2021 Indiana State Infrastructure Report
(January 1, 2021 – December 31, 2021)

May 2022

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

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- **Existing Capacity:** Coal represents approximately 55.8 percent of the total installed capacity in the Indiana service territory while natural gas represents approximately 35.2 percent. Comparatively across PJM, natural gas and coal represent approximately 44.2 and 26.6 percent of capacity.
- **Interconnection Requests:** Solar represents 66.5 percent of interconnection requests in Indiana, while storage represents approximately 20.3 percent.
- **Deactivations:** Indiana had no generators give notice of deactivation in 2021.
- **RTEP 2021:** Indiana's 2021 RTEP project total represents $254.8 million in investment.

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- **Load Forecast:** Indiana's summer peak load is projected to increase by 0.1 percent annually over the next ten years, while the winter peak is projected to increase by 0.3 percent.
- **1/1/21 – 12/31/21 Market Performance:** Indiana's average hourly LMPs generally aligned with the PJM average hourly LMP.
- **2022/23 Capacity Market:** The portion of Indiana within the PJM footprint cleared at the RTO price of $50/MW-day in the 2022/2023 Base Residual Auction.
- **Emissions:** Indiana's average CO2 emissions slightly increased in 2021 compared to 2020 levels.

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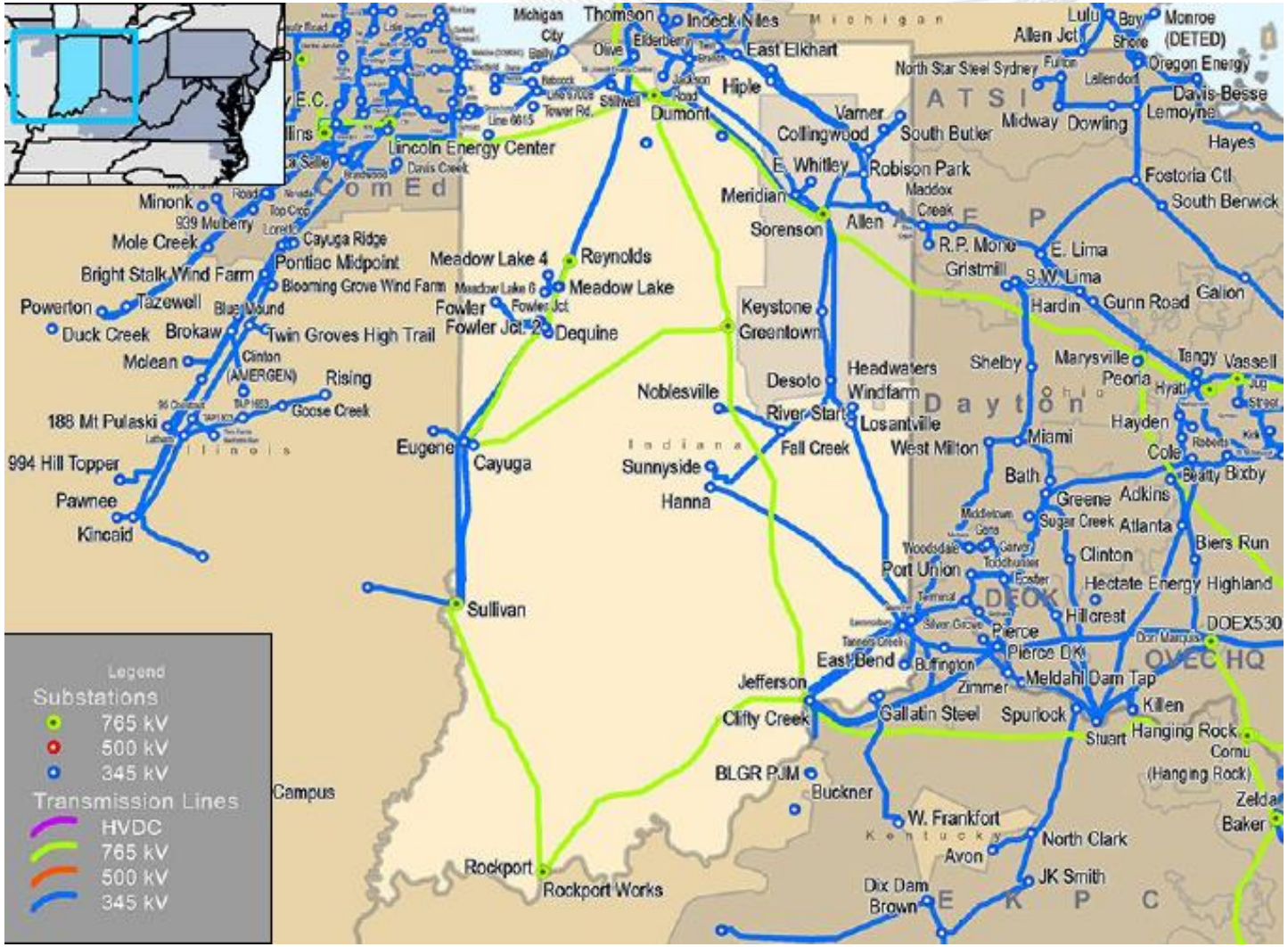
PJM Service Area – Indiana



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.

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Planning

Generation Portfolio Analysis

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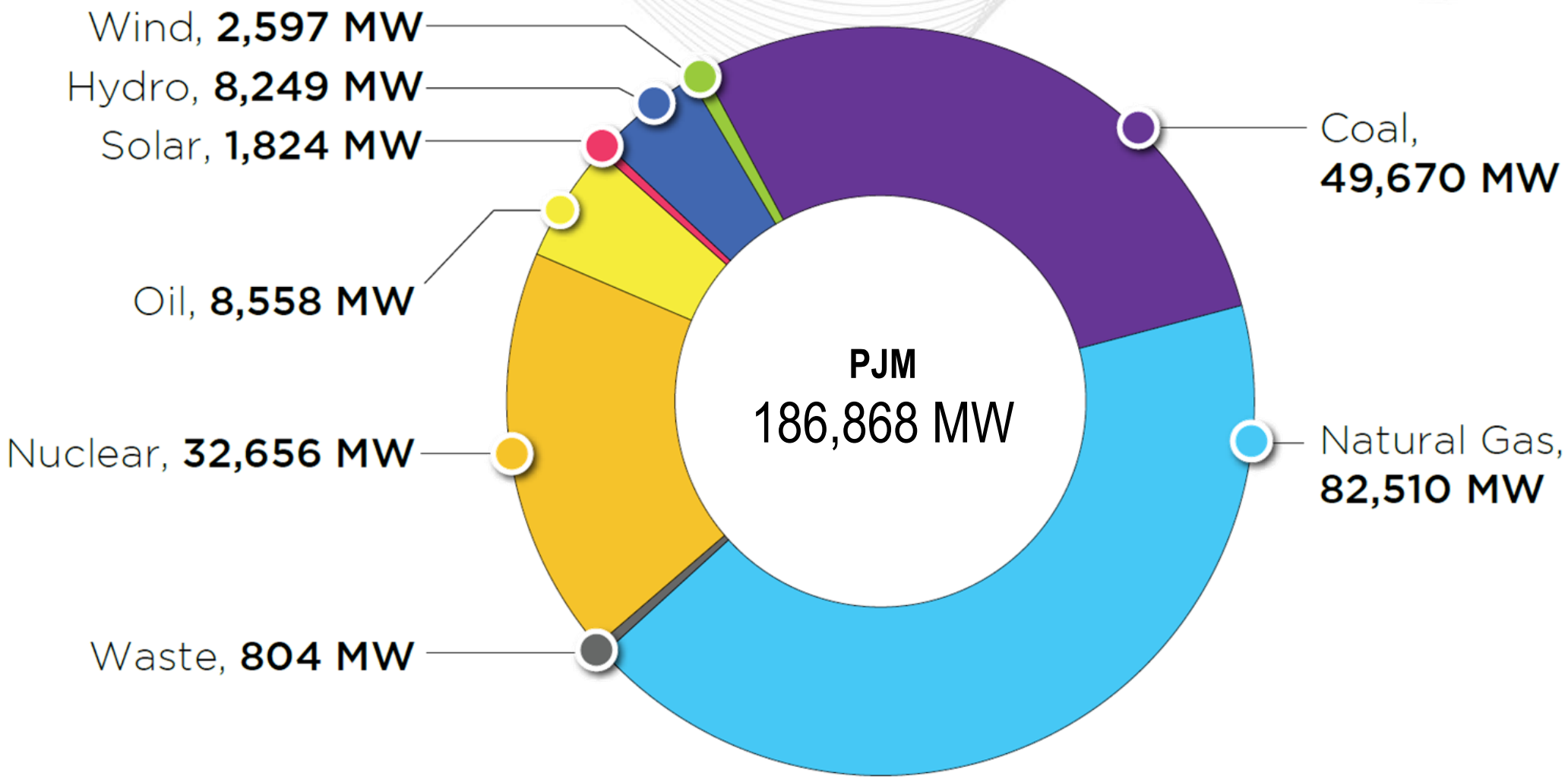
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



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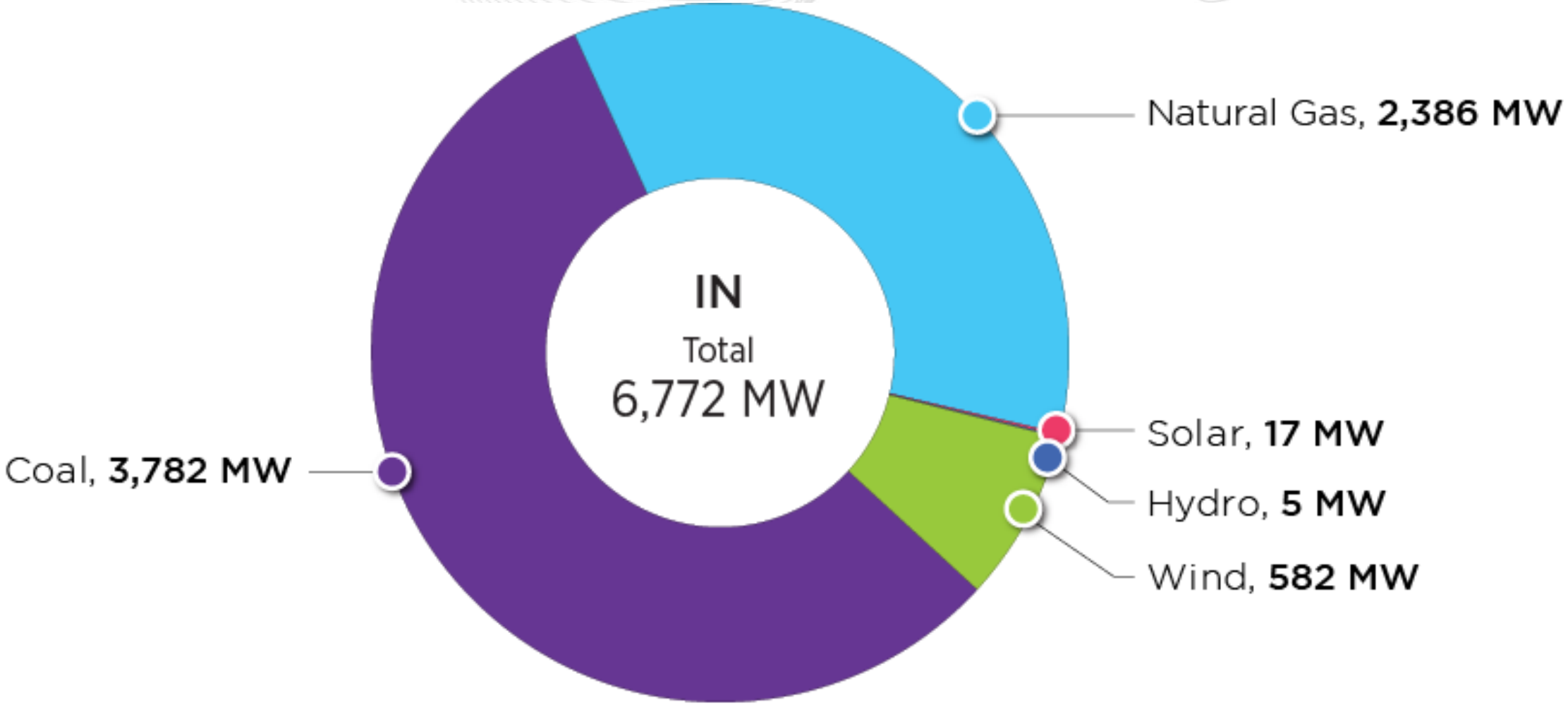
Indiana – Existing Installed Capacity

(CIRs – as of Dec. 31, 2021)



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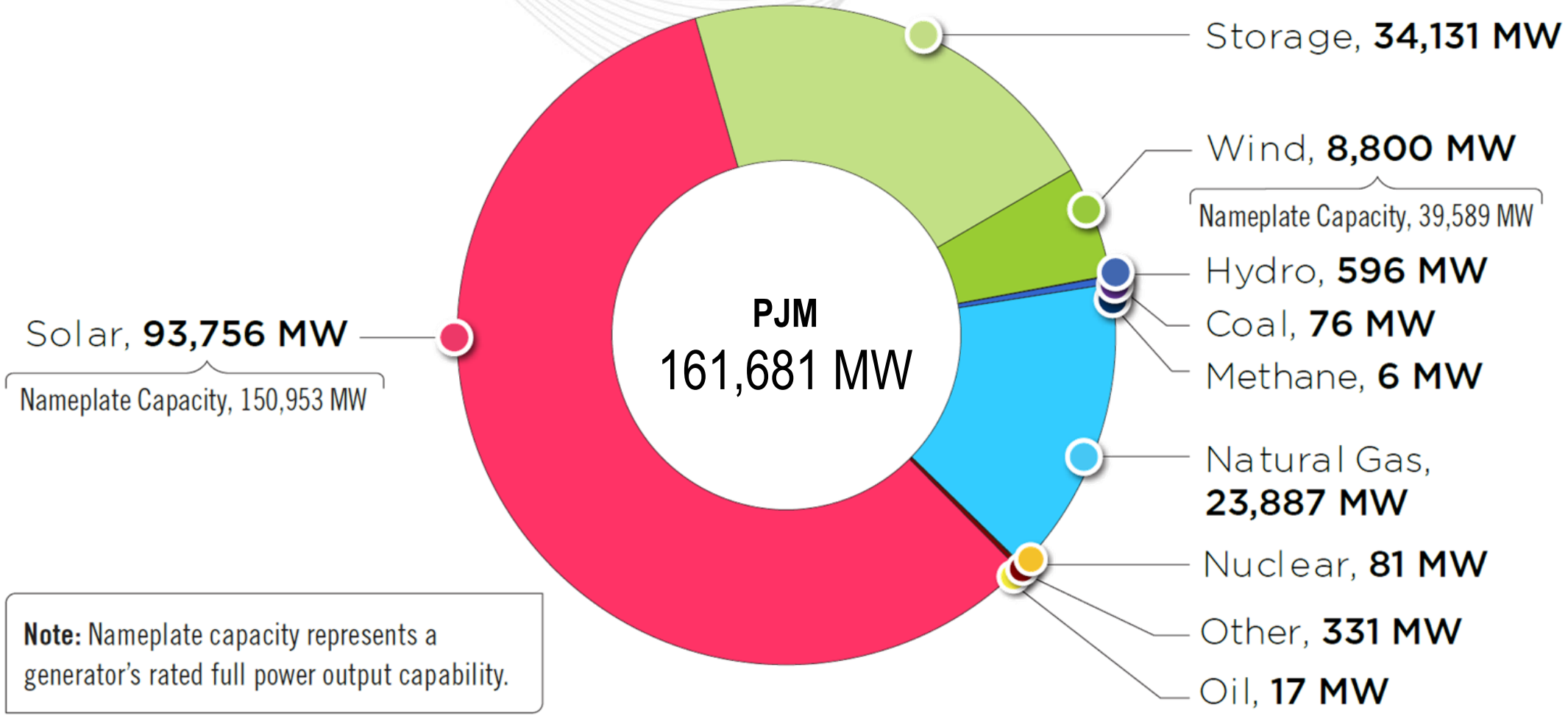
PJM – Queued Capacity (MW) by Fuel Type

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



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

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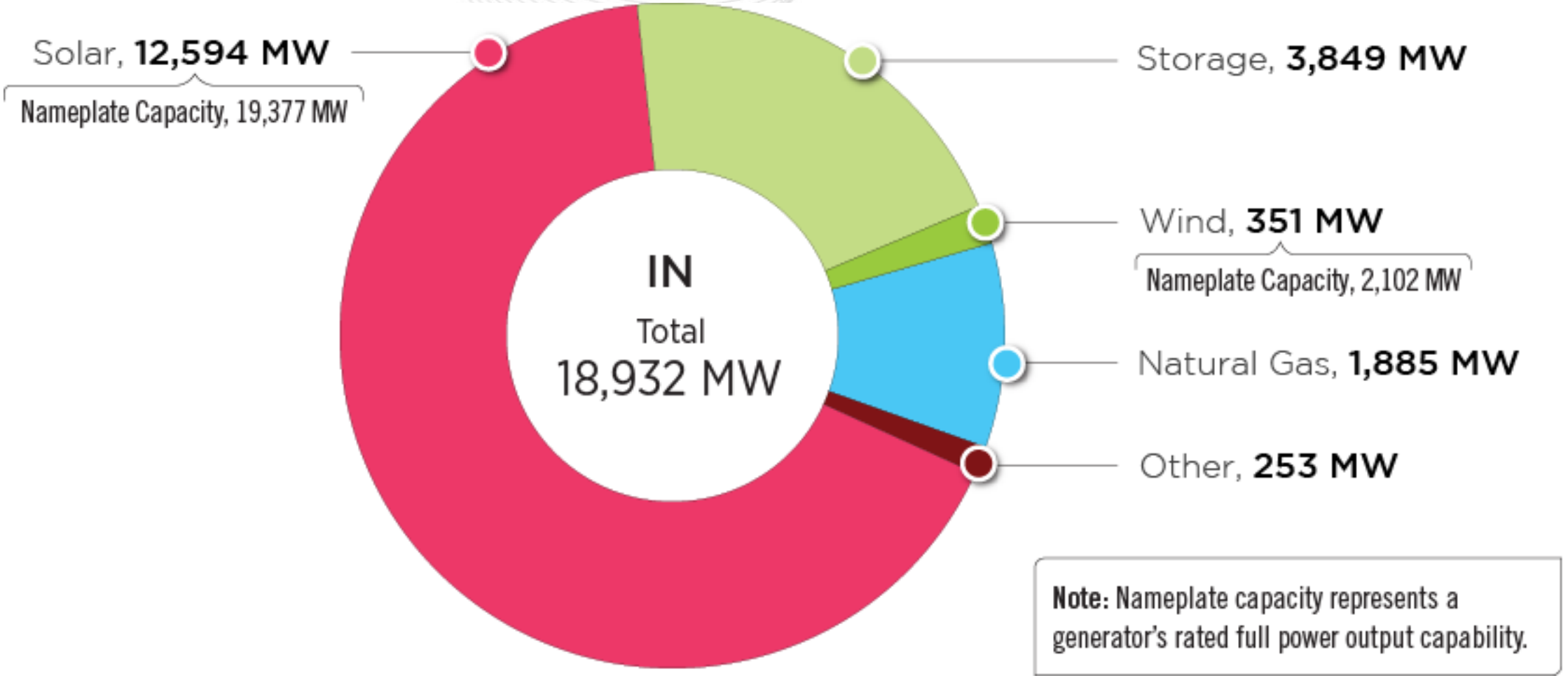
Indiana – Queued Capacity (MW) by Fuel Type

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



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Indiana – Historical Interconnection Requests by Fuel Type

(as of Dec. 31, 2021)

		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	4	1,835.0	1	50.0	5	811.0	2	1,747.0	12	4,443.0
	Other	1	253.4	0	0.0	0	0.0	0	0.0	1	253.4
	Storage	47	3,849.3	0	0.0	0	0.0	13	614.1	60	4,463.5
Renewable	Methane	0	0.0	0	0.0	2	8.0	1	3.6	3	11.6
	Solar	130	12,426.8	3	167.5	4	17.1	29	3,819.6	166	16,431.0
	Wind	12	350.8	0	0.0	11	414.9	50	1,835.6	73	2,601.3
	Grand Total	**194**	**18,715.3**	**4**	**217.5**	**26**	**1,317.0**	**97**	**8,921.0**	**321**	**29,170.8**

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

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Indiana – Progression History of Interconnection Requests

Percentage of planned capacity and projects that have reached commercial operation

13.8%	Requested capacity megawatts
22.8 %	Requested projects

			Capacity	Nameplate
Projects withdrawn after final agreement	3	Interconnection Service Agreements	74 MW	420 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.

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Indiana – Generation Deactivation Notifications Received in 2021

Indiana had no generators give notice of deactivation in 2021.

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Transmission Infrastructure Analysis

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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

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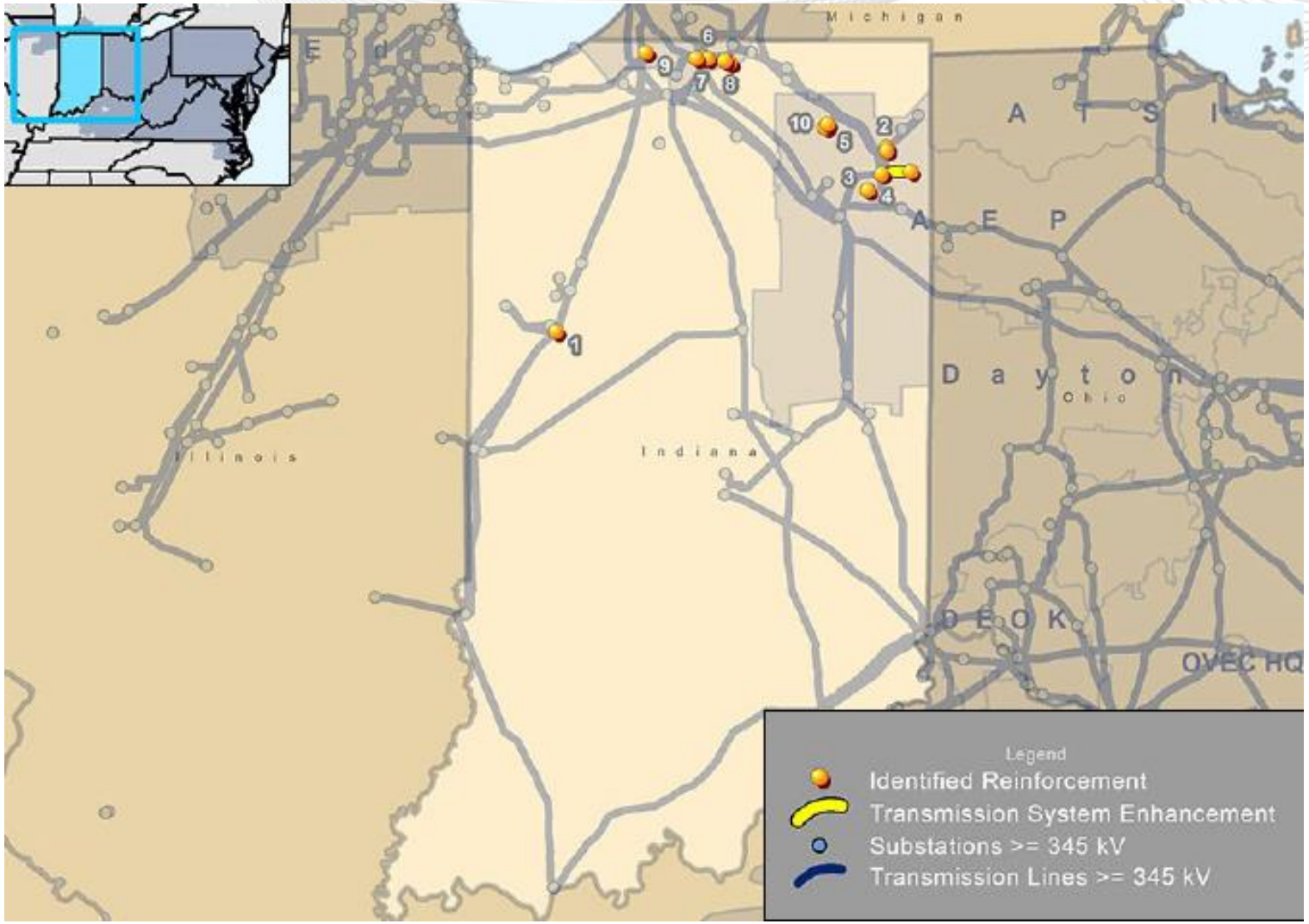
Indiana – RTEP Baseline Projects



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

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Indiana – RTEP Baseline Projects

Map ID	Project	Description	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	b2668.1	Replace the bus/risers at Dequine 345 kV station.	6/1/2020	$2.30	AEP	11/2/2021
2	b2779.6	Construct a 345 kV ring bus at Dunton Lake to serve SDI load at 345 kV via two circuits.	6/1/2016	$24.80		12/1/2020
	b2779.7	Retire Collingwood 345 kV station.				
3	b3243	Replace risers at Bass 34.5 kV station.	6/1/2025	$0.10		11/20/2020
4	b3244	Rebuild approximately nine miles of the Rob Park-Harlan 69 kV line.		$20.90		
5	b3248	Install a low-side 69 kV circuit breaker at Albion 138/69 kV transformer No. 1.		$0.40		
6	b3257	Replace two spans of 336.4 26/7 ACSR on Twin Branch-AM General No. 2 34.5 kV circuit.		$0.14		
7	b3291	Replace the Russ St. 34.5 kV switch.		$1.50		1/15/2021
8	b3296	Rebuild the overloaded portion of the Concord-Whitaker 34.5 kV line (1.13 miles).		$2.80		
9	b3324	Replace the bus section at Olive.	6/1/2022	$0.10		8/10/2021
10	b3343	Rebuild ~0.3 miles of overloaded 69 kV line between Albion-Philips switch and Philips switch-Brimfield switch with 556 ACSR conductor.	6/1/2026	$0.61		11/2/2021

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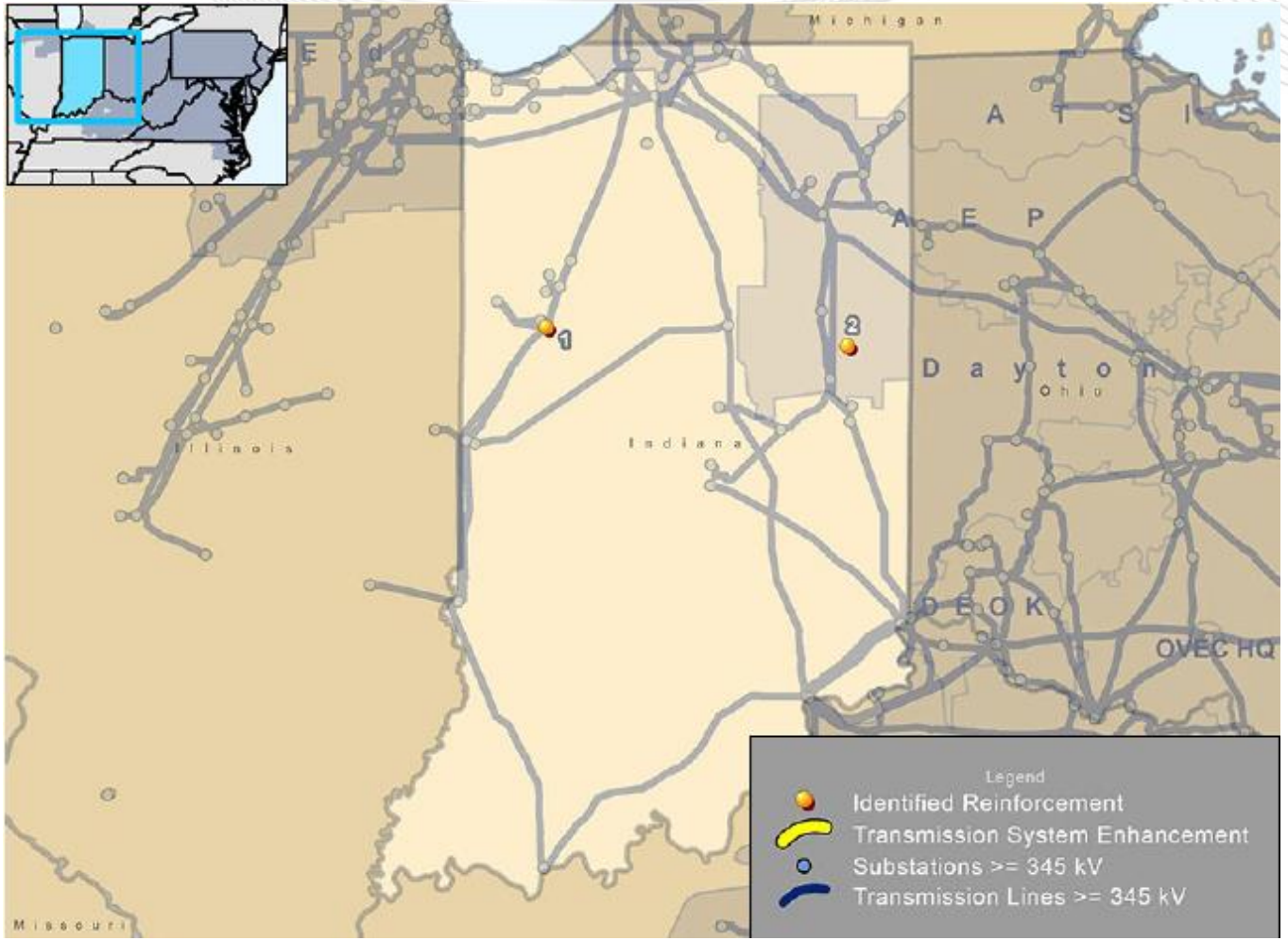
Indiana – RTEP Network Projects



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.

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Indiana – RTEP Network Projects

Map ID	Project	Description	Generation	Required In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	n5817	Install Dequine 345 kV circuit breaker D.	J468	11/5/2019	$1.17	AEP	11/30/2021
2	n5969	Install 138 kV revenue metering at Jay substation.	AC2-177	10/1/2020	$0.25		

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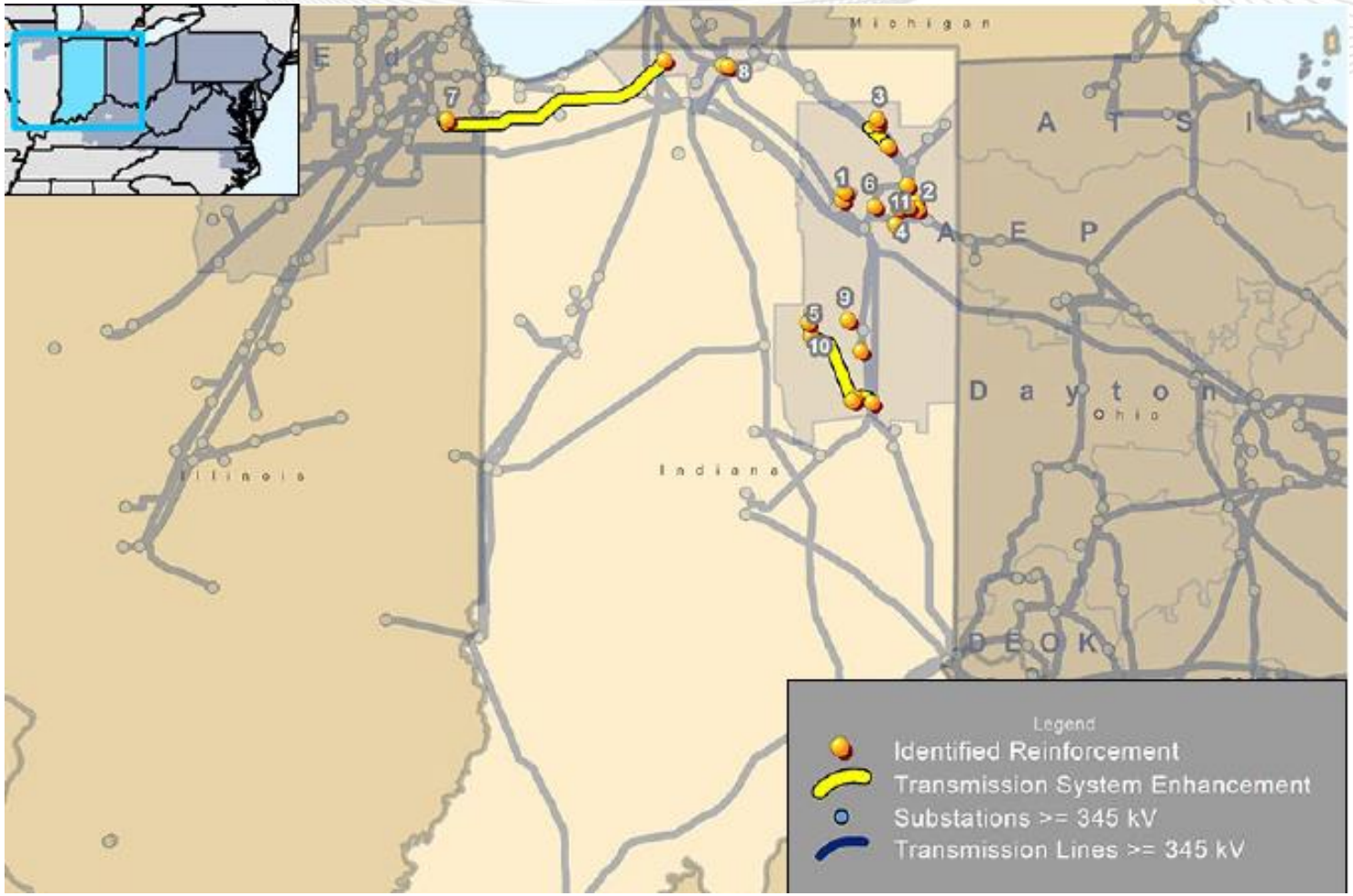
Indiana – TO Supplemental Projects



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.

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Indiana – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
1	s2391.1	Replace 69 kV circuit breaker “E” at Gateway station with a 3000A 40kA circuit breaker.	4/3/2023	$1.80	AEP	9/11/2020
	s2391.2	Replace 69 kV circuit breaker “J” at Columbia station with a 3000A 40kA circuit breaker.				
2	s2392.1	Rebuild the ~7.8 mile 138 kV Rob Park-Lincoln line using Drake 795 ACSR (SN/SE/WN/WE: 257/360/325/404MVA).		$26.30		
	s2392.2	Add a 3000A bus tie circuit breaker at 138 kV Trier station to separate the 4 MOABs in series.				
3	s2431.1	Rebuild North Kendallville 69/1 2kV station as Henderson 138/12 kV station.	6/1/2024	$17.80		11/20/2020
	s2431.2	Expand Bixler 138/12 kV station with a second transformer. Rebuild the through path to accommodate the expansion with a bus tie breaker and line MOABs.				
	s2431.3	Add a 138 kV circuit breaker to Kendallville station on the line exit to Henderson.				
	s2431.4	Rebuild the ~1.8 mile North Kendallville 69 kV tap as the 138 kV Henderson-Kendallville line.				
	s2431.5	Build the new ~2.6 mile Henderson-Bixler 138kV line.				
	s2431.6	Retire the 138 kV Bixler Sw, and the ~.6 mile between Bixler SW and Kendallville station.				

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Indiana – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
4	s2432.1	Retire Harvest Park 34.5 kV station and move distribution load source to Lincoln station.	4/3/2023	$34.50	AEP	11/20/2020
	s2432.2	Retire ~.6 miles of the Storm Water-Lincoln line.				
	s2432.3	Retire the ~2.5 mile Anthony-Harvest Park line.				
	s2432.4	Retire Filtration switch.				
	s2432.5	Retire the ~1.1 mile Anthony-Lincoln 34.5 kV line.				
	s2432.6	Retire the ~2.9 mile Anthony-Lincoln 138 kV line.				
	s2432.7	At Lincoln station, move the Storm Water circuit breaker to the 69 kV bus. Install 138/12 kV transformer with new 12 kV distribution bay to replace Harvest Park.				
	s2432.8	Rebuild the Lincoln-Inca line. Line will connect to the new Lincoln 69/34.5 kV extension at Maumee switch.				
	s2432.9	Build a ~0.9 mile 69/34.5 kV double circuit line out of Lincoln station to connect to the Lincoln-Maumee 34.5 kV line and the Lincoln-Stormwater 69 kV line.				
	s2432.10	Install a 34.5 kV POP switch to feed Inca station called Maumee switch.				
	s2432.11	Build a greenfield ~1.7 mile Anthony-Melita 69 kV line.				

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Indiana – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
4	s2432.12	At Storm Water station – Replace Transformer No. 1 with a 69/12 kV unit and re-energize station at 69 kV.	4/3/2023	(Continued)	AEP	11/20/2020
	s2432.13	At Water Pollution station – Re-energize station at 69 kV. Station was previously built to take either 34.5 or 69 kV service.				
	s2432.14	At Omnisource station – Replace Transformer No. 1 with a 69/4 kV No. unit and re-energize station at 69 kV.				
	s2432.15	At Melita station – Install a 3000A 40 kA 69 kV circuit breaker for the Anthony line entrance.				
	s2432.16	At Anthony station – Replace both 34.5/12 kV transformers with 69/12 kV, 25 MVA units. Replace two circuit breakers with 3000A 40 kA, 69 kV circuit breakers for the Water Pollution line exit and bus tie positions. Reuse the existing Water Pollution breaker for the new Melita line entrance. Install a 21.6 MVAR capacitor bank. Retire the 138/34.5 kV transformer, the 34.5 kV circuit breakers Q and A, and the existing buswork.				
5	s2466.1	Install a 138 kV box bay with 138 kV, 3000A MOAB switches at Wes Del station toward Desoto and Deer Creek via Gaston.	1/1/2022	$1.39		2/17/2021
	s2466.2	Reterminate the existing Desoto-Deer Creek-Delaware 138 kV line into the new station bays at Wes Del station with 0.2 miles of 636 ACSR 26/7. Remove 0.1 miles of the Desoto-Deer Creek-Delaware 138 kV line to accommodate the new connection of Wes Del to the Deer Creek-Desoto 138 kV circuit.				
6	s2471	Illinois Road 138/69 kV – Replace the 138/69 kV transformer with a 90 MVA, 138/69 kV transformer.	5/16/2022	$1.70		3/19/2021
7	s2509	Rebuild the (L97008: Univ. Park S/S-Olive S/S 345 kV) of the ~20 mile double-circuit line with monopoles and new conductor utilizing existing right of way (Univ. Park S/S-Olive S/S 345 kV).	6/15/2023	$51.90	NEET	5/11/2021

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Indiana – TO Supplemental Projects

Map ID	Project	Description	Projected In-Service Date	Project Cost ($M)	TO Zone	TEAC Date
8	s2510	Rebuild 0.96 miles of the AM General No. 2-Twin Branch 34.5 kV.	10/1/2024	$4.30	AEP	4/16/2021
9	s2511	Expand and upgrade Van Buren station to a three 138 kV breaker ring bus to accommodate three elements (two transmission lines and one transformer) and eliminate the three-terminal line. Replace 138/69/12 kV transformer with separate 138/69 kV and 69/12 kV transformers to separate the distribution load from the transmission transformer's tertiary winding. Replace 69 kV circuit breaker B.	9/1/2022	$9.10		
10	s2570.1	Deer Creek-Hartford City 69 kV – Rebuild ~17.67 miles of 69 kV line with the conductor size 556.5 ACSR 26/7 Dove. The following cost includes the line rebuild, line removal and right of way.	10/25/2024	$49.23		7/16/2021
	s2570.2	Hummel Creek-Deer Creek 34.5 kV – Retire ~4.6 miles of 34.5 kV 1940s wood line.				
	s2570.3	Jonesboro-Gas City 34.5 kV – Retire ~0.99 miles of 34.5 kV 1969 wood line.				
	s2570.4	Deer Creek-Alexandria 34.5 kV – Retire ~2.2 miles of 34.5 kV 1968 wood line.				
	s2570.5	Hummel Creek 34.5 kV Station – Remove the 34.5 kV circuit breaker "M." Replace 34.5 kV circuit breaker "L" with a system spare circuit breaker. Rebuild the 34.5 kV bus to 69 kV standards. Install a 138 kV high-side circuit switcher on the 138/34.5 kV transformer.				
	s2570.6	Deer Creek substation – Remove the 34.5 kV circuit breaker "M." Install a 138/12 kV, 20 MVA transformer with a high-side 138 kV circuit switcher. Also install a low-side 12 kV, 2000A circuit breaker a 12 kV, 2000A bus tie circuit breaker and three 12 kV, 2000A feeder circuit breakers. Install a new high-side 138 kV circuit switcher 138/12 kV transformer No. 4.				
11	s2583.1	Deptmer 69 kV switch – Install a phase-over-phase switch to feed the new Harber load. Both switch and load are built to 138 kV standards but operated at 69 kV.	2/21/2022	$1.70		8/16/2021
	s2583.2	Hillcrest-Pleasant 69 kV – Cut Deptmer switch into the 69 kV line.				
	s2583.3	Deptmer-Harber 69 kV Radial – Install a new two-span radial to the Harber load. Radial will be built to 138 kV standards.				

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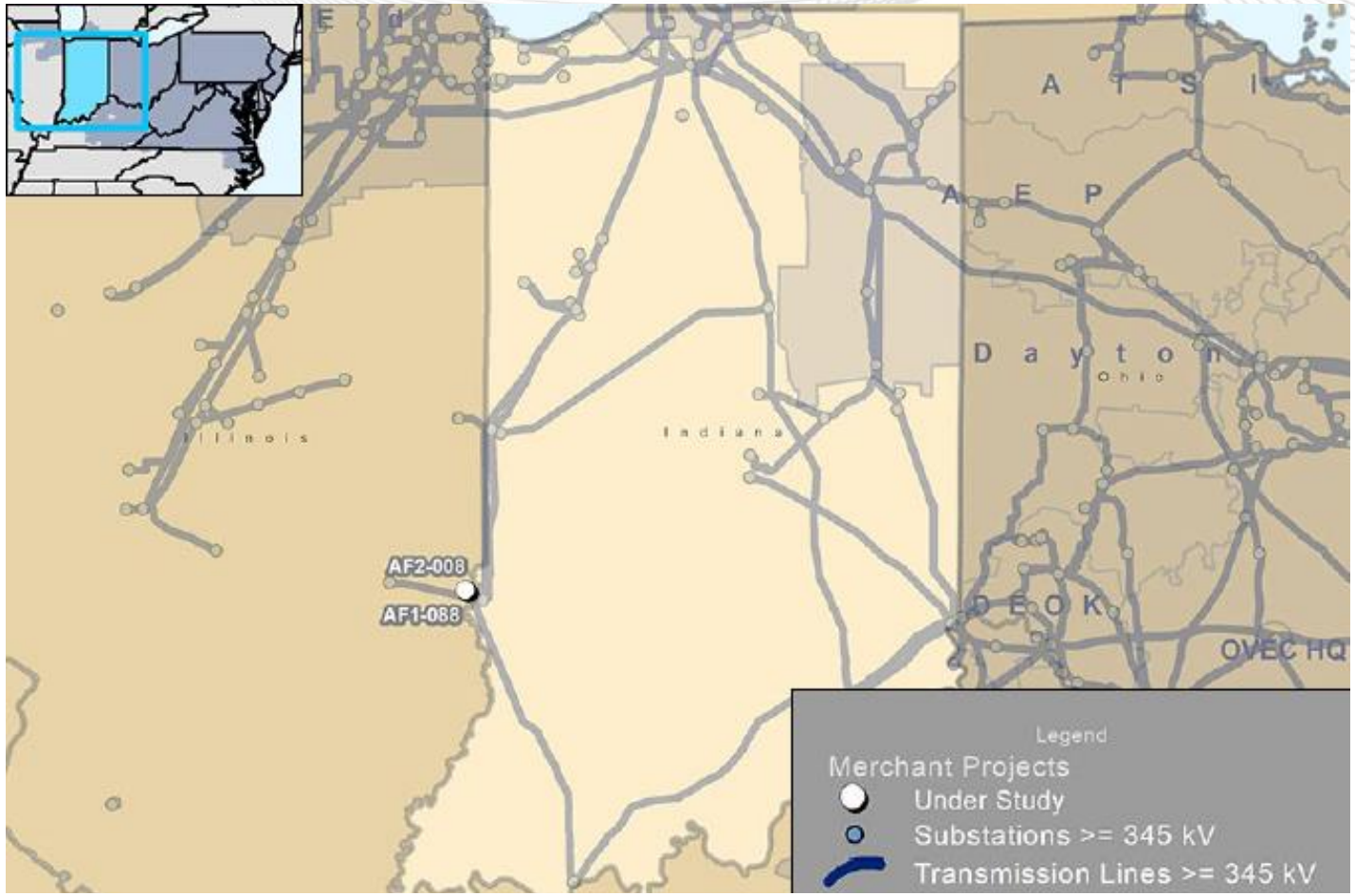
Indiana – Merchant Transmission Project Requests



Queue Number	Queue Name	TO Zone	Status	Actual or Requested In-Service Date	Maximum Output (MW)
AF2-008	Sullivan 345 kV	AEP	Active	12/31/2025	1,000
AF1-088		ComEd			

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Planning
Load Forecast

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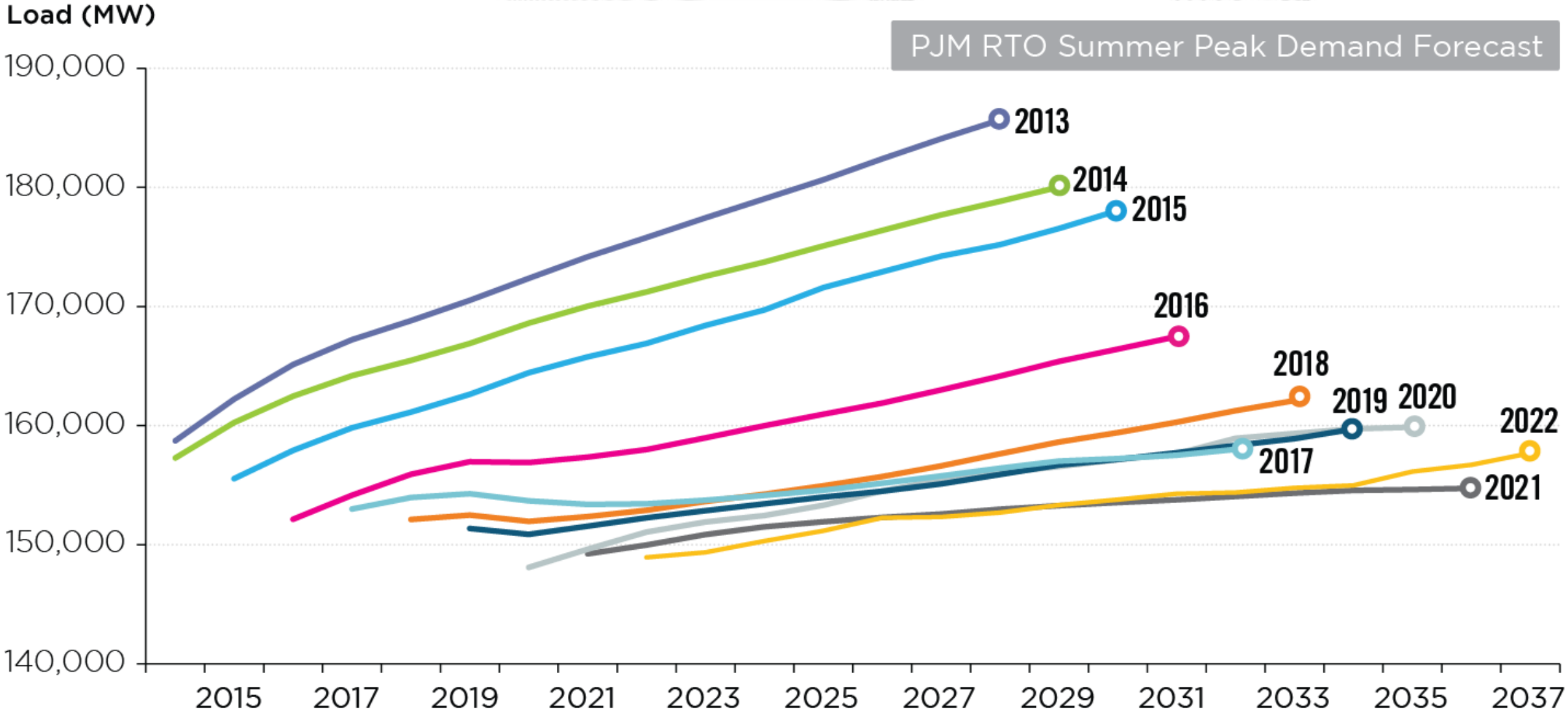
PJM Annual Load Forecasts

(Jan. 2022)



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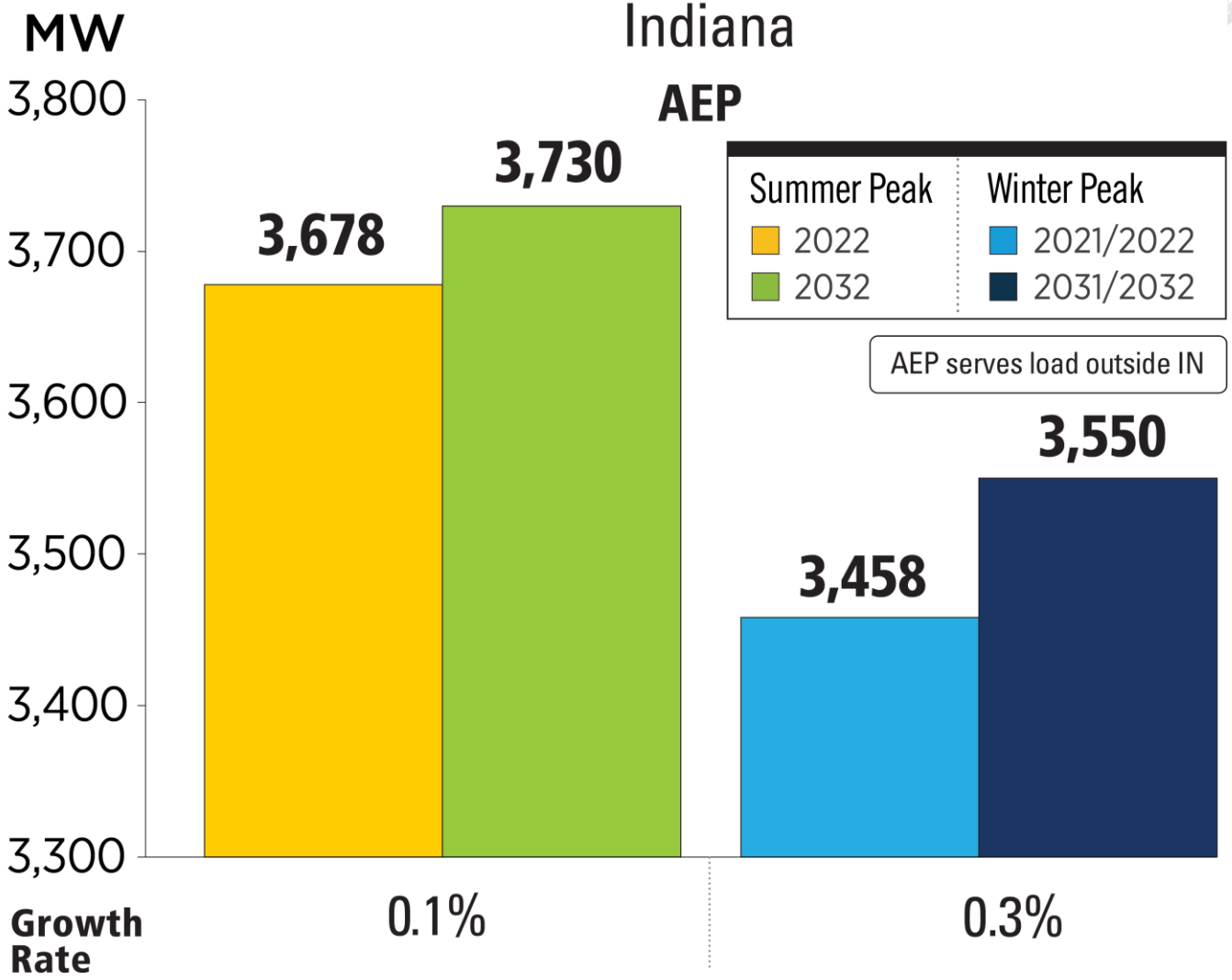
Indiana – 2022 Load Forecast Report



PJM RTO Summer Peak		PJM RTO Winter Peak	
2022	2032	2021/2022	2031/2032
149,938 MW	154,381 MW	132,102 MW	141,516 MW
Growth Rate 0.4%		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.

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Markets

Capacity Market Results

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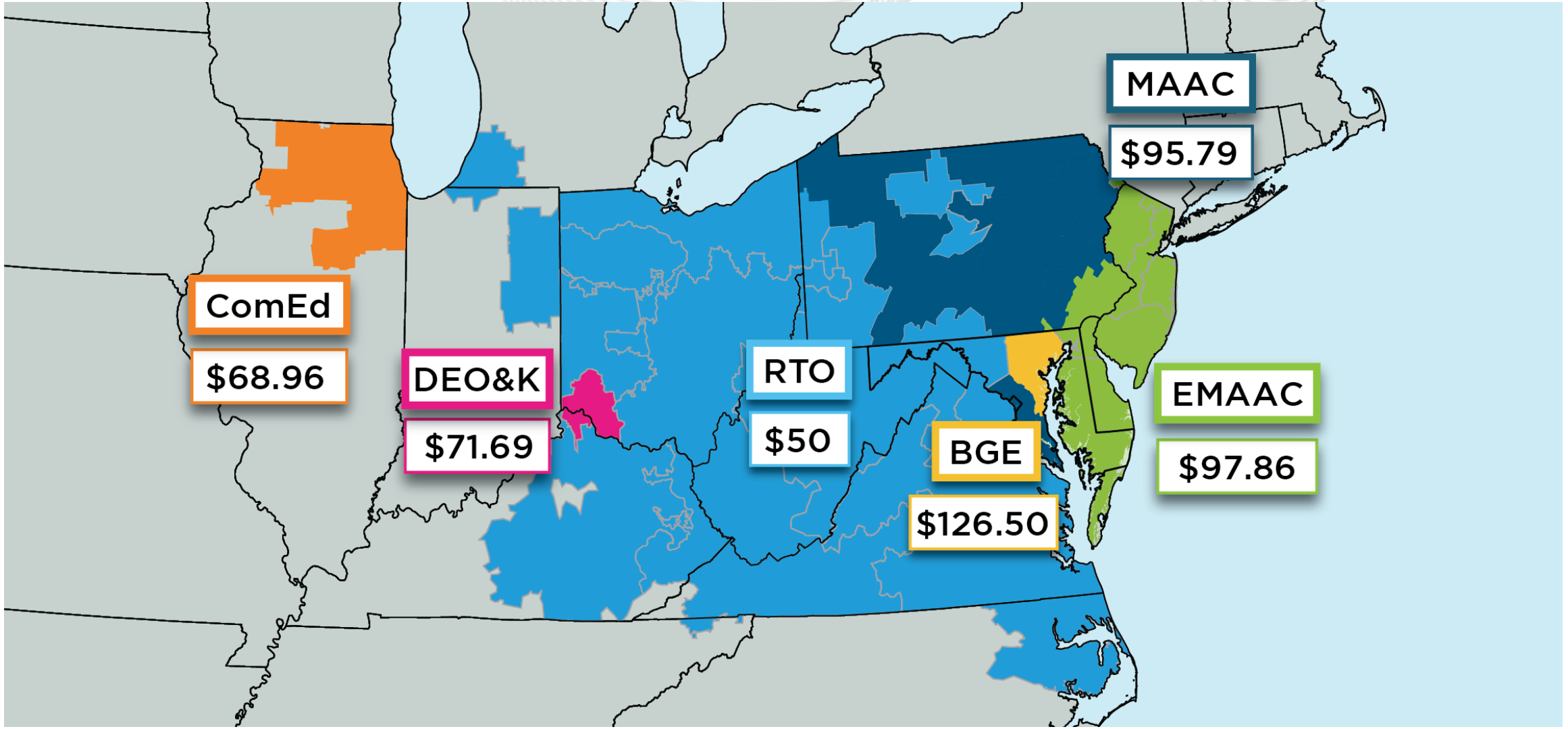
2022/2023 Base Residual Auction Clearing Prices ($/MW-Day)



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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	

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Markets

Market Analysis

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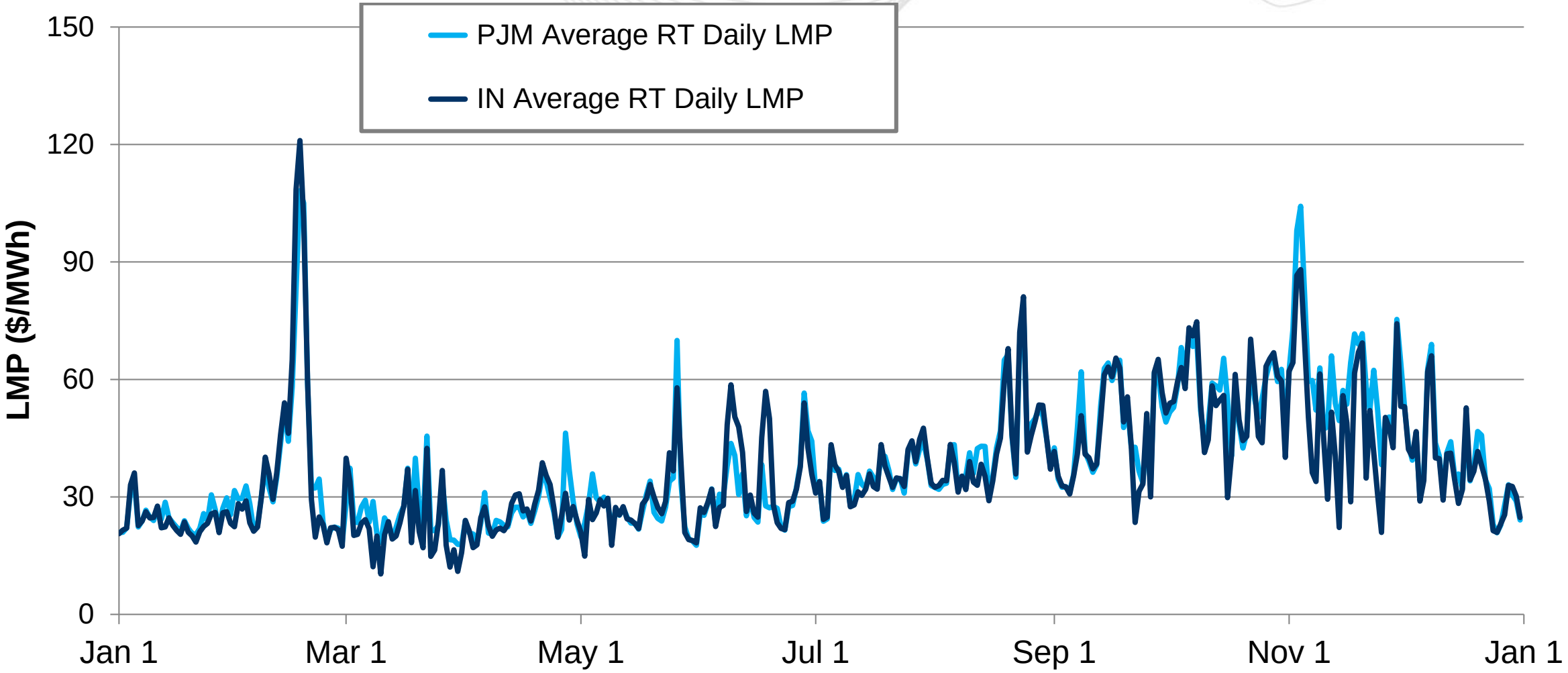
Indiana – Average Daily LMP

(Jan. 1, 2021 – Dec. 31, 2021)



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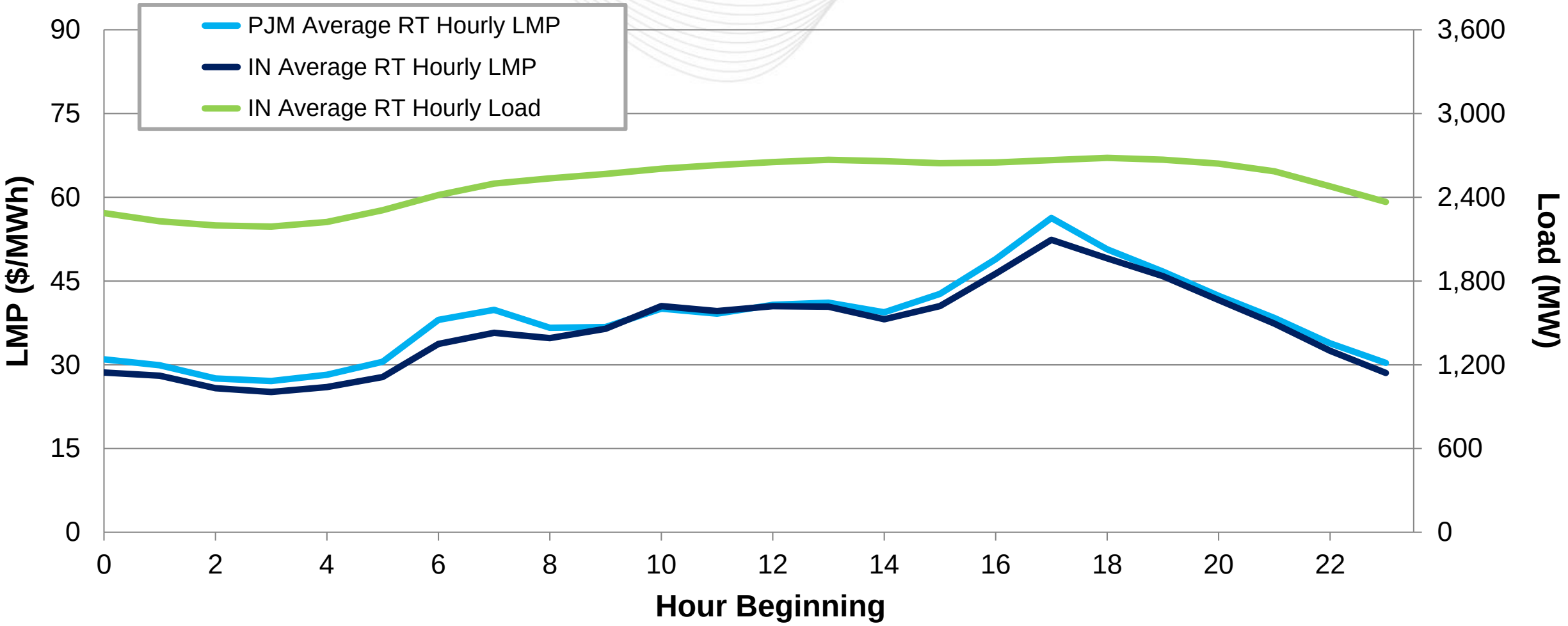
Indiana – Average Hourly LMP and Load

(Jan. 1, 2021 – Dec. 31, 2021)

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



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Indiana – Net Energy Import/Export Trend

(Jan. 2021 – Dec. 2021)

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

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Operations

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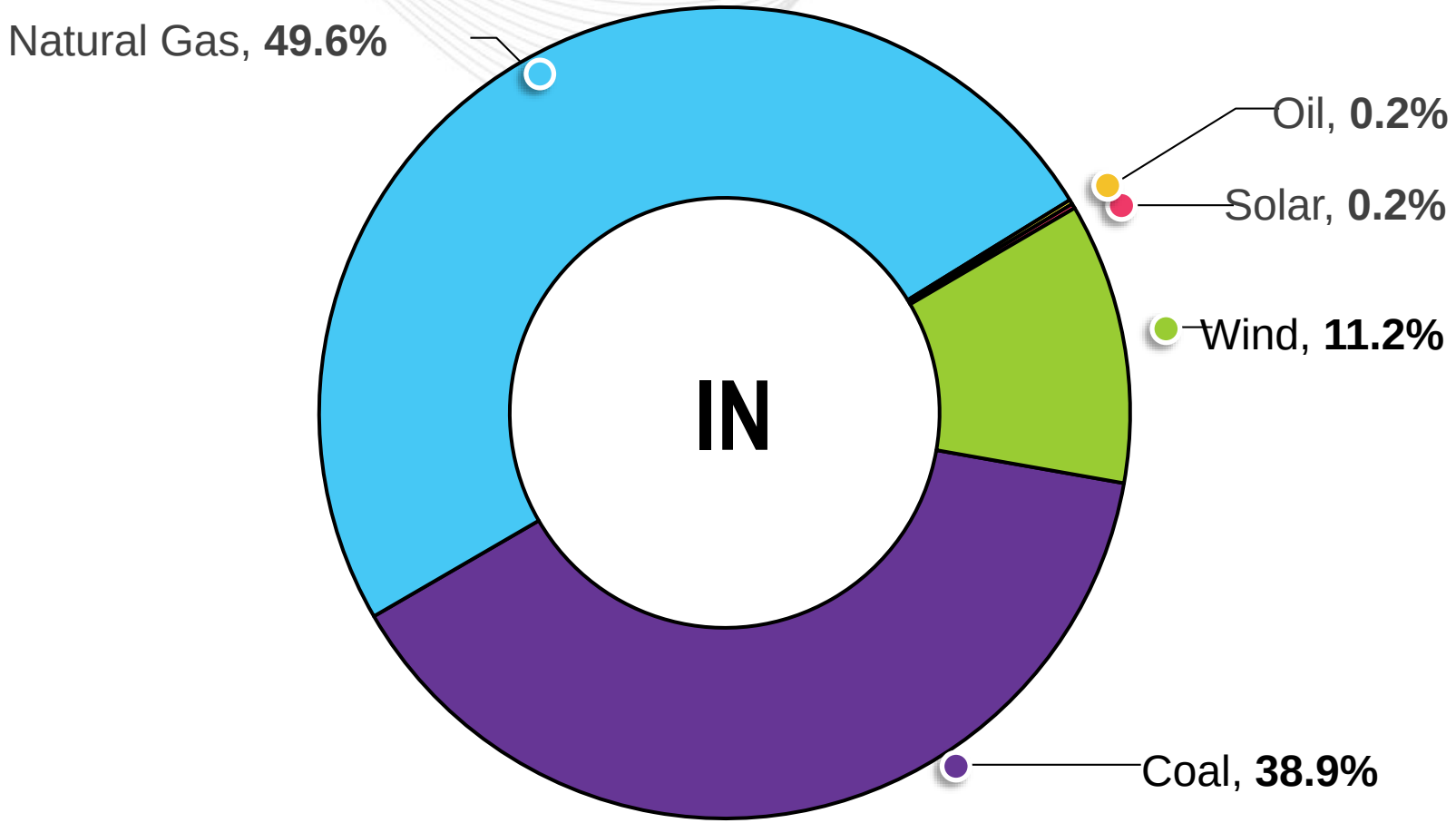
Indiana – 2021 Generator Production



The data in this chart comes from EIA Form 923 (2021) and represents only generators within the PJM portion of IN.

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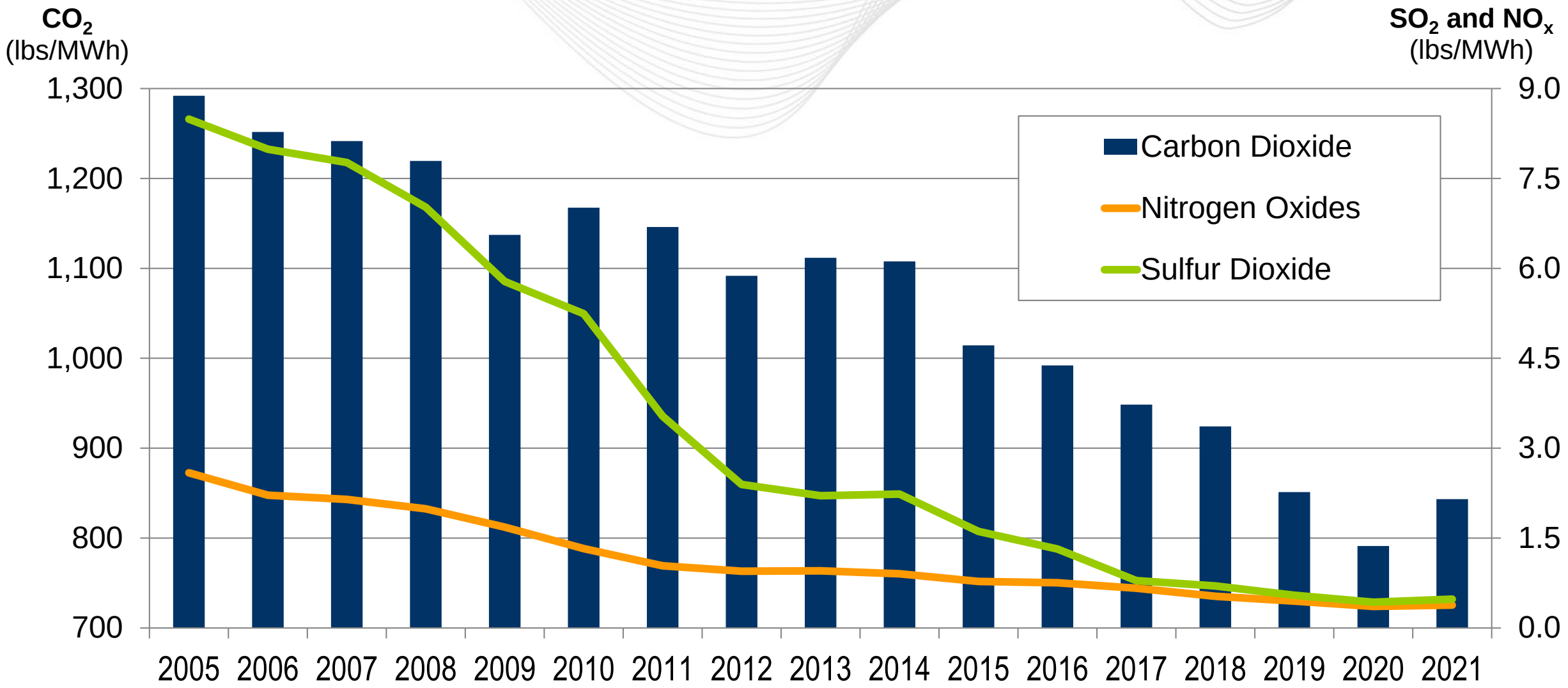
2005 – 2021 PJM Average Emissions



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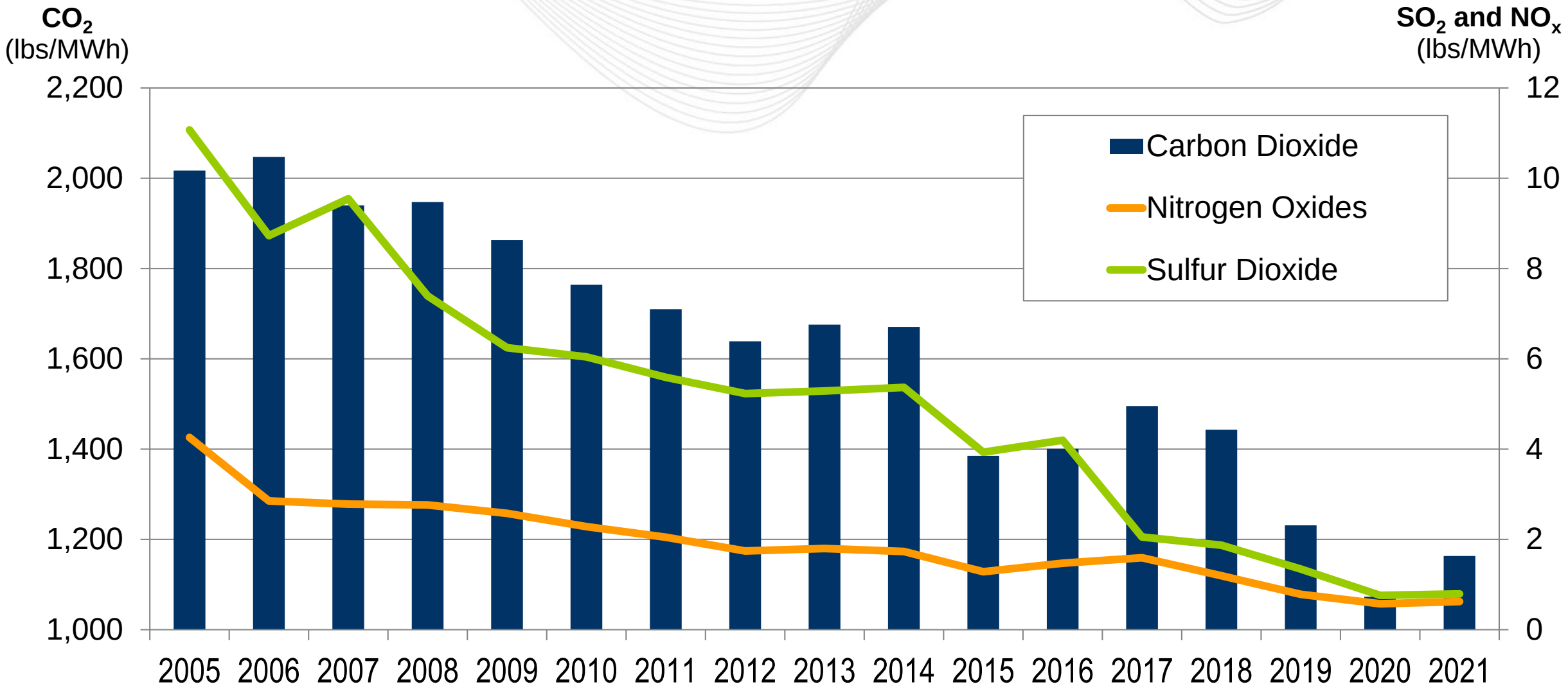
Indiana – Average Emissions (lbs/MWh)

(Feb. 2022)



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