New Jersey State Report

July 2017

Table of Contents

Executive Summary

(July 2017)

- **Existing Capacity:** Natural gas represents approximately 58 percent of the total installed capacity in New Jersey while coal represents approximately 11 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 97 percent of new interconnection requests in New Jersey.
- **Deactivations**: Approximately 10 MW of capacity in New Jersey retired in 2016. This represents less than 3 percent of the 392 MW that retired RTO-wide in 2016. 1,600 MW announced retirement to occur 2017. 1,200 MW retired on June 1, 2017.
- **RTEP 2016:** New Jersey RTEP 2016 projects total more than $63 M of investment. Approximately 78 percent of that represents supplemental projects.
- **Load Forecast:** New Jersey load growth is nearly flat, averaging between - 0.4 and 0.3 percent per year over the next 10 years. This aligns with PJM RTO load growth projections.

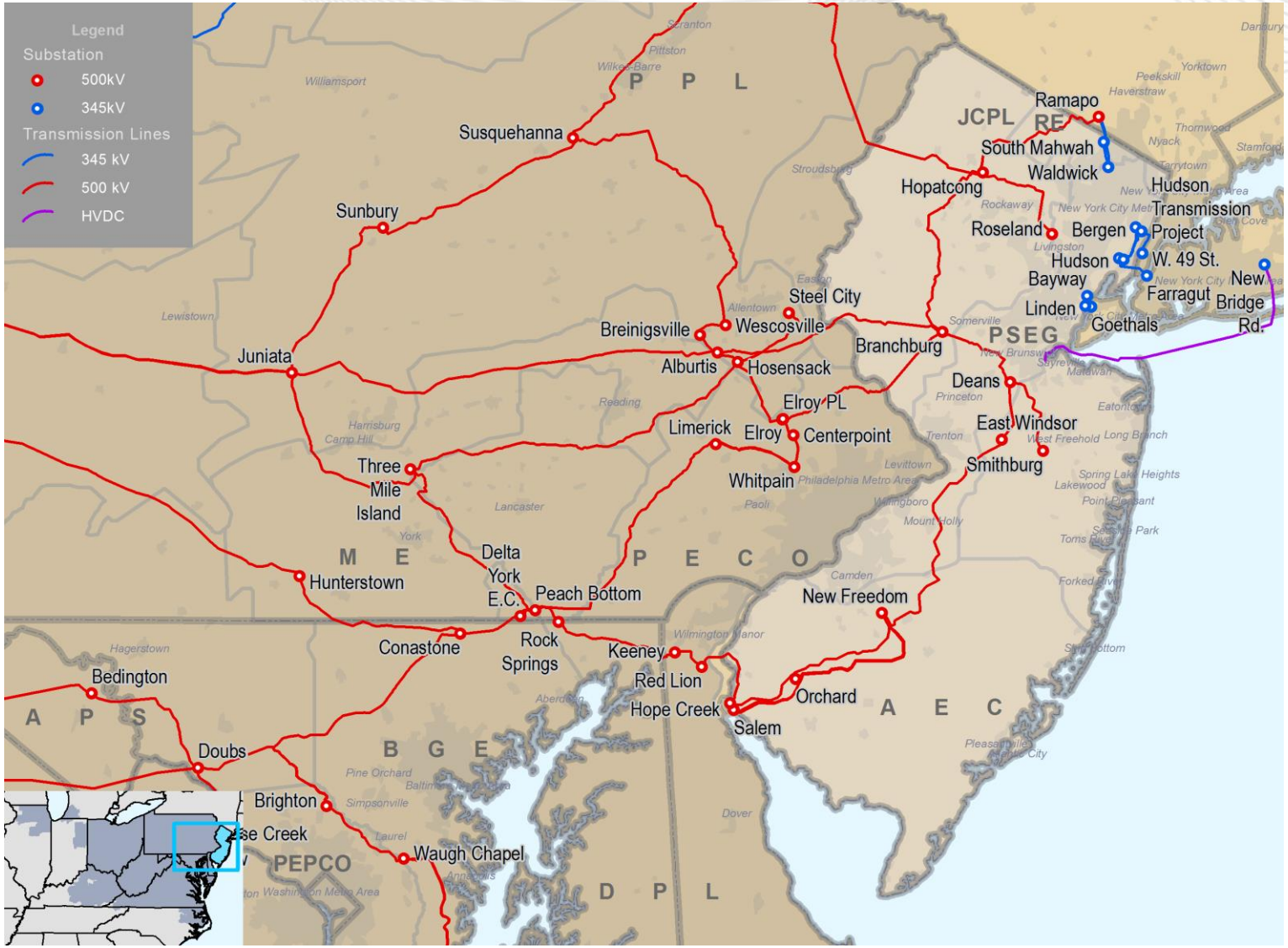
Executive Summary

(July 2017)

- **2020/21 Capacity Market:** Compared to the PJM footprint, New Jersey's distribution of generation, demand response and energy efficiency is similar.
- **6/1/14 – 5/31/17 Performance:** New Jersey's average daily locational marginal prices were consistently at or below PJM average daily LMPs. Nuclear resources represented 41 percent of generation produced in New Jersey while natural gas averaged 29 percent.
- **Emissions:** 2016 carbon dioxide and sulfur dioxide emissions are slightly up from 2015; nitrogen oxides continue to hold flat from 2015.

PJM Service Area - New Jersey

(December 31, 2016)



PJM operates and plans the bulk electric system in New Jersey, including facilities owned and operated by Atlantic City Electric Co., Jersey Central Power & Light, Linden Variable Frequency Transformer (VFT), Neptune Regional Transmission System, Public Service Electric & Gas Co.

Planning

Generation Portfolio Analysis

New Jersey – Existing Installed Capacity

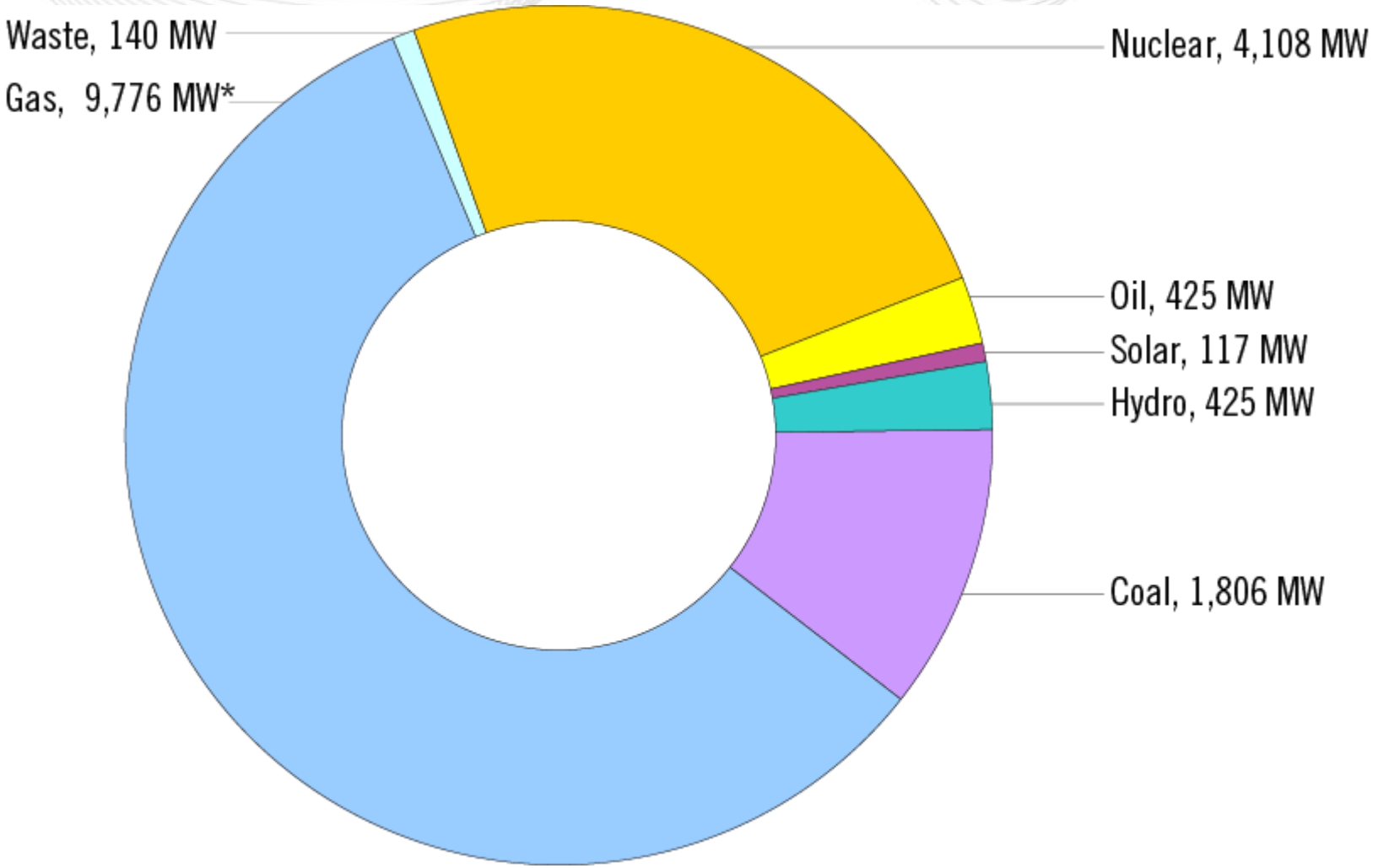
(Capacity Rights, December 31, 2016)

Summary:

Natural gas represents approximately 58 percent of the total installed capacity in New Jersey while coal represents approximately 11 percent.

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

* Gas Contains	
Natural Gas	9,731 MW
Other Gas	44 MW

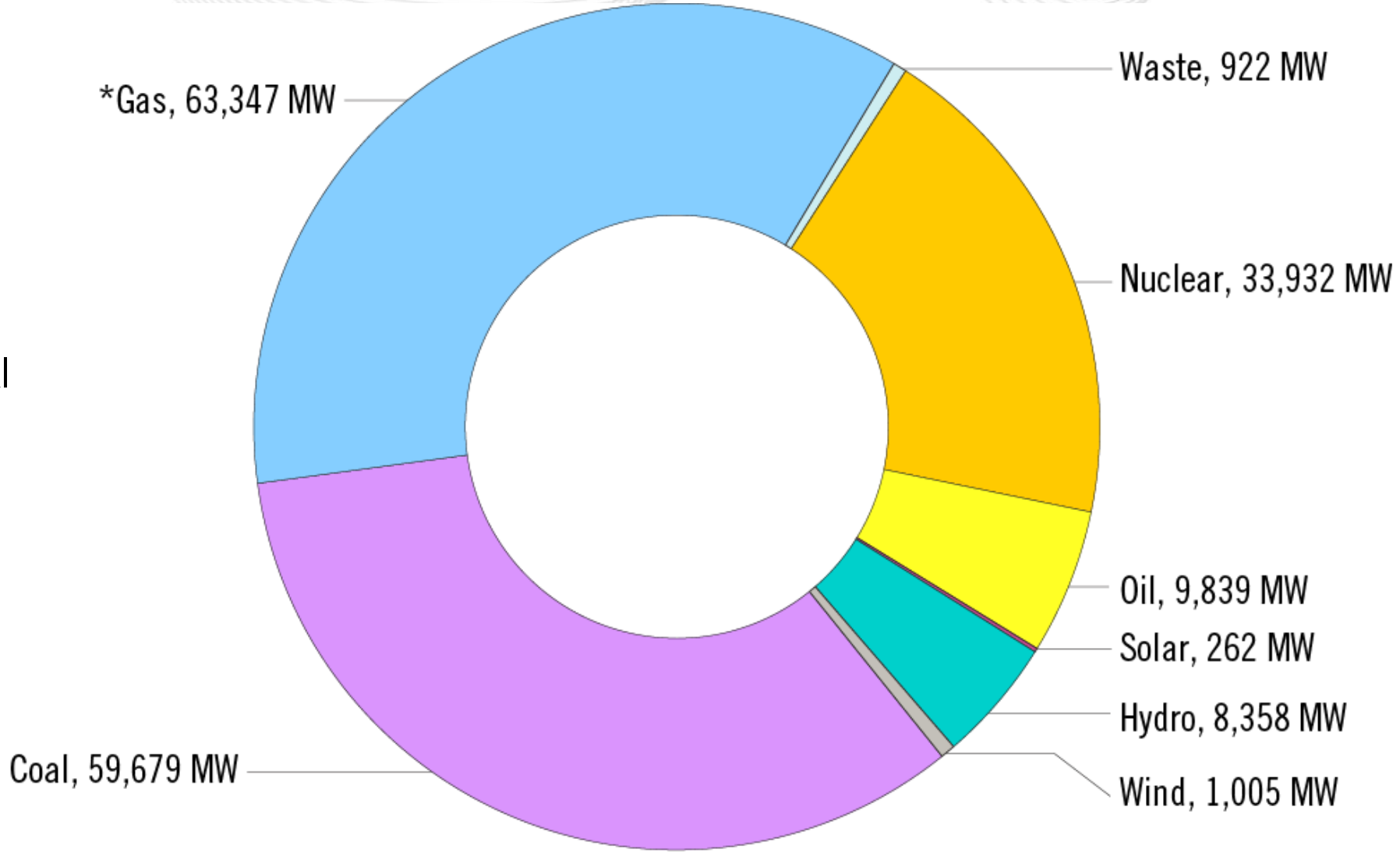


PJM – Existing Installed Capacity

(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



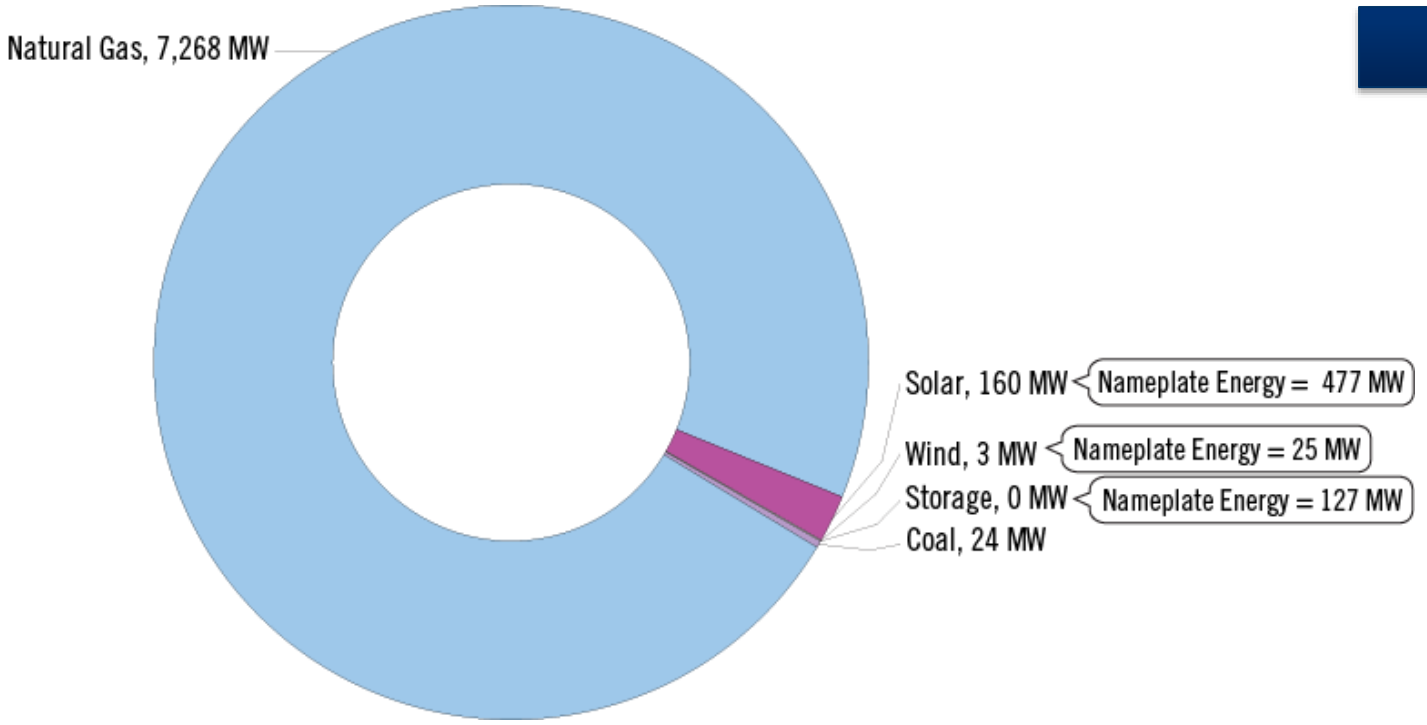
New Jersey – Interconnection Requests

(Requested Capacity Rights, December 31, 2016)

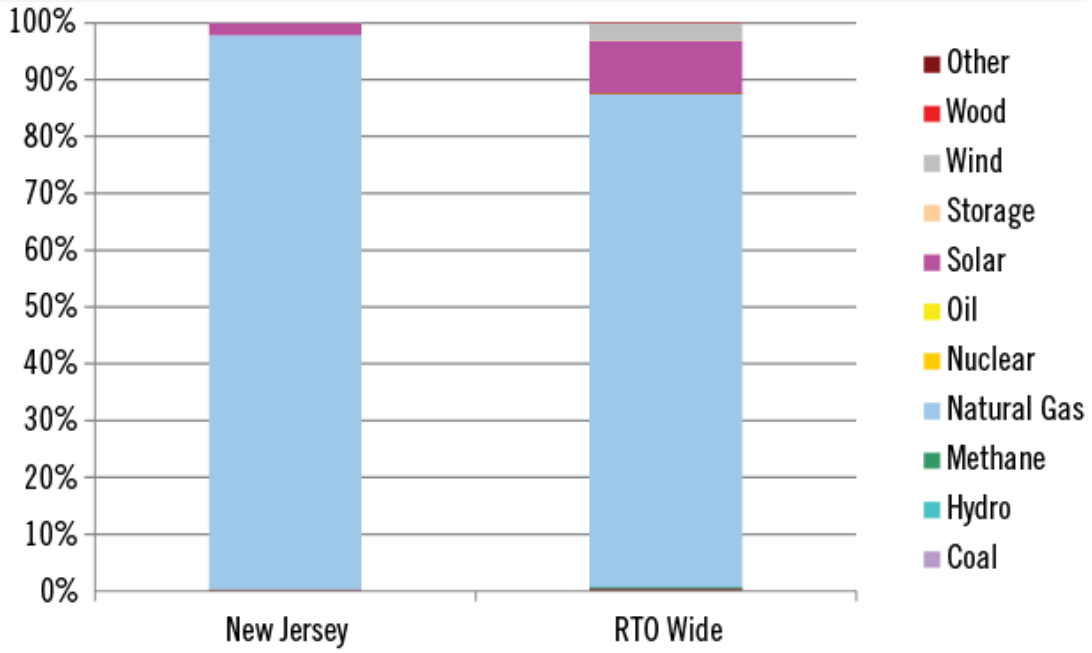
Natural gas represents more than 97 percent of new interconnection requests in New Jersey.

	MW	# of projects
Active	4,842	52
Under Construction	1,354	43
Suspended	1,259	20
Total	**7,455**	**115**

Total MW Capacity by Fuel Type



Fuel as a Percentage of Projects in Queue



NJ – 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									10.0	1	10.0	1
Coal							24.0	1	15.0	1	39.0	2
Diesel			0.0	1							0.0	1
Hydro			20.5	2					1,001.1	2	1,021.6	4
Methane			45.3	16					40.6	9	85.9	25
Natural Gas	4,787.5	17	6,993.0	63	1,246.0	4	1,234.0	13	45,167.0	138	59,427.5	235
Nuclear			381.0	6							381.0	6
Oil			35.0	2					945.0	8	980.0	10
Solar	54.0	25	163.5	81	10.1	7	95.7	27	1,214.2	364	1,537.5	504
Storage	0.0	10	0.0	2	0.0	7	0.0	2	20.0	25	20.0	46
Other									45.5	7	45.5	7
Wind			0.0	1	3.3	2			601.7	17	605.0	20
Total	**4,841.5**	**52**	**7,638.3**	**174**	**1,259.3**	**20**	**1,353.7**	**43**	**49,060.2**	**572**	**64,153.0**	**861**

New Jersey – Progression History Interconnection Requests (Requested Capacity Rights, 1999 - 2016)

Following Final Agreement execution, 1,302 MW of capacity withdrew from PJM's interconnection process. Another 2,574 MW have executed agreements but were not in service as of December 31, 2016. Overall, 13 percent of requested capacity MW reaches commercial operation.

New Jersey – 2016 Generation Deactivations

(Capacity, As of December 31, 2016)

Unit	MW Capacity	TO Zone	Age	Actual Deactivation Date
Columbia Dam Hydro (Columbia NJ)	0.5	JCPL	undetermined	10/3/2016
Warren County Landfill	1.5	JCPL	10	6/1/2016
BL England Diesel(s) {IC1, IC2, IC3, IC4}	8.0	AE	51	5/31/2016

Summary:

- Three generating units in NJ deactivated in 2016
- 11 generating units totaling 392 MW of capacity deactivated in PJM in 2016

New Jersey – 2016 Announced Generation Deactivations

(Capacity, As of December 31, 2016)

Unit	MW Capacity	TO Zone	Age	Projected Deactivation Date
B.L. England 2	155	AE	52	*4/30/2017
B.L. England 3	148.9	AE	42	*4/30/2017
Hudson 2	617.9	PSEG	47	6/1/2017
Mercer 1	321	PSEG	55	6/1/2017
Mercer 2	320.3	PSEG	55	6/1/2017

Note: There are additional generators in NJ slated to deactivate in future years – see deactivation maps

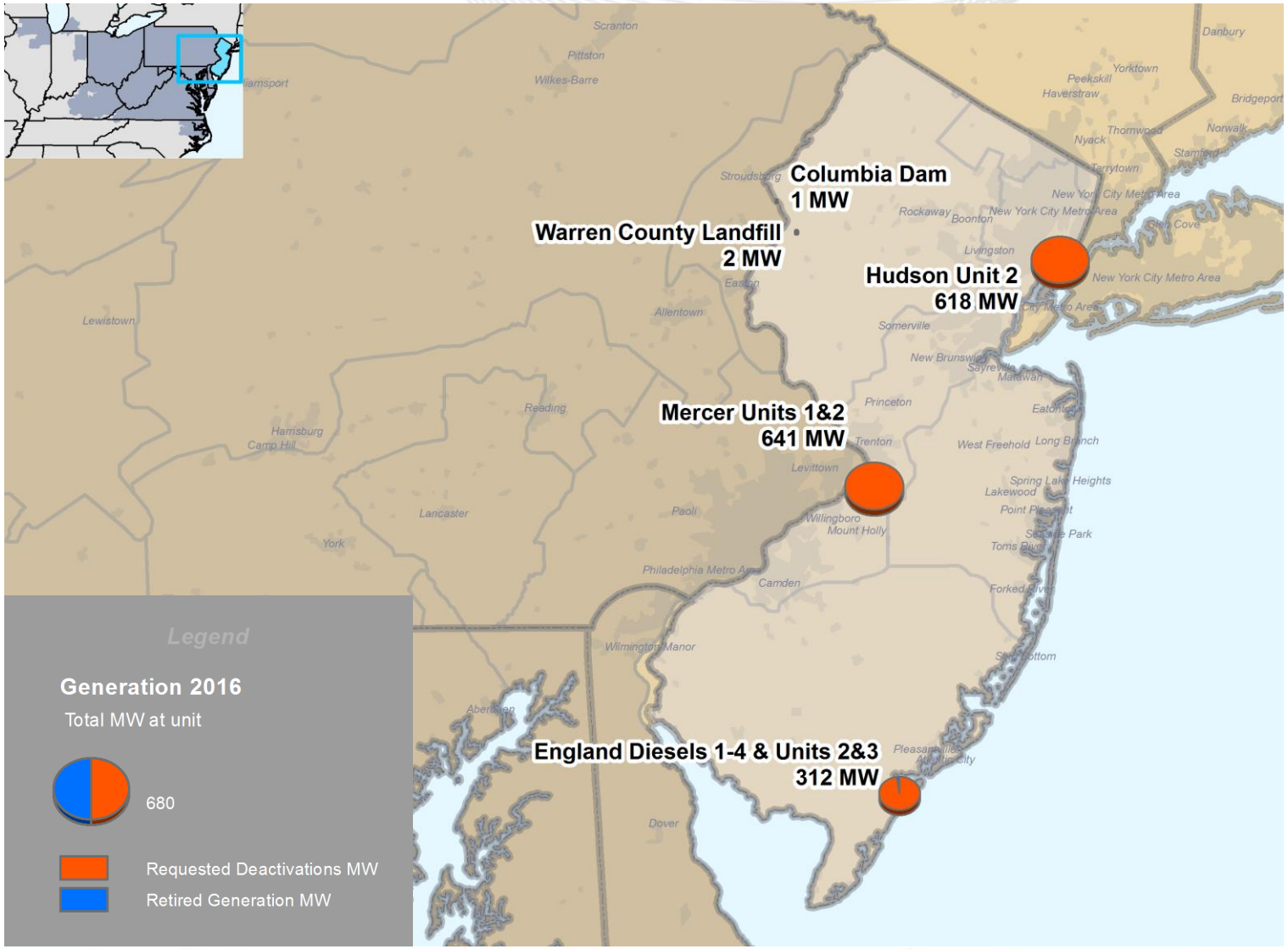
***B.L. England** notified PJM of its intent to deactivate effective 4/30/2017 but due to reliability reason both B.L. England units will continue to operate under an RMR arrangement until the required upgrades are completed

Summary:

- In 2016 five generating units in NJ announced their intention to deactivate, all in 2017.
- In 2016 there were a total of 23 PJM generating units that announced their intent to deactivate, ranging in date from 2016 - 2020.

New Jersey – 2016 Actual and Announced Generation Deactivations

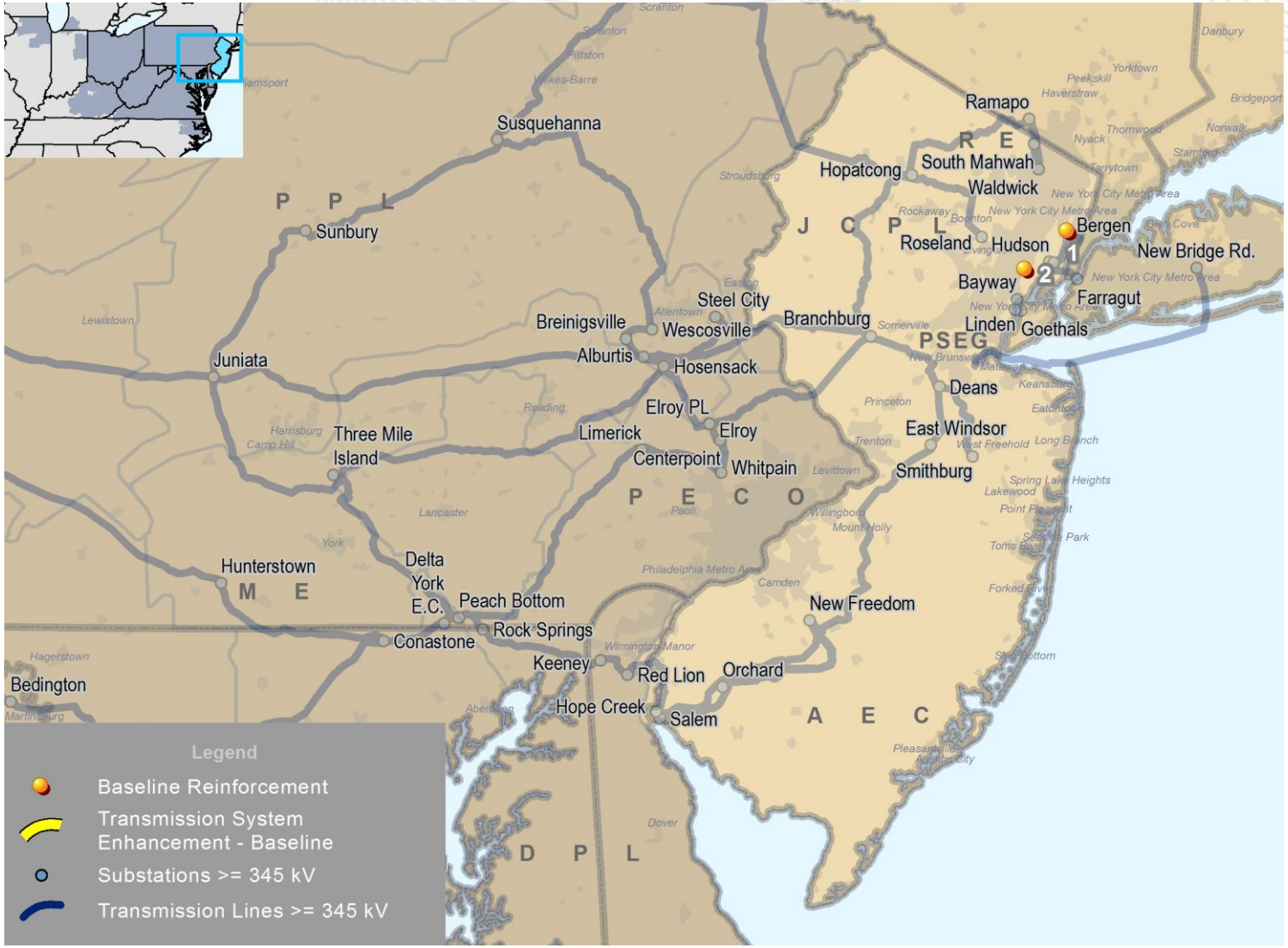
(Capacity, As of December 31, 2016)



Planning

Transmission Infrastructure Analysis

NJ – RTEP Baseline Projects

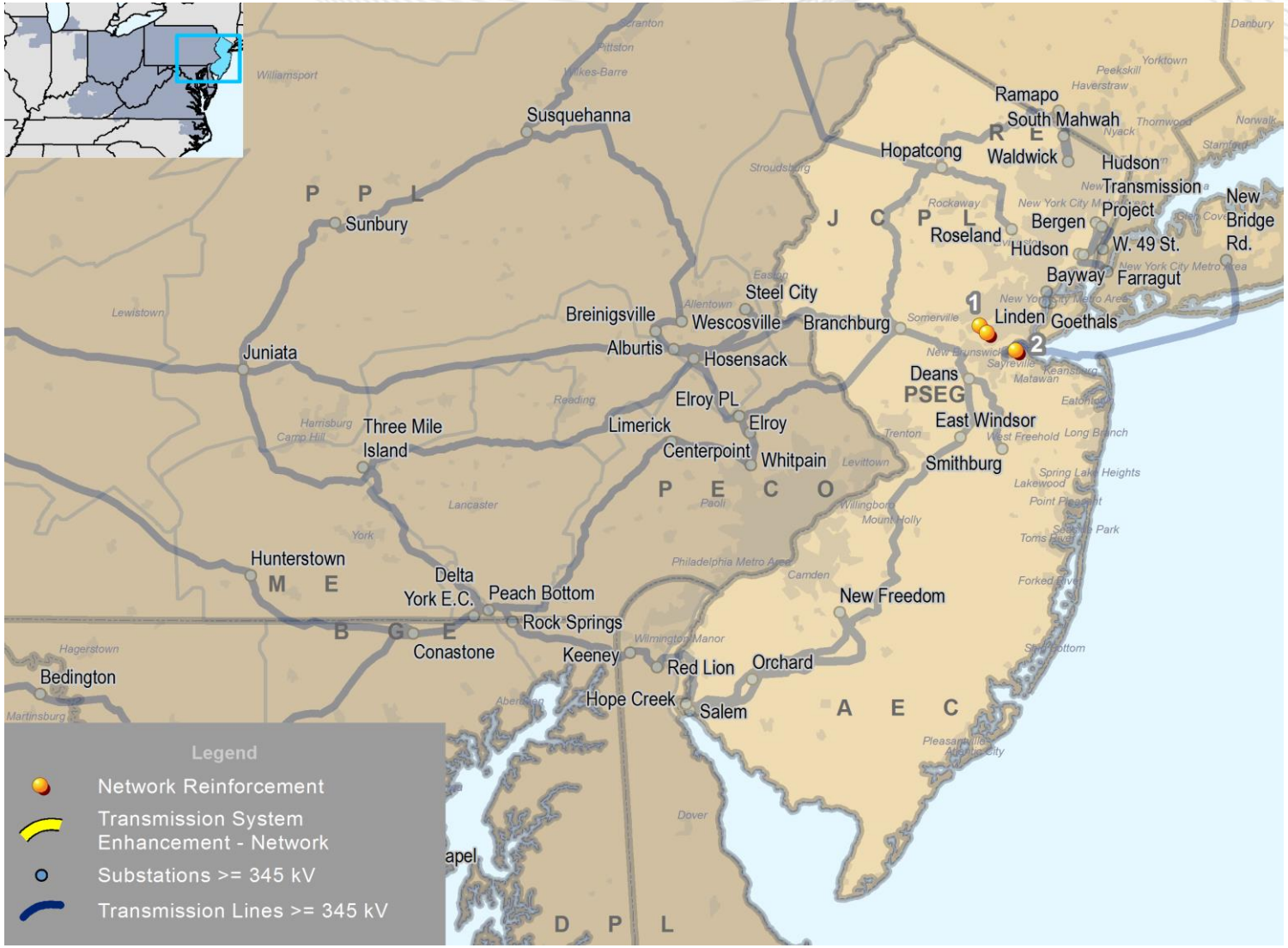


NJ – RTEP Baseline Projects

			NJ Baseline Project Driver								
Map ID	Project ID	Project	Baseline Load Growth/ Deliverability & Reliability	Congestion Relief - Economic	Operational Performance	Generator Deactivation	TO Criteria Violation	Required Date	Cost ($M)	Designated Entity*	2016 TEAC Review
1	b2722	Reconductor the 1 mile Bergen – Bergen GT 138 kV circuit (B-1302)			•			10/30/2016	$6.50	PSEG	12/8/2015
2	b2755	Build a third 345 kV source into Newark Airport					•	6/1/2018	$43.00	PSEG	7/14/2016

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

NJ – RTEP Network Projects

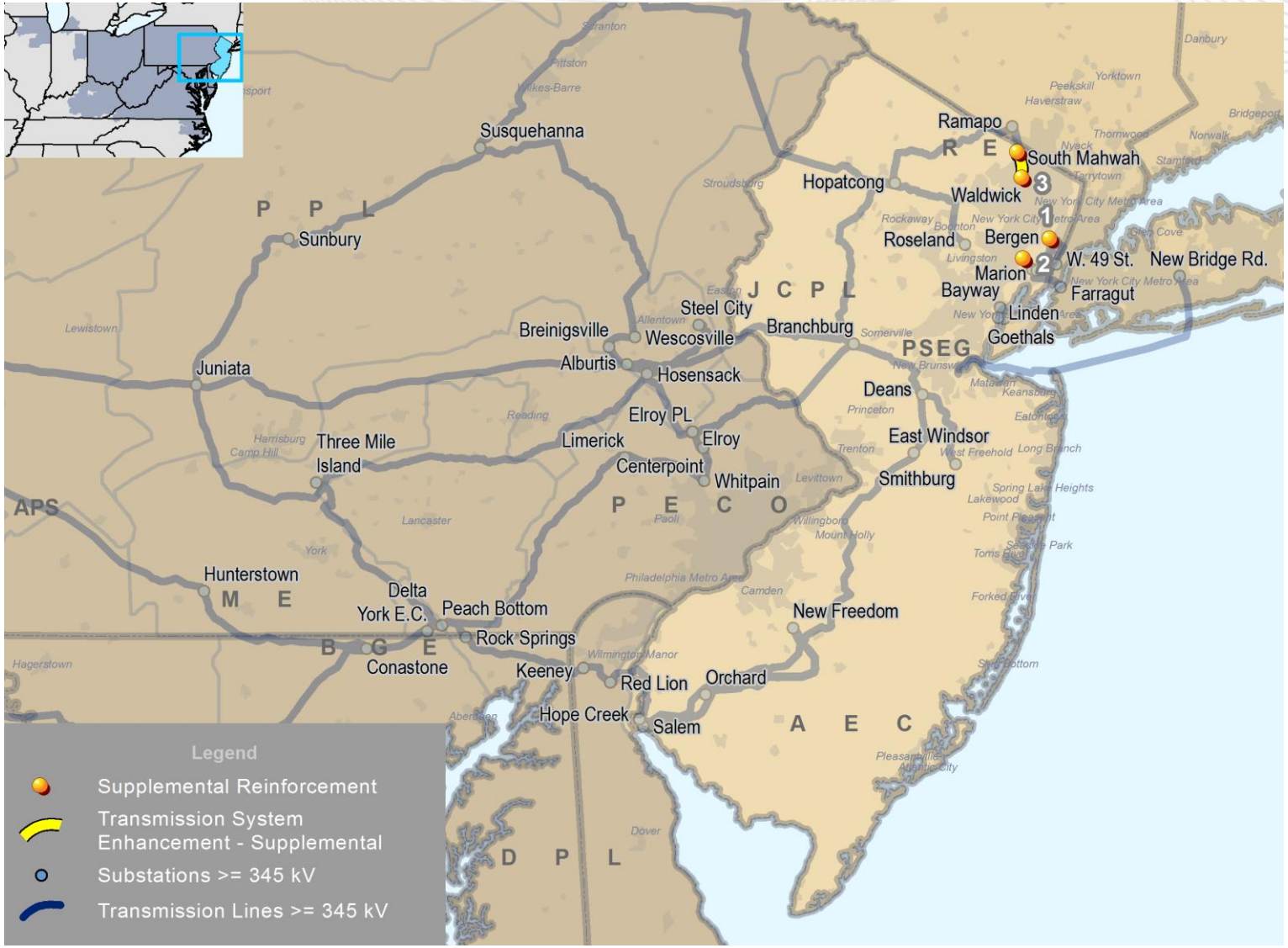


NJ – RTEP Network Projects

Map ID	Project ID	Project	NJ Network Project Drivers: Generation Interconnection	NJ Network Project Drivers: Merchant Transmission Interconnection	NJ Network Project Drivers: Long-term Firm Transmission Service	Required Date	Cost ($M)	TO Zone(s)	2016 TEAC Review
1	n4940	Reconductor the 2.1 mile Lake Nelson-Kilmer (I1023) 230kV line w/ single 1590 kcmil ACSS conductor, replacing the existing 1590 kcmil ACSR conductor	AA2-128			6/30/2017	$8.00	JCPL	10/6/2016
2	n4985	Horseshoe Road Substation: Construct a 115 kV three breaker ring bus interconnect substation between Raritan River and Werner substations for AA2-128 Interconnection.	AA2-128			6/17/2016	$5.92	JCPL	10/6/2016

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.

NJ TO – Supplemental Projects

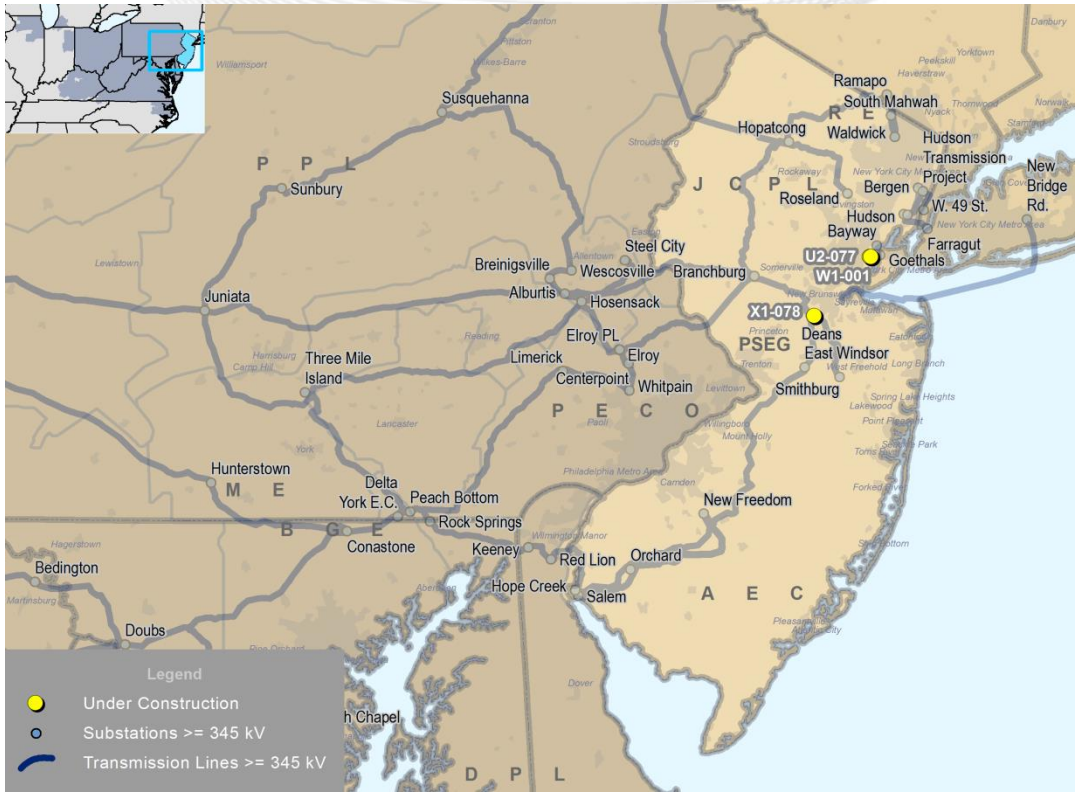


NJ – TO Supplemental Projects

			New Jersey Supplemental Project Driver			
Map ID	Project ID	Project	Required Date	Cost ($M)	TO Zone(s)	2016 TEAC Review
1	s0879.1	Relocate the Bergen 138kV ’40P’ and ‘90P’ breakers to the Bergen generation station and install additional one 138 kV breaker	12/31/2017	$6.16	PSEG	7/26/2016
2	s1151	Build a new 13 kV class-H substation in Kingsland with two new 230/13 kV transformers	5/31/2019	$29.60	PSEG	7/26/2016
3	s1177	Install Stop Joints on South Mahwah - Waldwick 345 kV circuit J-3410	5/23/2017	$6.00	PSEG	11/3/2016

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.

NJ – Merchant Transmission Project Requests



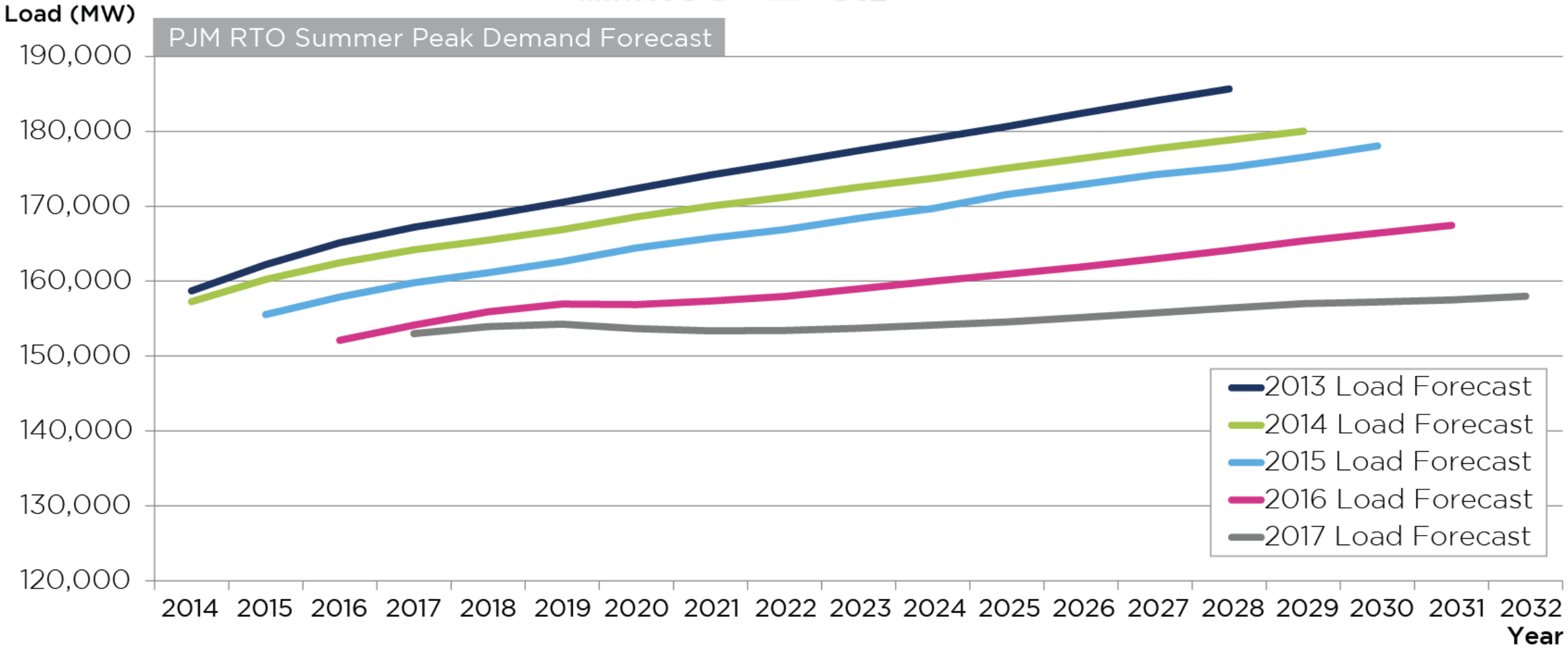
Queue	Project Name	MFO	Status	In Service Date	TO
U2-077	Linden 230kV	300	In-Service	06/01/11	PSEG
W1-001	Linden VFT 230kV	15	In-Service	06/01/11	PSEG
X1-078	Deans (Poseidon) 500kV	525	Under Construction	05/01/17	PSEG

Planning

Load Forecast

PJM Annual Load Forecasts

(January 9, 2017)



New Jersey – 2017 Load Forecast Report

Transmission Owner	Summer Peak (MW)			Winter Peak (MW)		
	2017	2027	Growth Rate (%)	2016/17	2026/27	Growth Rate (%)
Atlantic City Electric Company	2,495	2,445	-0.2%	1,630	1,565	-0.4%
Jersey Central Power and Light	6,056	6,108	0.1%	3,864	3,797	-0.2%
Public Service Electric and Gas Company	10,057	10,012	0.0%	6,821	6,754	-0.1%
Rockland Electric Company	404	404	0.0%	234	233	0.0%
PJM RTO	152,999	155,773	0.2%	131,391	134,915	0.3%

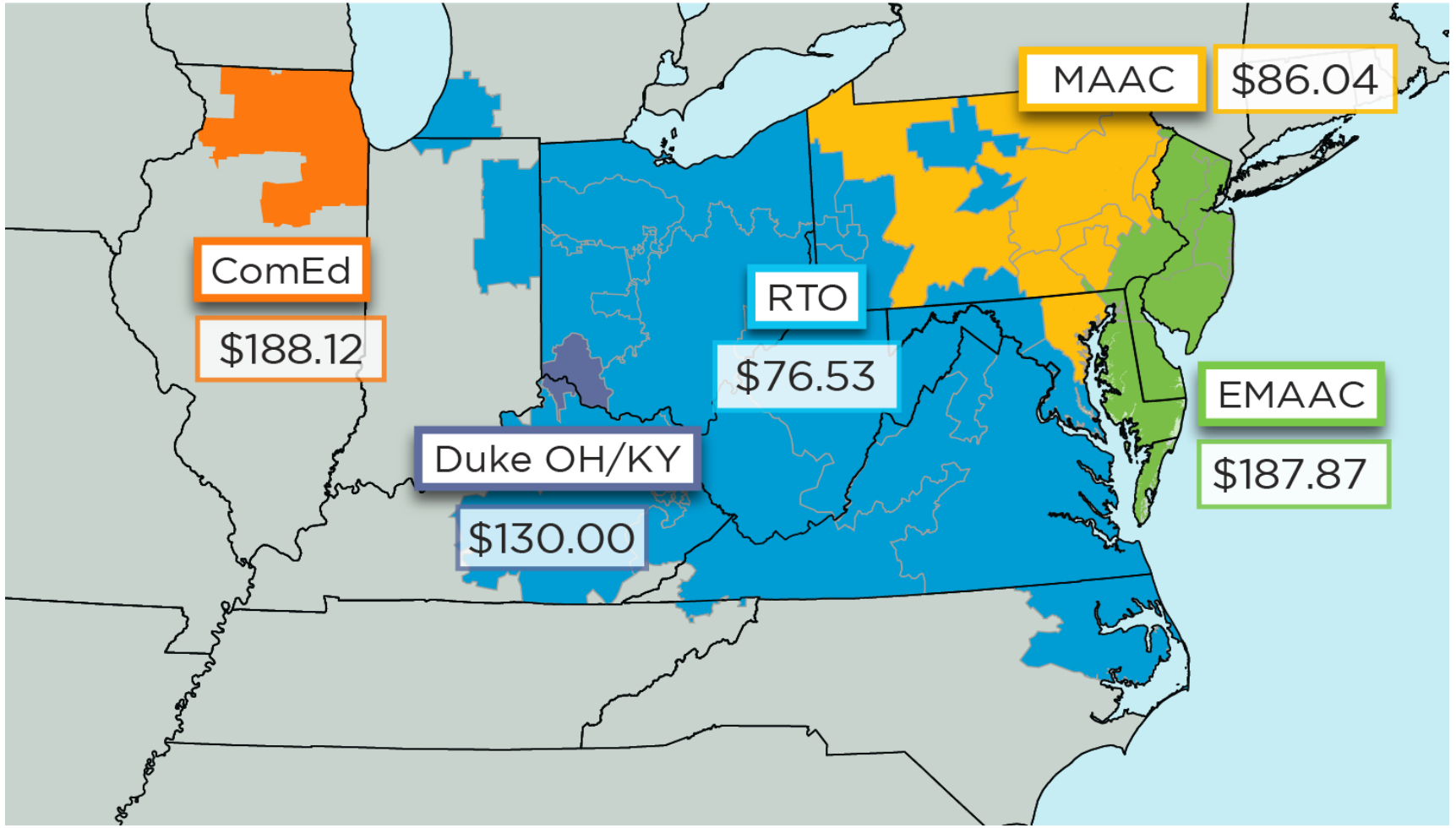
*PJM's 2017 forecast reflects methodology improvements implemented in 2016: variables to account for equipment and appliance saturation and efficiency, distributed solar generation adjustments and more refined treatment of weather data.

Markets

Capacity Market Results

PJM 2020/21 Auction Clearing Prices

(May 23, 2017)



New Jersey - Cleared Resources in 2020/21 Auction

(May 23, 2017)

	Cleared MW (Unforced Capacity)	Change from 2019/20 Auction
Generation	12,631	(643)
Demand Response	574	(164)
Energy Efficiency	199	101
Total	13,403	(706)

EMAAC 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)

New Jersey – Offered and Cleared Resources in 2020/21 Auction

(May 23, 2017)

		Unforced Capacity
Generation	Offered MW	13,647
	Cleared MW	12,631
Demand Response	Offered MW	590
	Cleared MW	574
Energy Efficiency	Offered MW	203
	Cleared MW	199
Total Offered MW		14,440
Total Cleared MW		13,403

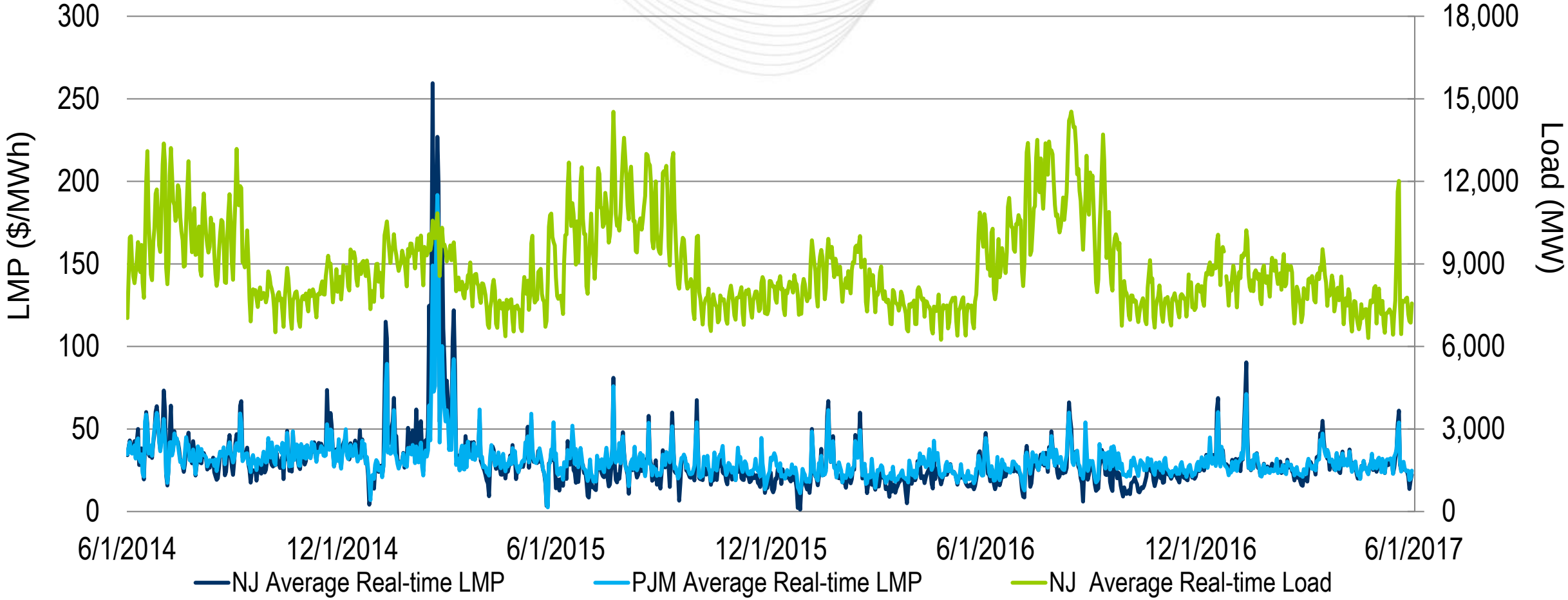
Markets

Market Analysis

New Jersey - Average Daily Load and LMP

(June 1, 2014 - May 31, 2017)

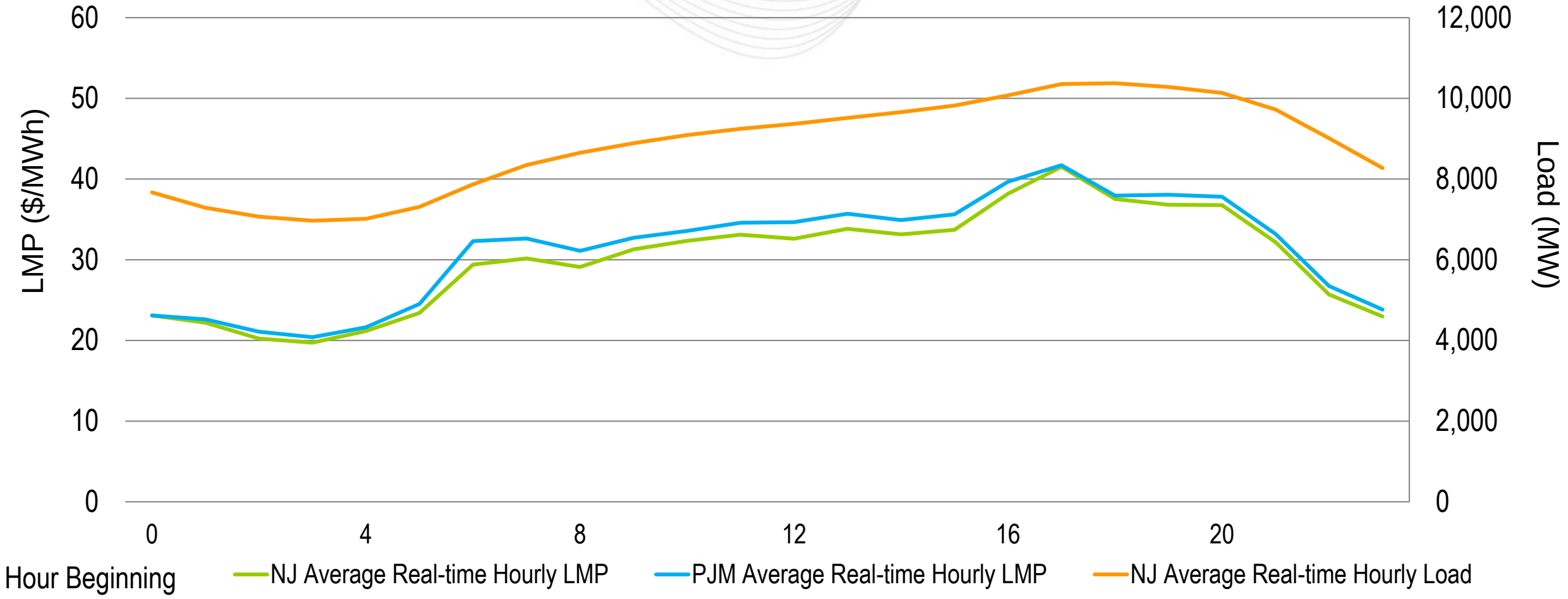
New Jersey's average daily LMPs generally align with the PJM average daily LMP



New Jersey – Hourly Average LMP and Load

(June 1, 2014 – May 31, 2017)

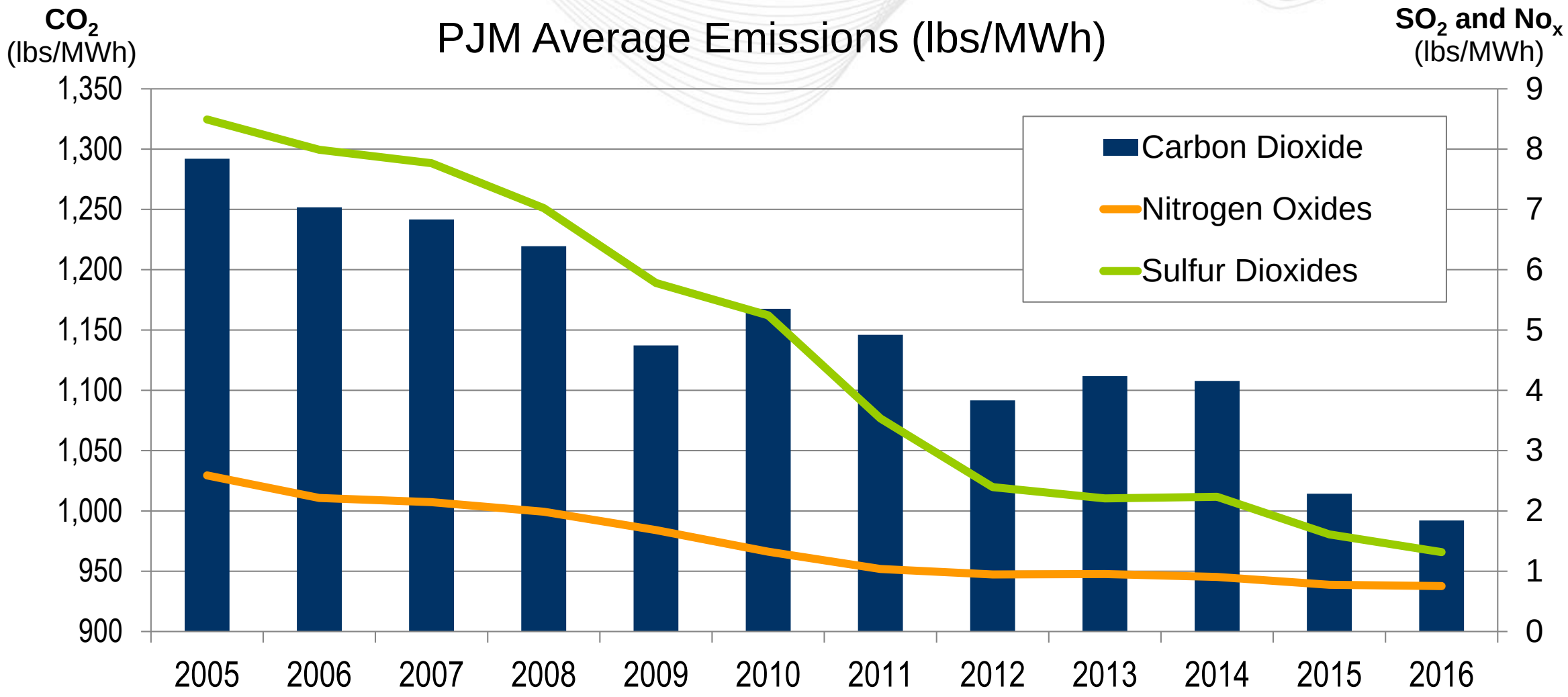
New Jersey's hourly LMPs were at or above the PJM average.



Operations
Emissions Data

PJM - Average Emissions (lbs/MWh)

(December 31, 2016)



New Jersey - Average Emissions (lbs/MWh)

(December 31, 2016)