2022 Michigan State Infrastructure Report
(January 1, 2022 – December 31, 2022)

May 2023

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
   • Capacity Market Results
   • Market Analysis
   • Net Energy Import/Export Trend

3. Operations
   • Generator Production
   • Emissions Data
• **Existing Capacity:** Nuclear represents approximately 50.3 percent of the total installed capacity in the Michigan service territory while natural gas represents approximately 49.5 percent. Comparatively across PJM, natural gas and nuclear are 46.6 and 17.7 percent of total installed capacity, respectively.

• **Interconnection Requests:** Solar represents 88.8 percent of the proposed generation requests in Michigan, while storage represents approximately 11.2 percent.

• **Deactivations:** Michigan had no generators deactivate or give a notice of deactivation in 2022.

• **RTEP 2022:** Michigan’s 2022 RTEP project total represents approximately $110.91 million in investment.
• **Load Forecast:** Michigan’s summer peak load served within the AEP portion of PJM is projected to grow at 0.1 percent annually over the next ten years. The overall PJM RTO projected summer load growth rate is 0.8 percent.

• **2023/24 Capacity Market:** The portion of Michigan within the PJM footprint cleared at the RTO price of $34.13/MW-day in the 2023/2024 Base Residual Auction.

• **2024/25 Capacity Market:** The portion of Michigan within the PJM footprint cleared at the RTO price of $28.92/MW-day in the 2024/2025 Base Residual Auction.

• **1/1/22 – 12/31/22 Market Performance:** Michigan’s average hourly LMPs were lower than the PJM average hourly LMP.
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
Michigan – Existing Installed Capacity
(CIRs – as of Dec. 31, 2022)

Total 4,336 MW

Nuclear, 2,181 MW
Solar, 2 MW
Hydro, 6 MW
Natural Gas, 2,147 MW
PJM Queued Capacity (Nameplate) by Fuel Type
(“Active” in the PJM Queue as of April 1, 2023)

- **Solar**, 147,986 MW
- **Storage**, 55,037 MW
- **Wind***, 43,221 MW
- **Natural Gas**, 5,537 MW
- **Hydro**, 824 MW
- **Other**, 60 MW

*Wind includes both onshore and offshore wind

PJM RTO 252,665 MW
Michigan Queued Capacity (Nameplate) by Fuel Type

(“Active” in the PJM Queue as of April 1, 2023)

MI
2,247 MW

Storage,
252 MW

Solar,
1,995 MW
Michigan had no generators deactivate or give a notice of deactivation in 2022.
Planning
Transmission Infrastructure Analysis
For reporting purposes, the 2022 state infrastructure reports provide maps displaying all baseline, network, and supplemental projects for the respective state. The reports also include aggregated project cost tables of these projects by Transmission Owner zone. For a detailed list of each project shown on a state’s project map, please see that state’s section in the 2022 Annual RTEP Report on pjm.com:

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
Michigan – RTEP Baseline Projects

Michigan had no baseline project upgrades in 2022.

Note: Baseline upgrades are those that resolve a system reliability criteria violation.
Note: Network projects 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. The costs of network projects are borne by the interconnection customer.
Michigan – 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.
Planning
Load Forecast
PJM Annual Load Forecast

PJM RTO Summer Peak Demand Forecast

Load (MW)

185,000

175,000

165,000

155,000

145,000


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The summer and winter peak megawatt values reflect the estimated amount of forecast 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.

- **PJM RTO Summer Peak**
  - 2023: 149,059 MW
  - 2033: 160,971 MW
  - Growth Rate: 0.8%

- **PJM RTO Winter Peak**
  - 2023: 130,811 MW
  - 2033: 144,992 MW
  - Growth Rate: 1.0%

**AEP serves load outside MI**

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**Michigan – 2023 Load Forecast Report**

**AEP**

- **Summer Peak**
  - 2023: 834 MW
  - 2033: 841 MW
- **Winter Peak**
  - 2022/2023: 664 MW
  - 2032/2033: 674 MW

- Growth Rate: 0.1%
Markets
Capacity Market Results
2023/24 Base Residual Auction Clearing Prices ($/MW-Day)
### 2023/24 Cleared MW (UCAP) by Resource Type

<table>
<thead>
<tr>
<th></th>
<th>ANNUAL (MW)</th>
<th>SUMMER</th>
<th>WINTER</th>
<th>Total (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generation</strong></td>
<td>131,256.3</td>
<td>47.0</td>
<td>474.1</td>
<td>131,777.4</td>
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<tr>
<td><strong>DR</strong></td>
<td>7,919.1</td>
<td>177.1</td>
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<td>8,096.2</td>
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<tr>
<td><strong>EE</strong></td>
<td>5,221.1</td>
<td>250.0</td>
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<td>5,471.1</td>
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<tr>
<td><strong>Total (MW)</strong></td>
<td>144,396.5</td>
<td>474.1</td>
<td>474.1</td>
<td>131,777.4</td>
</tr>
</tbody>
</table>
2024/25 Base Residual Auction Clearing Prices ($/MW-Day)

- **MAAC**: $49.49
- **Eastern MAAC**: $54.95
- **DPL-South**: $90.64
- **RTO**: $28.92
- **BGE**: $73.00
- **DEO&K**: $96.24
## 2024/2025 Cleared MW (UCAP) by Resource Type

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<th>Total (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation</td>
<td>131,779.3</td>
<td>38.2</td>
<td>605.6</td>
<td>132,423.1</td>
</tr>
<tr>
<td>DR</td>
<td>7,804.3</td>
<td>188.4</td>
<td>0</td>
<td>7,992.7</td>
</tr>
<tr>
<td>EE</td>
<td>7,289.7</td>
<td>379.0</td>
<td>0</td>
<td>7,668.7</td>
</tr>
<tr>
<td><strong>Total (MW)</strong></td>
<td><strong>146,873.3</strong></td>
<td><strong>605.6</strong></td>
<td><strong>605.6</strong></td>
<td><strong>132,423.1</strong></td>
</tr>
</tbody>
</table>
Markets
Market Analysis
Michigan – Average Daily LMP
(Jan. 1, 2022 – Dec. 31, 2022)

Note: The significant price spike in late Dec. 2022 was a result of Winter Storm Elliott's impact on system conditions.
Michigan’s average hourly LMPs were lower than the PJM average hourly LMP.
This chart reflects the portion of Michigan that PJM operates. Positive values represent exports and negative values represent imports.
Michigan – 2022 Generator Production

- **Nuclear, 62.7%**
- **Other, <1%**
- **Natural Gas, 37.3%**

The data in this chart comes from EIA Form 923 (2022) and represents only generators within the PJM portion of MI.
2005 – 2022 PJM Average Emissions
(March 2023)

**CO₂**
(lbs/MWh)

**SO₂ and NOₓ**
(lbs/MWh)

- **Carbon Dioxide**
- **Nitrogen Oxides**
- **Sulfur Dioxide**