



# 2019 Michigan State Infrastructure Report

(January 1, 2019 – December 31, 2019)

May 2020  
(updated July 2020)

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

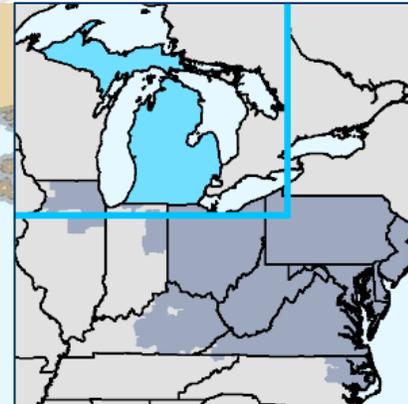
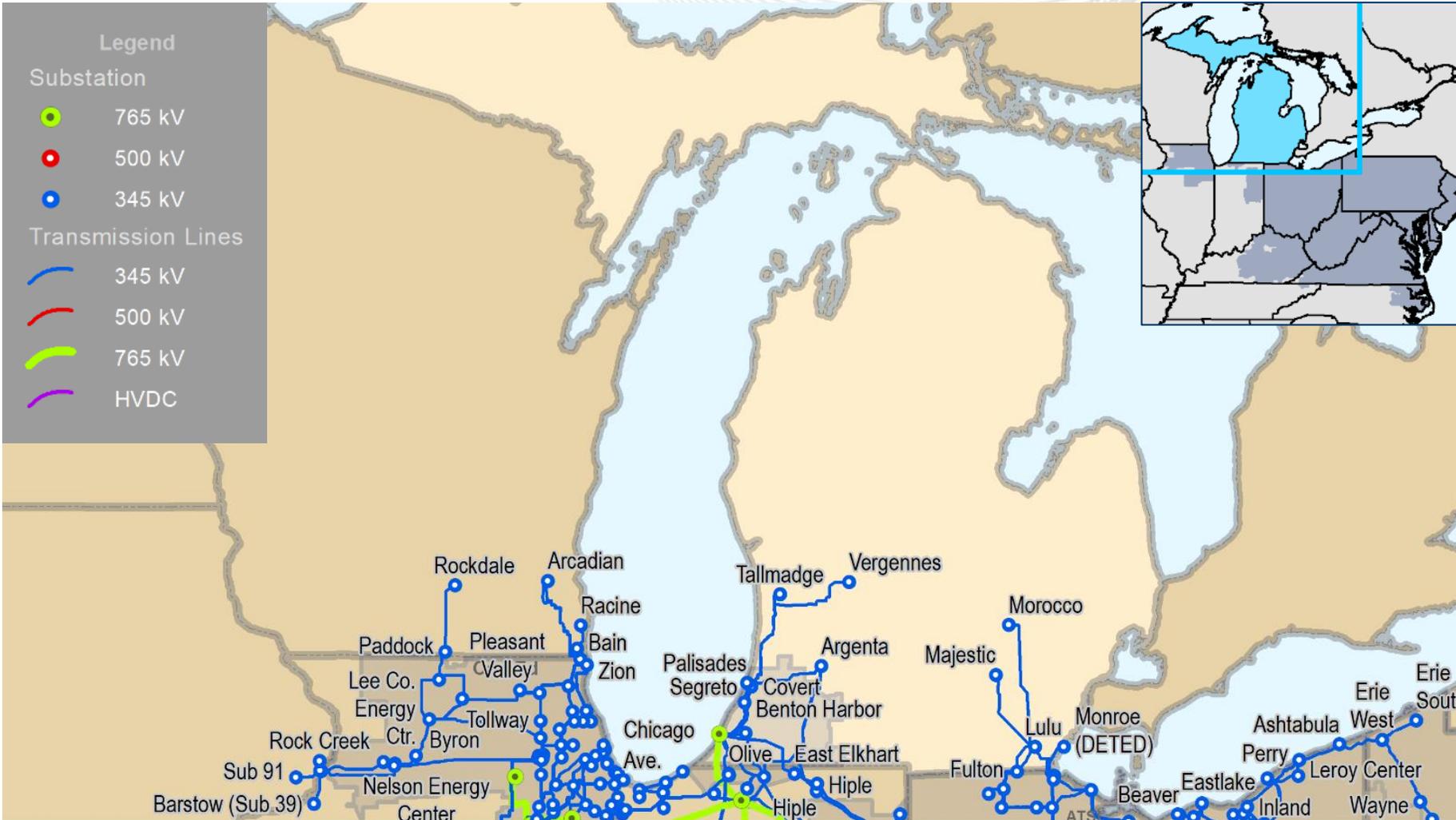
- Market Analysis

# 3. Operations

- Emissions Data

- **Existing Capacity:** Nuclear represents approximately 66.7 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 at 42.4 and 17.7 percent of total installed capacity.
- **Interconnection Requests:** Natural gas represents 70.9 percent of new interconnection requests in Michigan, while solar represents approximately 19.3 percent of new requests.
- **Deactivations:** No generation in Michigan gave a notification of deactivation in 2019.
- **RTEP 2019:** Michigan's 2019 RTEP projects total approximately \$34.8 million in investment. Approximately 64.7 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 0.9 annually over the next ten years. Comparatively, the overall PJM RTO projected load growth rate is 0.6 percent.
- **2022/23 Capacity Market:** No Base Residual Auction was conducted in 2019. For most recent auction results, please see the 2018 Michigan State Infrastructure Report.
- **1/1/19 – 12/31/19 Market Performance:** Michigan's average hourly LMPs generally aligned with PJM average hourly LMPs.



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.

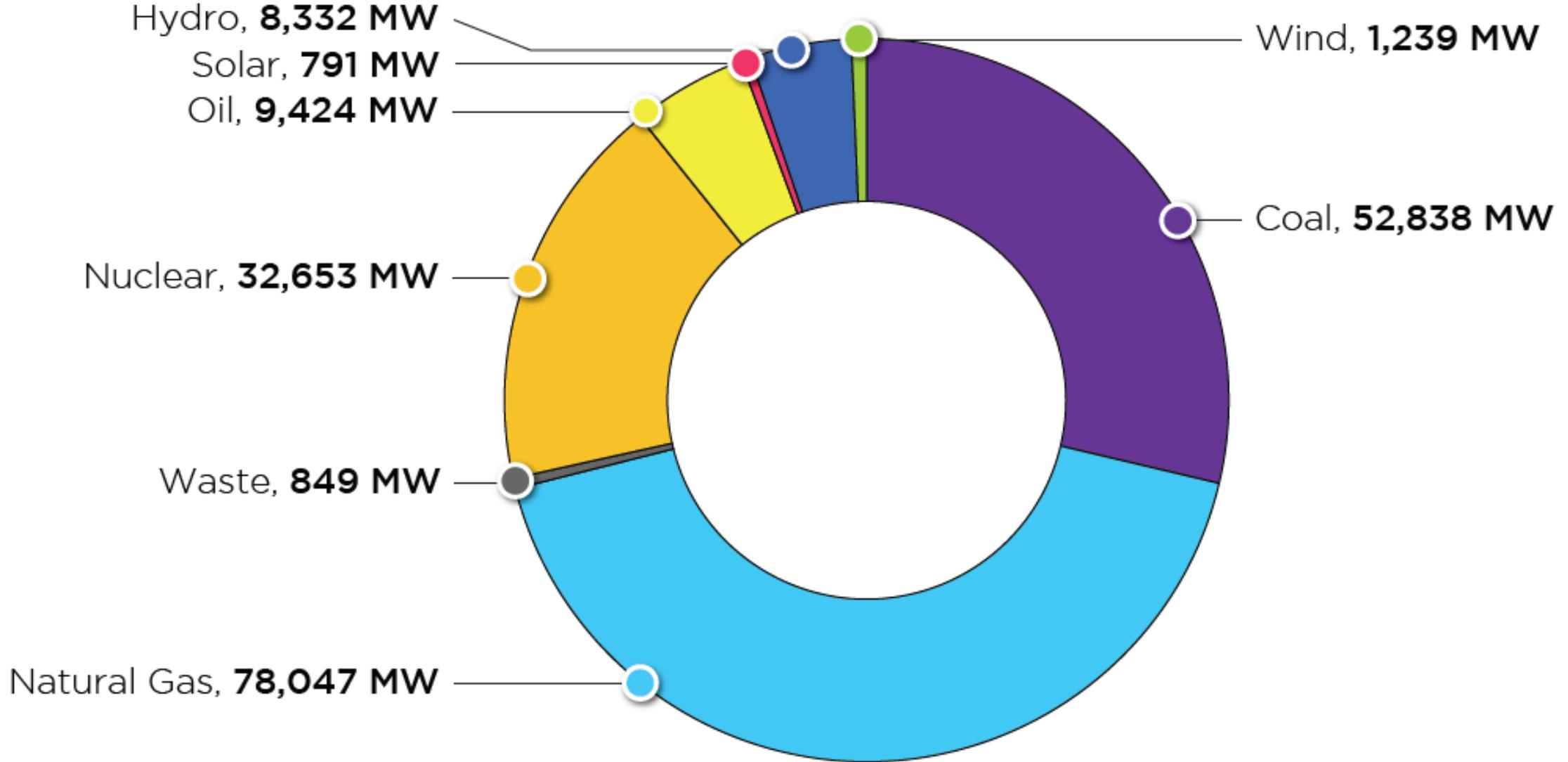
# Planning

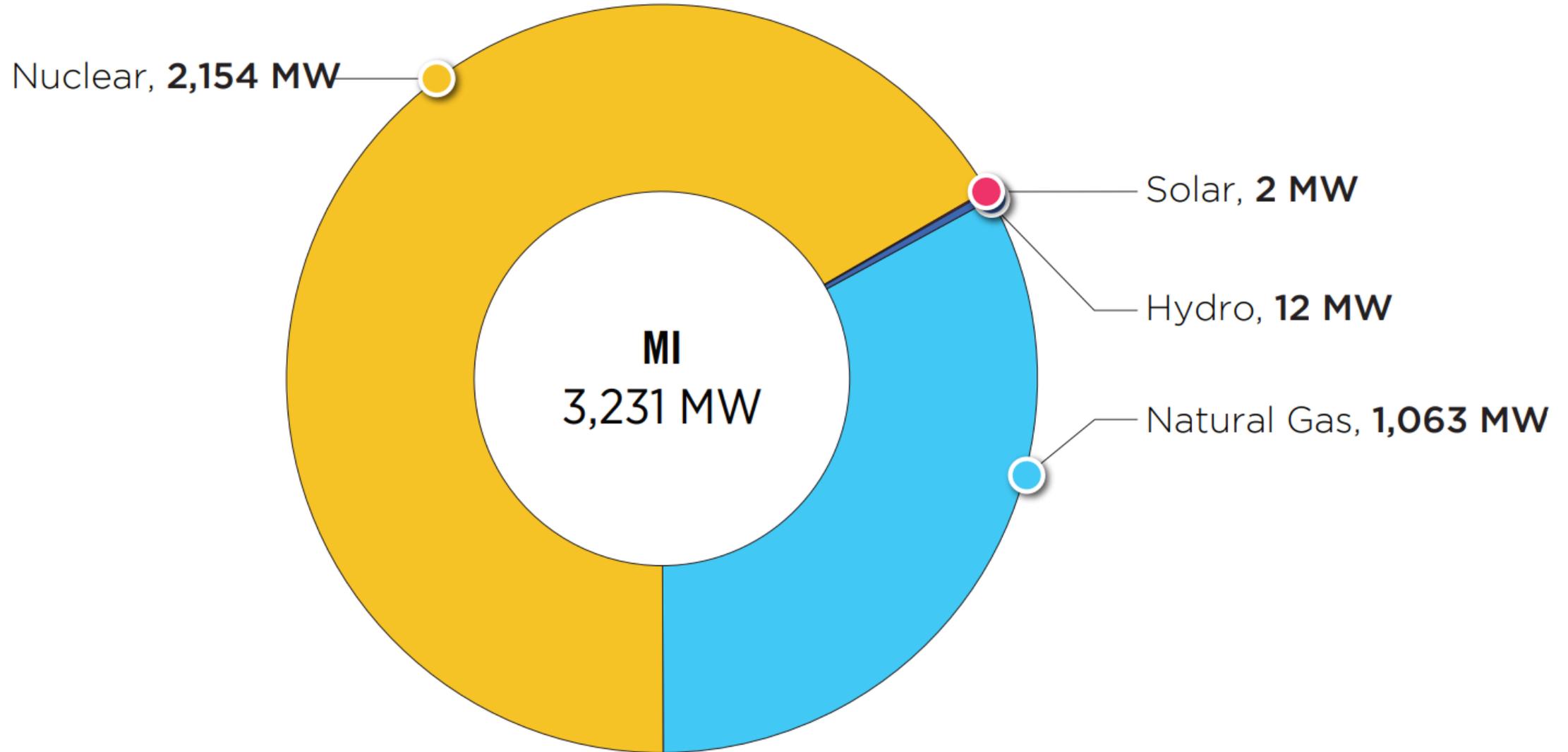
## Generation Portfolio Analysis



# PJM – Existing Installed Capacity

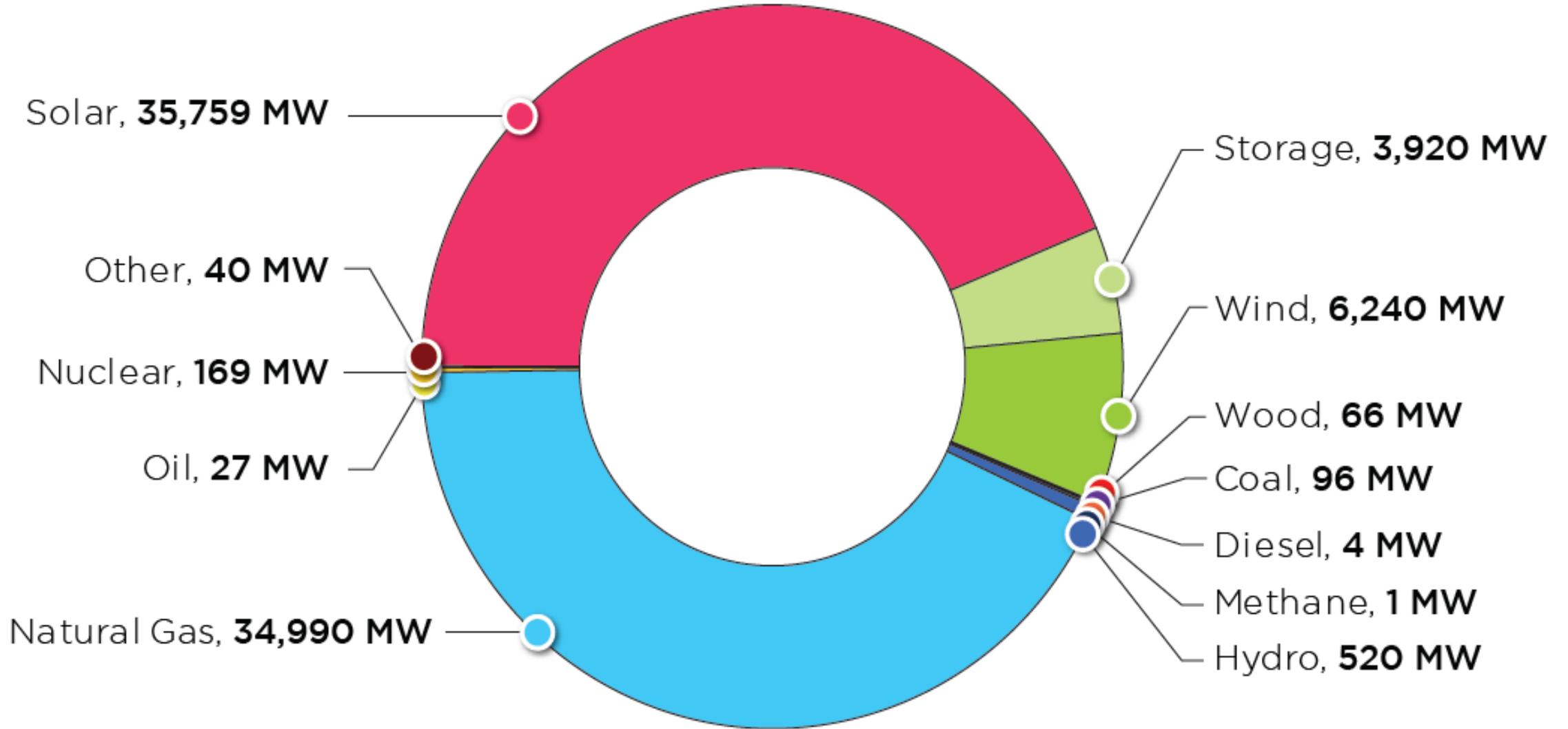
(CIRs – as of Dec. 31, 2019)





# PJM – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2019)



# Michigan – Queued Capacity (MW) by Fuel Type

(Requested CIRs – as of Dec. 31, 2019)

Natural Gas, **1,230 MW**

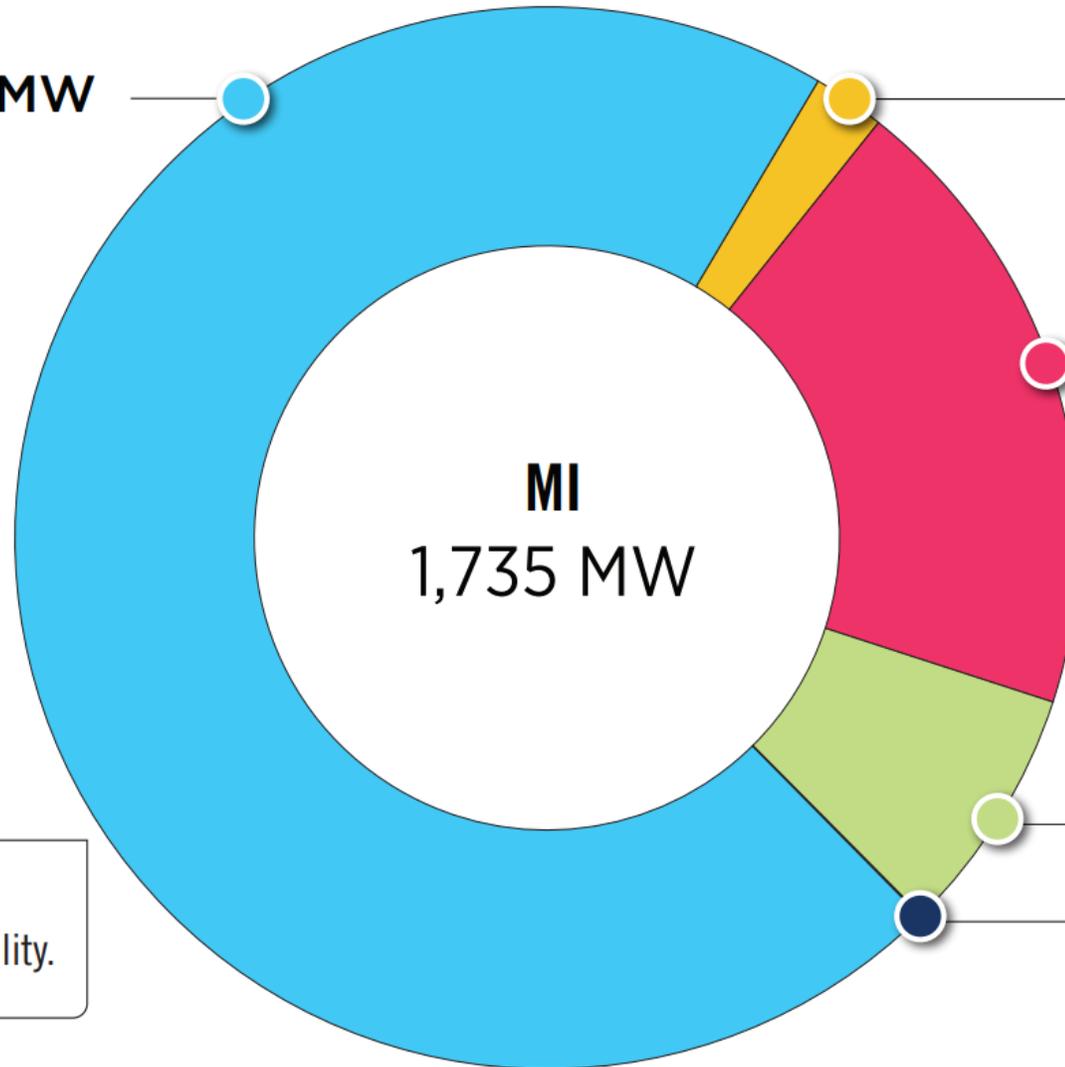
Nuclear, **38 MW**

Solar, **335 MW**

Nameplate Capacity, **635 MW**

Storage, **131 MW**

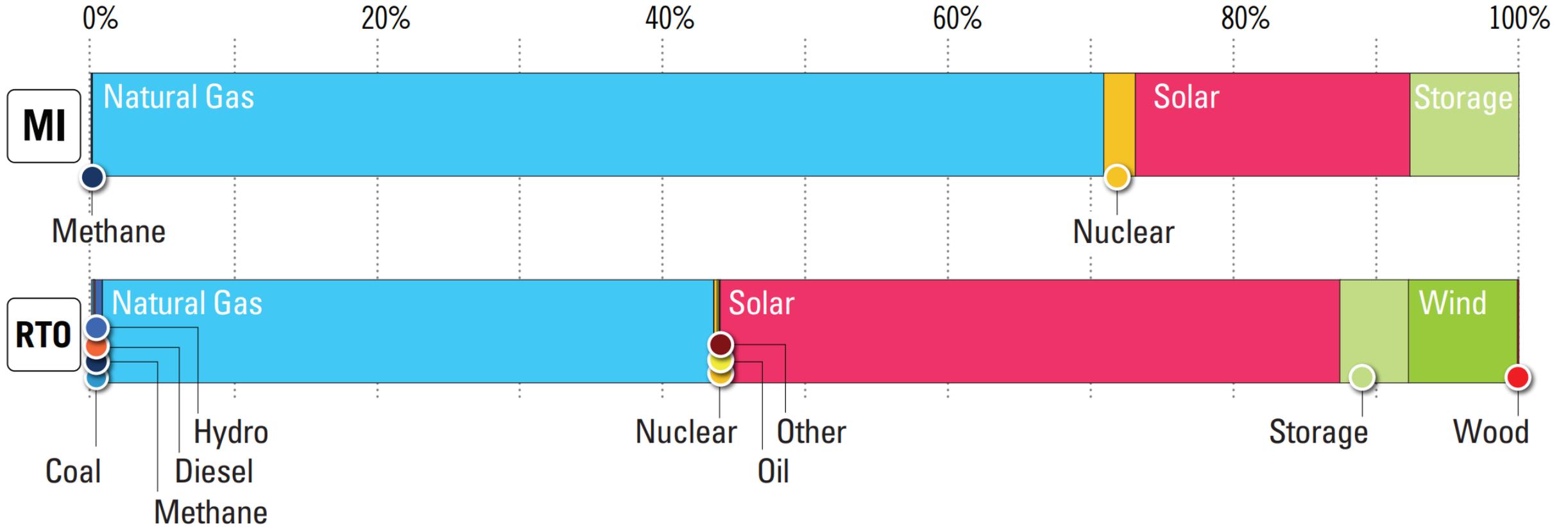
Methane, **1 MW**



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

# Michigan – Percentage of MW in Queue by Fuel Type

(Dec. 31, 2019)





# Michigan – Interconnection Requests

(Unforced Capacity – as of Dec. 31, 2019)

		In Queue						Complete				Grand Total	
		Active		Suspended		Under Construction		In Service		Withdrawn			
		No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of Projects	Capacity (MW)	No. of 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	5	88.0
	Nuclear	1	38.0	0	0.0	2	167.0	0	0.0	3	205.0	0	0.0
	Other	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0
	Storage	3	131.3	0	0.0	0	0.0	0	0.0	3	131.3	0	0.0
Renewable	Methane	1	0.8	0	0.0	2	9.6	0	0.0	3	10.4	1	12.0
	Solar	4	334.8	0	0.0	1	2.3	3	177.8	8	514.8	126	5,481.3
	Wind	0	0.0	0	0.0	0	0.0	1	26.0	1	26.0	11	261.3
<b>Grand Total</b>		<b>10</b>	<b>649.9</b>	<b>2</b>	<b>1,085.0</b>	<b>7</b>	<b>1,233.9</b>	<b>6</b>	<b>1,323.8</b>	<b>25</b>	<b>4,292.5</b>	<b>145</b>	<b>5,972.6</b>

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

# Michigan – Progression History of Interconnection Requests



## Projects withdrawn after final agreement

0	Interconnection Service Agreements
0	Wholesale Market Participation Agreements

Percentage of planned capacity and projects that have reached commercial operation	34%	47%
	Requested capacity megawatt	Requested projects

*This graphic shows the final state of generation submitted in all PJM queues that reached in-service operation, began construction, or was suspended or withdrawn as of Dec. 31, 2019.*



# Michigan – Generation Deactivation Notifications Received in 2019

Michigan had no generation deactivation notifications in 2019.

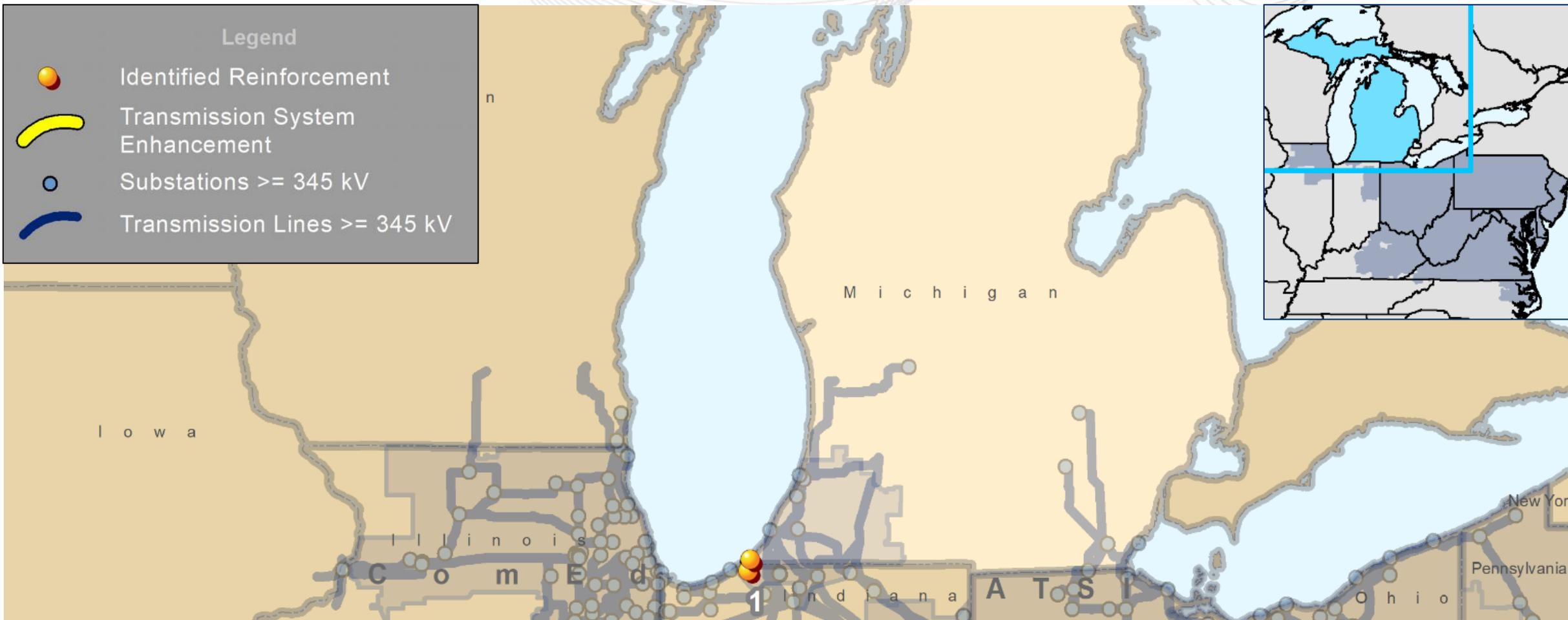
# Planning

## 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/rtep-upgrades-status/construct-status.aspx>



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



# Michigan – RTEP Baseline Projects

(Greater than \$5 million)

Map ID	Project	Description	Projected In-Service Date	Project Cost (\$M)	TO Zone	TEAC Date
1	b3132	Rebuild 3.11 miles of the LaPorte Junction-New Buffalo 69 kV line with 795 ACSR.	6/1/2022	\$12.3	AEP	6/17/2019

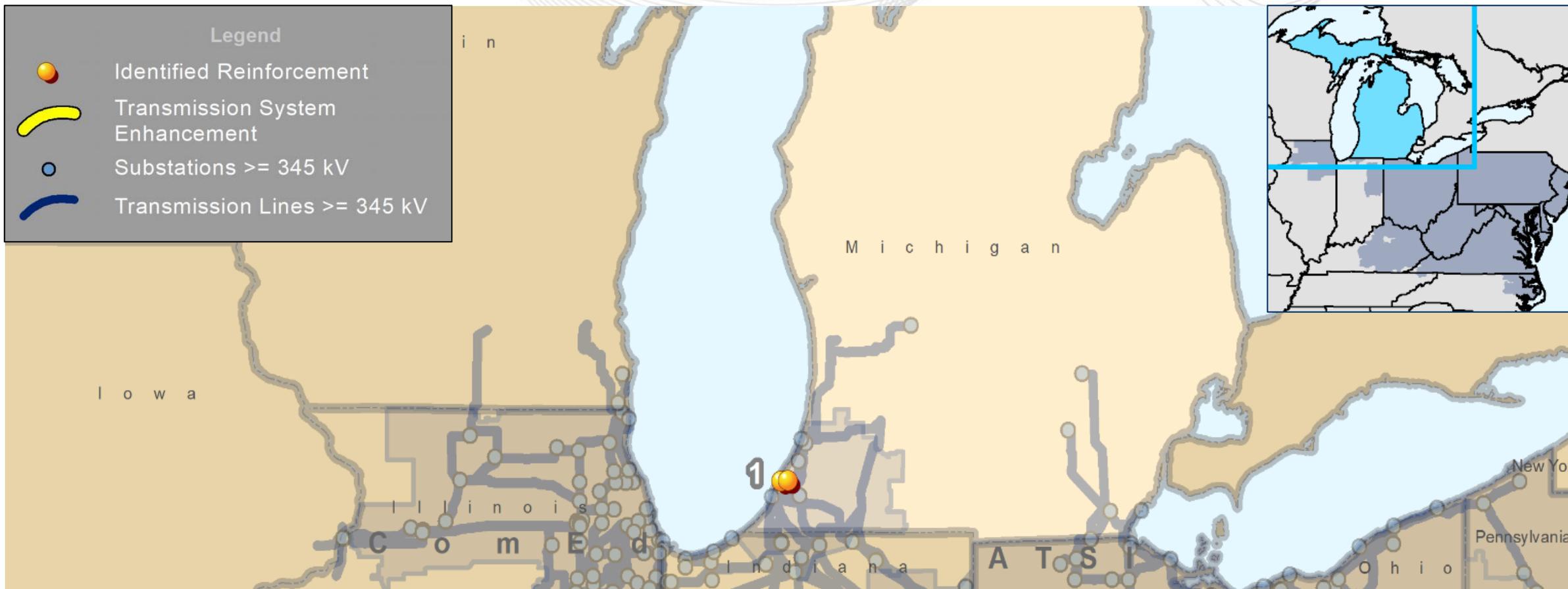


# Michigan – RTEP Network Projects

(Greater than \$5 million)

Michigan had no network project upgrades in 2019.

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	s2090	Rebuild 6.7 miles of the 34.5 kV circuit Main Street-Hickory Creek circuit using 556 ACSR conductor.	2/3/2023	\$22.5	AEP	10/25/2019
		Rebuild 0.5 miles of the Langley-Main Street 34.5 kV branch starting from the Langley station, using 556 ACSR conductor.				

# Planning

## Load Forecast

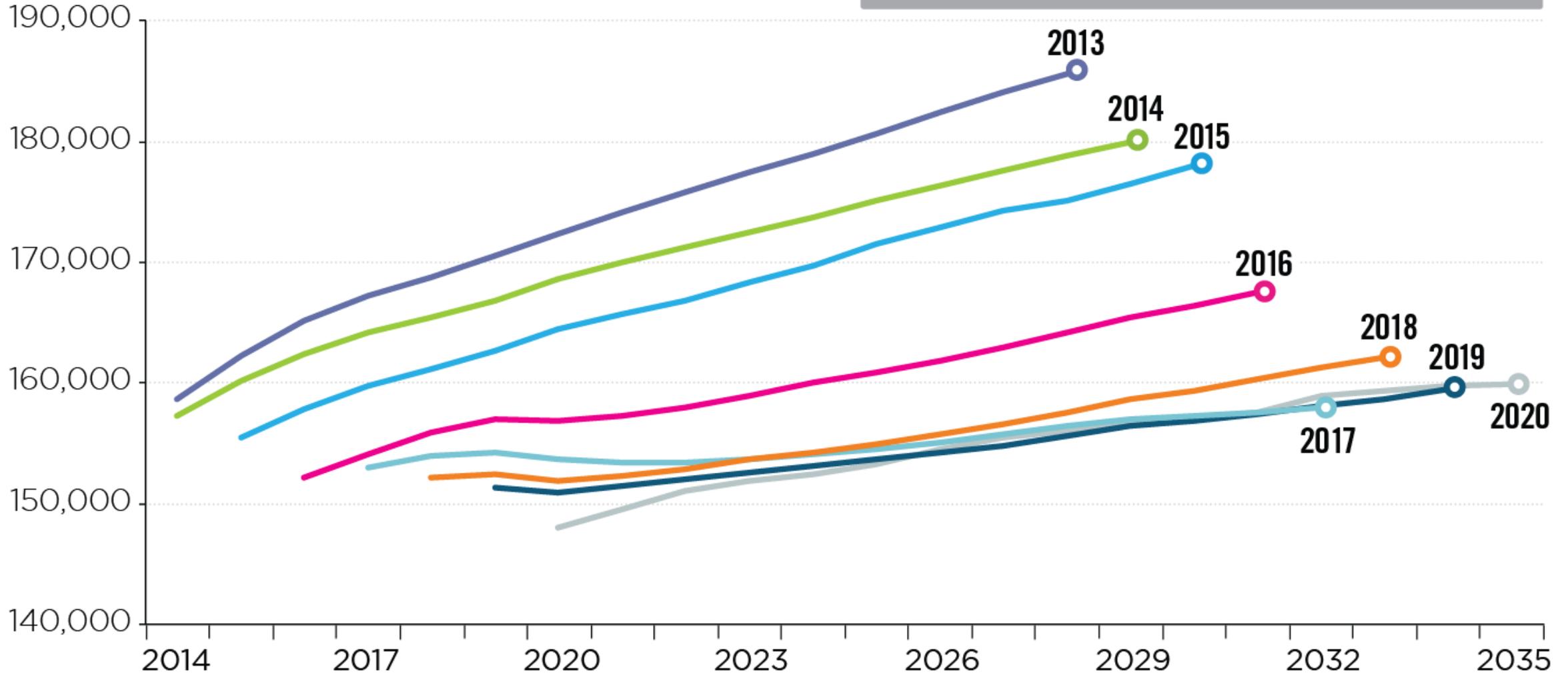


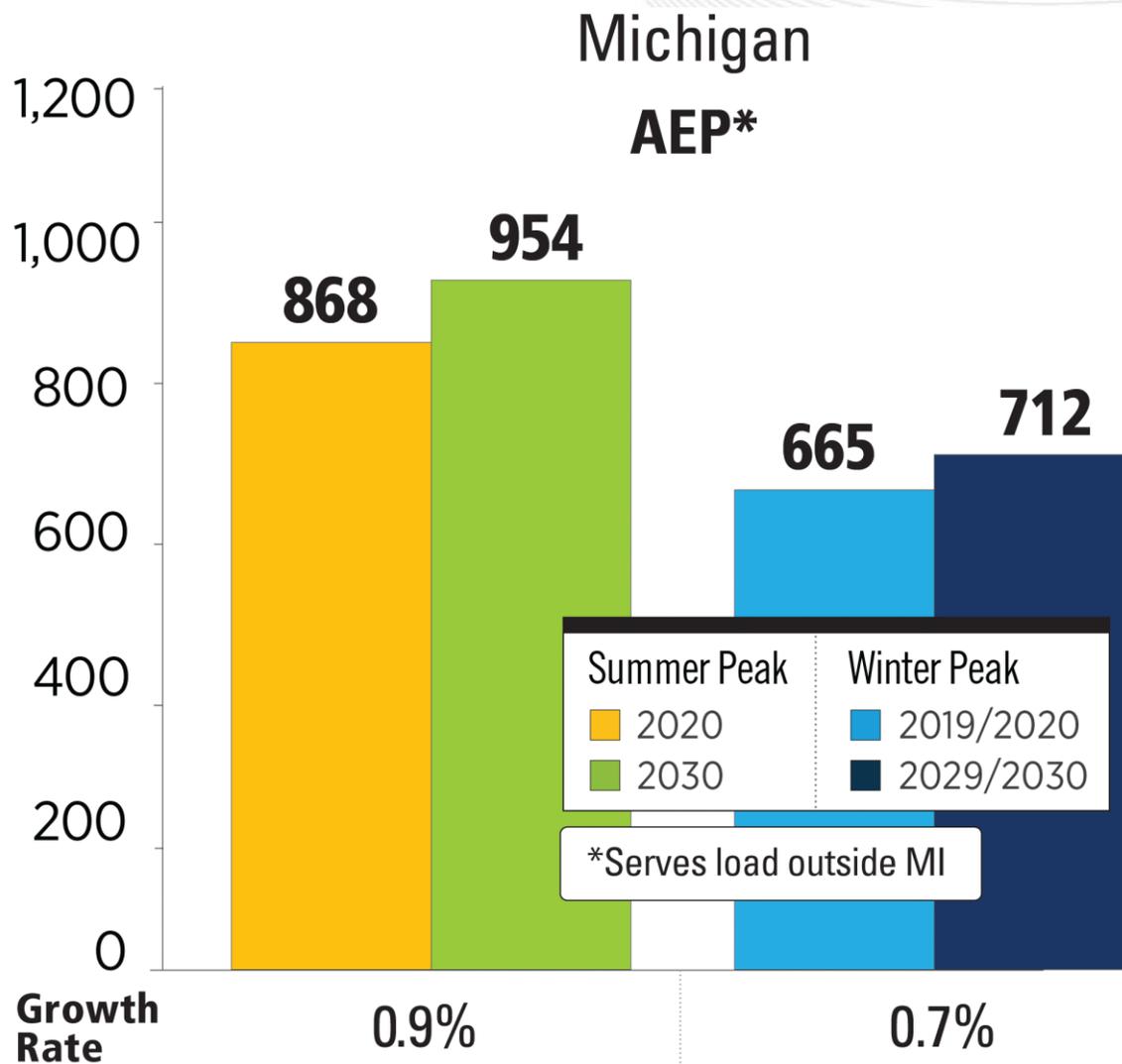
# PJM Annual Load Forecasts

(January 2020)

## PJM RTO Summer Peak Demand Forecast

Load (MW)





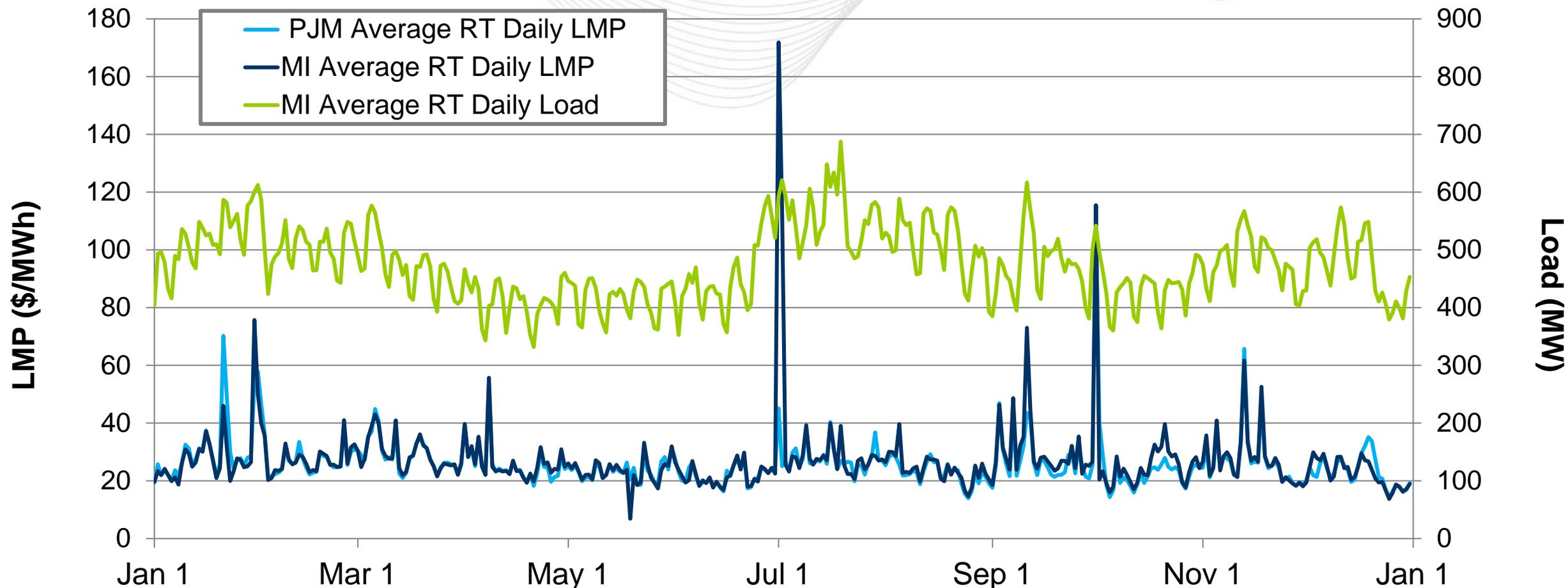
PJM RTO Summer Peak		PJM RTO Winter Peak	
2020	2030	2019/2020	2029/2030
148,092 MW	157,132 MW	131,287 MW	139,970 MW
Growth Rate 0.6%		Growth Rate 0.6%	

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. 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.

The Load Forecast was produced prior to COVID-19 and will be updated before the next Base Residual Auction to reflect changes in load patterns.

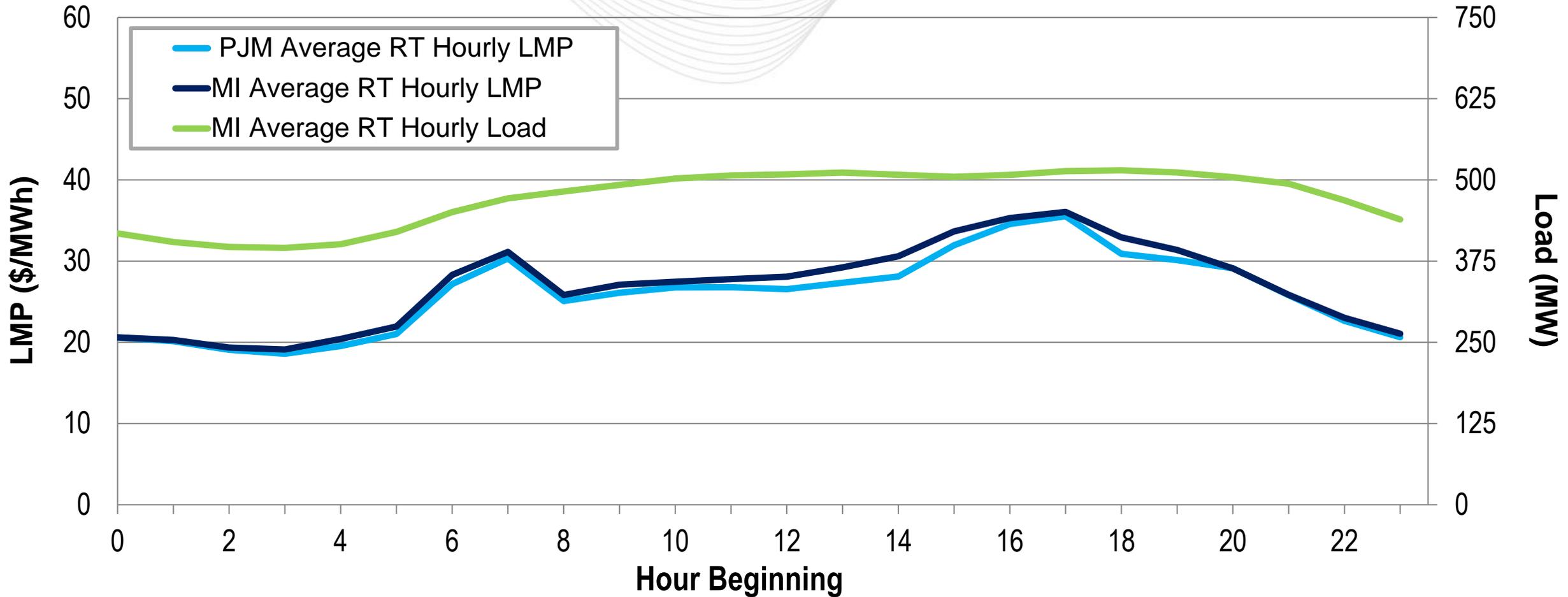
# Markets

## Market Analysis



**Note:** The price spike in early July reflects several binding constraints that occurred on the transmission system. The spike in October reflects the Performance Assessment Interval event that occurred on October 2nd.

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





# Michigan – Net Energy Import/Export Trend

(May 2019 – April 2020)



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

# Operations Emissions Data



# 2005 – 2019 PJM Average Emissions

