



2017 Illinois State Infrastructure Report

(January 1, 2017 – December 31, 2017)

May 2018

This report reflects information for the portion of Illinois within the PJM service territory.

1. Planning

- Generation Portfolio Analysis
- Transmission Analysis
- Load Forecast

2. Markets

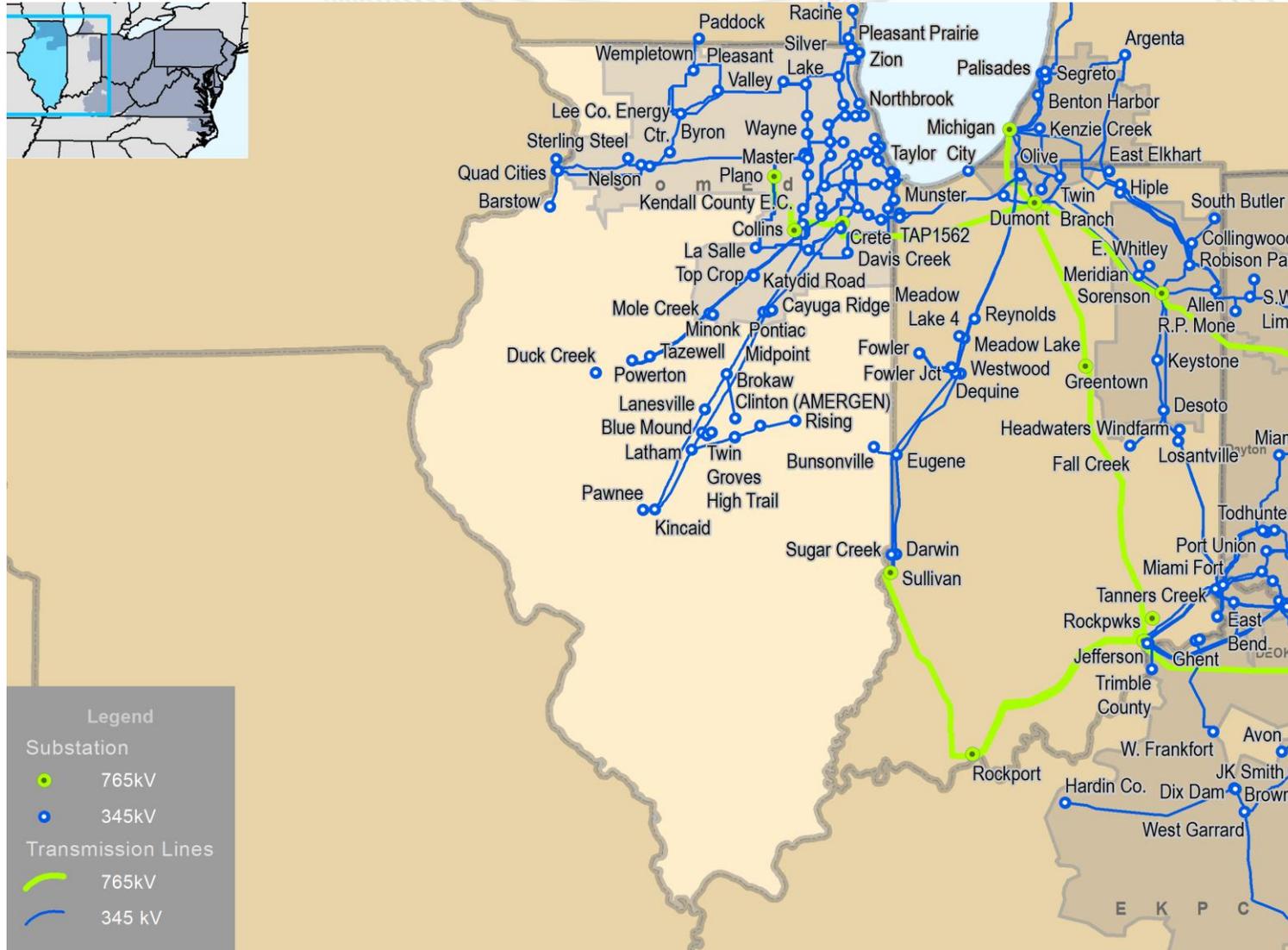
- Capacity Market Results
- Market Analysis

3. Operations

- Emissions Data

- **Existing Capacity:** Natural gas represents 41.6 percent of the total installed capacity in Illinois with nuclear a close second at 40.7 percent. Coal only represents 14.8 percent of total installed capacity in Illinois. This differs from PJM where natural gas and coal are at 37 and 32 percent of total installed capacity.
- **Interconnection Requests:** Natural gas represents approximately 88 percent of new interconnection requests in Illinois.
- **Deactivations:** Illinois had no generation deactivations or deactivation notifications of in 2017.
- **RTEP 2017:** Illinois RTEP 2017 projects total almost \$1.5 billion in investment. Approximately 8 percent of that represents supplemental projects.
- **Load Forecast:** Illinois load growth is nearly flat, averaging between .4 and .5 percent per year over the next 10 years. This aligns with PJM RTO load growth projections.

- **2021/22 Capacity Market:** Illinois cleared 554 MW more Demand Response and Energy Efficiency resources than in the prior auction.
- **6/1/15 – 12/31/17 Market Performance:** Illinois' average daily locational marginal prices were generally at or below PJM average daily LMPs. Nuclear resources represented 70 percent of generation produced in Illinois while coal represented 15.4 percent. Illinois exported 24.1% of the generation produced within the state.
- **Emissions:** 2017 carbon dioxide emissions were slightly up from 2016; sulfur dioxide and nitrogen oxide emissions both decreased from 2016.



Planning

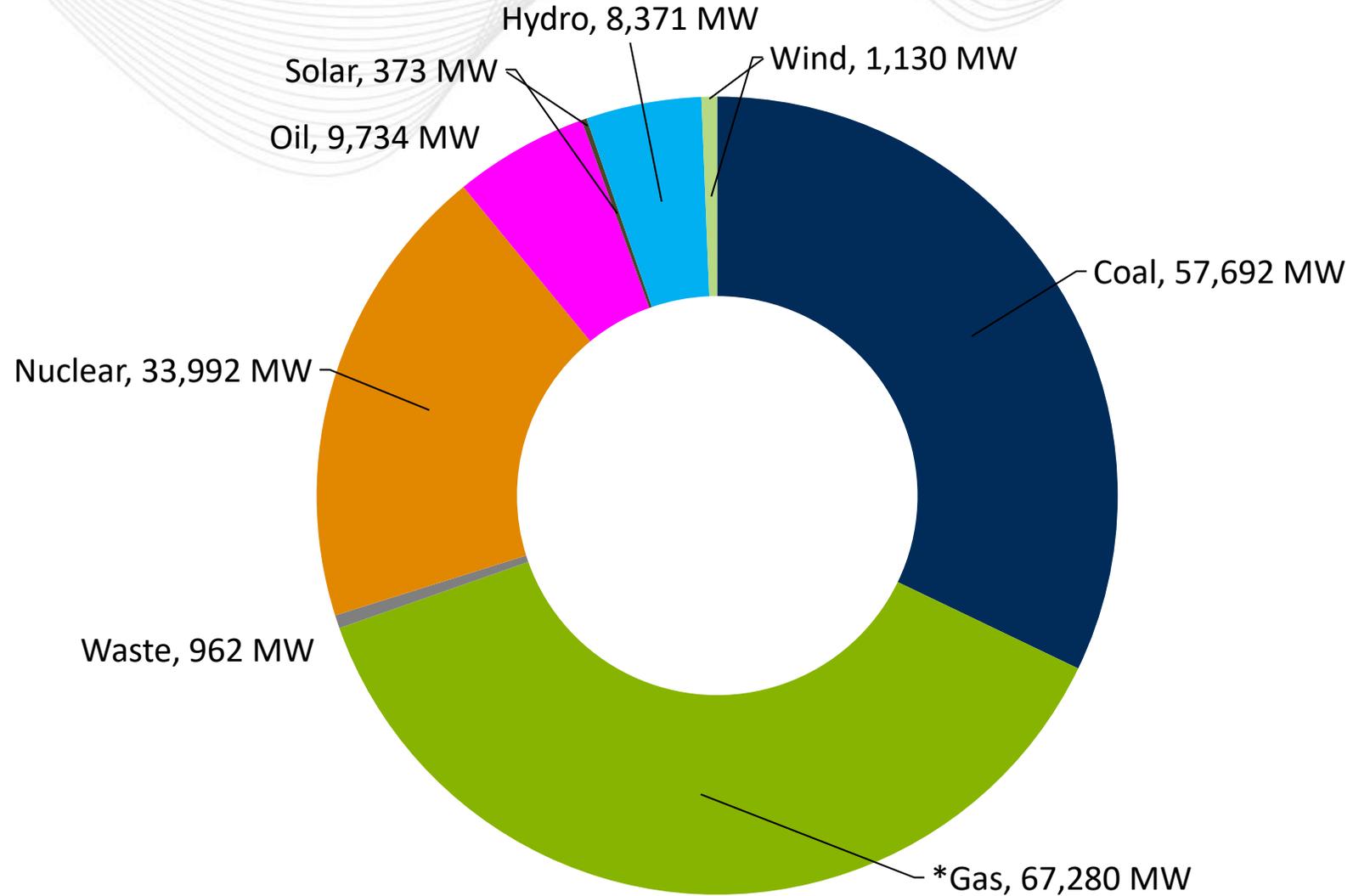
Generation Portfolio Analysis

PJM – Existing Installed Capacity

(MW submitted to PJM, December 31, 2017)

In PJM, natural gas and coal make up nearly 70 percent of total installed capacity. Nuclear represents another 18.9 percent.

* Gas Contains	
Natural Gas	66,836.3 MW
Other Gas	443.8 MW



Illinois – Existing Installed Capacity

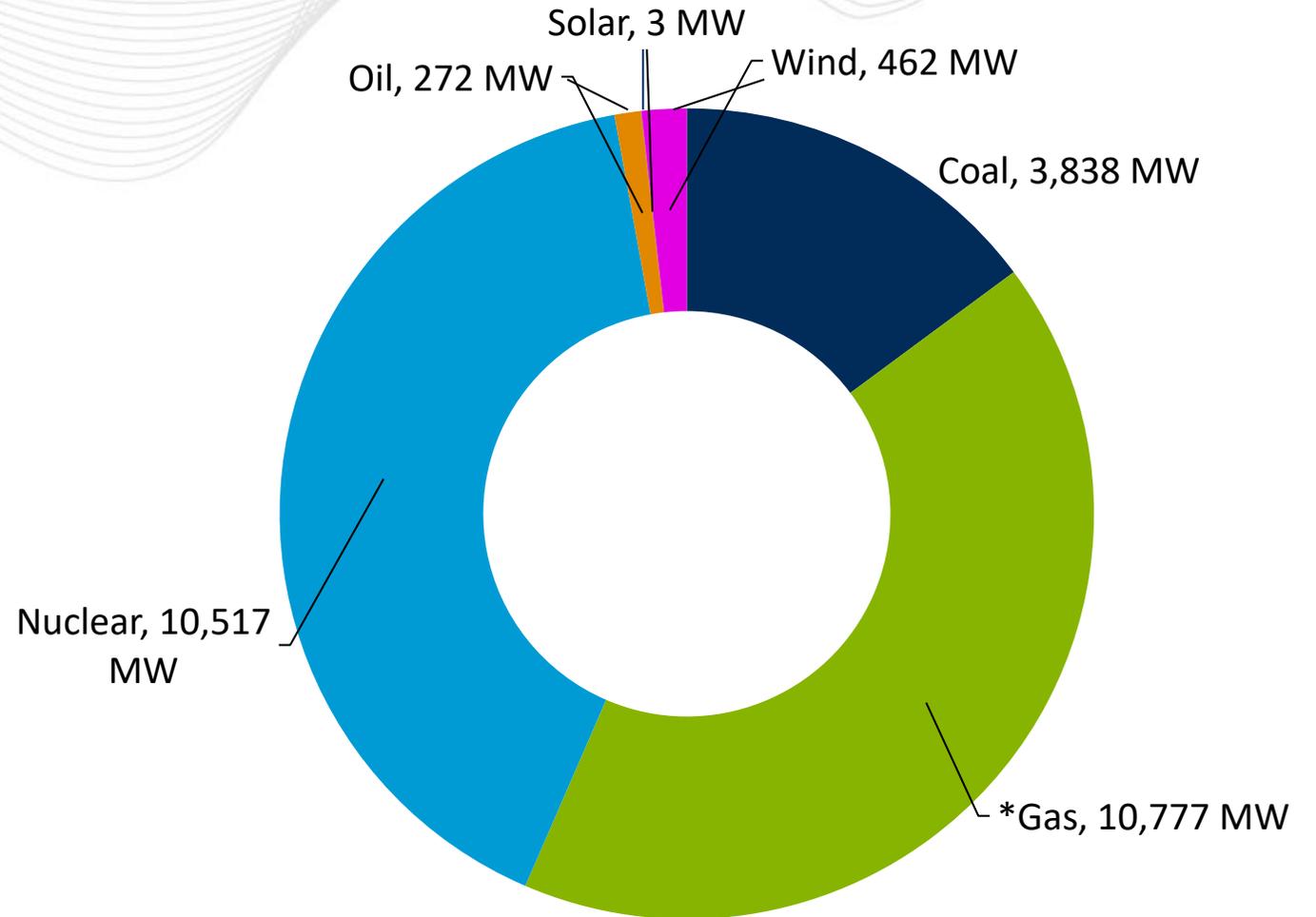
(MW submitted to PJM, December 31, 2017)

Summary:

Natural gas represents approximately 41.6 percent of the total installed capacity in the Illinois territory while coal represents approximately 14.8 percent.

Overall in PJM, natural gas represents approximately 37 percent of installed capacity while coal represents 32 percent.

* Gas Contains	
Natural Gas	10,765.4 MW
Other Gas	11.9 MW

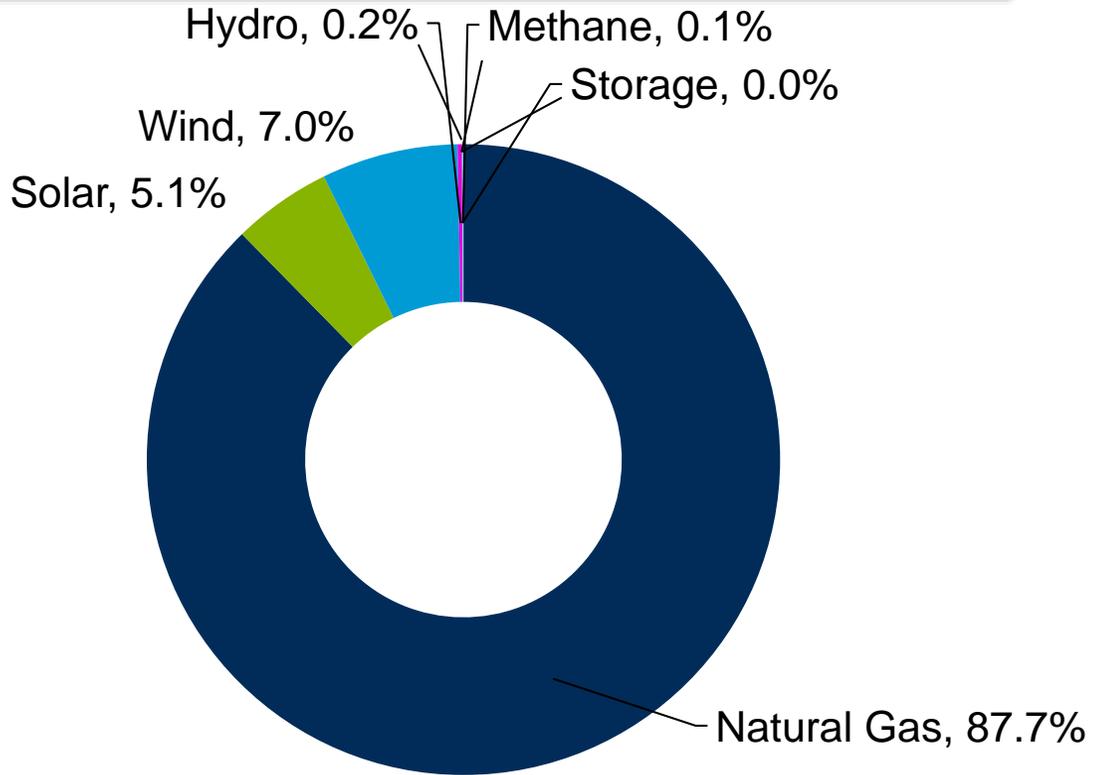


Illinois – Interconnection Requests

(Requested Capacity Rights, December 31, 2017)

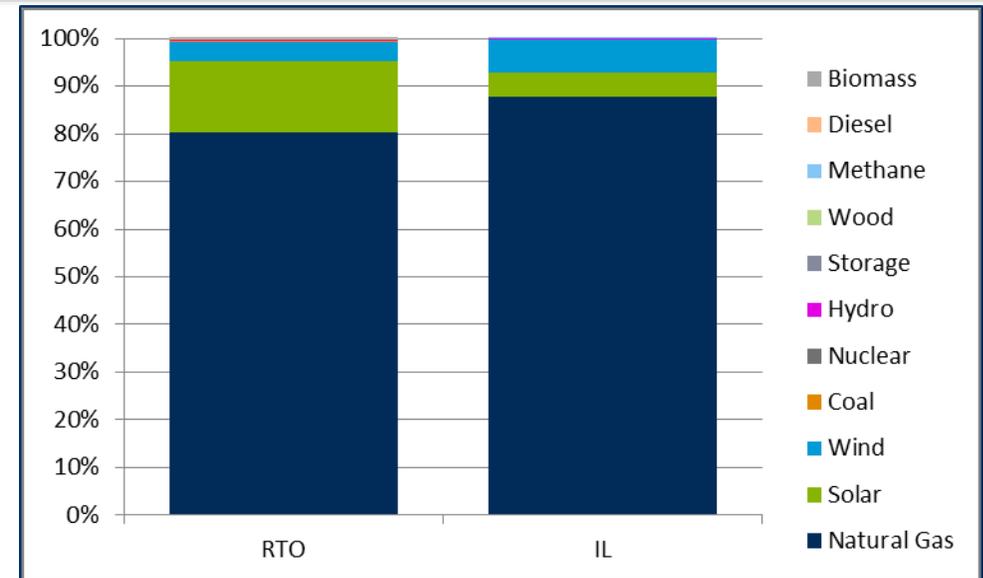
Natural gas represents approximately 88 percent of new interconnection requests in Illinois.

Total MW Capacity by Fuel Type



Fuel Source	Capacity, MW	Nameplate Capability, MW
Natural Gas	9,137.8	9,473.8
Wind	726.3	4,599.7
Solar	527.0	1,065.5
Hydro	22.7	22.7
Methane	6.2	6.2
Storage	2.2	86.5
Total	10,422.2	15,254.4

Fuel as a Percentage of Projects in Queue





Illinois – Interconnection Requests

(As of December 31, 2017)

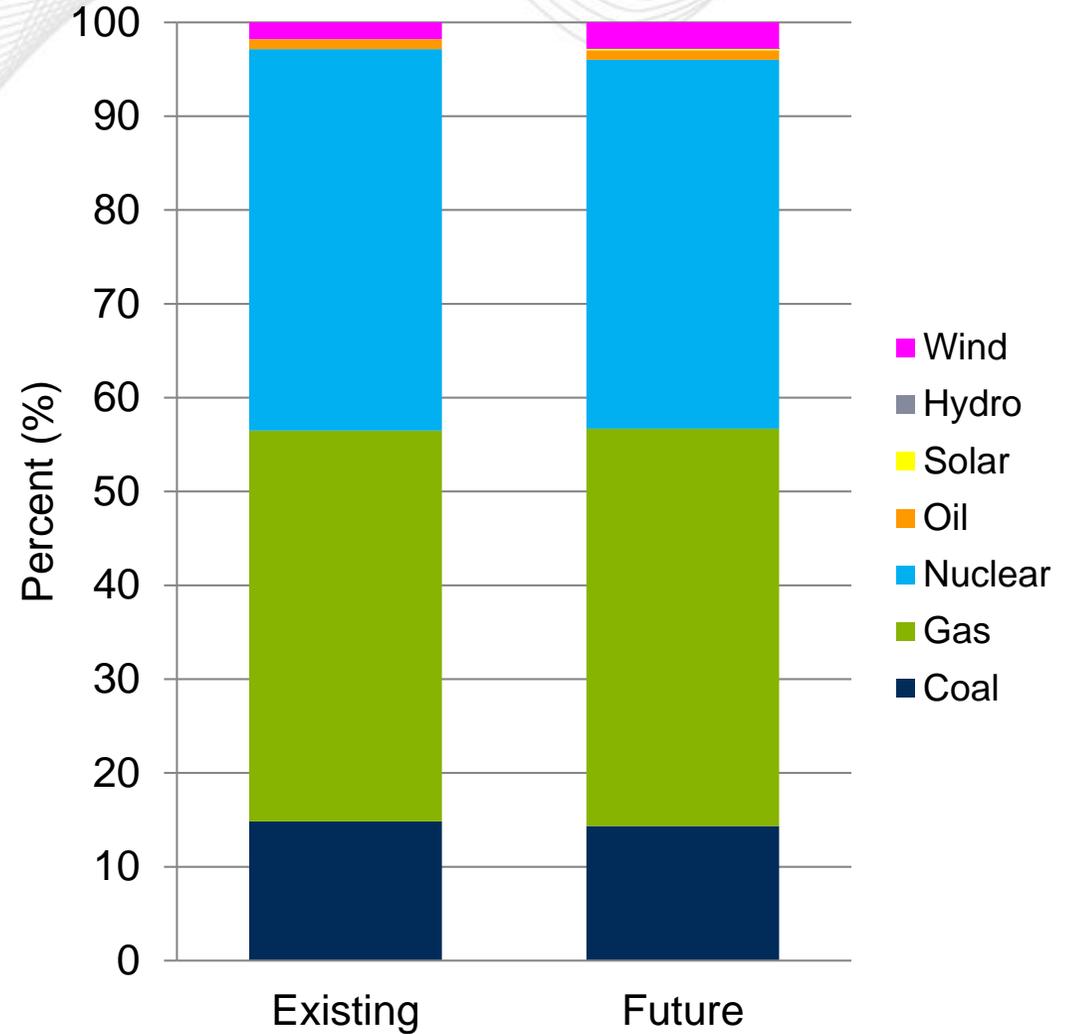
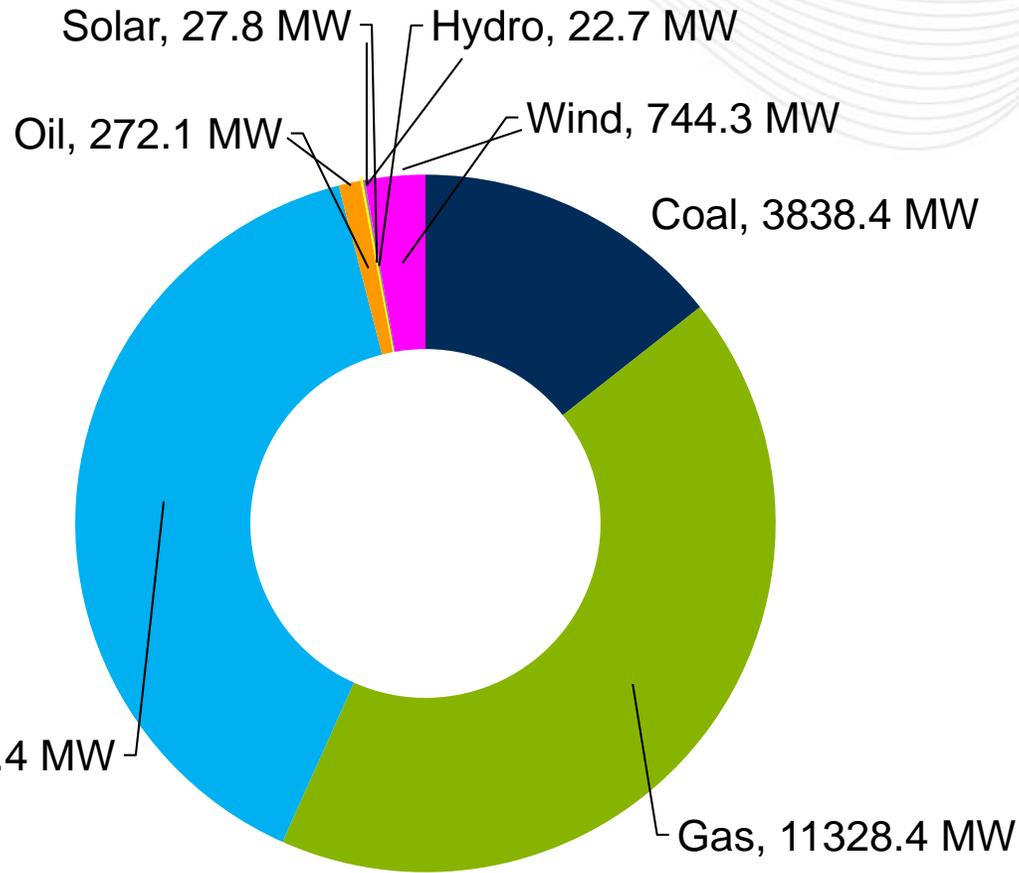
	Complete				In Queue						Grand Total	
	In Service		Withdrawn*		Active		Suspended**		Under Construction**			
	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects	MW	# of Projects
Non-Renewable	1,831	30	7,535	35	9,107	34			33	4	18,506	103
Coal			3,652	5							3,652	5
Diesel	22	2									22	2
Natural Gas	1,403	14	3,097	11	9,105	28			33	2	13,638	55
Nuclear	386	10	782	5							1,168	15
Other	20	1		3							20	4
Storage	0	3	4	11	2	6			0	2	6	22
Renewable	629	26	2,525	118	963	41	100	1	219	9	4,437	195
Biomass			90	3							90	3
Hydro				1					23	2	23	3
Methane	49	6	58	13	6	1					113	20
Solar	3	1	93	9	527	25					623	35
Wind	577	19	2,285	92	430	15	100	1	196	7	3,588	134
Grand Total	2,460	56	10,060	153	10,071	75	100	1	252	13	22,942	298

*May have executed final agreement

** Executed final agreement (ISA / WMPA)

Illinois – Future Capacity Mix

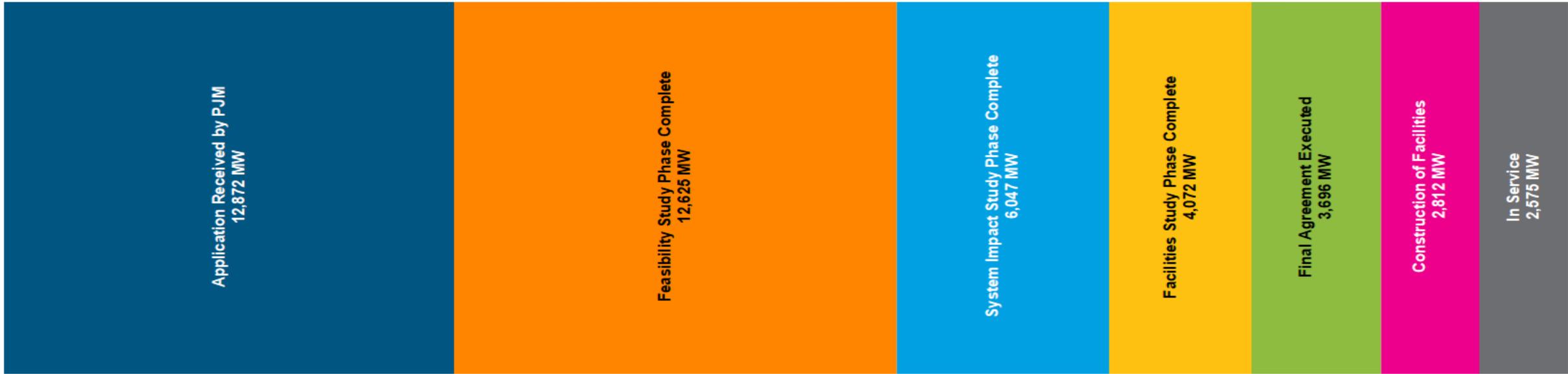
Based on known queued interconnection requests and deactivation notices through December 31, 2022, adjusted to reflect the probability of commercialization as indicated by historical trends specific to an interconnection request's state/zonal location and fuel type.





Illinois – Progression History Interconnection Requests

Projects under construction, suspended, in service, or withdrawn – As of December 31, 2017



Projects that withdrew after a final agreement

	Number of Projects	Capacity, MW	Nameplate Capability, MW
ISA	7	276	1,178
WMPA	3	4	15

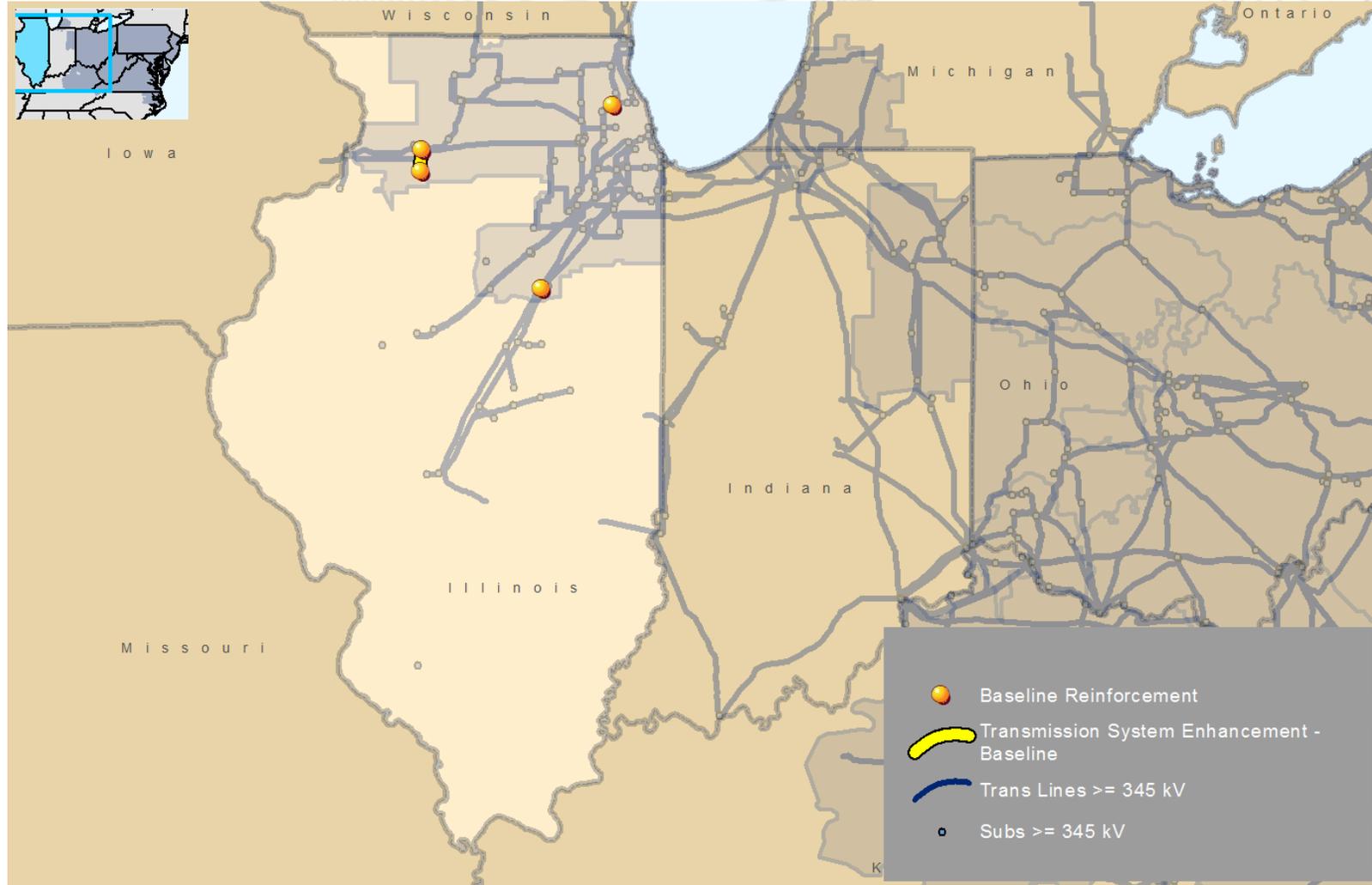
20.0% of requested capacity megawatt and 26.9% of projects reaches commercial operation

Illinois – Actual Generation Deactivations and Deactivation Notifications Received in 2017

Illinois had no generation deactivations or deactivation notifications of in 2017.

Planning

Transmission Infrastructure Analysis



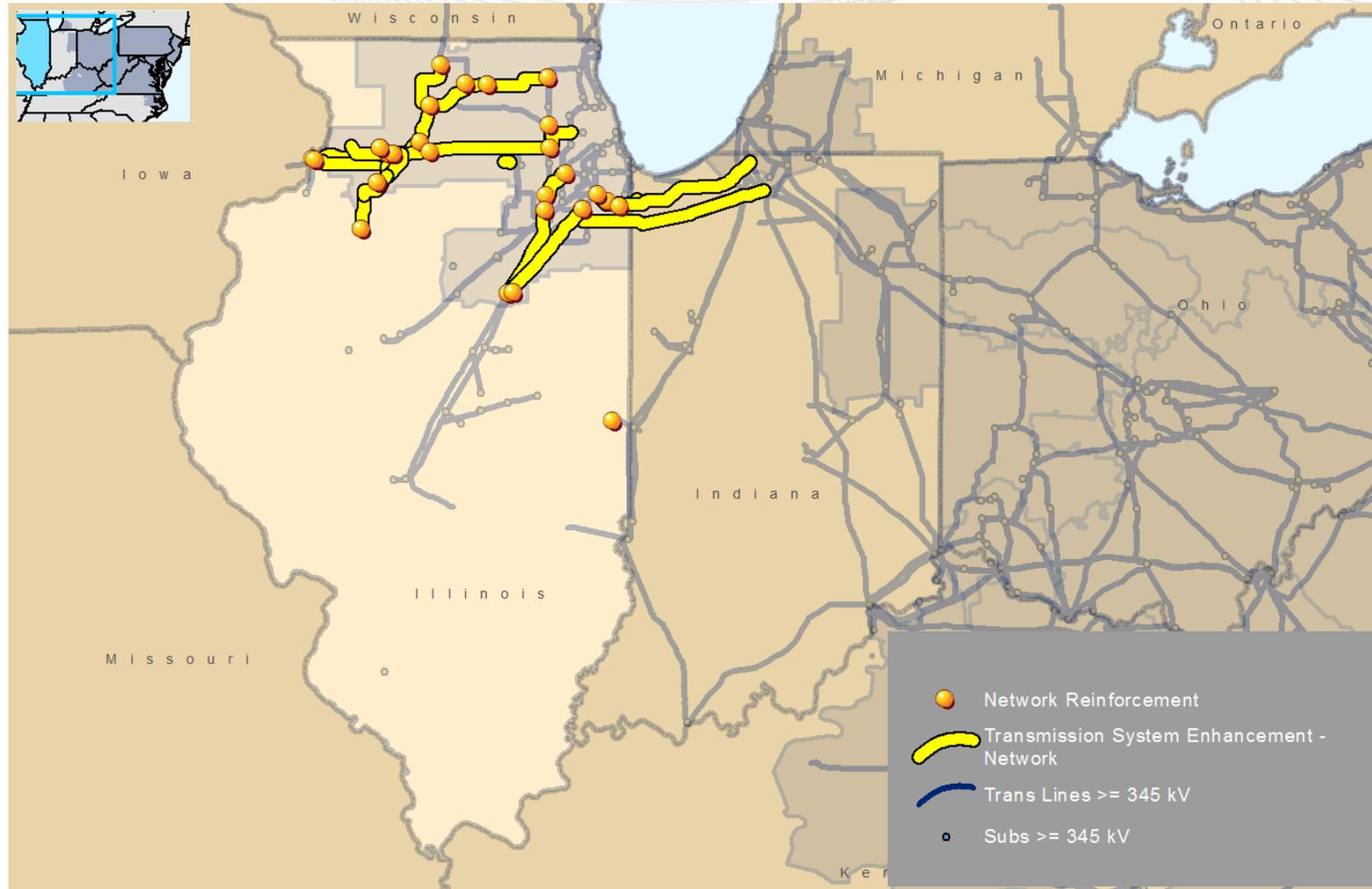
Note: Baseline upgrades are those that resolve a system reliability criteria violation.



Illinois - RTEP Baseline Projects

(Greater than \$5 million)

Project ID	Project	Project Driver	Required In Service Date	Project Cost (\$M)	TO Zone(s)	2017 TEAC Review
b2931	Upgrade substation equipment at Pontiac Midpoint station to increase capacity on Pontiac-Brokaw 345 kV line.	Congestion Relief - Economic	6/1/2021	\$ 5.6	ComEd	8/10/2017
b2941	Build an indoor new Elk Grove 138kV GIS substation at the point where Rolling Meadows & Schaumburg tap off from the main lines, between Landmeier and Busse. The four 345 kV circuits in the ROW will be diverted into Gas Insulated Bus (GIB) and go through the basement of the building to provide clearance for the above ground portion of the building.	Baseline Load Growth Deliverability & Reliability	12/31/2017	\$ 90.0	ComEd	9/11/2017
b2959	Install a new 138kV circuit 18702 from Schauff Road to Rock Falls and install a fourth breaker and a half run at Schauff Road.	Baseline Load Growth Deliverability & Reliability	11/1/2019	\$ 20.0	ComEd	11/2/2017



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.



Illinois - RTEP Network Projects

(Greater than \$5 million)

Project ID	Description	Project Driver	Queue	Required In Service Date	Project Cost (\$M)	TO Zone(s)	2017 TEAC Review
n5144	Upgrade L10805 Kendall;B - Lockport; B 345 kV line conductor.	Generation	AA2-035	6/30/2019	\$ 8.2	ComEd	10/12/2017
n5145	Reconfigure Wilton 765kV bus thereby allowing for 765kV L11216 (currently on Bus 6) to be relocated to Bus 8. Along with this line relocation, installation of 2-765kV BT CB's (6-8 & 8-2).	Generation	AA2-035	6/30/2019	\$ 11.0	ComEd	10/12/2017
n5178	Replacement of 345kV breaker at Sta 6 Byron BT5-6 with 2-cycle IPO breaker	Generation	AB1-089	6/1/2019	\$ 12.0	ComEd	10/12/2017
	Replacement of 345kV breaker at Sta 6 Byron BT4-5 with 2-cycle IPO breaker						
	Replacement of 345kV breaker at Sta 6 Byron BT11-12 with 2-cycle IPO breaker						
	Replacement of 345kV breaker at Sta 6 Byron BT12-13 with 2-cycle IPO breaker						
n5179	Installation of about 50 miles of 345kV line from AB1-089/AB1-090 to Wayne	Generation	AB1-089	6/1/2019	\$ 115.0	ComEd	10/12/2017
	Installation of 2-345kV breakers at Wayne and 3-345kV breakers at AB1-089/AB1-090 terminal station						
n5252	Mitigate the sag on the Wilton - Dumont 765 kV line L11215 to achieve an ALDR that exceeds 6166 MVA.	Generation	AB1-122	6/1/2020	\$ 9.0	ComEd	10/12/2017
n5253	Reconductor the ComEd portion of Crete - St John 345 kV line	Generation	AB1-122	6/1/2020	\$ 18.0	ComEd	10/12/2017
n5254	Reconductor the Lee County - Byron 345 kV line.		Not Specified	10/1/2017	\$ 6.0	ComEd	10/12/2017
n5303	Rebuild/Reconductor 40.61 miles of the AEP owned section of the Olive - University Park 345 kV ACSR/PE 1414 62/19 line section 1 and replace Olive switches and riser.	Generation	AB1-122	6/1/2020	\$ 82.6	ComEd	10/12/2017
n5315	Re-conductor the Cherry Valley – Garden Prairie 345 kV line and upgrade terminal equipment at both ends.	Generation	AB1-089	6/1/2019	\$ 50.0	ComEd	10/12/2017
n5316	Re-conductor the Cordova - Nelson 345 kV line and replace station conductor at Cordova.		Not Specified	6/1/2020	\$ 20.2	ComEd	10/12/2017



Illinois - RTEP Network Projects

(Greater than \$5 million)

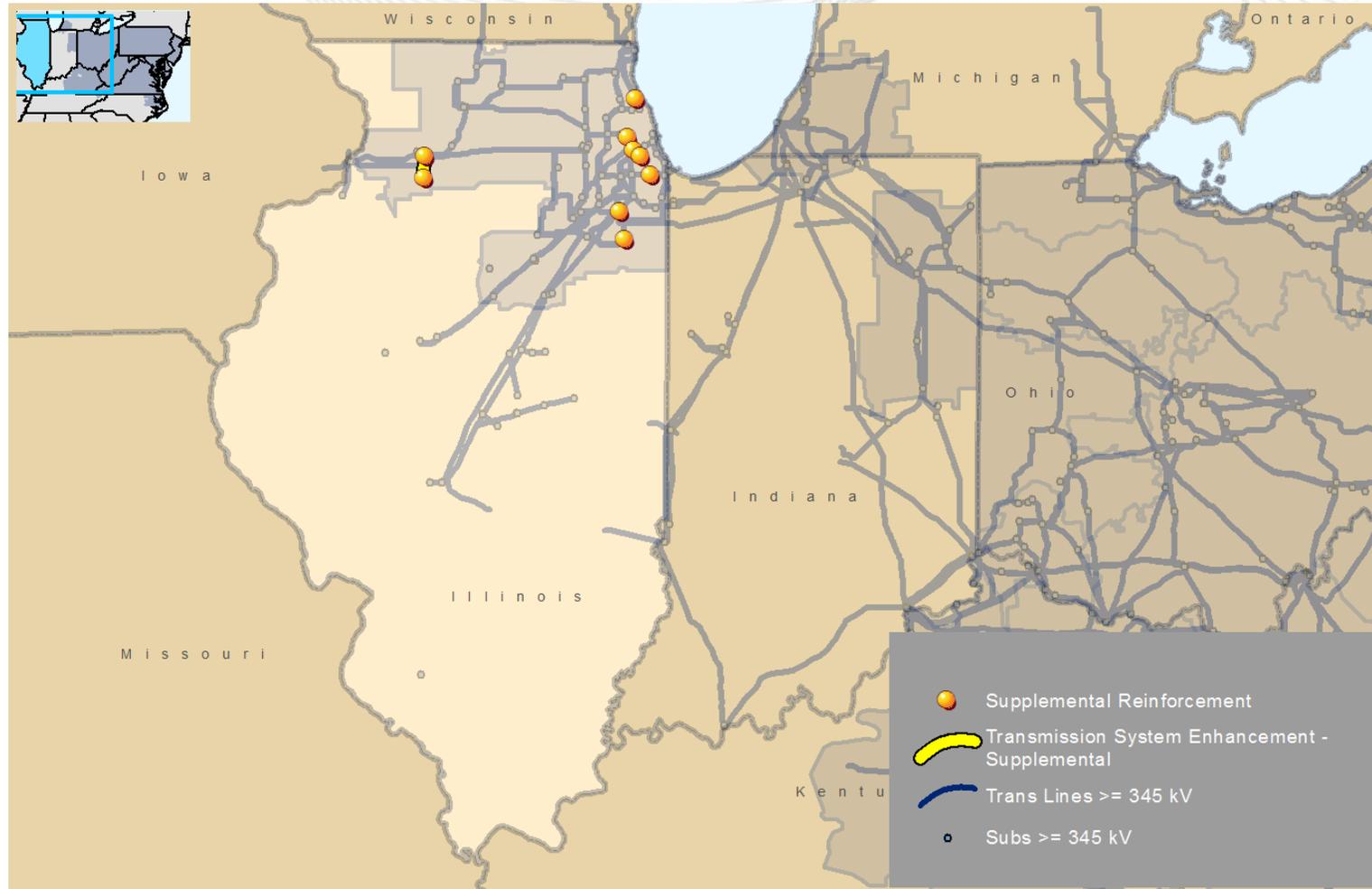
Project ID	Description	Project Driver	Queue	Required In Service Date	Project Cost (\$M)	TO Zone(s)	2017 TEAC Review
n5317	Re-conductor the E Frankfort – Crete 345 kV line.		Not Specified		\$ 10.0	ComEd	10/12/2017
n5318	Re-conductor the Garden Prairie – Silver Lake 345 kV line and station conductor at both terminals.	Generation	AB1-090	6/1/2019	\$ 50.0	ComEd	10/12/2017
n5319	Re-conductor the Nelson – Lee County 345 kV line and upgrade station conductor, 2-345kV Bus Tie Circuit Breakers, and disconnect switches at Nelson.		Not Specified	1/9/2017	\$ 15.0	ComEd	10/12/2017
n5320	Re-conductor the Pontiac - Dresden 345 kV line.		Not Specified	9/1/2017	\$ 22.0	ComEd	10/12/2017
n5321	Re-conductor the Quad Cities – ESS H471 345 kV line and upgrade station conductor at Sterling Steel & Quad Cities.		Not Specified	6/1/2020	\$ 20.2	ComEd	10/12/2017
n5322	Re-conductor the ESS H471 - Nelson 345 kV line and upgrade station conductor.		Not Specified		\$ 20.2	ComEd	10/12/2017
n5323	Re-conductor the Lee County – Byron 345 kV line, upgrade station conductor, and replace bus disconnect switches at Byron.		Not Specified		\$ 6.5	ComEd	10/12/2017
n5324	Re-conductor the AB1-122 Tap – Dresden 345 kV line.	Generation	AB1-122	6/1/2020	\$ 20.0	ComEd	10/12/2017
n5326	Build a 2nd Nelson - Electric Jct 345 kV line		Not Specified	9/15/2018	\$ 300.0	ComEd	10/12/2017
n5358	28 miles of 345kV Reconductoring of Wempleton to Byron line and Substation Conductor	Auction Revenue Requests	AB1-185	6/1/2016	\$ 56.1	ComEd	10/12/2017
n5359	26.7 miles of 345kV Reconductoring from Silver lake to GardenPR and Substation Conductor	Auction Revenue Requests	AB1-185	6/1/2016	\$ 54.1	ComEd	10/12/2017
n5360	13.8 miles of 345kV Reconductoring from Cherry Valley to GardenPR	Auction Revenue Requests	AB1-185	6/1/2016	\$ 27.0	ComEd	10/12/2017
n5362	40 miles of 345kV Reconductoring of Nelson to Cardova	Auction Revenue Requests	AB1-185	6/1/2016	\$ 80.0	ComEd	10/12/2017



Illinois - RTEP Network Projects

(Greater than \$5 million)

Project ID	Description	Project Driver	Queue	Required In Service Date	Project Cost (\$M)	TO Zone(s)	2017 TEAC Review
n5365	10.4 miles of 138kV reconductoring of rockfalls line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 10.4	ComEd	10/12/2017
n5368	26.9 miles of 138 kV Reconductoring from Normandy to Kewanee line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 26.9	ComEd	10/12/2017
n5369	5.4 miles of 138kV Reconductoring of Normandy line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 5.4	ComEd	10/12/2017
n5370	13.6 miles of 345kV Reconductoring of Electric junction to Lombard	Auction Revenue Requests	AB1-185	6/1/2016	\$ 27.2	ComEd	10/12/2017
n5371	6.7 miles of 345kV Reconductoring Byron to Cherry Valley line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 13.4	ComEd	10/12/2017
n5384	8.8 miles of 138kV Reconductoring of WestPlano to Sandwich line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 8.8	ComEd	10/12/2017
n5385	12.5 miles of 138kV Reconductoring of Nelson to O-029 line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 12.5	ComEd	10/12/2017
n5387	7.9 miles of 345kV Reconductoring from Nelson to ESSH471	Auction Revenue Requests	AB1-185	6/1/2016	\$ 15.8	ComEd	10/12/2017
n5390	11 miles of 138kV Reconductoring at GardenPL to ESSH71 line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 11.0	ComEd	10/12/2017
n5392	19.472 miles 345kV Reconductoring of Byron-leeCoEnergyCenter and Substation Conductor	Auction Revenue Requests	AB1-185	6/1/2016	\$ 39.0	ComEd	10/12/2017
n5393	5.4 miles of 138kV Reconductoring to O-029 to Normandy line	Auction Revenue Requests	AB1-185	6/1/2016	\$ 5.4	ComEd	10/12/2017
n5394	17.9 miles of 138kV Reconductoring to Normandy to Annawan	Auction Revenue Requests	AB1-185	6/1/2016	\$ 17.9	ComEd	10/12/2017
n5396	6.7 miles of 138kV Reconductoring from Byron to CherryValley	Auction Revenue Requests	AB1-185	6/1/2016	\$ 13.4	ComEd	10/12/2017
n5398	Install Additional Auto transformer at Nelson;B-nelson2M	Auction Revenue Requests	AB1-185	6/1/2016	\$ 15.0	ComEd	10/12/2017



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.

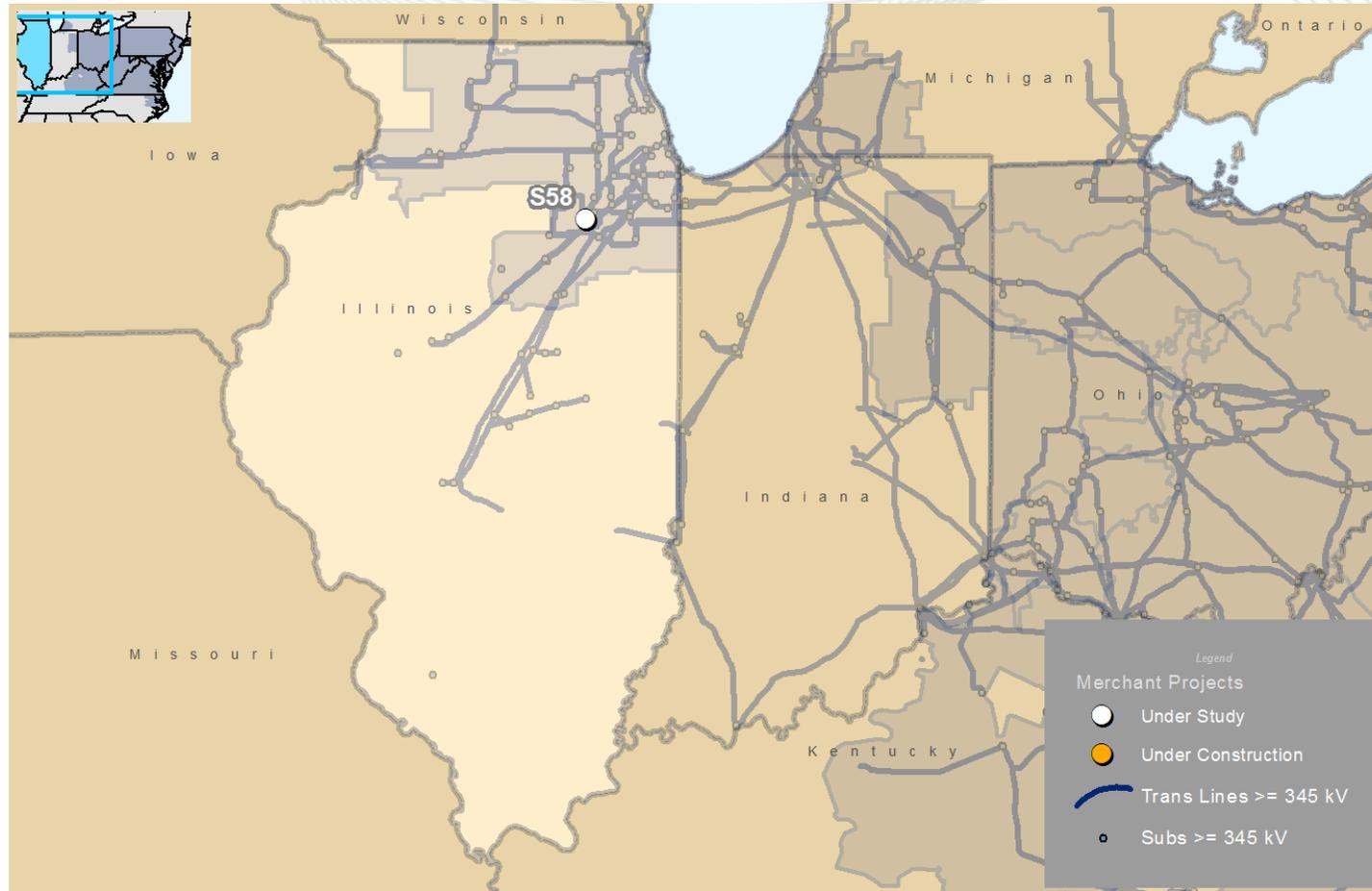


Illinois - TO Supplemental Projects

(Greater than \$5 million)

Project ID	Description	Required Date	Project Cost (\$M)	TO Zone(s)	2017 TEAC Date
s1204	Install 765 kV CB at Wilton Center 765kV substation on line 11215 (Wilton Center – Dumont 765kV line) shunt inductor	6/1/2018	\$ 5.8	ComEd	3/9/2017
s1284	Rebuild the 138 kV Line 13304 (Rock Falls – Normandy) 11 miles of wood H frame construction with steel poles.	12/31/2018	\$ 13.2	ComEd	5/31/2017
s1439	Add 5 138kV CB's and reconfigure Bellwood 138kV substation bus from a straight bus to a ring bus to create 2 new line bays. Extend two new 138kV lines from Bellwood for 3.3 miles to a new customer substation.	12/1/2018	\$ 12.0	ComEd	12/18/2017
s1440	Replace Blue Island 345/138kV transformer 82. Remove tertiary cap bank and install 115MVar 138kV bus cap.	12/1/2018	\$ 12.0	ComEd	12/18/2017
s1442	Remove McCook 345/138kV Transformer 84 tertiary capacitor banks and install 138kV 115MVar capacitor banks	12/1/2018	\$ 6.0	ComEd	12/18/2017
s1444	Expand Davis Creek 345kV straight busses to breaker and half	12/1/2018	\$ 34.0	ComEd	12/14/2017
s1445	Install three 345kV breakers at Northbrook and allow independent operation of the transmission lines and transformers.	12/1/2019	\$ 8.5	ComEd	12/14/2017
	Retire SPOG 3-34, requiring switching to be performed in a specified order. Northbrook				
s1446	Replace Bedford Park open air 345kV bus with indoor GIS	12/1/2020	\$ 28.0	ComEd	12/14/2017

Illinois - Merchant Transmission Project Requests

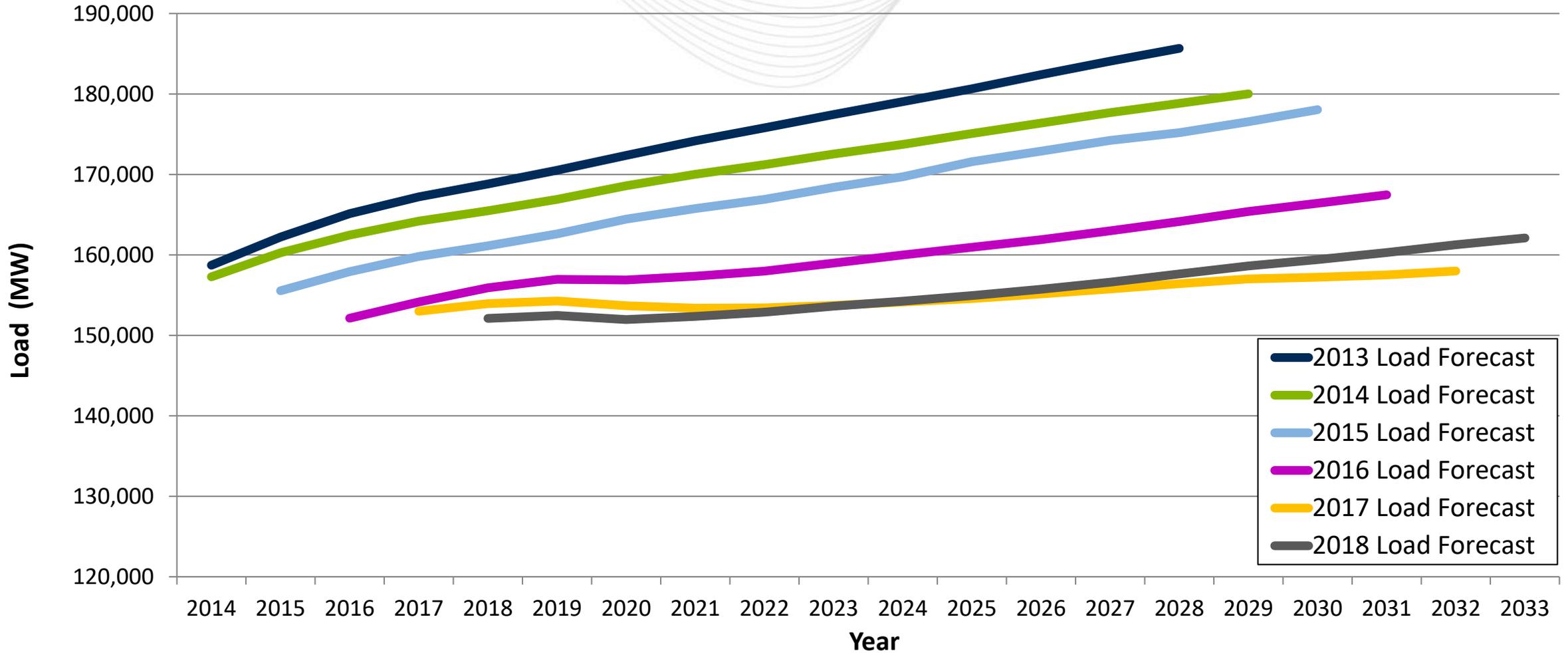


Queue	Project Name	MFO	Status	In Service Date	TO
S58	Collins	1600	Active	12/31/2020	ComEd

Planning

Load Forecast

PJM RTO Summer Peak Demand Forecast





Illinois – 2018 Load Forecast Report

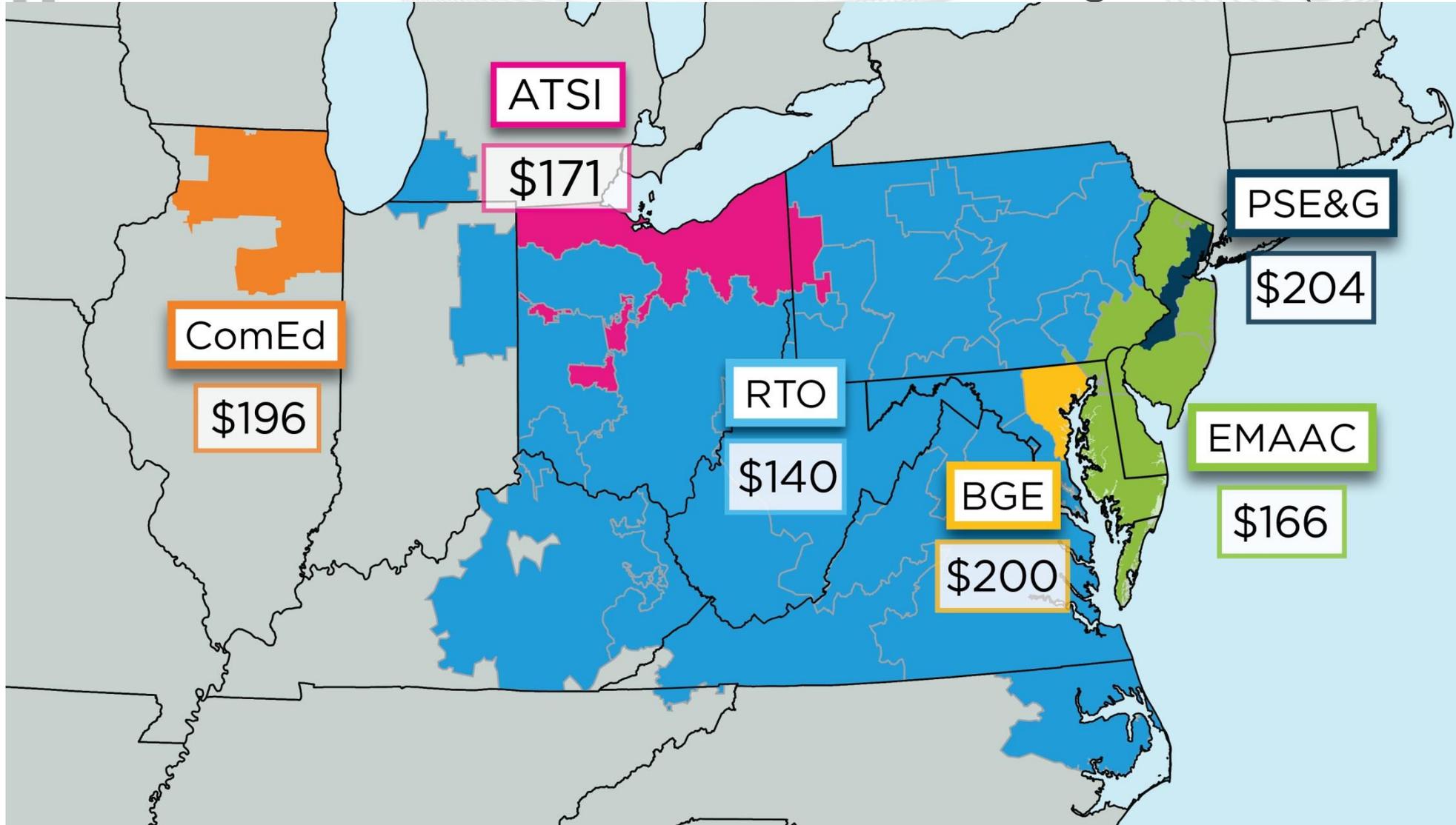
Transmission Owner	Summer Peak (MW)			Winter Peak (MW)		
	2018	2028	Growth Rate (%)	2017/18	2027/28	Growth Rate (%)
Commonwealth Edison Company	22,121	23,207	0.5%	15,714	16,329	0.4%
PJM RTO	152,108	157,635	0.4%	131,463	136,702	0.4%

* PJM notes that it does not serve the entire state of Illinois.

Markets

Capacity Market Results

2021/22 Base Residual Auction Clearing Prices (\$/MW-Day)



	Cleared MW (Unforced Capacity)	Change from 2020/21 Auction
Generation	19,864	(2,030)
Demand Response	1,998	485
Energy Efficiency	771	68.6
Total	22,633	(1,477)

ComEd Locational Clearing Prices

Clearing Price: \$196



PJM - 2021/2022 Cleared MW (UCAP) by Resource Type

	Annual	Summer	Winter	Total
Generation	149,616 MW	54 MW	716 MW	150,385 MW
DR	10,674 MW	452 MW	- MW	11,126 MW
EE	2,623 MW	209 MW	- MW	2,832 MW
Total	162,912 MW	716 MW	716 MW	164,343 MW



Illinois – Offered and Cleared Resources in 2021/22 Auction

(May 23, 2018)

		Unforced Capacity
Generation	Offered MW	25,065
	Cleared MW	19,864
Demand Response	Offered MW	2,078
	Cleared MW	1,998
Energy Efficiency	Offered MW	788
	Cleared MW	771
Total Offered MW		27,930
Total Cleared MW		22,633

Markets

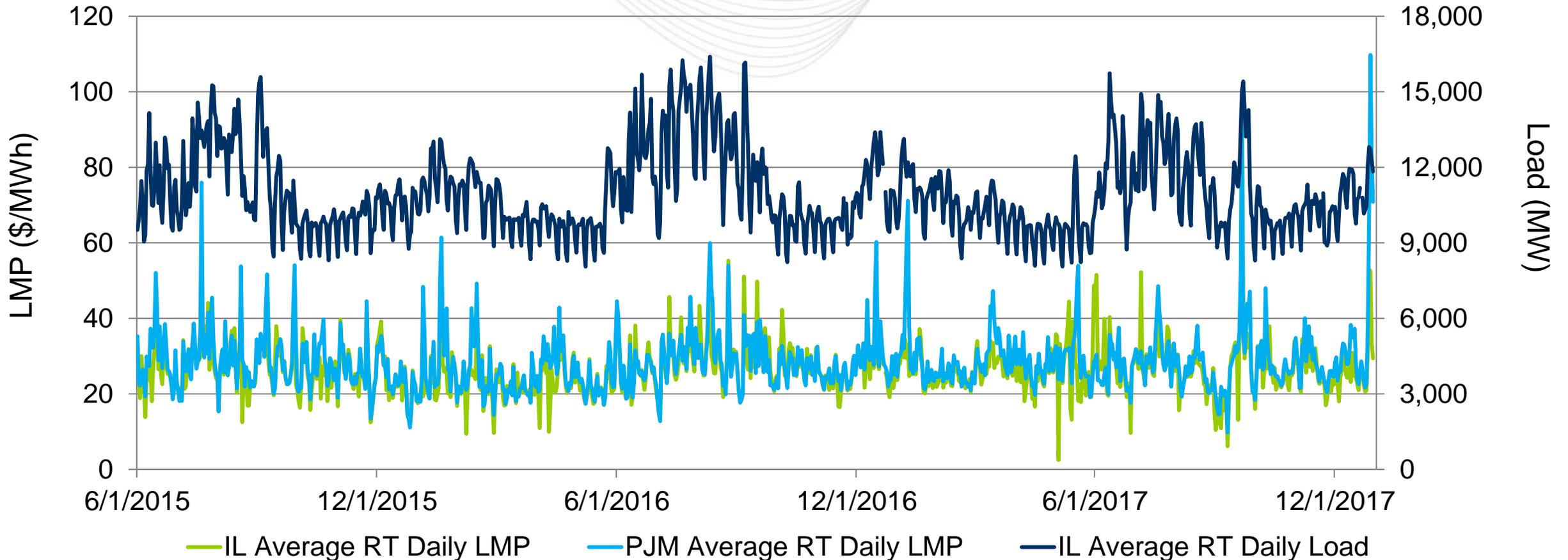
Market Analysis



Illinois - Average Daily Load and LMP

(June 1, 2015 - December 31, 2017)

Illinois' average daily LMPs generally align with the PJM average daily LMP



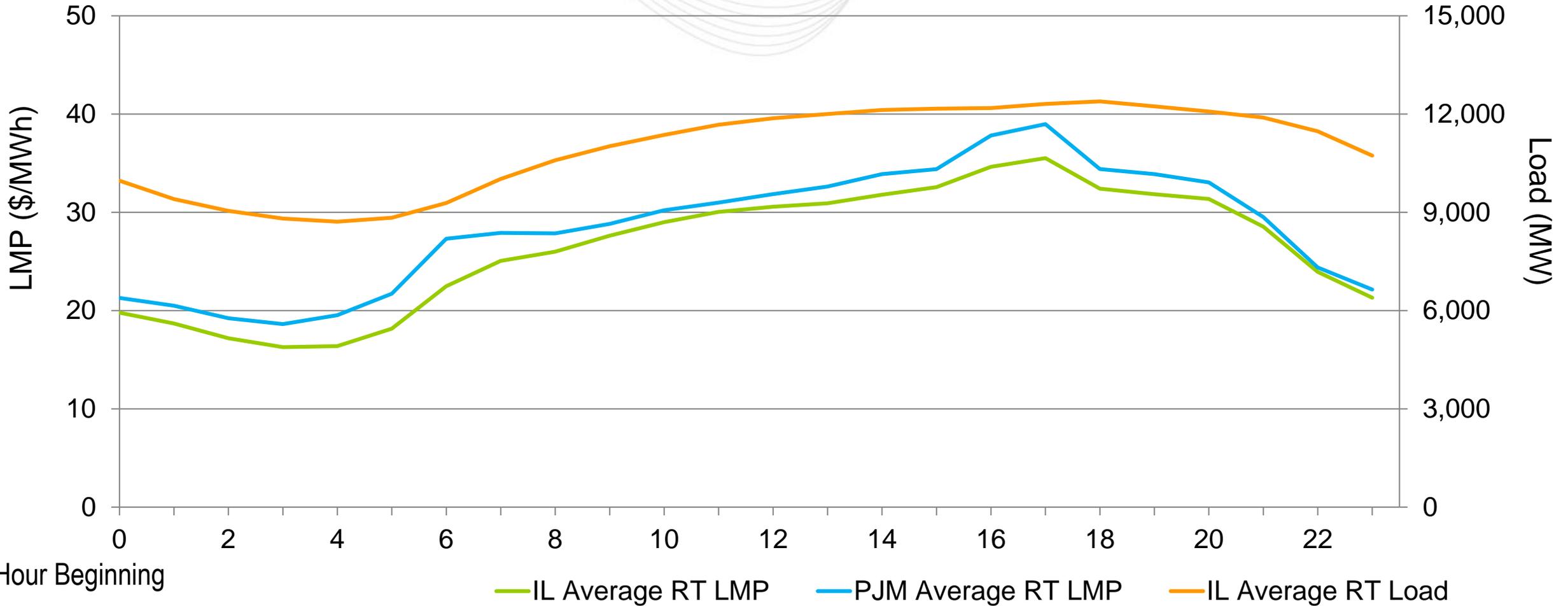
Note: The price spike on 9/21/2017 reflects the PJM shortage pricing event. The price spike starting 12/28/2017 reflects the beginning of the Cold Snap.



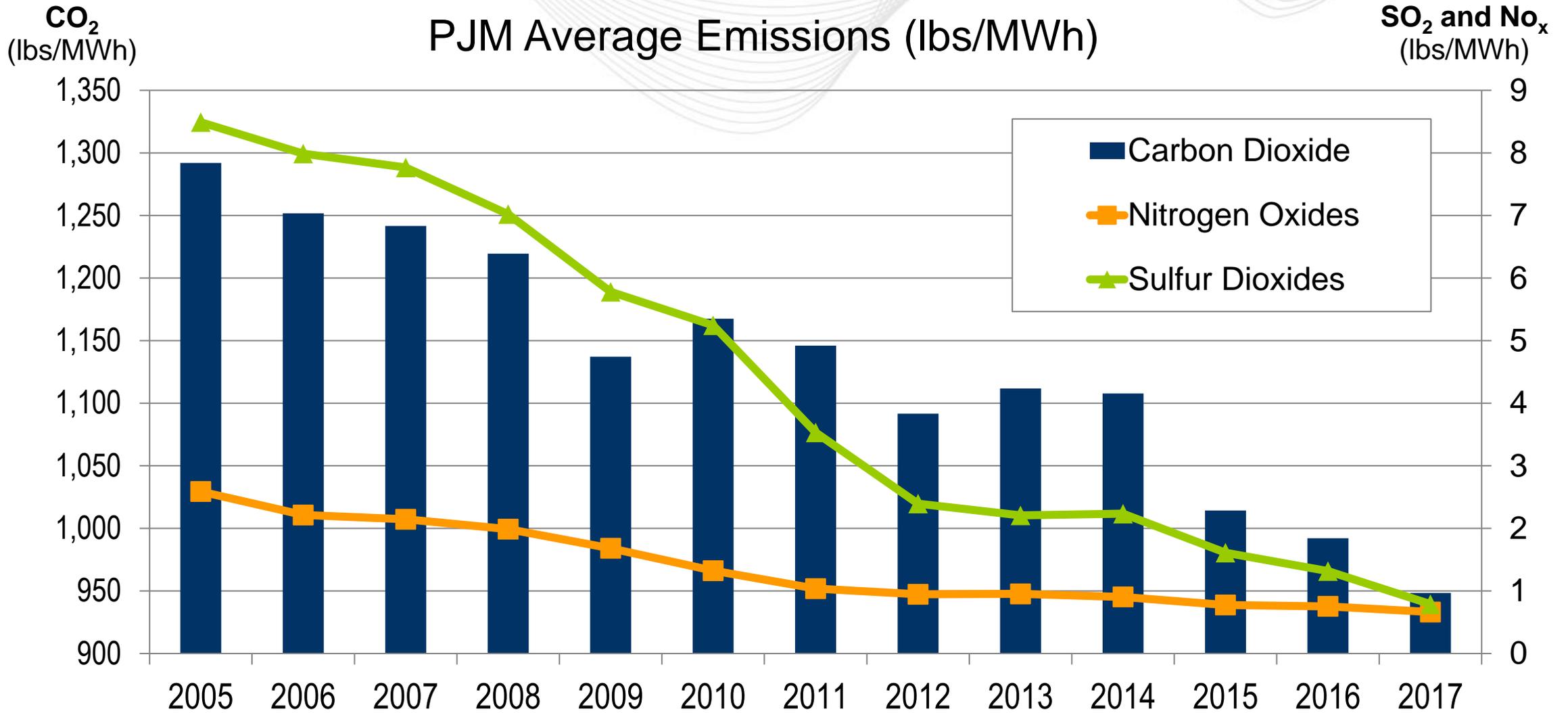
Illinois – Hourly Average LMP and Load

(June 1, 2015 – December 31, 2017)

Illinois' hourly LMPs generally aligned with the PJM average.



Operations Emissions Data



CO₂
(lbs/MWh)

Illinois Average Emissions (lbs/MWh)

SO₂ and No_x
(lbs/MWh)

