2022 West Virginia Infrastructure Report
(January 1, 2022 – December 31, 2022)

May 2023
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:** Coal represents approximately 88.4 percent of the total installed capacity in the West Virginia service territory while natural gas represents approximately 7.8 percent. Across PJM, natural gas and coal account respectively for 46.6 and 24.0 percent of total installed capacity, respectively.

• **Interconnection Requests:** Solar represents 66.2 percent of new interconnection requests in West Virginia, while natural gas represents approximately 18.0 percent of new requests.

• **Deactivations:** 1,278 MW of generation in West Virginia gave a notice of deactivation in 2022.

• **RTEP 2022:** West Virginia's 2022 RTEP project total represents approximately $358.83 million in investment.
• **Load Forecast:** West Virginia’s summer peak load is projected to increase by 0.1 to 0.8 percent annually over the next ten years, while the winter peak is projected to increase by 0.2 to 1.1 percent, depending on the transmission zone.

• **2023/24 Capacity Market:** West Virginia’s service territory cleared at the RTO price of $34.13/MW-day in the 2023/2024 Base Residual Auction.

• **2024/25 Capacity Market:** West Virginia’s service territory 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:** West Virginia’s average hourly LMPs aligned with the PJM average hourly LMP.

• **Emissions:** West Virginia’s average CO2 emissions decreased in 2022 compared to 2021 levels.
Planning
Generation Portfolio Analysis
PJM – Existing Installed Capacity

(CIRs – as of Dec. 31, 2022)

PJM 184,833 MW

- Natural Gas, 86,212 MW
- Coal, 44,293 MW
- Wind, 3,508 MW
- Hydro, 8,238 MW
- Solar, 2,707 MW
- Oil, 6,424 MW
- Nuclear, 32,649 MW
- Waste, 802 MW

www.pjm.com | Public 7 PJM©2023
West Virginia – Existing Installed Capacity
(CIRs – as of Dec. 31, 2022)

- Wind: 299 MW
- Hydro: 224 MW
- Oil: 11 MW
- Natural Gas: 1,112 MW
- Coal: 12,532 MW

Total: 14,178 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
West Virginia Queued Capacity (Nameplate) by Fuel Type
(“Active” in the PJM Queue as of April 1, 2023)

- Solar, 8,055 MW
- Storage, 1,076 MW
- Wind, 799 MW
- Natural Gas, 2,190 MW
- Hydro, 51 MW

Total: 12,171 MW
West Virginia – 2022 Generator Deactivations

<table>
<thead>
<tr>
<th>Unit</th>
<th>TO Zone</th>
<th>Fuel Type</th>
<th>Request Received to Deactivate</th>
<th>Actual or Projected Deactivation Date</th>
<th>Age (Years)</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasant Unit2</td>
<td>AP</td>
<td>Coal</td>
<td>3/14/2022</td>
<td>6/1/2023</td>
<td>42</td>
<td>639.0</td>
</tr>
<tr>
<td>Pleasant Unit 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>639.0</td>
</tr>
</tbody>
</table>
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: https://www.pjm.com/-/media/library/reports-notices/2022-rtep/2022-rtep-report.ashx

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
Note: Baseline upgrades are those that resolve a system reliability criteria violation.
West Virginia – RTEP Network Projects

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.
West Virginia – TO Supplemental Projects

**WV Supplemental Projects**

<table>
<thead>
<tr>
<th>TO Zone</th>
<th>Cost ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEP</td>
<td>$221.60</td>
</tr>
<tr>
<td>AP</td>
<td>$10.10</td>
</tr>
</tbody>
</table>

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.
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.

**West Virginia – 2023 Load Forecast Report**

<table>
<thead>
<tr>
<th></th>
<th>AEP*</th>
<th></th>
<th>AP*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2022</strong></td>
<td>3,030</td>
<td>3,055</td>
<td>2,951</td>
<td>3,208</td>
</tr>
<tr>
<td><strong>2023</strong></td>
<td>3,494</td>
<td>3,549</td>
<td>3,147</td>
<td>3,527</td>
</tr>
<tr>
<td><strong>2032</strong></td>
<td>3,555</td>
<td>3,596</td>
<td>3,235</td>
<td>3,572</td>
</tr>
<tr>
<td><strong>Growth Rate</strong></td>
<td>0.1%</td>
<td>0.2%</td>
<td>0.8%</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

*Serves load outside WV

<table>
<thead>
<tr>
<th></th>
<th>PMJ RTO Summer Peak</th>
<th>PMJ RTO Winter Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2023</strong></td>
<td>149,059 MW</td>
<td>130,811 MW</td>
</tr>
<tr>
<td><strong>2033</strong></td>
<td>160,971 MW</td>
<td>144,992 MW</td>
</tr>
<tr>
<td><strong>Growth Rate</strong></td>
<td>0.8%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

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.
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</th>
<th>SUMMER</th>
<th>WINTER</th>
<th>Total (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation</td>
<td>131,256.3</td>
<td>47.0</td>
<td>474.1</td>
<td>131,777.4</td>
</tr>
<tr>
<td>DR</td>
<td>7,919.1</td>
<td>177.1</td>
<td>0.0</td>
<td>8,096.2</td>
</tr>
<tr>
<td>EE</td>
<td>5,221.1</td>
<td>250.0</td>
<td>0.0</td>
<td>5,471.1</td>
</tr>
<tr>
<td>Total (MW)</td>
<td>144,396.5</td>
<td>474.1</td>
<td>474.1</td>
<td></td>
</tr>
</tbody>
</table>
2024/25 Base Residual Auction Clearing Prices ($/MW-Day)

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

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Annual (MW)</th>
<th>Summer (MW)</th>
<th>Winter (MW)</th>
<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>Total (MW)</td>
<td>146,873.3</td>
<td>605.6</td>
<td>605.6</td>
<td>132,423.1</td>
</tr>
</tbody>
</table>
Markets
Market Analysis
West Virginia – 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.
West Virginia’s average hourly LMPs aligned with the PJM average hourly LMP.
West Virginia – Net Energy Import/Export Trend
(Jan. 2022 – Dec. 2022)

Positive values represent exports and negative values represent imports.
Operations
West Virginia – 2022 Generator Production

The data in this chart comes from EIA Form 923 (2022).
2005 – 2022 PJM Average Emissions (March 2023)

- **CO₂ (lbs/MWh)**
- **SO₂ and NOₓ (lbs/MWh)**

**CO₂ (lbs/MWh):**
- 2005: 1,300
- 2022: 0.0

**SO₂ and NOₓ (lbs/MWh):**
- 2005: 7.5
- 2022: 0.0

**Graph Key:**
- Blue bars: Carbon Dioxide
- Orange line: Nitrogen Oxides
- Green line: Sulfur Dioxide
West Virginia – Average Emissions (lbs/MWh)

(March 2023)

SO\textsubscript{2} and NO\textsubscript{x} (lbs/MWh)

CO\textsubscript{2} (lbs/MWh)

- Carbon Dioxide
- Nitrogen Oxides
- Sulfur Dioxide