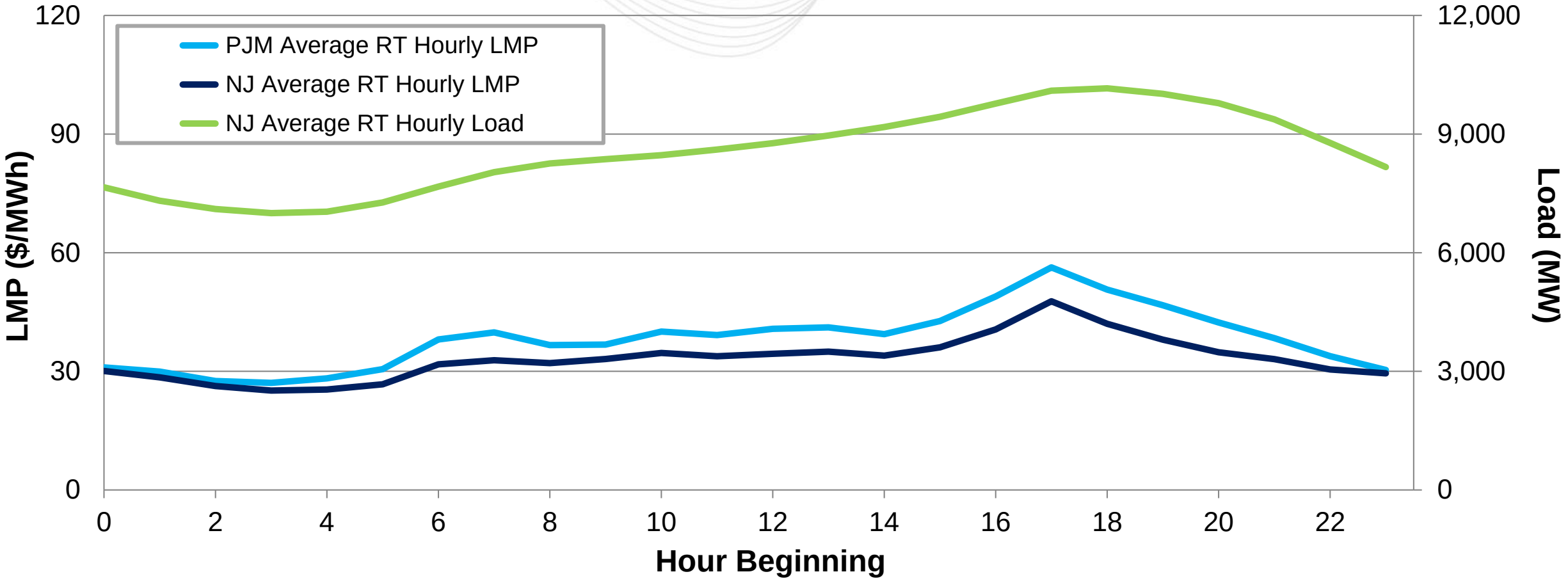
(Jan. 1, 2021 – Dec. 31, 2021)



New Jersey – Average Hourly LMP and Load

(Jan. 1, 2021 – Dec. 31, 2021)

New Jersey's average hourly LMPs were below the PJM average hourly LMP.



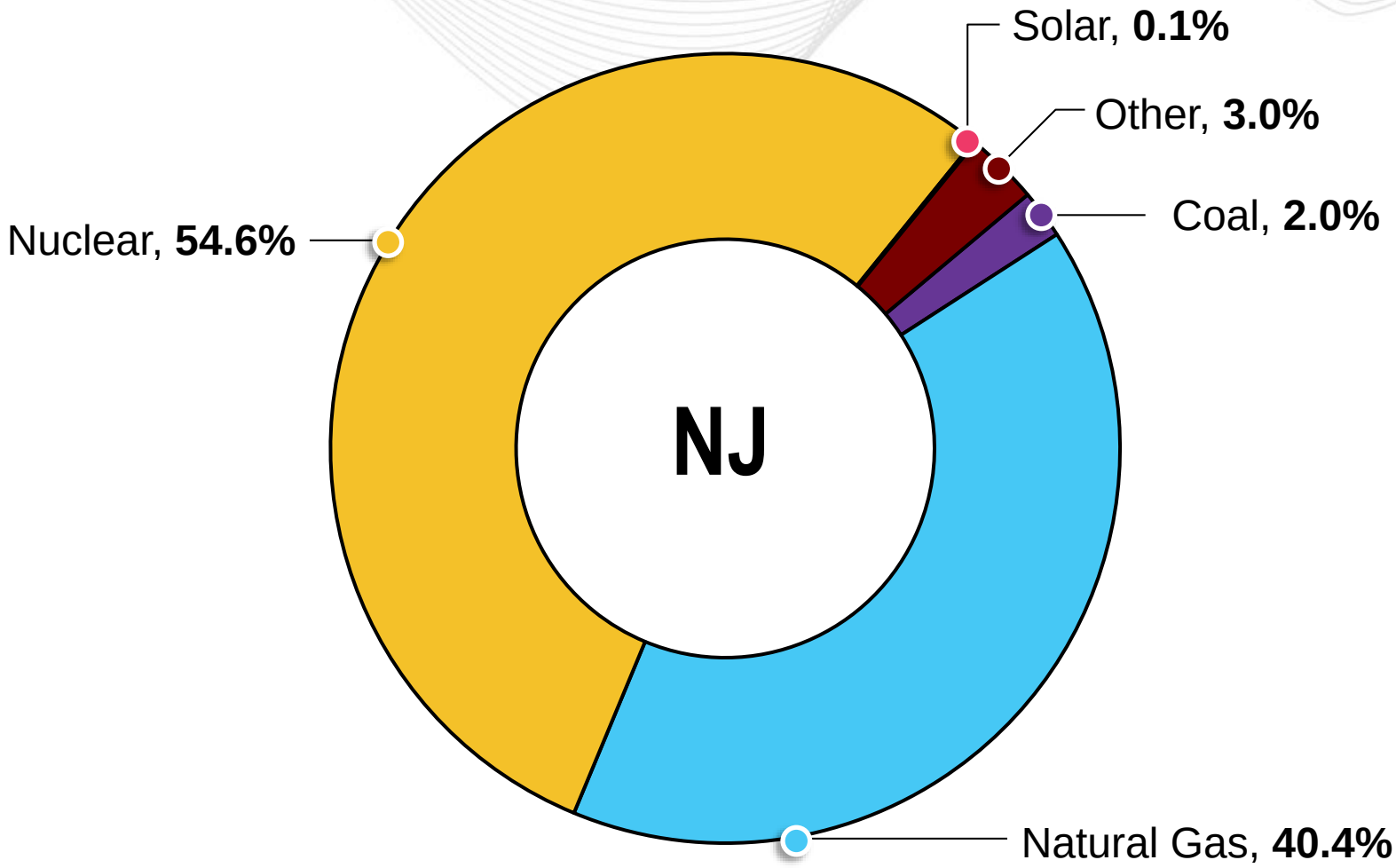
New Jersey – Net Energy Import/Export Trend

(Jan. 2021 – Dec. 2021)

Positive values represent exports and negative values represent imports.

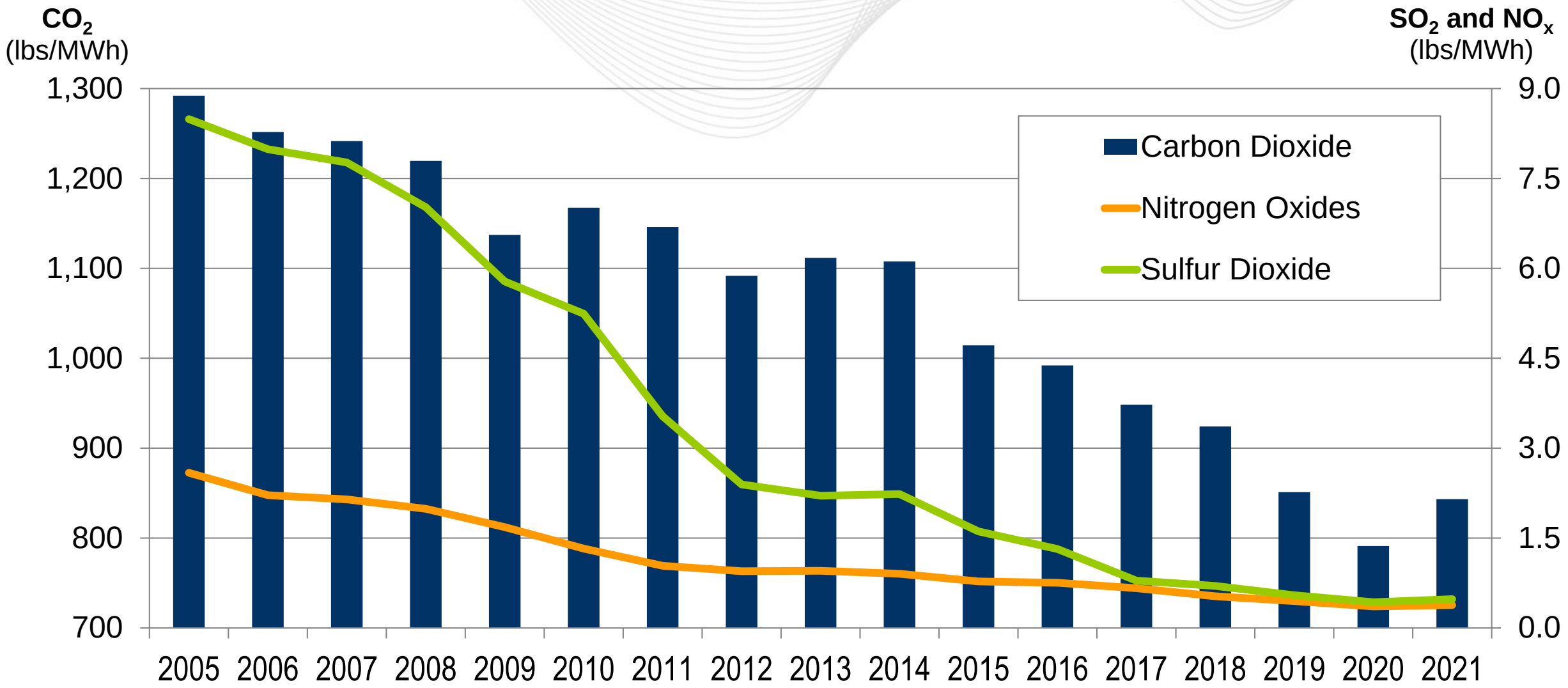
Operations

New Jersey – 2021 Generator Production



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

2005 – 2021 PJM Average Emissions



New Jersey – Average Emissions (lbs/MWh)

(Feb. 2022)