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

May 2023

This report reflects information for the portion of Kentucky within the PJM service territory.
Table of Contents

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 53.5 percent of the total installed capacity in the Kentucky service territory while natural gas represents approximately 43.7 percent. Comparatively across PJM, natural gas and coal are at 44.6 and 24.0 percent of total installed capacity.

• **Interconnection Requests:** Approximately 95.4 of the proposed generation in Kentucky is solar, while storage comprises 4.6 percent of proposed generation.

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

• **RTEP 2022:** Kentucky's 2022 RTEP project total represents approximately $89.26 million in investment.

• **Load Forecast:** Kentucky’s peak load growth is projected to range between -0.2 and 0.3 percent annually over the next ten years, based on the service territory. The overall PJM RTO projected summer load growth rate is 0.8 percent.
• **2023/24 Capacity Market:** The portion of Kentucky 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 Kentucky within the PJM footprint cleared at the RTO price of $28.92/MW-day and at $96.24 within DEO&K for the 2024/2025 Base Residual Auction.

• **1/1/22 – 12/31/22 Market Performance:** Kentucky’s average hourly LMPs generally aligned with the PJM average hourly LMP.

• **Emissions:** Kentucky’s average CO2 emissions slightly decreased in 2022 compared to 2021 levels.
The PJM service area in Kentucky 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, 2022)

PJM 184,833 MW

Natural Gas, 86,212 MW

Nuclear, 32,649 MW

Oil, 6,424 MW

Solar, 2,707 MW

Hydro, 8,238 MW

Wind, 3,508 MW

Coal, 44,293 MW

Waste, 802 MW
Kentucky – Existing Installed Capacity
(CIRs – as of Dec. 31, 2022)

KY
Total
4,828 MW

Hydro, 136 MW
Coal, 2,582 MW
Natural Gas, 2,110 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
Kentucky Queued Capacity (Nameplate) by Fuel Type

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

KY
14,701 MW

Solar, 14,025 MW

Storage, 676 MW
Kentucky 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
Note: Baseline upgrades are those that resolve a system reliability criteria violation.
Kentucky – 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.

<table>
<thead>
<tr>
<th>KY Network Projects</th>
<th>TO Zone</th>
<th>Cost ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EKPC</td>
<td>$7.74</td>
<td></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.
Planning
Load Forecast
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 Cleared MW (UCAP) by Resource Type

<table>
<thead>
<tr>
<th></th>
<th>ANNUAL (MW)</th>
<th>SUMMER (MW)</th>
<th>WINTER (MW)</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>
</tr>
<tr>
<td><strong>DR</strong></td>
<td>7,919.1</td>
<td>177.1</td>
<td>0.0</td>
<td>8,096.2</td>
</tr>
<tr>
<td><strong>EE</strong></td>
<td>5,221.1</td>
<td>250.0</td>
<td>0.0</td>
<td>5,471.1</td>
</tr>
<tr>
<td><strong>Total (MW)</strong></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
- **Eastern MAAC**: $54.95
- **MAAC**: $49.49
- **DPL-South**: $90.64
## 2024/2025 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><strong>Generation</strong></td>
<td>131,779.3</td>
<td>38.2</td>
<td>605.6</td>
<td>132,423.1</td>
</tr>
<tr>
<td><strong>DR</strong></td>
<td>7,804.3</td>
<td>188.4</td>
<td>0</td>
<td>7,992.7</td>
</tr>
<tr>
<td><strong>EE</strong></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>146,873.3</td>
<td>605.6</td>
<td>605.6</td>
<td></td>
</tr>
</tbody>
</table>
Markets
Market Analysis
Kentucky – 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.
Kentucky’s average hourly LMPs generally aligned with the PJM average hourly LMP.
Kentucky – Net Energy Import/Export Trend
(Jan. 2022 – Dec. 2022)

This chart reflects the portion of Kentucky that PJM operates. Positive values represent exports and negative values represent imports.
Kentucky – 2022 Generator Production

- Coal, 88.9%
- Natural Gas, 10.3%
- Other, 0.8%

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

Carbon Dioxide
Nitrogen Oxides
Sulfur Dioxide

CO₂ (lbs/MWh)

SO₂ and NOₓ (lbs/MWh)


©2023 PJM
www.pjm.com | Public
PJM©2023
Kentucky – Average Emissions (lbs/MWh)

(March 2023)

- **CO₂ (lbs/MWh)**
  - Carbon Dioxide
  - Nitrogen Oxides
  - Sulfur Dioxide

- **SO₂ and NOₓ (lbs/MWh)**