2020 Indiana State Infrastructure Report
(January 1, 2020 – December 31, 2020)

April 2021

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

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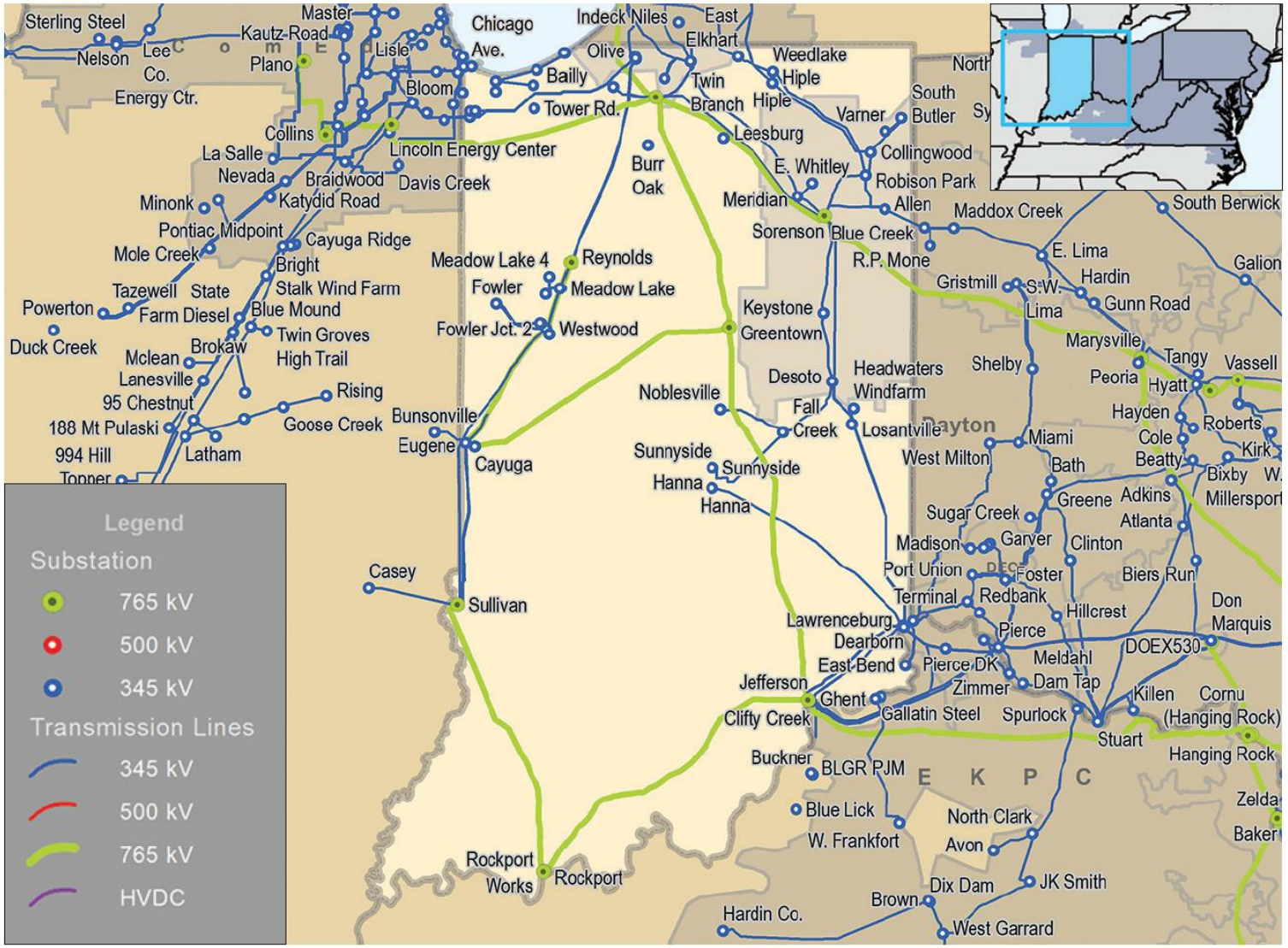
- **Existing Capacity:** Coal represents approximately 56.4 percent of the total installed capacity in the Indiana service territory while natural gas represents approximately 35.6 percent. Comparatively across PJM, natural gas and coal represent approximately 43.4 and 27.5 percent of capacity.
- **Interconnection Requests:** Solar represents 74.3 percent of interconnection requests in Indiana, while natural gas represents approximately 11.4 percent.
- **Deactivations:** Indiana had no generators give notice of deactivation in 2020.
- **RTEP 2020:** Indiana's 2020 RTEP projects total approximately $279.3 million in investment. Approximately 52 percent of that represents supplemental projects. These investment figures only represent RTEP projects that cost at least $5 million.

- **Load Forecast:** Indiana's load served within the AEP portion of PJM's footprint is projected to grow at about 0.4 annually over the next ten years. Comparatively, the overall PJM RTO projected load growth rate is 0.3 percent.
- **2022/23 Capacity Market:** No Base Residual Auction was conducted in 2020. For the most recent auction results, please see the 2018 Indiana State Infrastructure Report.
- **1/1/20 – 12/31/20 Market Performance:** Indiana's average hourly LMPs generally aligned with the PJM average hourly LMP.
- **Emissions:** 2020 carbon dioxide, sulfur dioxide, and nitrogen oxide emissions are all down from 2019.

PJM Service Area – Indiana



The PJM service area in Indiana is the AEP zone and is represented by the shaded portion of the map.

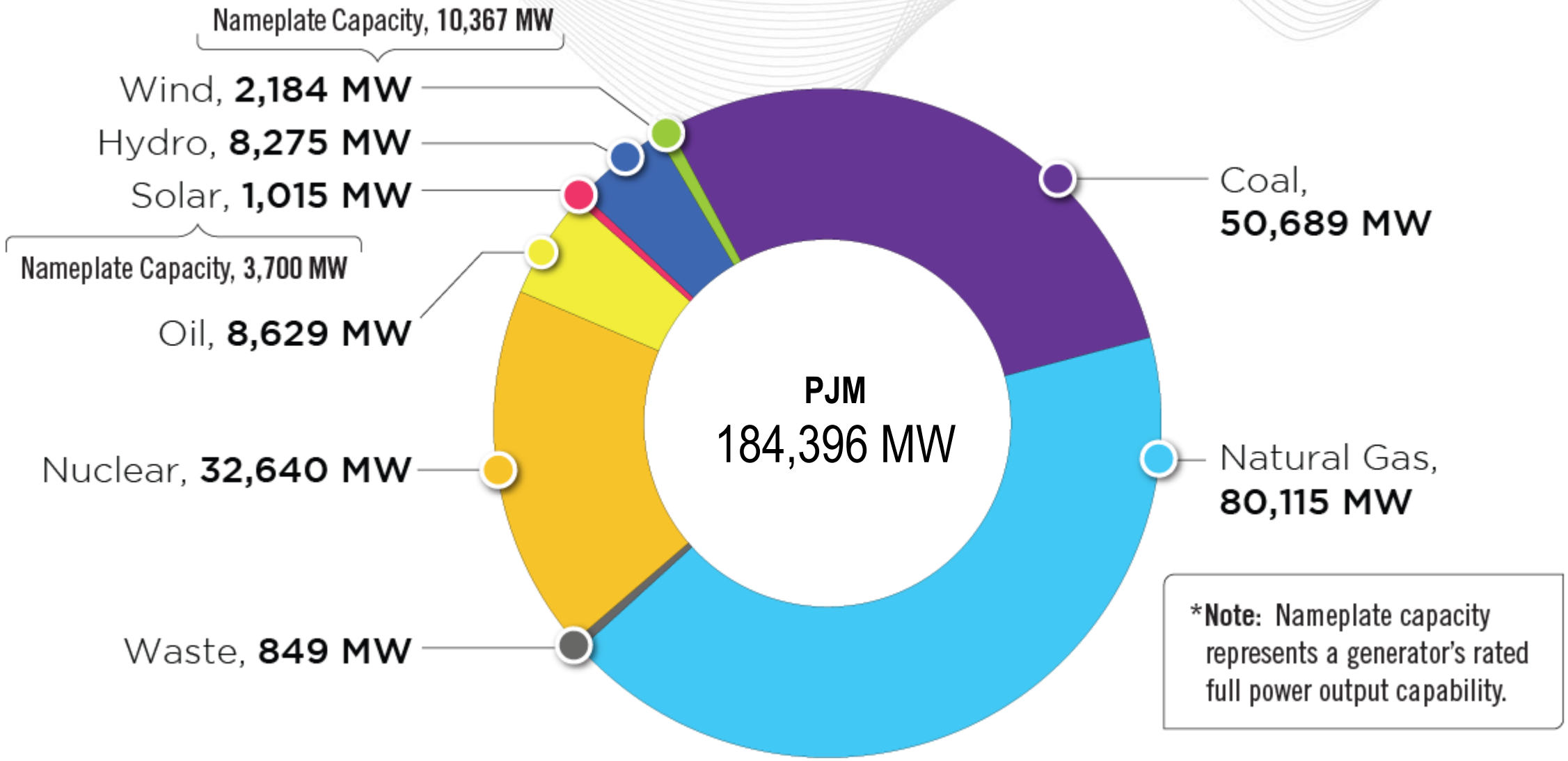
PJM operates transmission lines that extend beyond the service territory.

Planning

Generation Portfolio Analysis

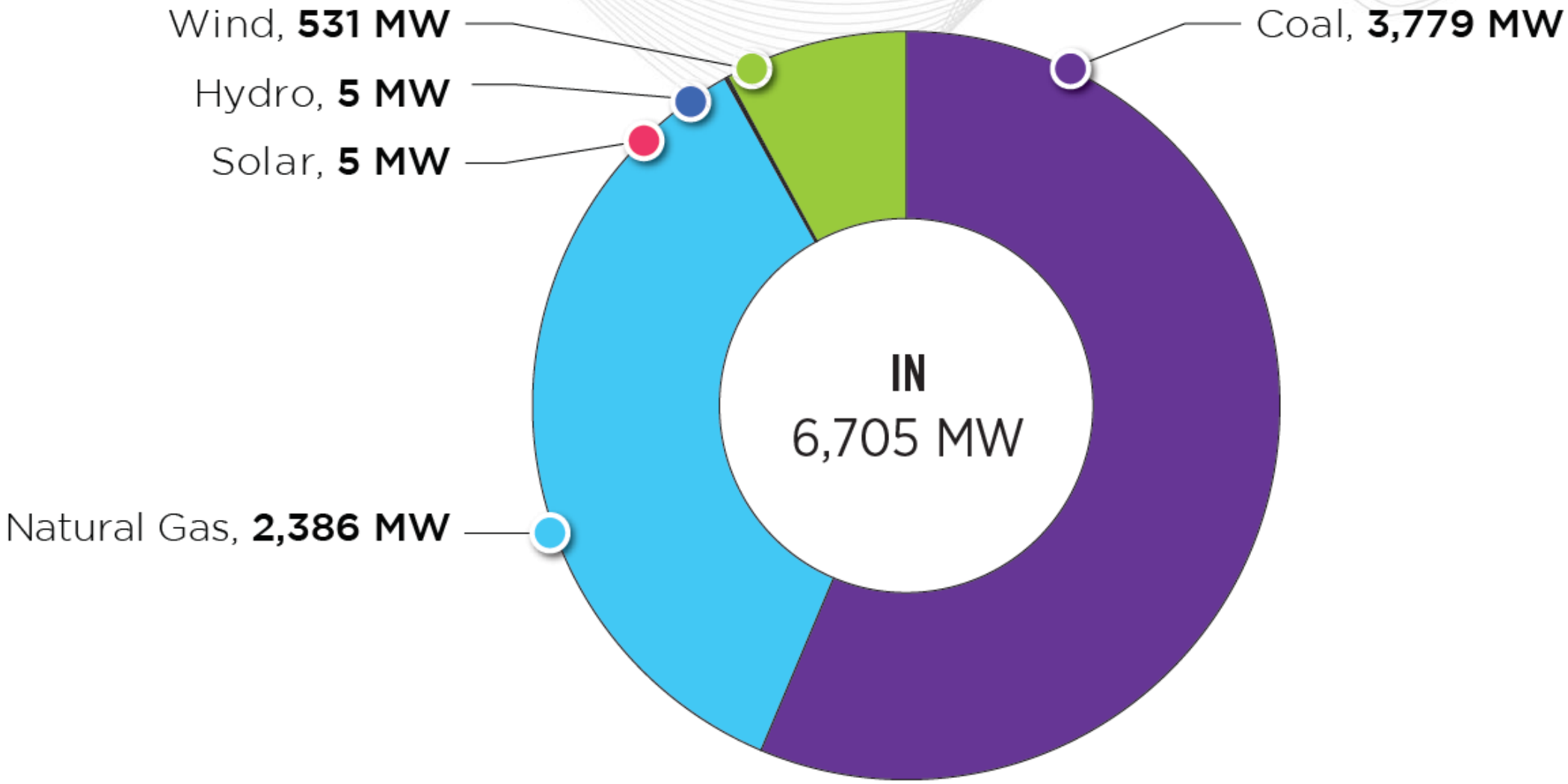
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2020)



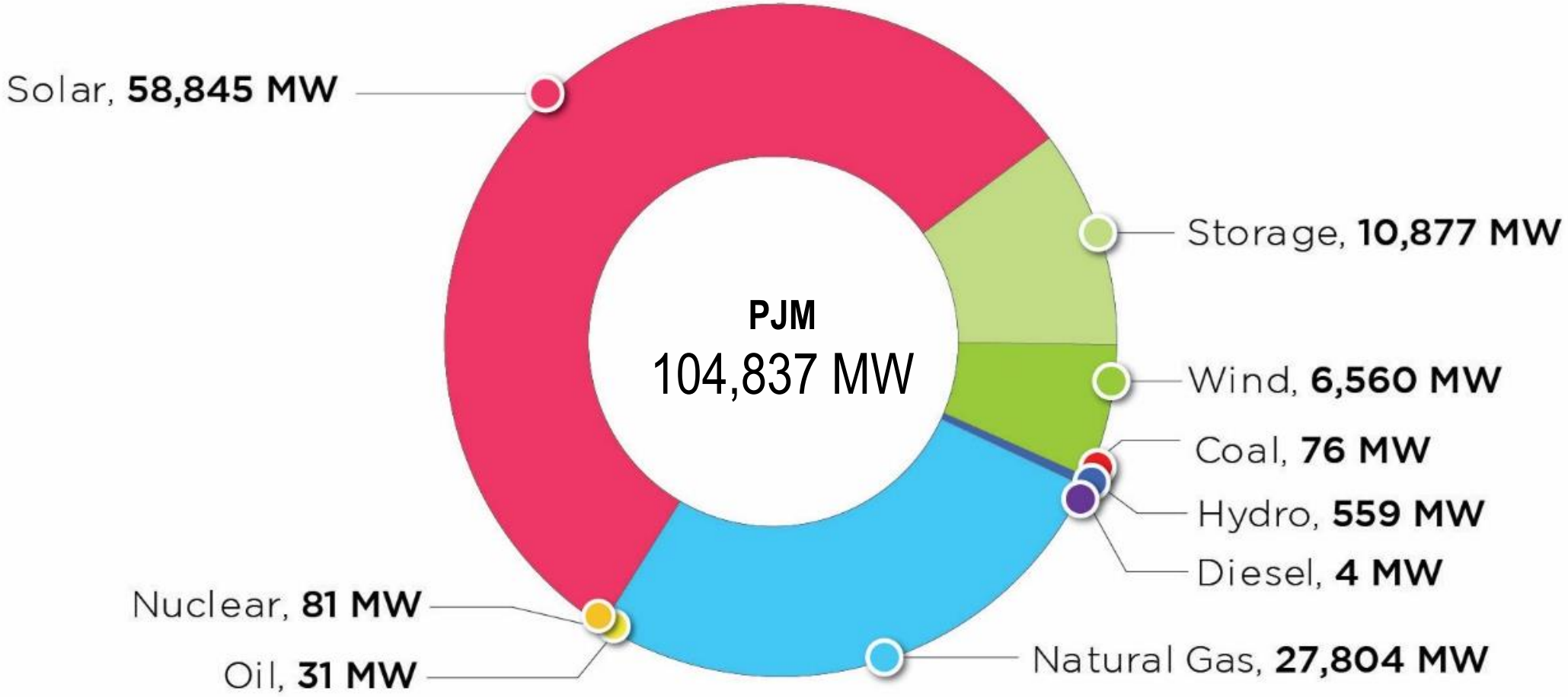
Indiana – Existing Installed Capacity

(CIRs – as of Dec. 31, 2020)



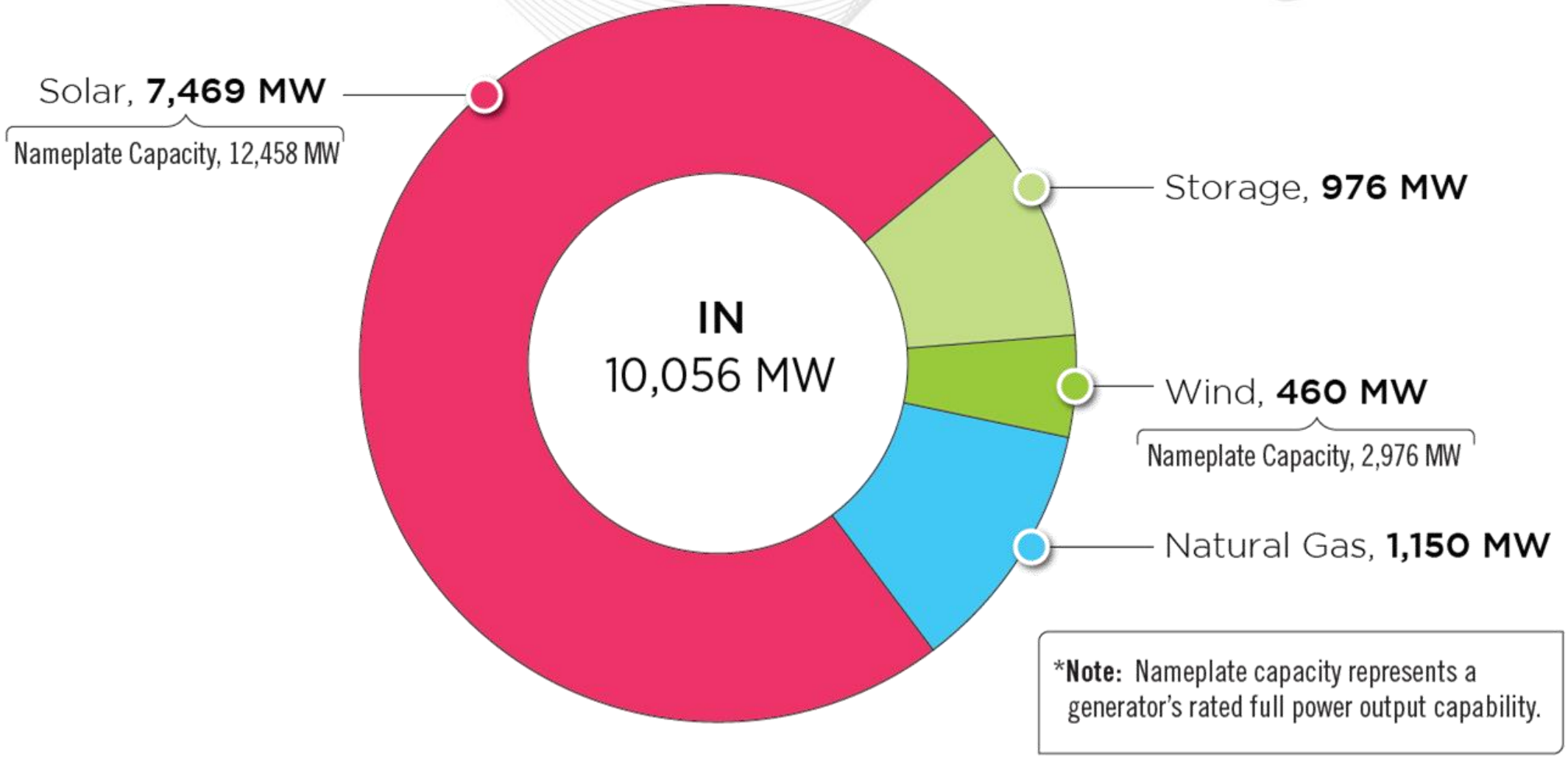
PJM – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2020)



Indiana – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2020)



Indiana – Interconnection Requests by Fuel Type

(Unforced Capacity – as of Dec. 31, 2020)

		In Queue				Complete					
		Active		Under Construction		In Service		Withdrawn		Grand Total	
		Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)	Projects	Capacity (MW)
Non-Renewable	Coal	0	0.0	0	0.0	4	66.0	2	901.0	6	967.0
	Natural Gas	2	1,100.0	1	50.0	5	811.0	2	1,747.0	10	3,708.0
	Storage	14	976.3	0	0.0	0	0.0	9	382.1	23	1,358.5
Renewable	Methane	0	0.0	0	0.0	2	8.0	1	3.6	3	11.6
	Solar	78	7,469.4	0	0.0	3	5.1	22	3,281.2	103	10,755.6
	Wind	16	433.9	1	26.0	10	388.9	45	1,699.7	72	2,548.5
	Grand Total	110	9,979.6	2	76.0	24	1,279.0	81	8,014.6	217	19,349.2

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

Indiana – Progression History of Interconnection Requests

Projects withdrawn after final agreement			Nameplate Capacity
3	Interconnection Service Agreements	71 MW	420 MW

Percentage of planned capacity and projects that have reached commercial operation	14% Requested capacity megawatts	23% Requested projects

This graphic shows the final state of generation submitted to the PJM queue that completed the study phase as of Dec. 31, 2020, 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, 2020.

Indiana – Generation Deactivation Notifications Received in 2020

Indiana had no generators give notice of deactivation in 2020.

Planning

Transmission Infrastructure Analysis

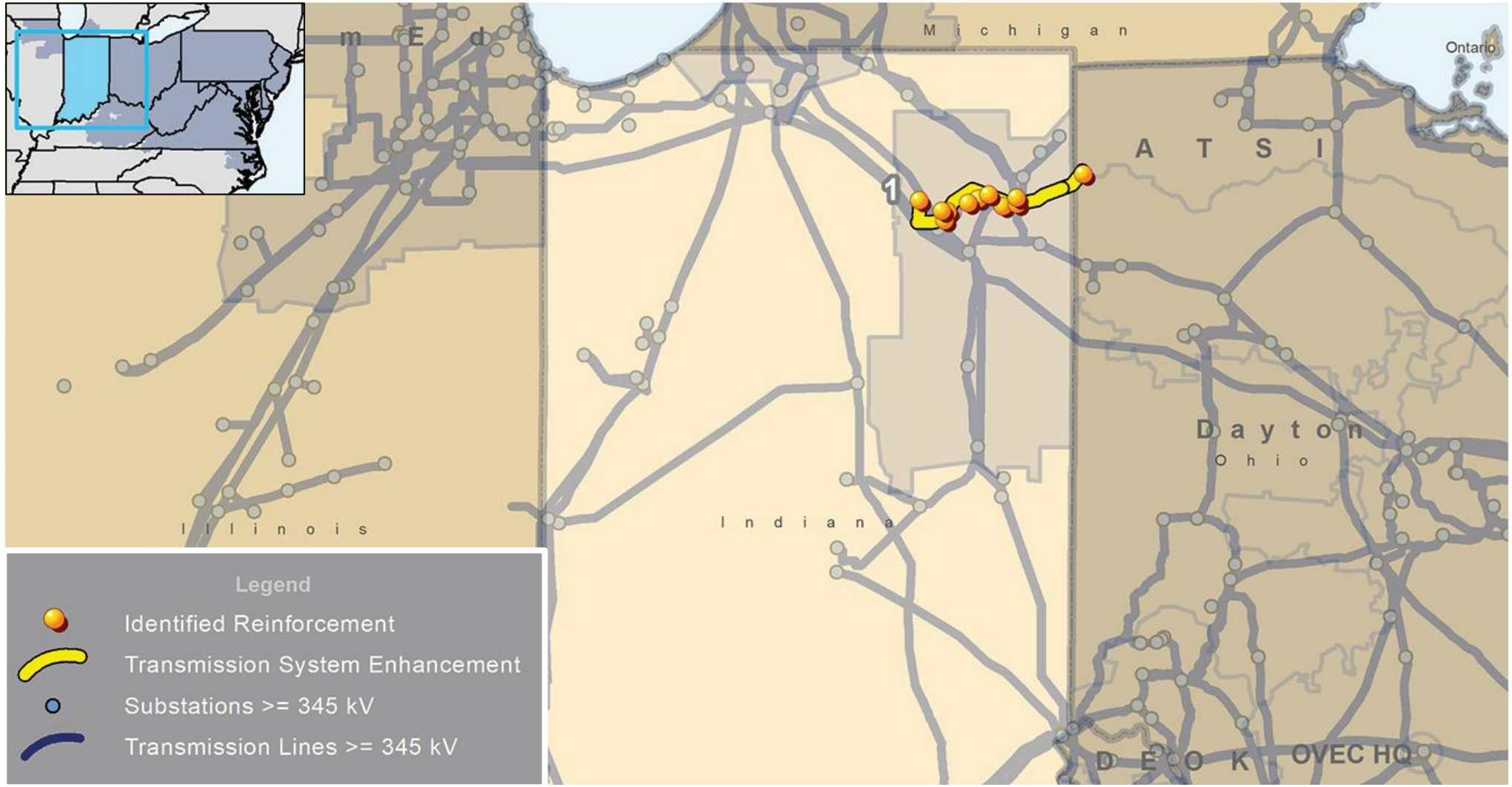
Please note that PJM historically used $5 million as the threshold for listing projects in the RTEP report. Beginning in 2018, it was decided to increase this cutoff to $10 million. All RTEP projects with costs totaling at least $5 million are included in this state report. However, only projects that 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/planning/project-construction

Indiana – RTEP Baseline Projects

(Greater than $10 million)



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

Indiana – RTEP Baseline Projects

(Greater than $5 million)

Map ID	Project	Description	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	b3151	Rebuild the ~30 mile Gateway-Wallen 34.5 kV circuit as the ~27 mile Gateway-Wallen 69 kV circuit.	6/1/2024	$113.00	AEP	11/22/2019
		Retire the ~3 mile Columbia-Whitley 34.5 kV line.				
		At Gateway station, remove all 34.5 kV equipment and install one 69 kV circuit breaker for the new Whitley line entrance.				
		Rebuild Whitley as a 69 kV station with two line and one bus tie circuit breakers.				
		Replace the Union 34.5 kV switch with a 69 kV switch structure.				
		Replace the Eel River 34.5 kV switch with a 69 kV switch structure.				
		Install a 69 kV Bobay switch at Woodland Station.				
		Replace Carroll and Churubusco 34.5 kV stations with the 69 kV Snapper station. Snapper will have two line circuit breakers, one bus tie circuit breaker and a 14.4 MVAR cap bank.				
		Remove 34.5 kV circuit breaker AD at Wallen station.				
		Rebuild the 2.5 mile Columbia-Gateway 69 kV line.				
		Rebuild Columbia station in the clear as a 138/69 kV station with two 138/69 kV transformers and four-breaker ring buses on the high and low side. Station will reuse 69 kV breakers J and K and 138 kV breaker D.				
		Rebuild the 13 mile Columbia-Richland 69 kV line.				
		Rebuild the 0.5 mile Whitley-Columbia City No. 1 line as 69 kV.				
		Rebuild the 0.5 mile Whitley-Columbia City No. 2 line as 69 kV.				
		Rebuild the 0.6 mile double-circuit section of the Rob Park-South Hicksville / Rob Park-Diebold Road as 69 kV.				

Indiana – RTEP Baseline Projects

(Greater than $5 million)

Map ID	Project	Description	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
	b3149	Rebuild the 2.3 mile Decatur – South Decatur 69 kV line using 556 ACSR in order to alleviate the overloads.	6/1/2024	$9.30	AEP	11/22/2019
	b3270	Install 1.7 miles of 795 ASCR 138kV conductor along the other side of Dragoon Tap 138 kV line, which is currently double circuit tower with one position open. Additionally, install a 2nd 138/34.5 kV transformer at Dragoon, install a high side circuit switcher on the current transformer at Dragoon Station, and install 2-138 kV line breakers on the Dragoon-Jackson 138 kV and Dragoon-Twin Branch 138 kV lines.	6/1/2025	$6.89	AEP	10/6/2020
		Replace Dragoon 34.5 kV Breakers "B", "C" and "D" with 40 kA breakers.				11/4/2020
	b3150	Rebuild Ferguson 69/12 kV station in the clear as the 138/12 kV Bear station and connect it to a ~1 mile double circuit 138 kV extension from the Aviation – Ellison Rd 138 kV line to remove the load from the 69 kV line.	6/1/2024	$6.40	AEP	11/22/2019

Indiana – RTEP Network Projects

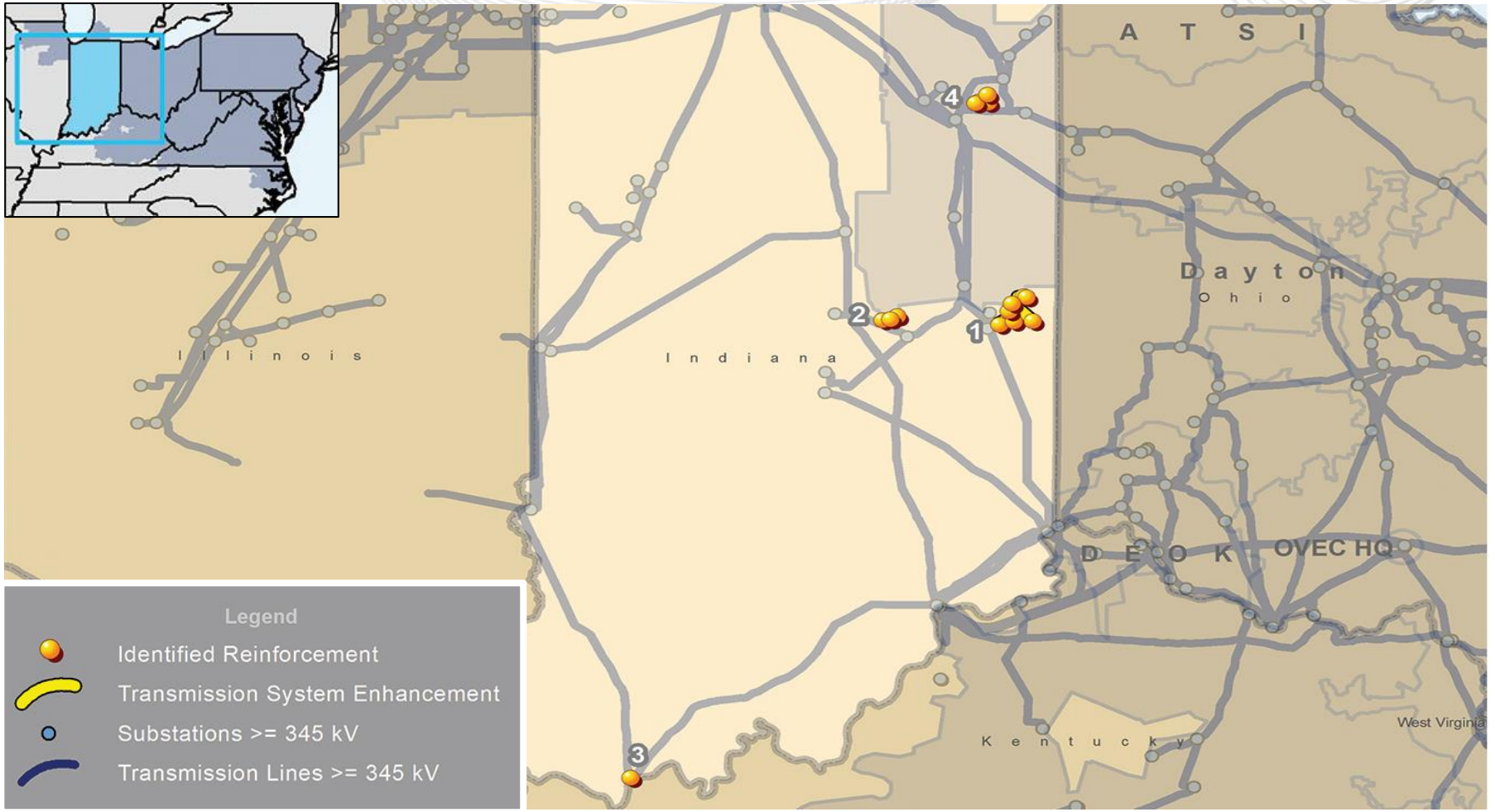
(Greater than $5 million)

Indiana had no network project upgrades in 2020.

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.

Indiana – TO Supplemental Projects

(Greater than $10 million)



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.

Indiana – TO Supplemental Projects

(Greater than $5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	s2273	Rebuild the 1.25 mile long Anchor Hocking-Winchester 69 kV circuit.	8/1/2025	$68.50	AEP	5/22/2020
		Expand and upgrade Anchor Hocking 69 kV station to a five-breaker ring bus to accommodate five elements (two transmission lines and three distribution transformers).				
		Replace circuit breakers A and B at Winchester 69 kV station.				
		At Modoc station, replace 138/69 kV Transformer No. 1. Install a three-breaker ring bus eliminating the three-terminal line.				
		At Randolph station, replace 138/69/12 kV Transformer No. 1 with a 138/69 kV 90 MVA unit. Move the distribution load to a new 138/12kV transformer and install a 138 kV bus tie circuit breaker. Replace cap switcher AA.				
		At Lynn station, install two 69 kV switches for sectionalizing.				
		Replace the Huntsville (REMC) switch structure on the Modoc-Winchester 69 kV line.				
		Rebuild the 13.4 mile Modoc-Winchester 69 kV line with 11.3 miles as single circuit and 2.1 miles as double circuit.				
		Rebuild the 5.7 mile Buena Vista-Lynn 69 kV line as double circuit.				
		Retire Lobdell station. Move the load from 69 kV to 12 kV.				
		Retire Buena Vista Switch 69 kV.				

Indiana – TO Supplemental Projects

(Greater than $5 million)

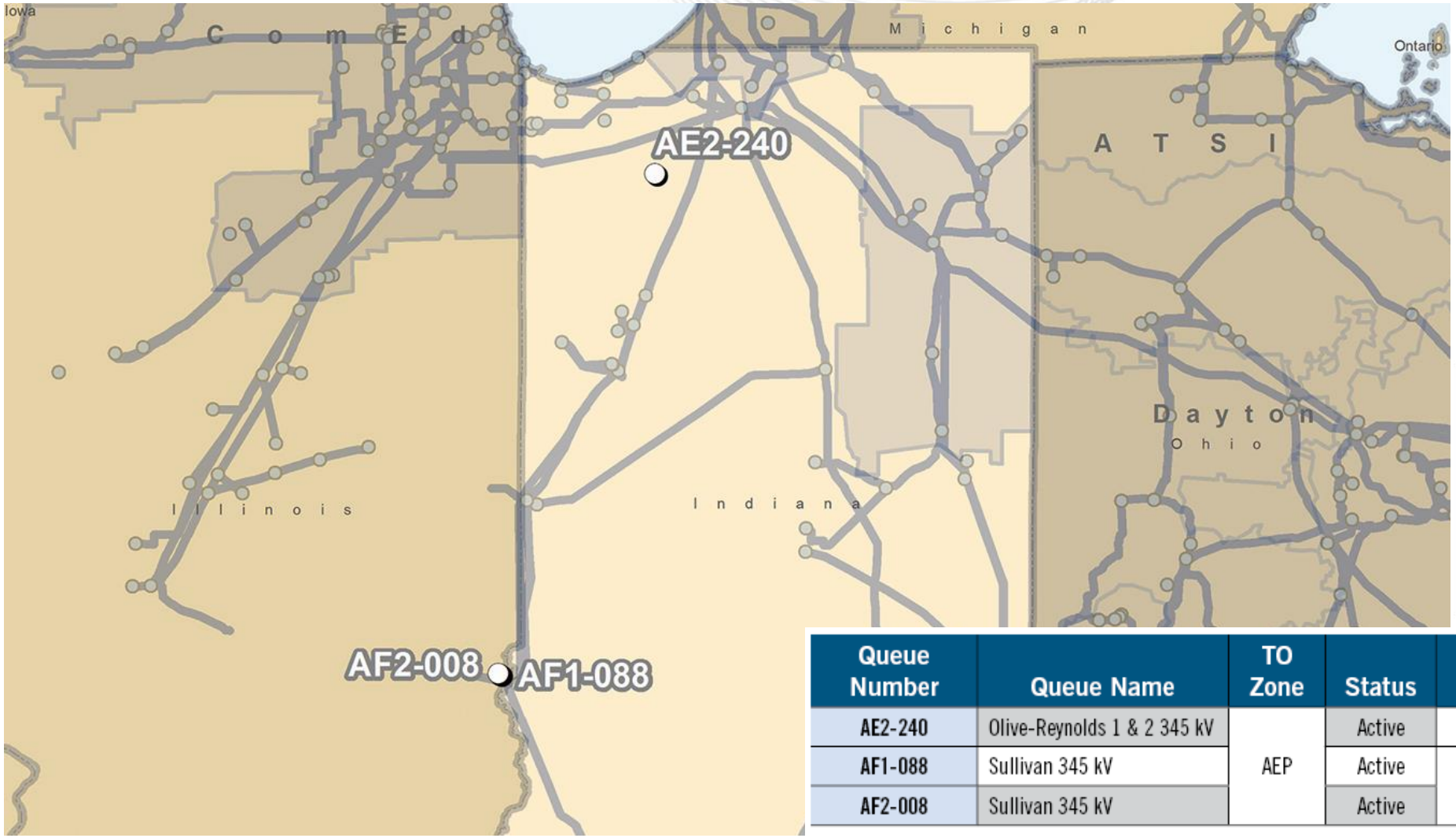
Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
2	s2274	Rebuild a 4.17 mile portion of the Madison-Pendleton 138 kV single circuit line with DRAKE 795 ACSR 26/7.	5/1/2023	$10.50	AEP	5/22/2020
		At Meadowbrook station, install two 138 kV circuit breakers to eliminate the three-terminal line.				
3	s2280	Replace Rockport CBs B, B2, C and C2 with 765kV SFMT 4000A CBs.	10/1/2024	$18.50		6/2/2020
4	s2344	Rebuild the ~5.8 mile 69 kV line from Colony Bay to the McKinley-Bass line.	4/3/2023	$15.60		7/17/2020
		Add a 69 kV bus tie CB to Hadley station.				
	s2196	Cut into the existing South Bend-New Carlisle 138kV line and install tap structures for the Ameriplex extension.	6/1/2021	$9.60		2/21/2020
		Install 1.75 miles of double circuit 138kV, 795 ACSR, off of the New Carlisle-South Bend 138kV line between New Carlisle and Pine road to serve new Ameriplex station.				
		Install new greenfield station Ameriplex on new greenfield Ameriplex 138kV tap off of the New Carlisle-South Bend 138kV line. The transmission through path consists of one 138kV breaker, one MOAB and one 138kV bus.				

Indiana – TO Supplemental Projects

(Greater than $5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
	s2194	Rebuild the high side of Adams 138/69kV station as a 3 breaker ring bus, re-using the existing breaker "C," and replace 69kV Breaker "D"	1/2/2026	$8.00	AEP	2/21/2020
		Rebuild the through-path of Pennville 138kV station with 2 MOABS				
	s2212	Sullivan 765/345kV Station: Replace Sullivan CB A2 765kV CB and associated equipment.	2/1/2023	$7.10		3/10/2020
	s2193	Replace 69kV CB's A and B and add a low side 69kV CB. Add 2 138kV CB's on the line exits.	11/10/2021	$5.90		2/21/2020

Indiana – Merchant Transmission Project Requests

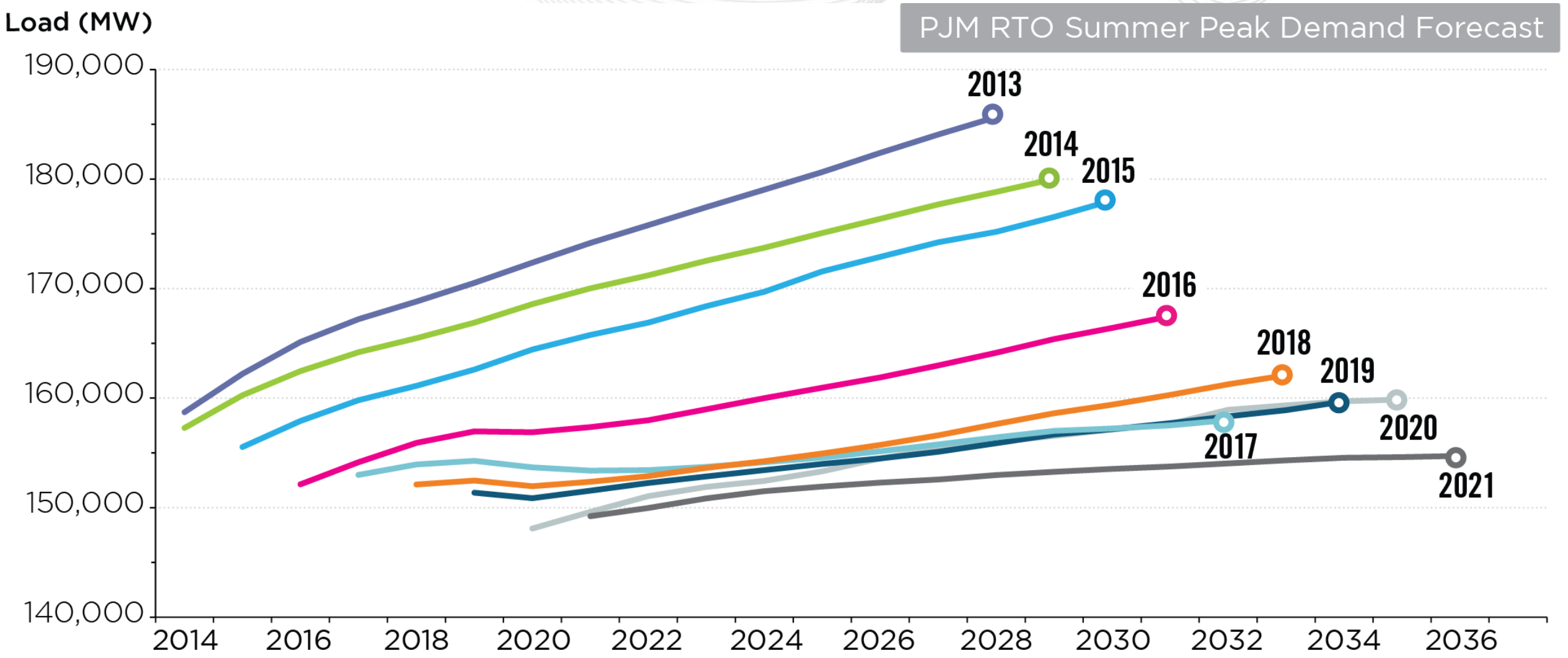


Queue Number	Queue Name	TO Zone	Status	Actual or Requested In-Service Date	Maximum Output (MW)
AE2-240	Olive-Reynolds 1 & 2 345 kV	AEP	Active	6/1/2019	3,170
AF1-088	Sullivan 345 kV		Active	12/31/2025	1,000
AF2-008	Sullivan 345 kV		Active		2,000

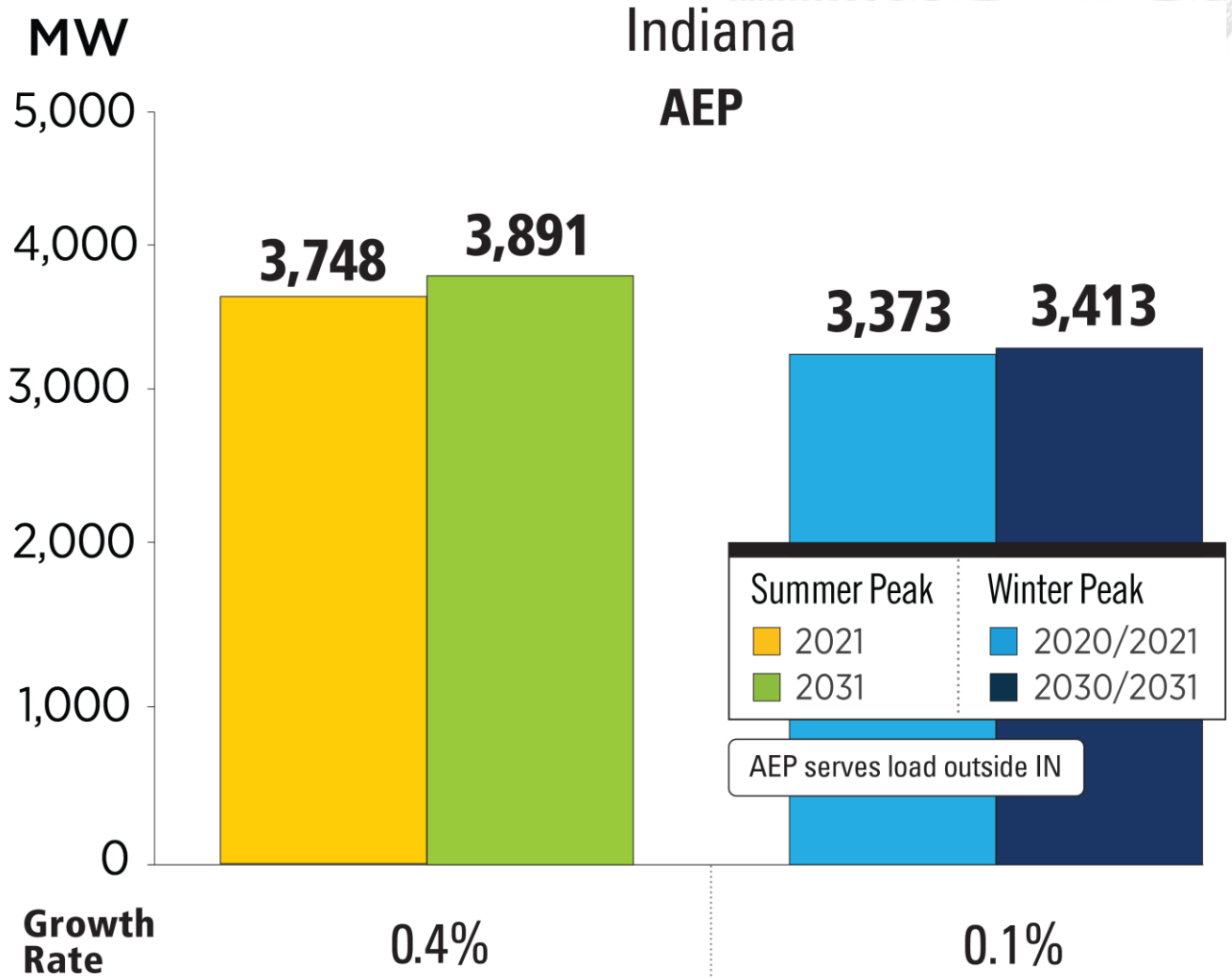
Planning
Load Forecast

PJM Annual Load Forecasts

(Jan. 2021)



Indiana – 2021 Load Forecast Report



PJM RTO Summer Peak		PJM RTO Winter Peak	
2021	2031	2020/2021	2030/2031
149,223 MW	153,759 MW	132,027 MW	135,568 MW
Growth Rate 0.3%		Growth Rate 0.2%	

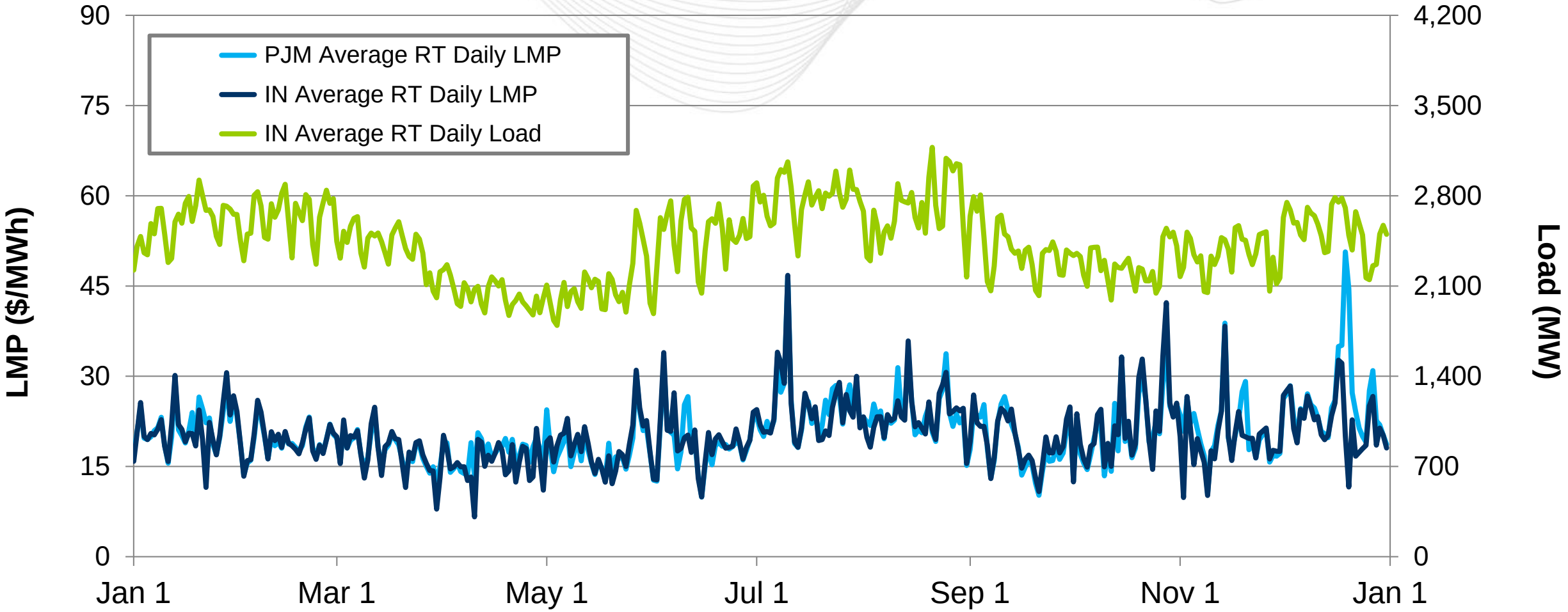
The summer and winter peak megawatt values reflect the estimated amount of forecasted load to be served by each transmission owner in the noted state/district. Estimated amounts were calculated based on the average share of each transmission owner's real-time summer and winter peak load in those areas over the past five years.

Markets

Market Analysis

Indiana – Average Daily LMP and Load

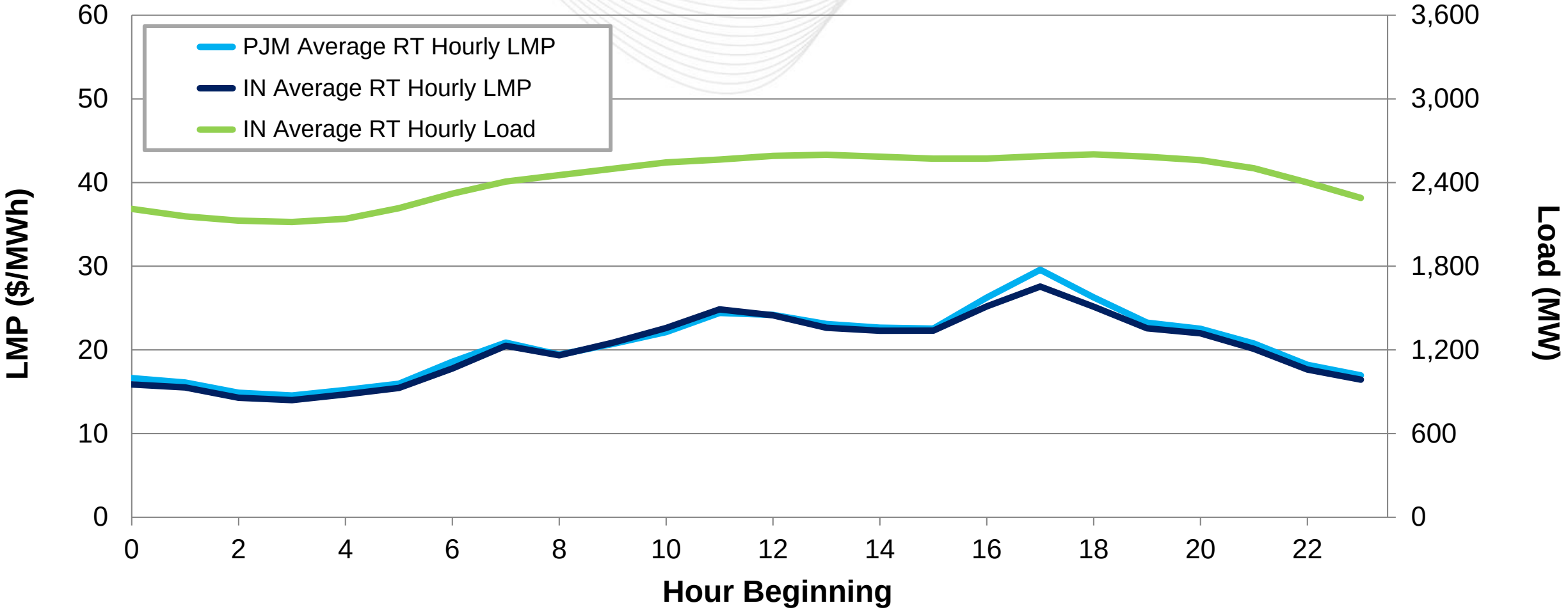
(Jan. 1, 2020 – Dec. 31, 2020)



Indiana – Average Hourly LMP and Load

(Jan. 1, 2020 – Dec. 31, 2020)

Indiana's average hourly LMPs generally aligned with the PJM average hourly LMP.



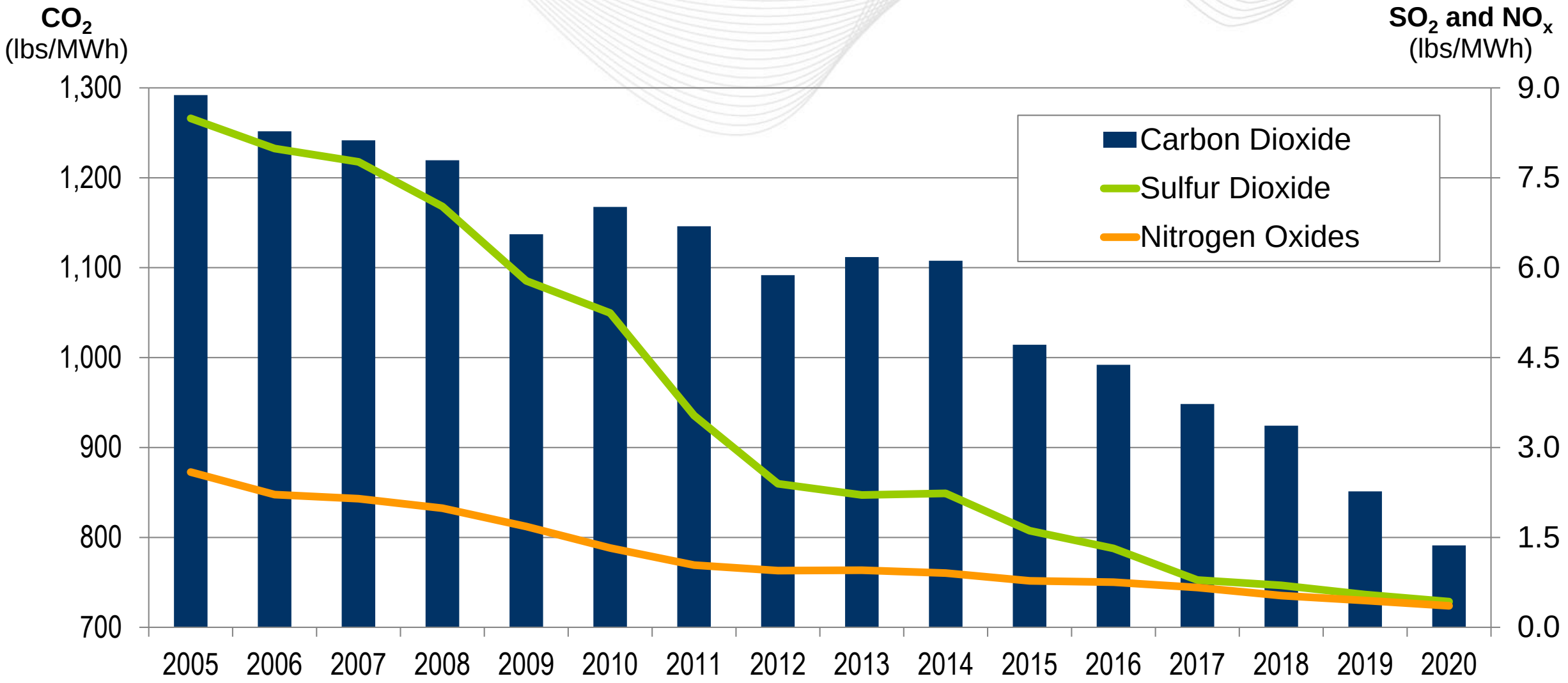
Indiana – Net Energy Import/Export Trend

(Jan. 2020 – Dec. 2020)

This chart reflects the portion of Indiana that PJM operates. Positive values represent exports and negative values represent imports.

Operations
Emissions Data

2005 – 2020 PJM Average Emissions



Indiana – Average Emissions (lbs/MWh)

(Feb. 2021)