



# 2019 New Jersey State Infrastructure Report

(January 1, 2019 – December 31, 2019)

May 2020  
(updated July 2020)

## 1. Planning

- Generation Portfolio Analysis
- Transmission Analysis
- Load Forecast

## 2. Markets

- Market Analysis

## 3. Operations

- Emissions Data

- **Existing Capacity:** Natural gas represents approximately 66.8 percent of the total installed capacity in the New Jersey service territory while nuclear represents approximately 23.6 percent. This differs from PJM where natural gas and nuclear are at 42.4 and 17.7 percent of total capacity.
- **Interconnection Requests:** Natural gas represents 45.3 percent of new interconnection requests in New Jersey, while wind represents approximately 32.8 percent of new requests.
- **Deactivations:** 3,473.4 MW in New Jersey gave notification of deactivation in 2019. All capacity associated with these notifications subsequently withdrew their deactivation.
- **RTEP 2019:** New Jersey's 2019 RTEP projects total approximately \$741.9 million in investment. Approximately 76.4 percent of that represents supplemental projects. These investment figures only represent RTEP projects that cost at least \$5 million.

- **Load Forecast:** New Jersey's load is projected to increase between 0.5 and 1.1 percent annually over the next ten years. Comparatively, the overall PJM RTO projected load growth rate is 0.6 percent.
- **2022/23 Capacity Market:** No Base Residual Auction was conducted in 2019. For the most recent auction results, please see the 2018 New Jersey State Infrastructure Report.
- **1/1/19 – 12/31/19 Market Performance:** New Jersey's average hourly LMPs were generally below PJM average hourly LMPs.
- **Emissions:** 2019 average carbon dioxide emissions increased from 2018, while sulfur dioxide and nitrogen oxide emissions remained flat from 2018 levels.



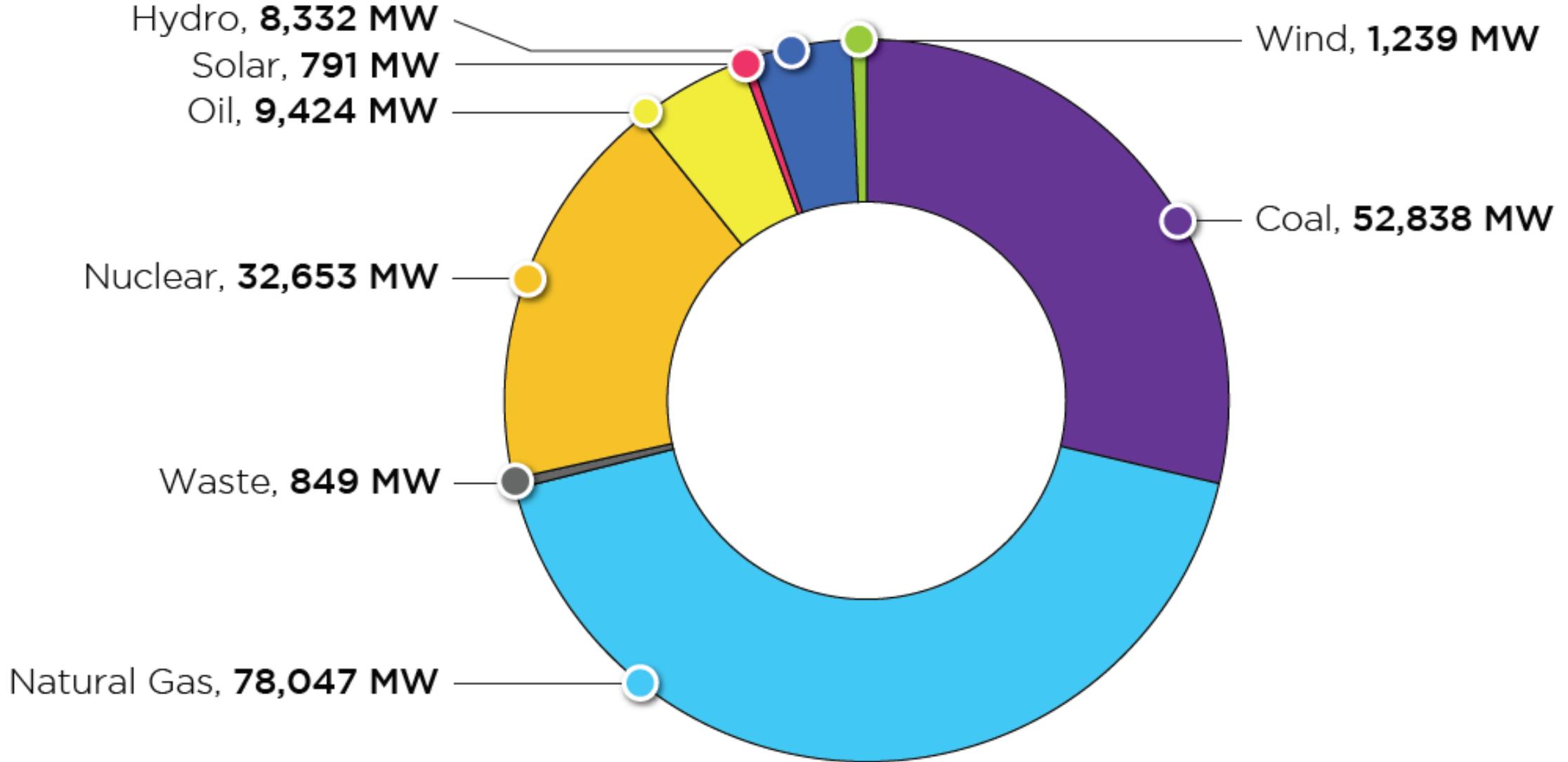
# Planning

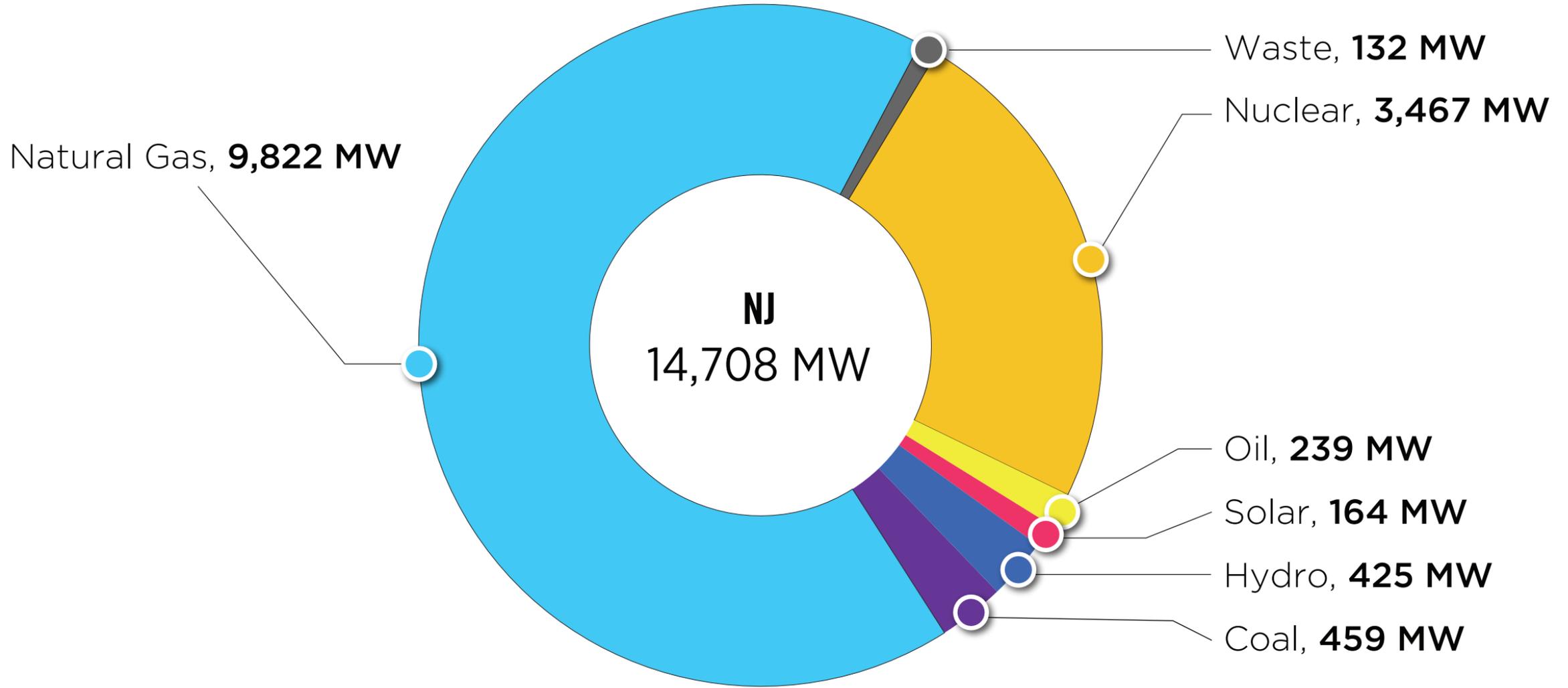
## Generation Portfolio Analysis



# PJM – Existing Installed Capacity

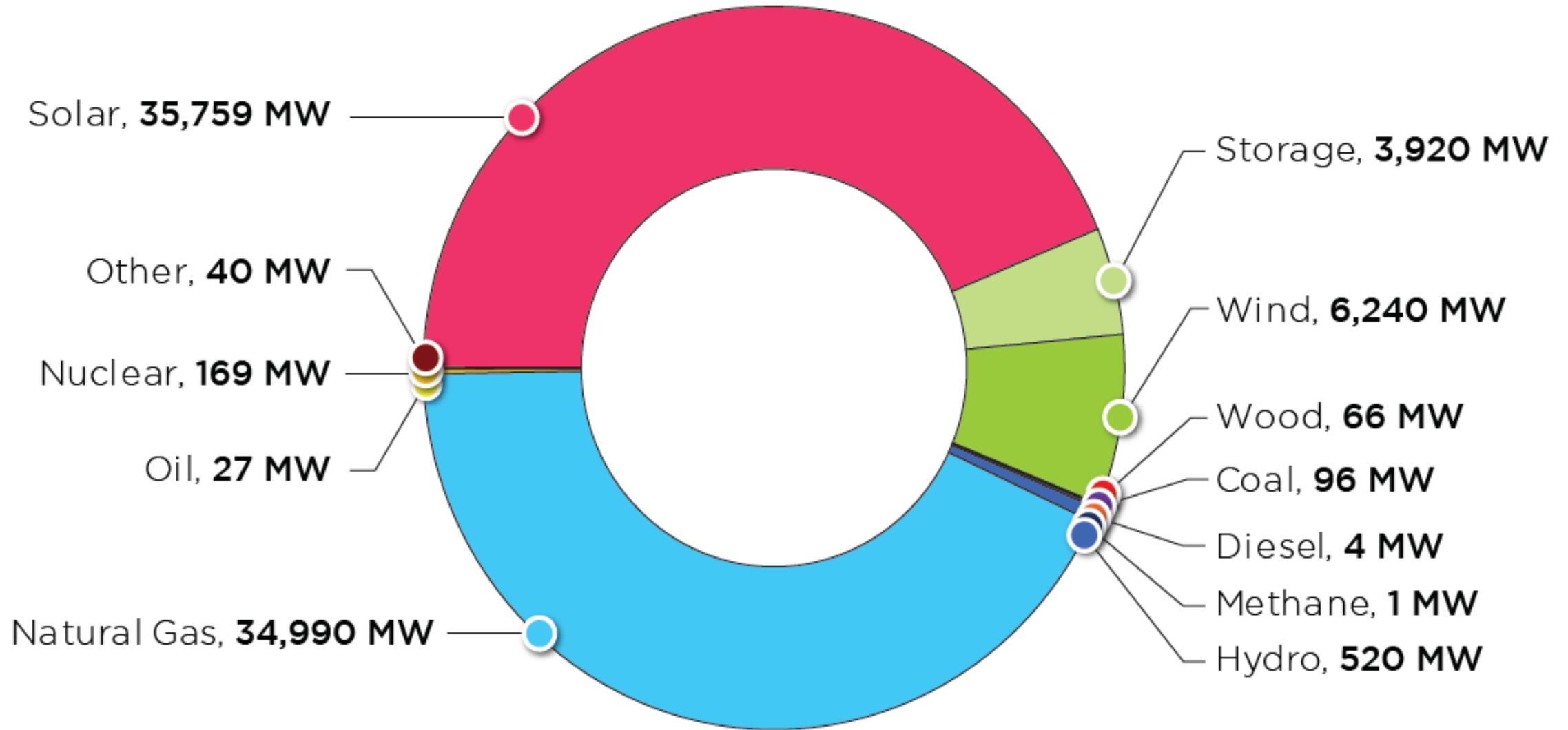
(CIRs – as of Dec. 31, 2019)





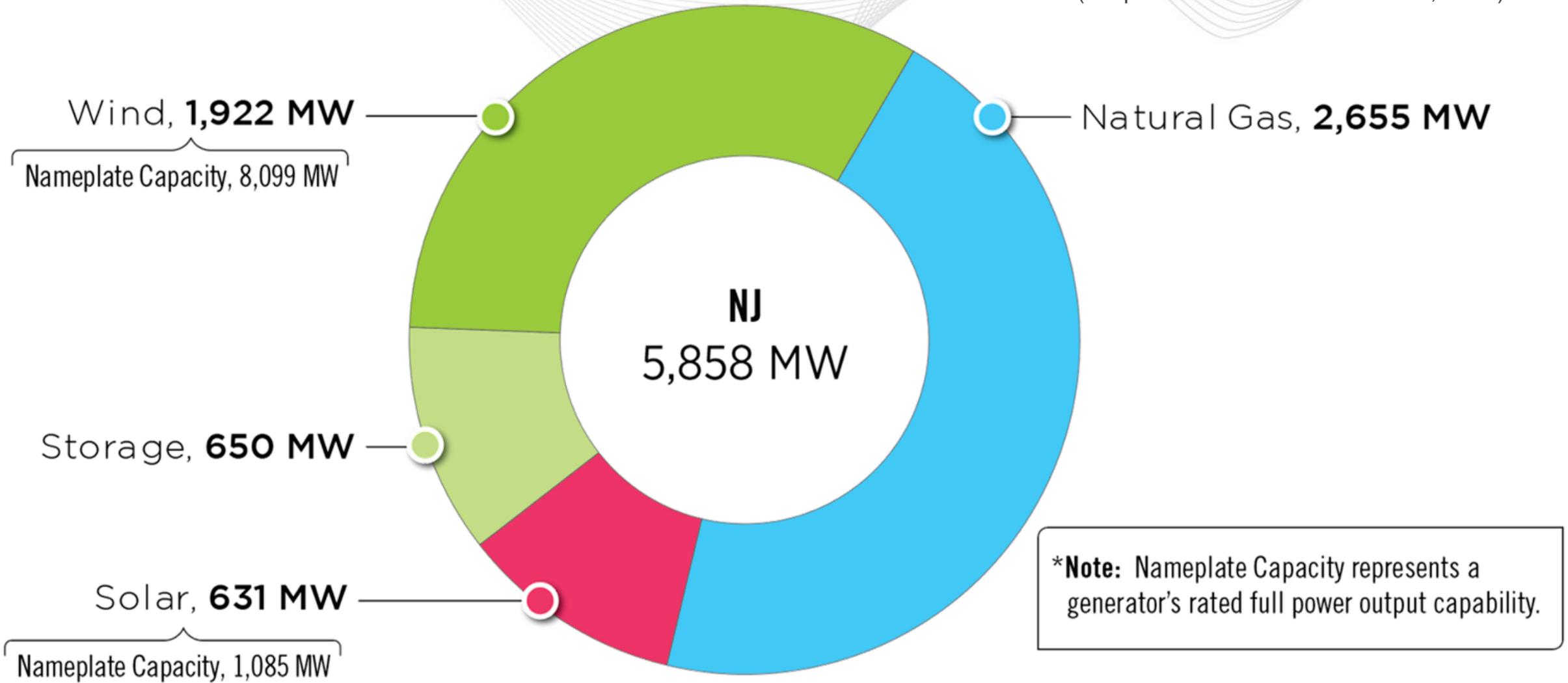
# PJM – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2019)



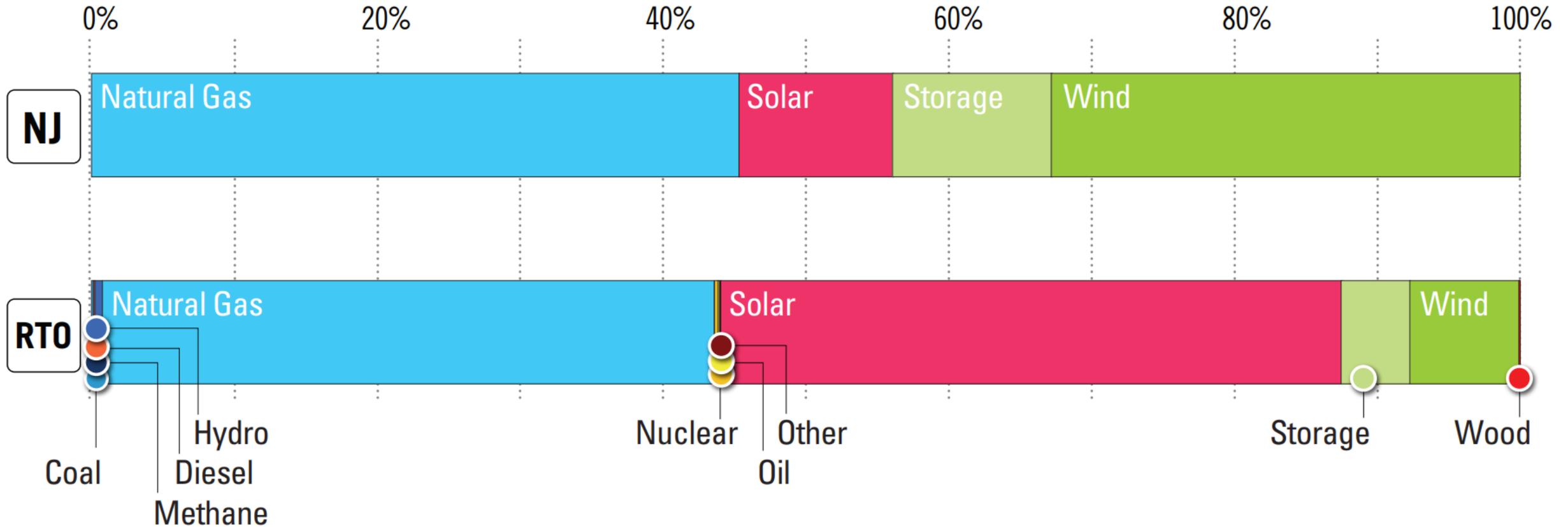
# New Jersey – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2019)



# New Jersey – Percentage of MW in Queue by Fuel Type

(Dec. 31, 2019)





# New Jersey – Interconnection Requests

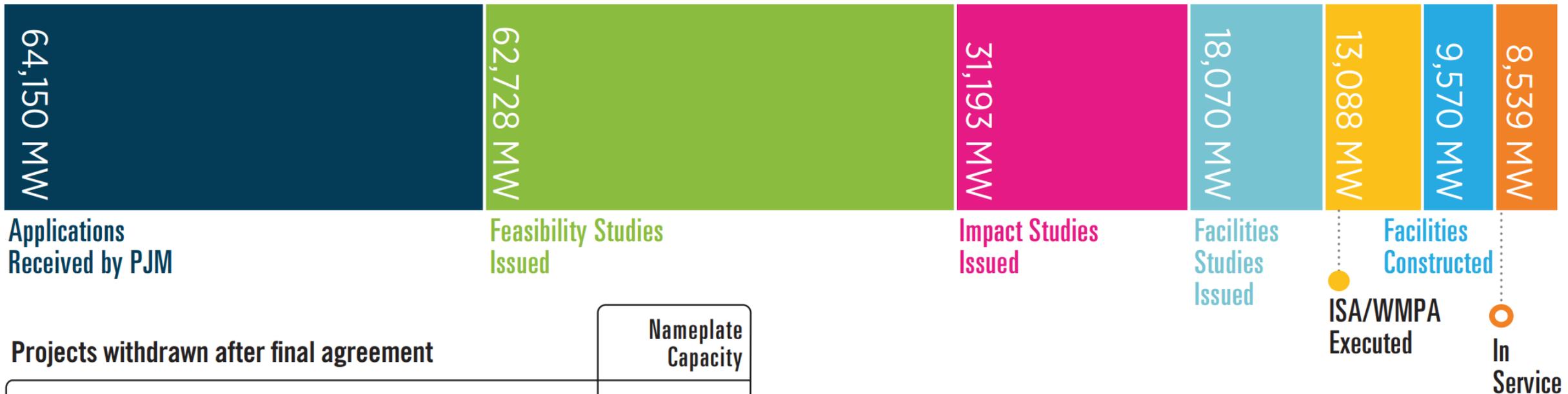
(Unforced Capacity – as of Dec. 31, 2019)

		In Queue						Complete				Grand Total	
		Active		Suspended		Under Construction		In Service		Withdrawn			
		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)
<b>Non-Renewable</b>	Coal	0	0.0	0	0.0	0	0.0	0	0.0	1	15.0	1	15.0
	Diesel	0	0.0	0	0.0	0	0.0	1	8.0	0	0.0	1	8.0
	Natural Gas	9	1,650.2	2	275.0	3	730.2	76	7,796.9	176	50,434.3	266	60,886.6
	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	6	45.5	6	45.5
	Storage	30	650.4	4	0.0	3	0.0	4	0.0	35	20.0	76	670.4
<b>Renewable</b>	Biomass	0	0.0	0	0.0	0	0.0	0	0.0	3	17.3	3	17.3
	Hydro	0	0.0	0	0.0	0	0.0	2	20.5	2	1,001.1	4	1,021.6
	Methane	0	0.0	0	0.0	0	0.0	16	45.3	9	40.6	25	85.9
	Solar	31	583.8	5	6.8	22	40.2	101	224.0	465	1,456.8	624	2,311.6
	Wind	13	1,922.4	0	0.0	0	0.0	1	0.0	19	605.0	33	2,527.4
<b>Grand Total</b>		<b>83</b>	<b>4,806.9</b>	<b>11</b>	<b>281.8</b>	<b>28</b>	<b>770.4</b>	<b>209</b>	<b>8,510.7</b>	<b>724</b>	<b>54,580.6</b>	<b>1,055</b>	<b>68,950.4</b>

**Note:** The "Under Construction" column includes both "Engineering and Procurement" and "Under Construction" project statuses.



# New Jersey – Progression History of Interconnection Requests



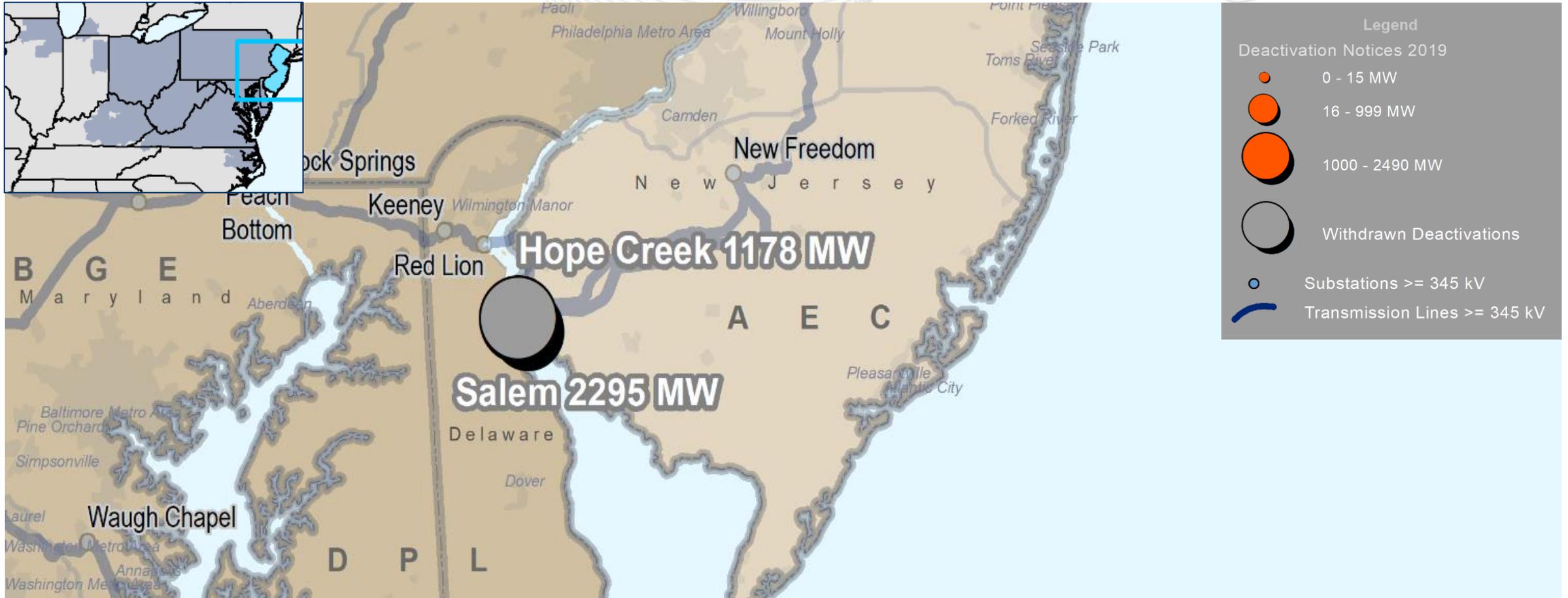
## Projects withdrawn after final agreement

		Nameplate Capacity
<b>19</b>	Interconnection Service Agreements	2,595 MW / 3,003 MW
<b>143</b>	Wholesale Market Participation Agreements	370 MW / 1,058 MW

Percentage of planned capacity and projects that have reached commercial operation	<b>13%</b>	<b>23%</b>
	Requested capacity megawatt	Requested projects

*This graphic shows the final state of generation submitted in all PJM queues that reached in-service operation, began construction, or was suspended or withdrawn as of Dec. 31, 2019.*

# New Jersey – Generation Deactivation Notifications Received in 2019





# New Jersey – Generation Deactivation Notifications Received in 2019

Unit	TO Zone	Fuel Type	Deactivation Notice	Projected/Actual Deactivation Date	Withdrawn Deactivation Date	Age (Years)	Capacity (MW)
Salem 2	PSEG	Nuclear	4/16/2019	4/1/2020	4/19/2019	38	1142.1
Salem 1	PSEG	Nuclear	4/16/2019	10/1/2020	4/19/2019	42	1153
Hope Creek 1	PSEG	Nuclear	4/16/2019	10/1/2019	4/19/2019	33	1178.3

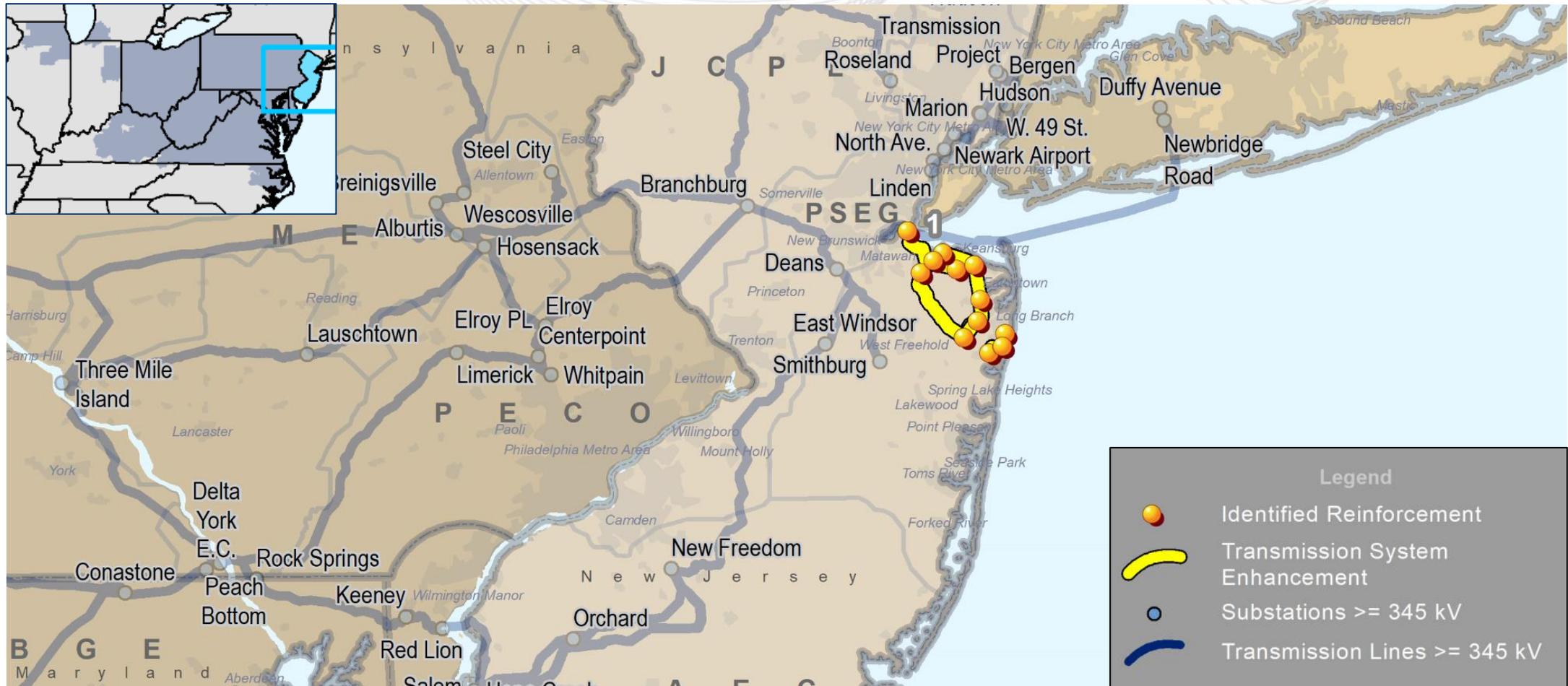
# Planning

## Transmission Infrastructure Analysis

Please note that PJM 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 included in this state report. However, only projects that are \$10 million and above are displayed on the project maps.

For a complete list of all RTEP projects, please visit the “RTEP Upgrades & Status – Transmission Construction Status” page on [pjm.com](https://www.pjm.com).

<https://www.pjm.com/planning/rtep-upgrades-status/construct-status.aspx>



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



# New Jersey – RTEP Baseline Projects

(Greater than \$5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
1	b3130	Construct seven new 34.5 kV circuits on existing pole lines (53.5 miles), rebuild two 34.5 kV circuits (total of 5.5 miles) and install a second 115/34.5 kV transformer.	6/1/2016	\$175.0	JCP&L	8/3/2019
		Construct a new 34.5 kV circuit from Oceanview to Allenhurst 34.5 kV (4.0 miles).				
		Construct a new 34.5 kV circuit from Atlantic to Red Bank 34.5 kV (12.0 miles).				
		Construct a new 34.5 kV circuit from Freneau to Taylor Lane 34.5 kV (6.5 miles).				
		Construct a new 34.5 kV circuit from Keyport to Belford 34.5 kV (6.0 miles).				
		Construct a new 34.5 kV circuit from Red Bank to Belford 34.5 kV (5.0 miles).				
		Construct a new 34.5 kV circuit from Werner to Clark Street (7.0 miles).				
		Construct a new 34.5 kV circuit from Atlantic to Freneau (13.0 miles).				
		Rebuild the Atlantic-Camp Woods Switch Point (3.5 miles) 34.5 kV circuit.				
		Rebuild/re-conductor the Allenhurst-Elberon (2.0 miles) 34.5 kV circuit.				
		Install second 115/34.5 kV Transformer at Werner Substation.				

New Jersey had no network project upgrades in 2019.

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

(Greater than \$5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
1	s1823	Build a new Walnut Avenue 69 kV substation. Eliminate Clark substation. Transfer load from nearby heavily loaded Aldene, Warinanco and Westfield substation to the new station.	4/30/2023	\$143.0	PSEG	1/25/2019
		Purchase property to accommodate new construction of Walnut Ave 69 kV substation.	5/30/2023			
		Install a 69 kV bus with two 69/13 kV transformers at Walnut Avenww.				
		Construct a new 69 kV circuit between Vauxhall and the new Walnut Avenue station.				
		Loop the Front Street to Springfield Road 69 kV circuit into Walnut Avenue station.				
2	s1824	Build new 69 kV substation in North Brunswick. Transfer load from nearby heavily loaded Adams, Bennetts Lane and Brunswick to the new station.	4/30/2023	\$129.0	PSEG	1/25/2019
		Purchase property to accommodate construction of the new 69 kV substation in North Brunswick.	3/30/2023			
		Install a 69 kV breaker-and-a-half bus with two 69/13 kV transformers at North Brunswick.				
		Loop the Bennetts Lane Brunswick 69 kV circuit into the new North Brunswick station.				
		Construct a new 69 kV circuit between the new North Brunswick station and the customer substation.				



# New Jersey – TO Supplemental Projects

(Greater than \$5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
3	s1825	Build a new 69 kV substation at Texas Avenue and transfer load from nearby heavily loaded Lawrence to the new station.	4/30/2023	\$71.0	PSEG	1/25/2019
		Purchase neighboring property to accommodate construction of the new Texas Avenue 69 kV substation.				
		Install a 69 kV bus with two 69/13 kV transformers at the New Texas Ave 69 kV Substation.				
		Loop the Ewing Hamilton 69 kV circuit into the new Texas Avenue station.				
		Construct a new 69 kV circuit between Lawrence and the new Texas Avenue station.				
4	s1831	Build a new 230 kV substation in Mansfield: Install a 230 kV bus with two 230/13 kV transformers, cut and loop the Bustleton-Crosswicks 230 kV line into the 230 kV bus, Transfer load from nearby heavily loaded Bustleton and Crosswicks to the new station.	12/1/2023	\$43.0	PSEG	2/22/2019
5	s2069	Rebuild 69 kV line from Moss Mill-Motts Farm substations. All structures, conductor and static wire will be replaced with new steel poles, conductor and OPGW.	5/31/2022	\$27.4	AE	1/25/2019
6	s2070	Rebuild 69 kV line from Churchtown-Paulsboro substations. All structures, conductor and static wire will be replaced with new steel poles, conductor and optical grounding wire communications.	12/31/2023	\$25.0	AE	1/25/2019



# New Jersey – TO Supplemental Projects

(Greater than \$5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
7	s2071	Rebuild 69 kV line from Mickleton-Valero-Paulsboro substations. All structures, conductor and static wire will be replaced with new steel poles, conductor and optical grounding wire communication.	12/31/2023	\$10.0	AE	1/25/2019
8	s2077	Construct a new Echelon 230 kV bus by tapping the existing New Freedom-Marlton 230 kV circuit and install two 230/13 kV transformers at the Echelon substation.	6/1/2024	\$39.0	PSEG	10/21/2019
9	s1806	Windsor and East Windsor related upgrade (JCPL-2018-001).	12/31/2020	\$32.4	JCP&L	11/28/2018
		East Windsor-Windsor 230 kV: Convert 2.6 miles 1590 ACSR six-wire circuit to two three-wire circuits.				
		Expand Windsor 230 kV bus to an eight breaker-and-a-half 230 kV station.				
		Install four new 34.5 kV breakers and one new 230-34.5 kV transformer at Windsor.				
		East Windsor Substation – Install one new 230 kV breaker.				
10	s1807	Pequest River 115 kV ring bus.	6/1/2020	\$17.5	JCP&L	11/28/2018
		Expand Pequest River substation to a five breaker 115 kV ring bus.				
		Loop in the Gilbert-Pequest River-Flanders (S919) 115 kV line into the 115 kV ring bus.				



# New Jersey – TO Supplemental Projects

(Greater than \$5 million)

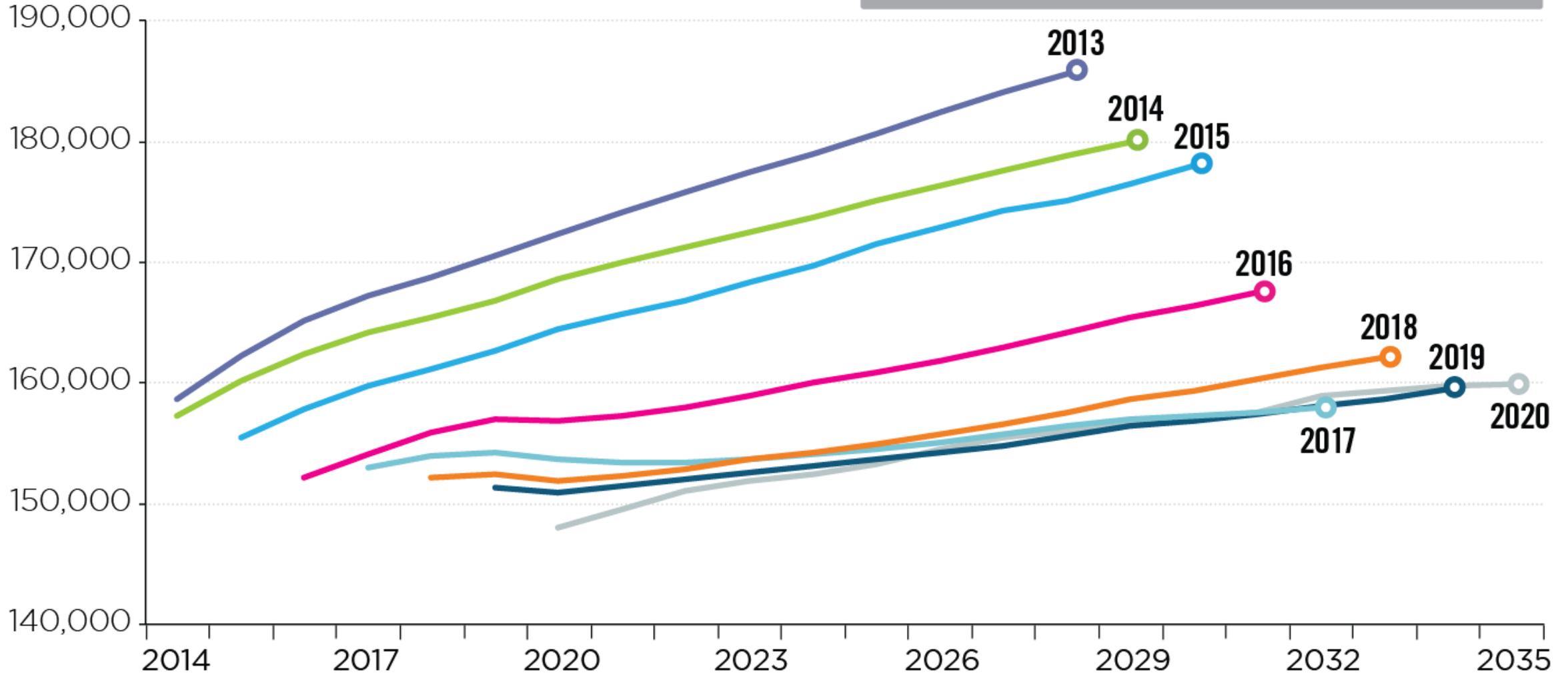
Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
11	s1809	Morristown 230 & 34.5 kV Substation Reconfiguration.	6/1/2021	\$22.6	JCP&L	11/28/2018
		Construct a four breaker 230 kV ring bus at Morristown.				
		Construct a 34.5 kV breaker-and-a-half station with 18 breakers at Morristown.				
		Replace the Morristown No. 5 and No. 6 230-34.5 kV with 230-34.5 kV 168 MVA transformers.				
		Replace all overdutied breakers at Whippany 230 kV and 34 kV substations.				
	s2099	Reconfigure the existing Newport 69/12 kV substation to a Ring Bus and add 2nd 69/12 kV transformer.	5/31/2023	\$7.0	AE	1/25/2019

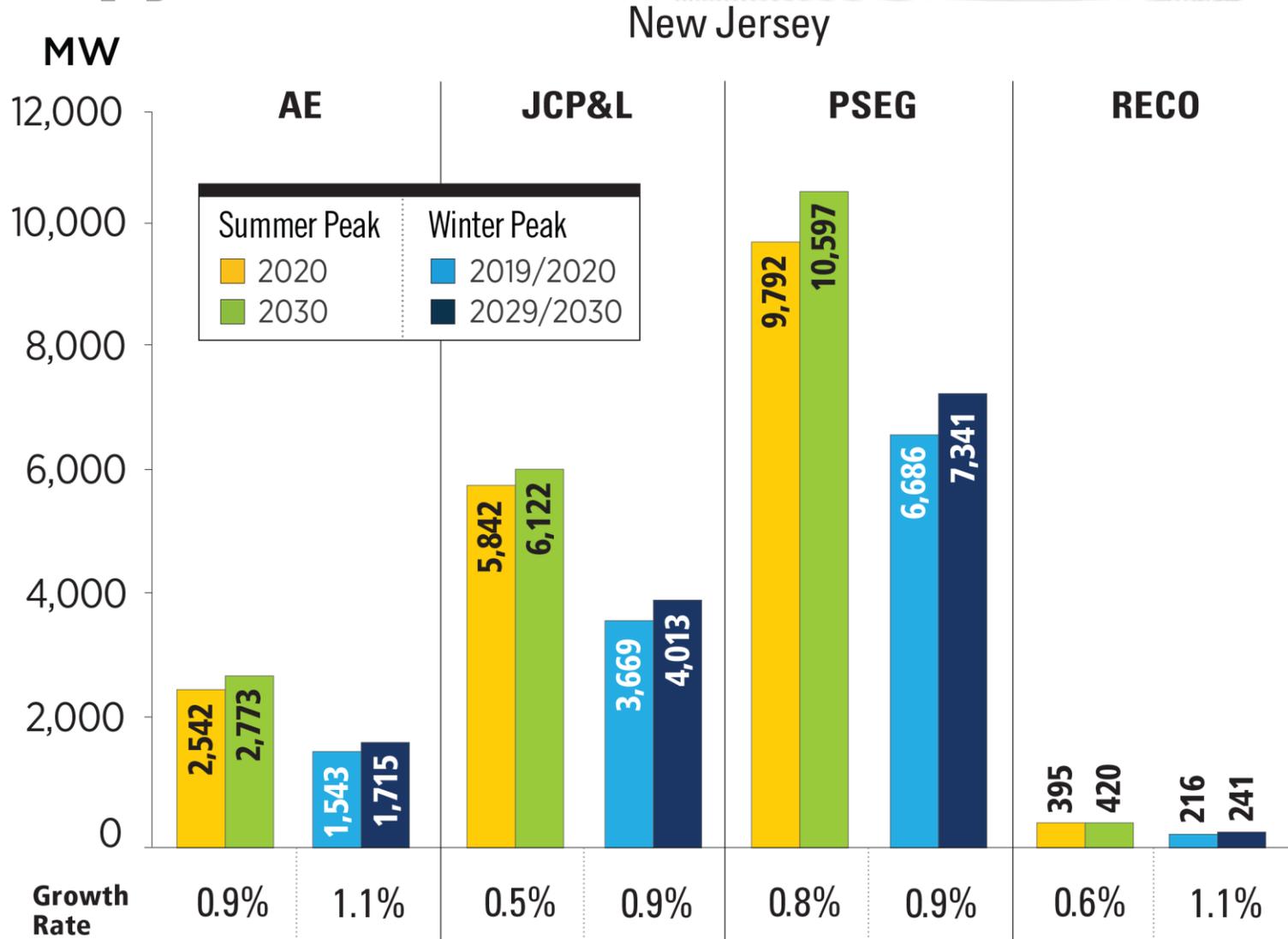
# Planning

## Load Forecast

## PJM RTO Summer Peak Demand Forecast

Load (MW)





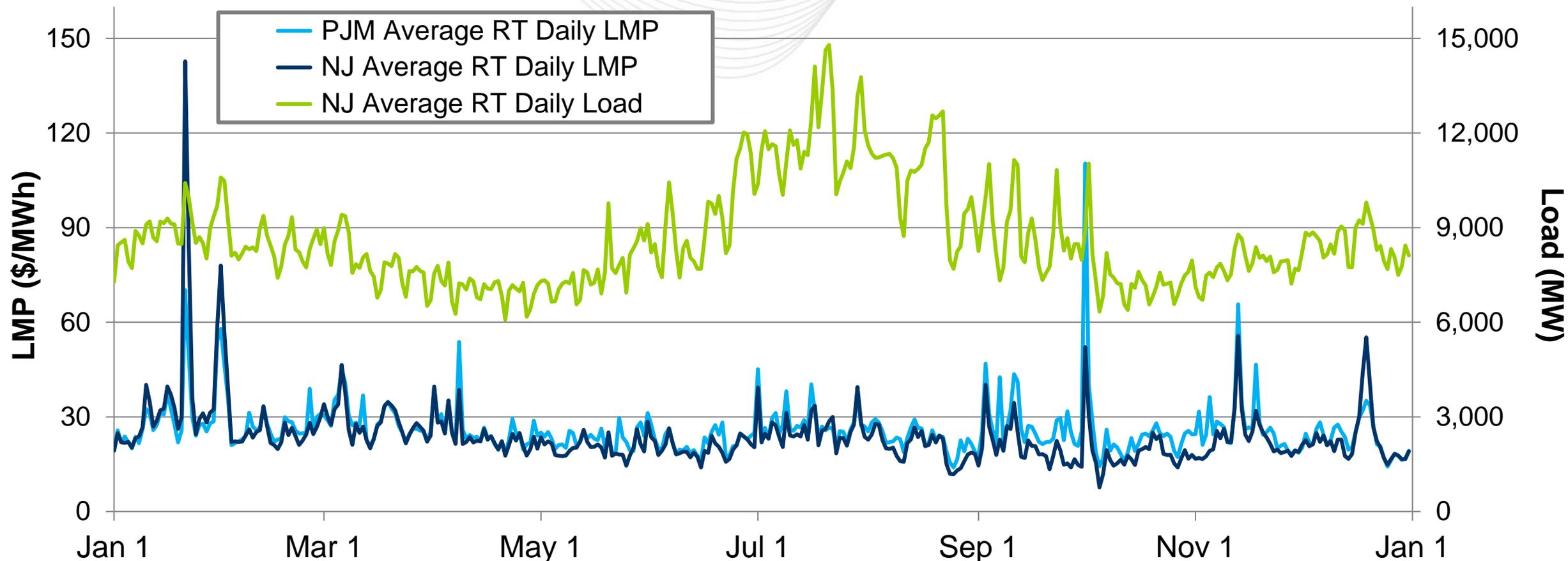
PJM RTO Summer Peak		PJM RTO Winter Peak	
2020	2030	2019/2020	2029/2030
148,092 MW	157,132 MW	131,287 MW	139,970 MW
Growth Rate 0.6%		Growth Rate 0.6%	

The summer and winter peak megawatt values reflect the amount of forecasted load to be served by each transmission owner in the noted state. 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.

The Load Forecast was produced prior to COVID-19 and will be updated before the next Base Residual Auction to reflect changes in load patterns.

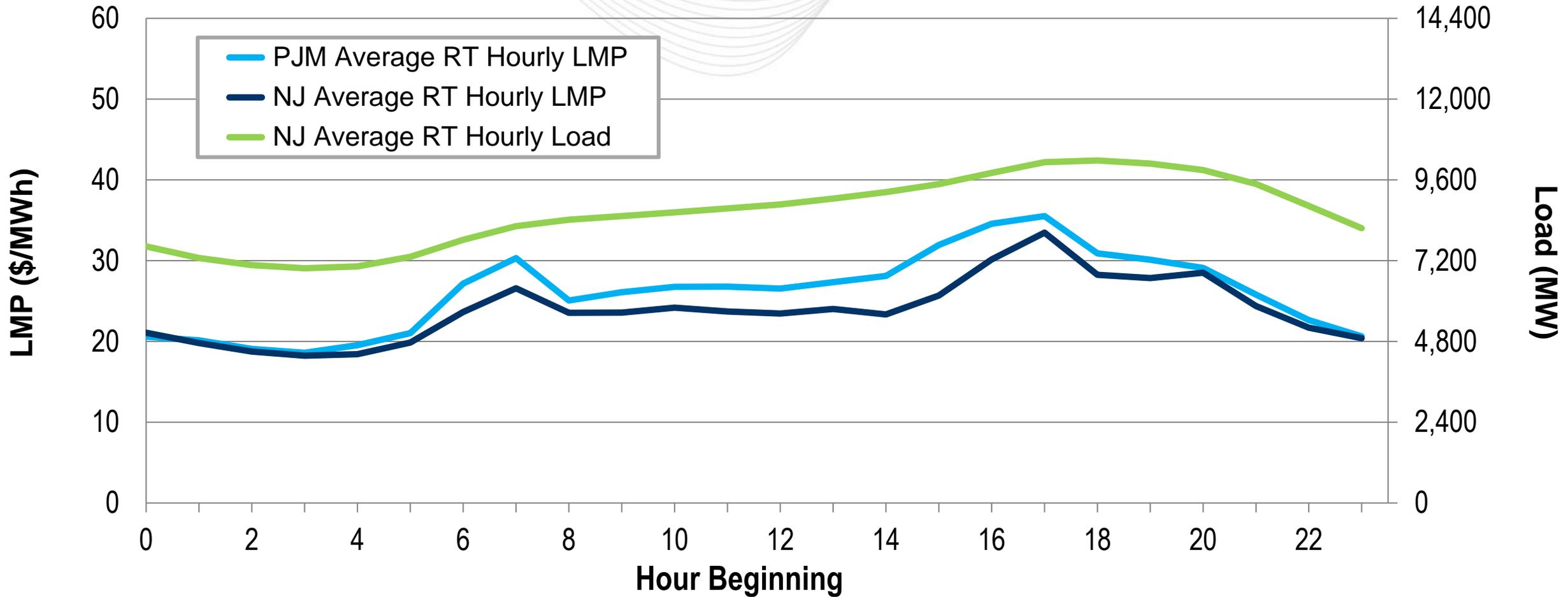
# Markets

## Market Analysis



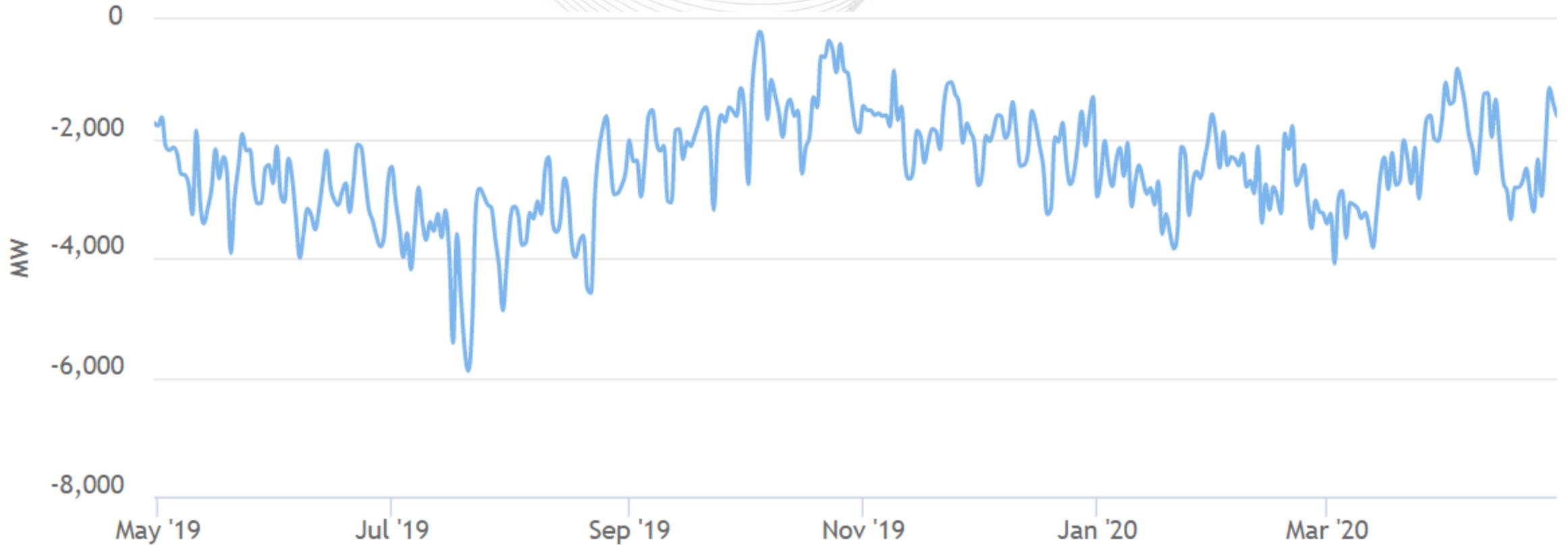
**Note:** The price spike in late January reflects severe cold weather across the RTO footprint that impacted outage rates and cumulative demand. The spike in October reflects the Performance Assessment Interval event that occurred on October 2nd.

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



# New Jersey – Net Energy Import/Export Trend

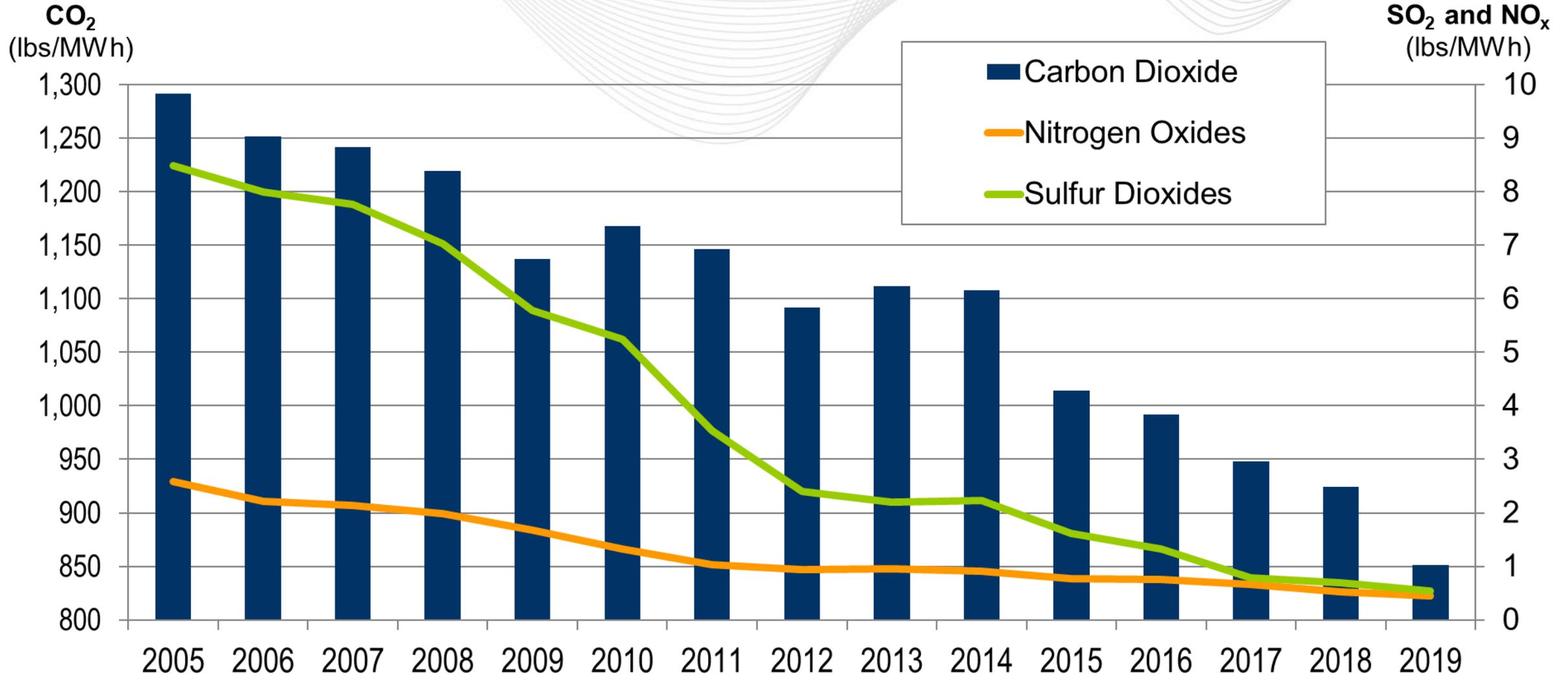
(May 2019 – April 2020)



Positive values represent exports and negative values represent imports.

# Operations Emissions Data

# 2005 – 2019 PJM Average Emissions





# New Jersey – Average Emissions (lbs/MWh)

(Feb. 7, 2020)

**CO<sub>2</sub>**  
(lbs/MWh)

**SO<sub>2</sub> and NO<sub>x</sub>**  
(lbs/MWh)

