



2020 Michigan State Infrastructure Report

(January 1, 2020 – December 31, 2020)

April 2021

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

1. Planning

- Generation Portfolio Analysis
- Transmission Analysis
- Load Forecast

2. Markets

- Market Analysis
- Net Energy Import/Export Trend

3. Operations

- Emissions Data

- **Existing Capacity:** Nuclear represents approximately 66.8 percent of the total installed capacity in the Michigan service territory while natural gas represents approximately 32.9 percent. This differs from PJM where natural gas and nuclear are 43.4 and 17.7 percent of total installed capacity.
- **Interconnection Requests:** Natural gas represents 61.6 percent of new interconnection requests in Michigan, while solar represents approximately 34.3 percent of new requests.
- **Deactivations:** No generation in Michigan gave a notification of deactivation in 2020.
- **RTEP 2020:** Michigan's 2020 RTEP projects total approximately \$52.8 million in investment. Approximately 31.4 percent of that represents supplemental projects. These investment figures only represent RTEP projects that cost at least \$5 million.

- **Load Forecast:** Michigan'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 Michigan State Infrastructure Report.
- **1/1/20 – 12/31/20 Market Performance:** Michigan's average hourly LMPs were higher than the PJM average hourly LMP during peak hours.



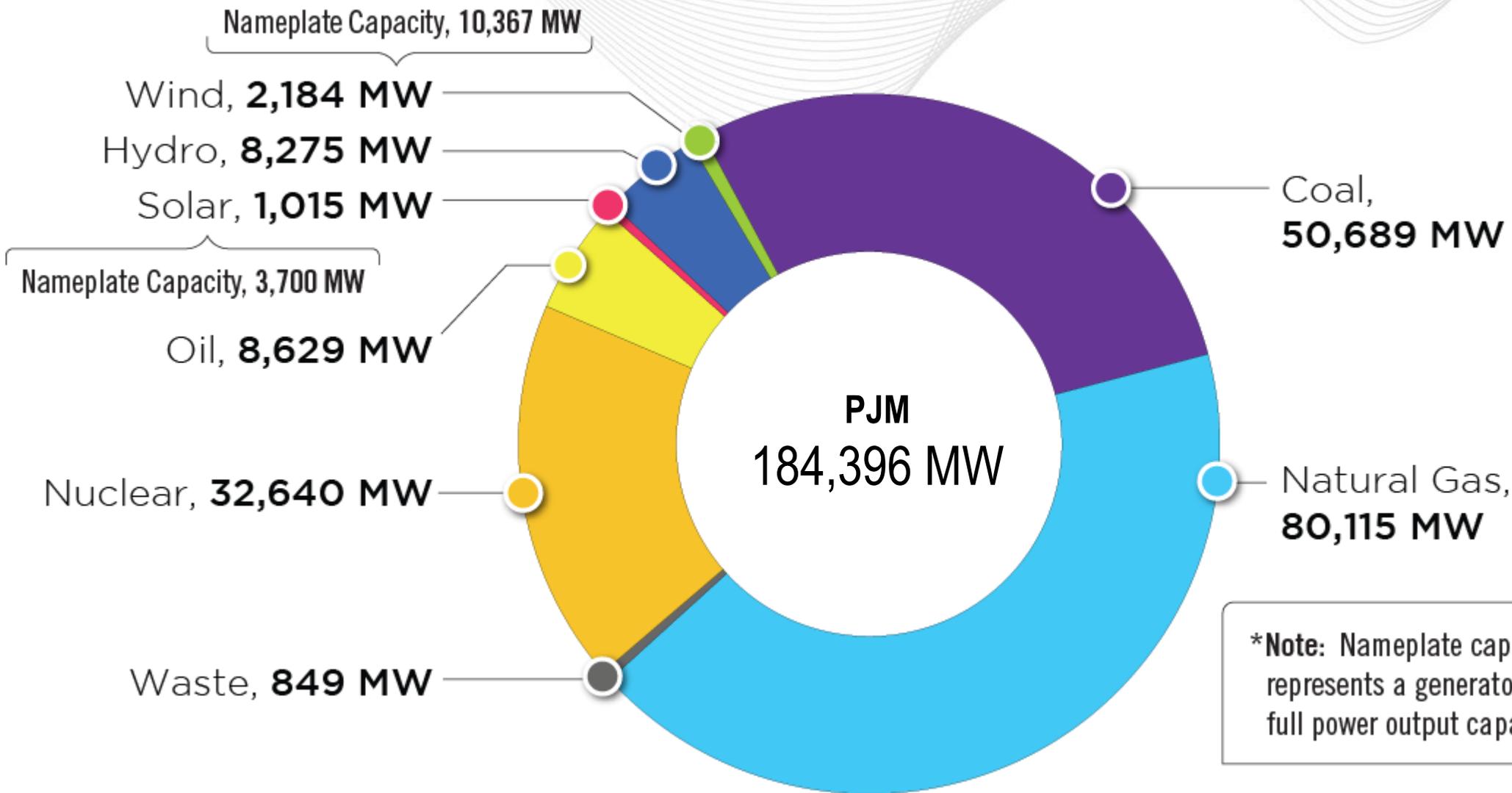
The PJM service area in Michigan is the AEP zone and is represented by the shaded portion of the map.

PJM operates transmission lines that extend beyond the service territory.



Planning

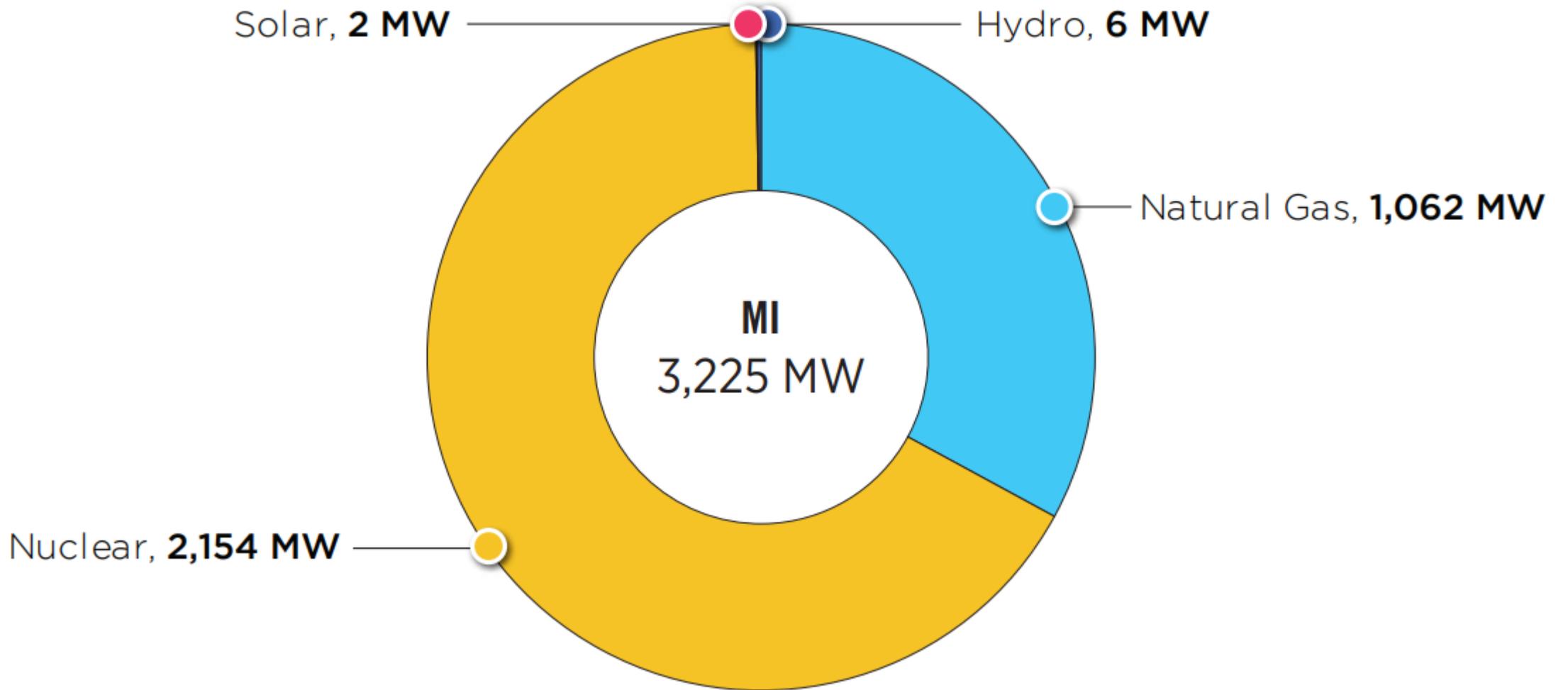
Generation Portfolio Analysis

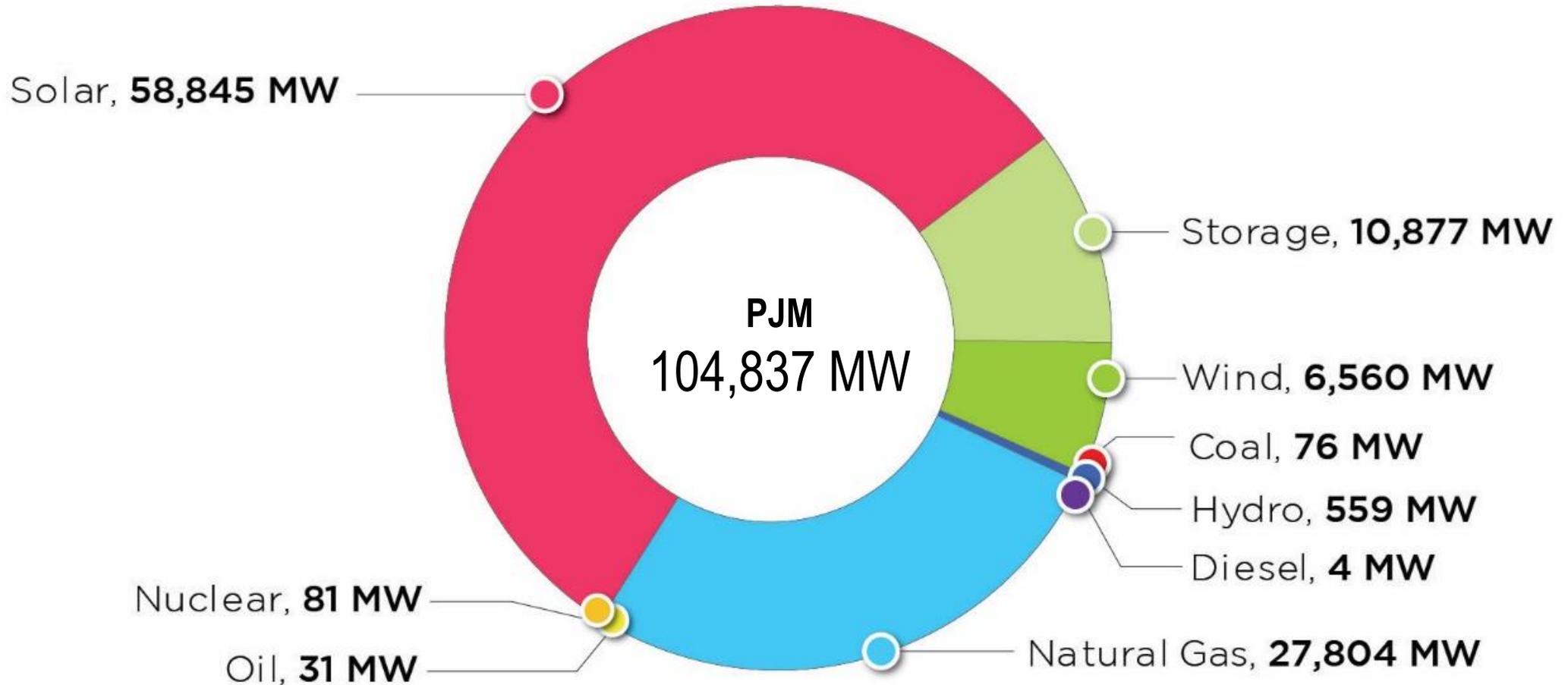


***Note:** Nameplate capacity represents a generator's rated full power output capability.

Michigan – Existing Installed Capacity

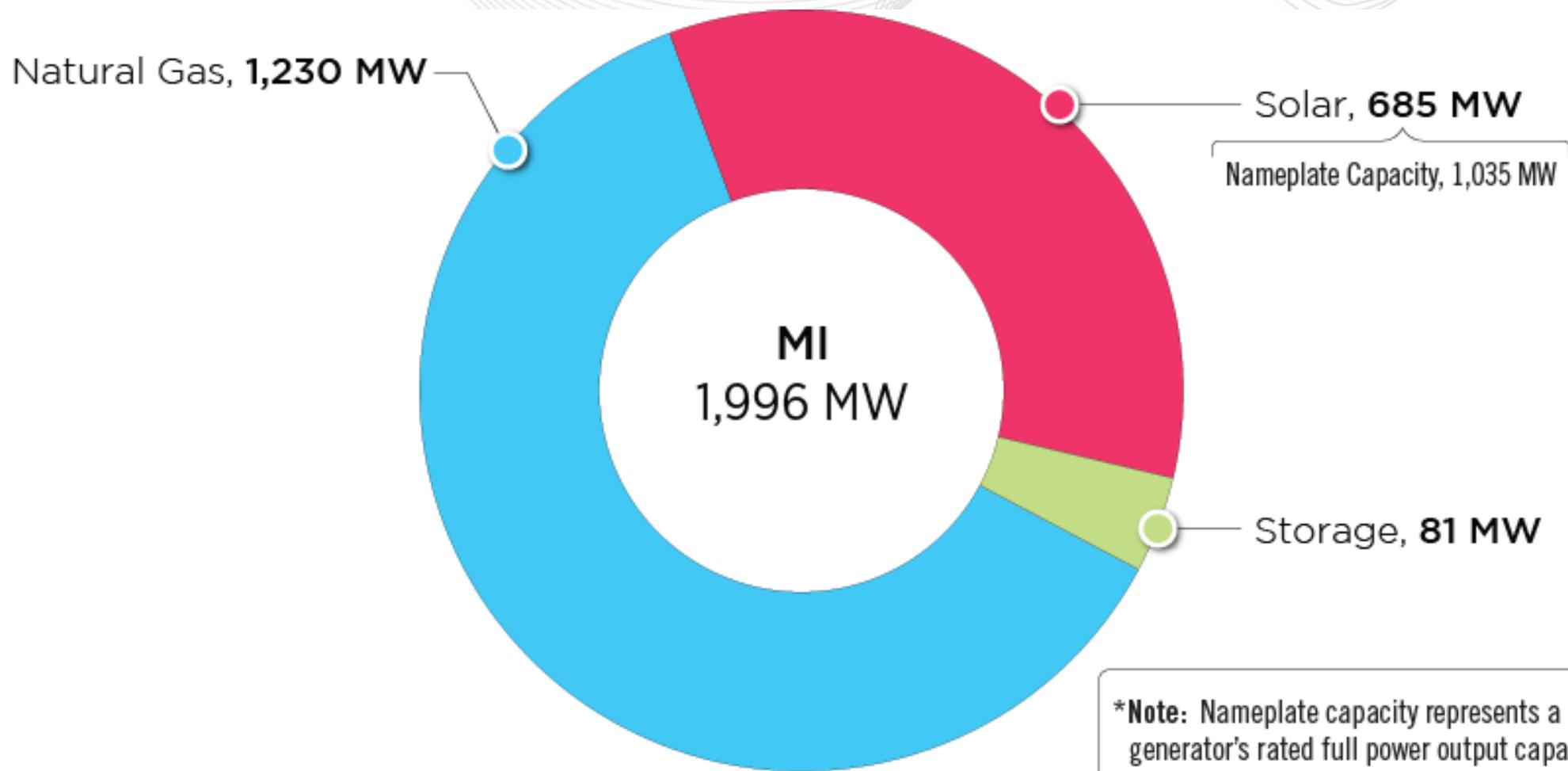
(CIRs – as of Dec. 31, 2020)





Michigan – Queued Capacity (MW) by Fuel Type

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





Michigan – Interconnection Requests by Fuel Type

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

		In Queue				Complete				Grand Total	
		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	Natural Gas	1	145.0	2	1,085.0	2	1,055.0	1	1,120.0	6	3,405.0
	Nuclear	0	0.0	0	0.0	3	205.0	0	0.0	3	205.0
	Other	0	0.0	0	0.0	0	0	1	0.0	1	0.0
	Storage	3	81.3	0	0.0	0	0	1	75.0	4	156.3
Renewable	Methane	0	0.0	0	0.0	3	10.4	0	0.0	3	10.4
	Solar	7	684.8	0	0.0	1	2.3	4	237.8	12	924.8
	Wind	0	0.0	0	0.0	0	0	1	26.0	1	26.0
Grand Total		11	911.1	2	1,085.0	9	1,272.7	8	1,458.8	30	4,727.5

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

Michigan – Progression History of Interconnection Requests



Percentage of planned capacity and projects that have reached commercial operation	33%	47%
	Requested capacity megawatts	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.



Michigan – Generation Deactivation Notifications Received in 2020

Michigan had no generation deactivation notifications 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).

<https://www.pjm.com/planning/project-construction>



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



Michigan – RTEP Baseline Projects

(Greater than \$5 million)

Map ID	Project	Description	Required In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
1	b3160	Construct a ~2.4 mile double-circuit 138 kV extension using 1033 ACSR to connect Lake Head to the 138 kV network.	6/1/2024	\$36.20	AEP	12/7/2019
		Retire the ~2.5 mile 34.5 kV Niles-Simplicity tap line.				
		Retire the ~4.6 mile Lakehead 69 kV tap.				
		Build a new 138/69 kV drop down station to feed Lakehead with a 138 kV breaker, 138 kV switcher, 138/69 kV transformer and a 138 kV MOAB.				
		Rebuild the ~1.2 mile Buchanan South 69 kV radial tap using 795 ACSR.				
		Rebuild the ~8.4 mile 69 kV Pletcher-Buchanan Hydro line as the ~9 mile Pletcher-Buchanan South 69 kV line using 795 ACSR.				
		Install a phase-over-phase switch at Buchanan South station with two-line MOABs.				

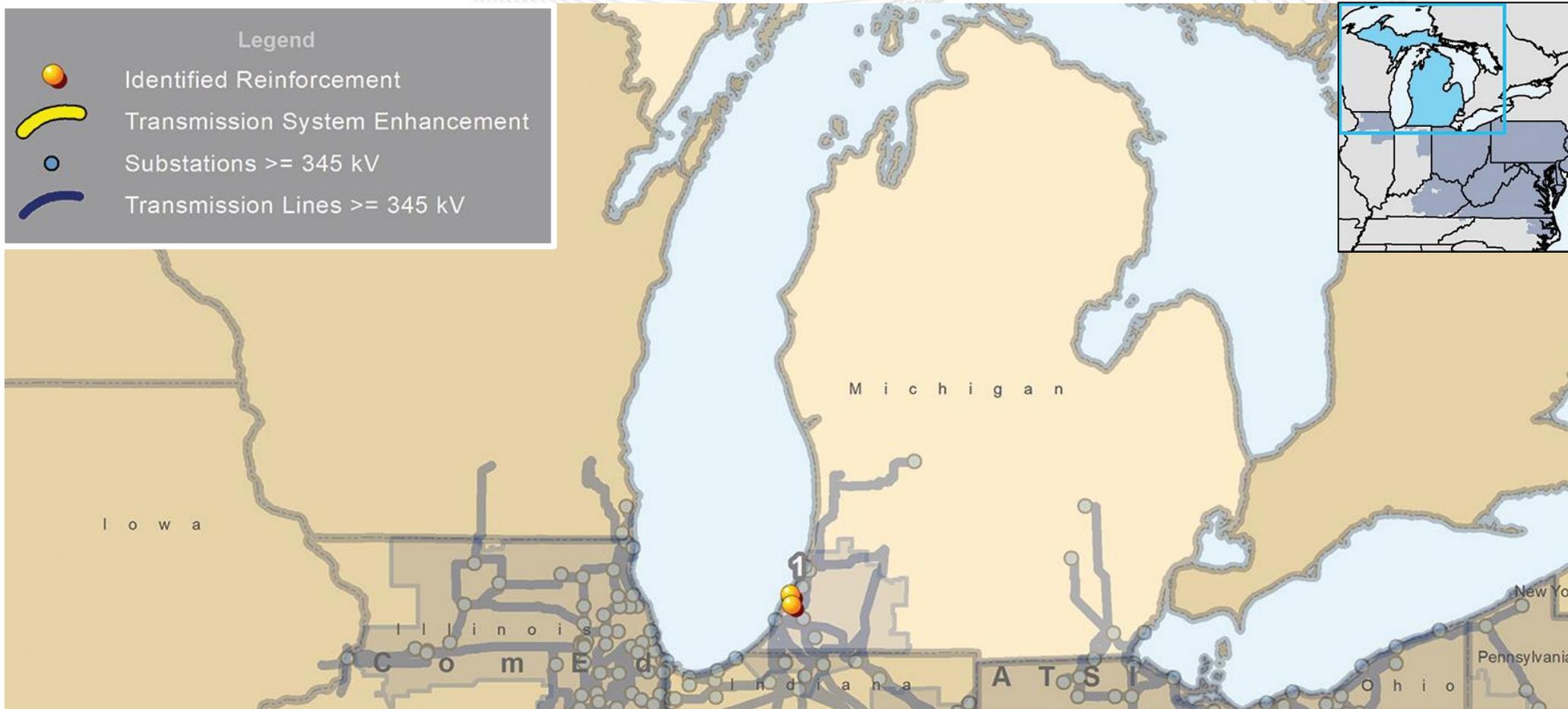


Michigan – RTEP Network Projects

(Greater than \$5 million)

Michigan 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.



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.



Michigan – TO Supplemental Projects

(Greater than \$5 million)

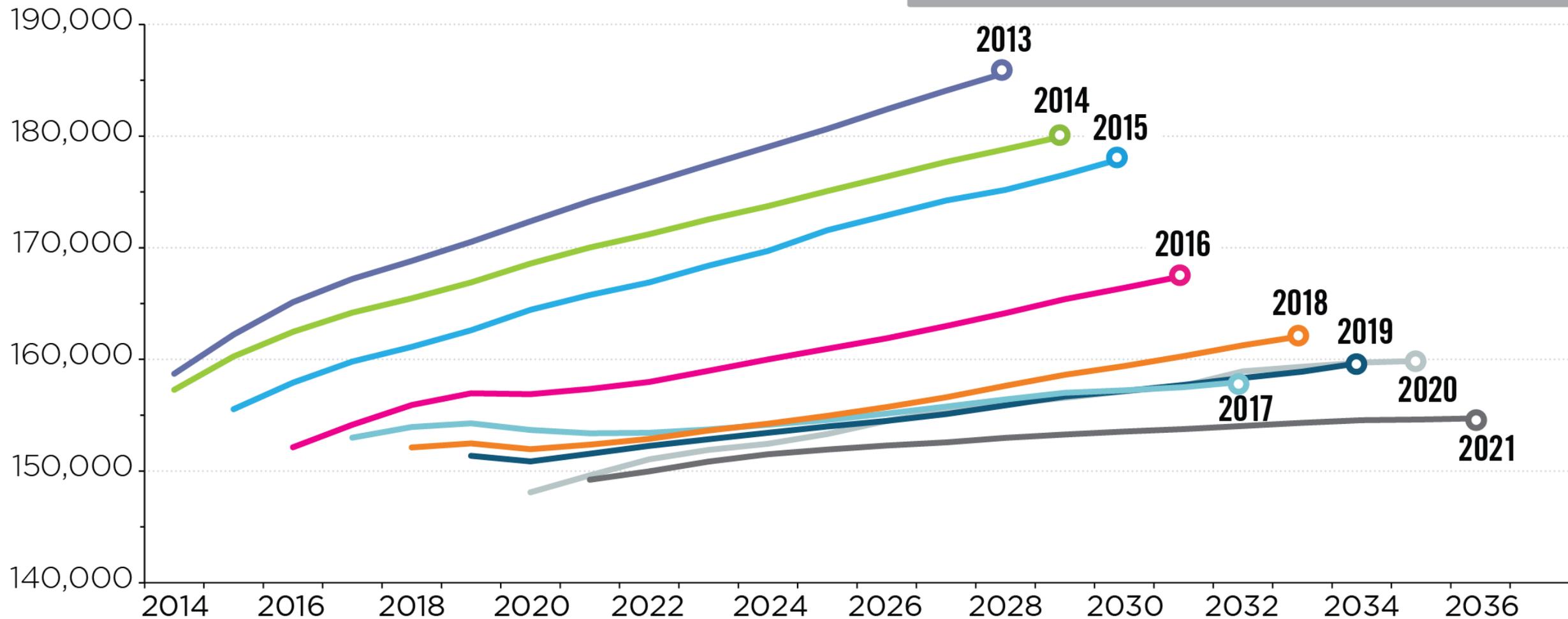
Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
1	s2345	Main St.-Riverside 34.5 kV line: Rebuild on center line ~4.1 miles of Main St.-Riverside 34.5 kV line with DOVE 556.5 ACSR 26/7.	2/14/2024	\$16.60	AEP	7/17/2020
		Riverside Station: Replace two 138 kV breakers and two 34.5 kV breakers at Riverside. While at the station and taking advantage of the outage, AEP will install a new 34.5 kV breaker to bring Whirlpool customer, whose delivery point is currently one tower outside of the station, into Riverside station. Install high-side circuit switcher to 138/69/34.5 kV transformer.				

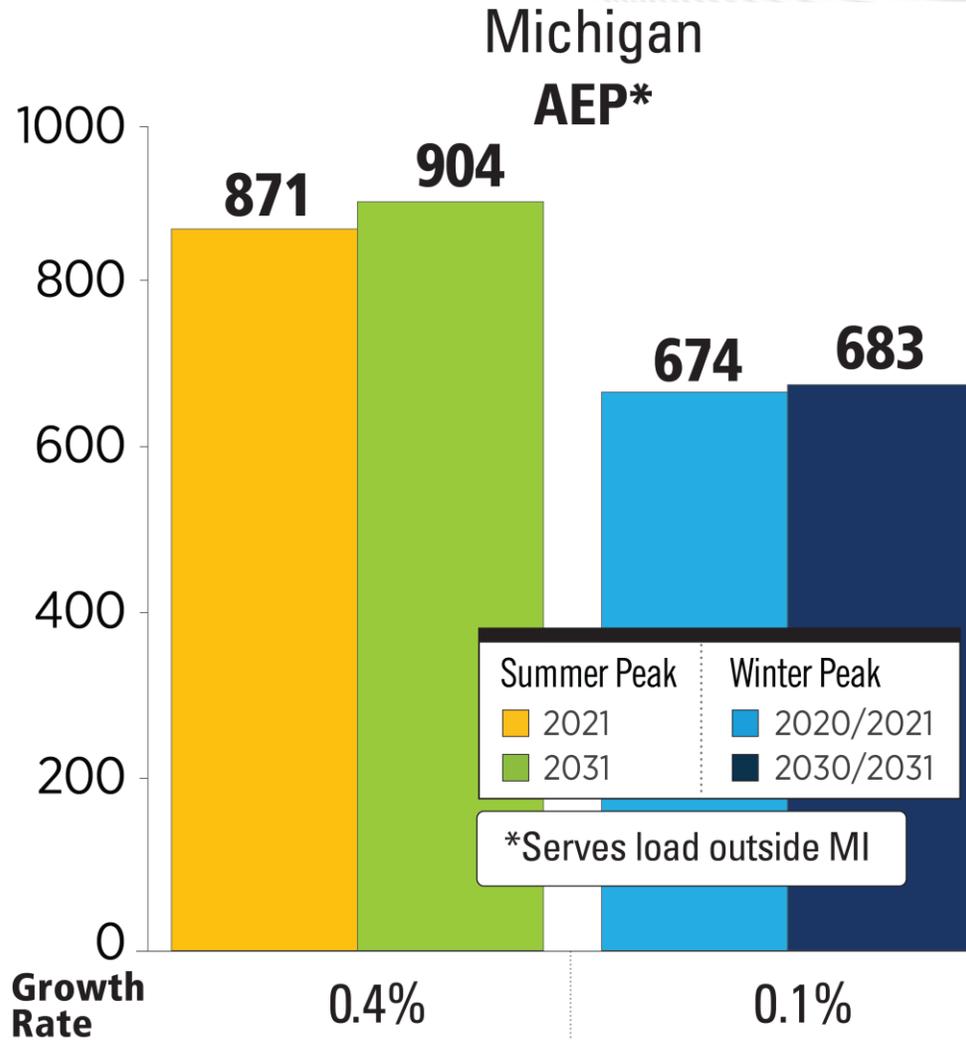
Planning

Load Forecast

PJM RTO Summer Peak Demand Forecast

Load (MW)





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.

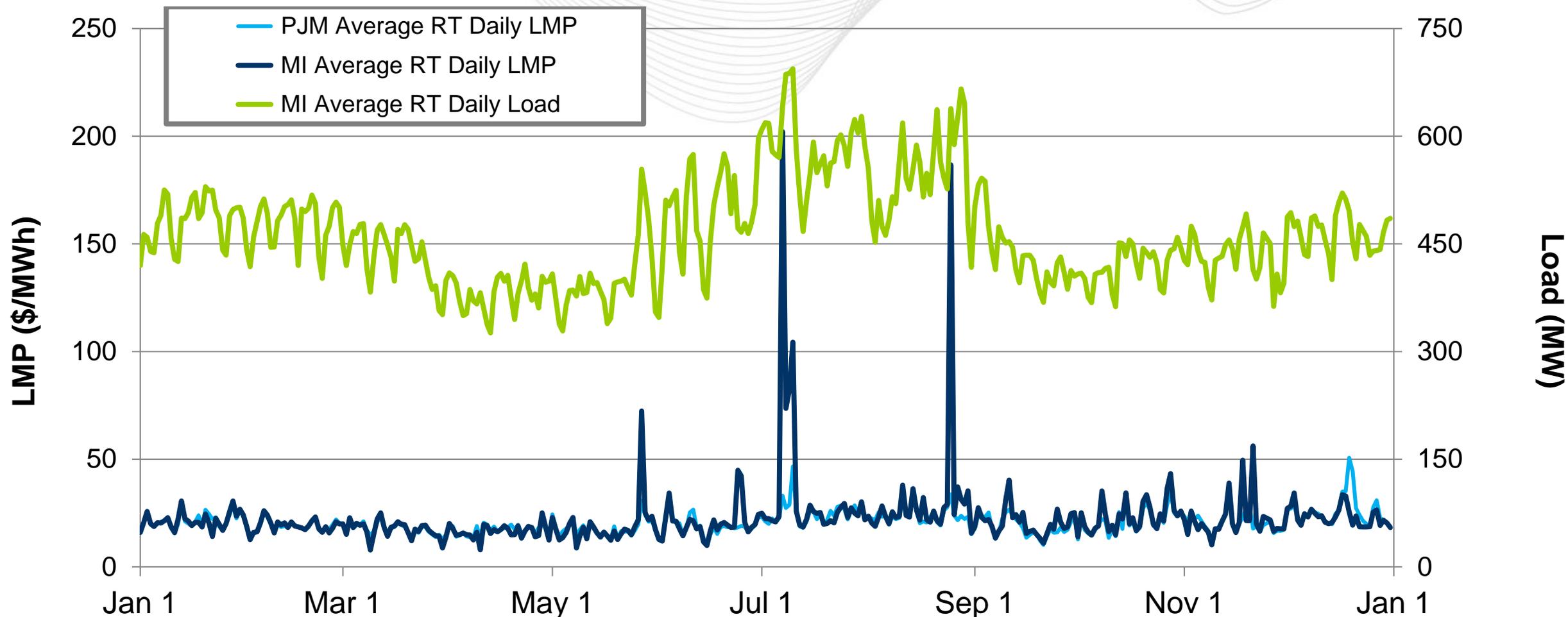


Markets

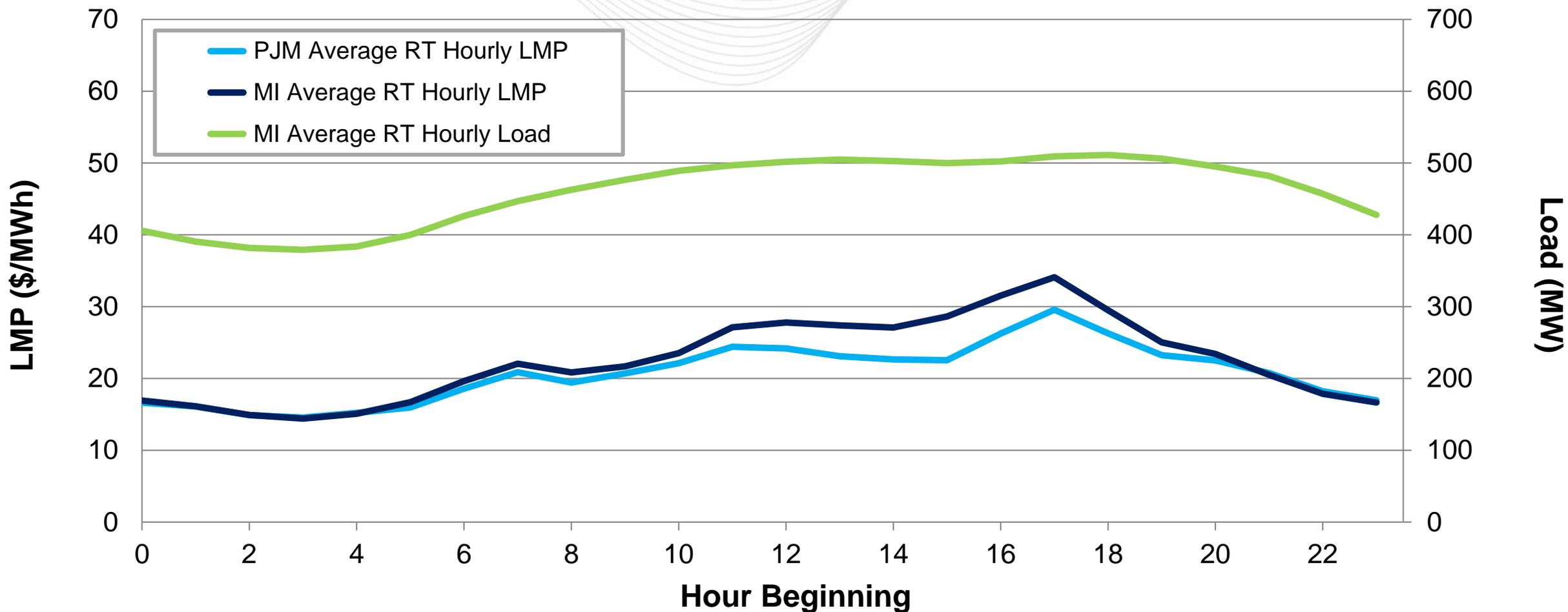
Market Analysis

Michigan – Average Daily LMP and Load

(Jan. 1, 2020 – Dec. 31, 2020)



Michigan's average hourly LMPs were higher than the PJM average hourly LMP during peak hours.





Michigan – Net Energy Import/Export Trend

(Jan. 2020 – Dec. 2020)



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

Operations Emissions Data



2005 – 2020 PJM Average Emissions

