14.4: Eastern Kentucky RTEP Overview

PJM operates Bulk Electric System (BES) transmission facilities (and others monitored at lower voltages), within eastern Kentucky as shown on Map 14.19, including those of American Electric Power (AEP). Customers are served by native generation resources and power transfers across tie-line facilities with adjoining systems.

Duke Integration

On June 25, 2010, Duke Energy Ohio, Inc. and Duke Energy Kentucky, Inc, subsidiaries of Duke Energy Corporation, filed with the Federal Energy Regulatory Commission (FERC) to withdraw their transmission assets from Midwest Independent System Operator and to place them into PJM Interconnection as of January 1, 2012. In addition to the Duke Ohio and Duke Kentucky transmission assets, the filing includes the integration of Duke-owned and jointly-owned generation assets. PJM began required analyses in 2010 to study Duke Energy integration. Initial deliverability studies necessary for May 2011 Reliability Pricing Model (RPM) auction input were completed in December 2010 and transmitted to Duke for review. Remaining integration studies will be completed as part of PJM’s 2011 cycle of analyses.

Critical Regional Transmission Expansion Plan (RTEP) Issues and Upgrades

PJM’s annual RTEP process assesses transmission in eastern Kentucky for compliance with NERC reliability criteria violations. In order to solve identified violations, PJM determines necessary baseline enhancements as well as network upgrades to accommodate the interconnection of new generating resources within the AEP transmission zone (TO) zone. Section 16 provides a topical index of RTEP results, issues and challenges discussed in this report.
14.4.1 – Load Growth and Existing Generations

**Internal Load Growth**
Load growth for summer and winter periods is shown in Section 14.0.2. The peak summer load growth rate for the AEP Transmission Owner zone within PJM is expected to be 1.4 percent on average over ten years through 2020. The peak winter load growth rate for AEP is expected to be 0.9 percent on average over ten years through 2019/20.

Forecasted summer peak loads are modeled in power flow studies used in PJM's 2010 RTEP studies. PJM's RTEP includes baseline transmission upgrades to meet expected near-term 2015 peak load conditions. RTEP studies also assess anticipated needs for additional transmission expansion plans to meet long-term load growth requirements beyond 2015 out through 2025 as well.

**Existing Generating Capability**
Figure 14.11 provides a snapshot of the existing installed capacity by fuel type in eastern Kentucky.

---

**Figure 14.11: Existing Installed Capacity in Eastern Kentucky (MW)**

![Pie Chart: Existing Installed Capacity in Eastern Kentucky]

- Coal, 1,073
- Natural Gas, 836
- Biomass, 63
- Hydro, 70
- Wind, 8

*Nameplate Energy = 60 MW*

---

**Figure 14.12: Queued Capacity by Fuel Type in Eastern Kentucky (MW)**

![Pie Chart: Queued Capacity by Fuel Type in Eastern Kentucky]

- Natural Gas, 20
- Coal, 134
- Biomass, 63
- Hydro, 70
- Wind, 8

*Nameplate Energy = 60 MW*
14.4.2 – Generator Interconnection Requests

PJM has received five interconnection requests – through the close of Queue W4 on January 31, 2011 – listed in Table 14.15 and shown on Map 14.20.

Figure 14.12 shows the fuel mix of queued generation interconnection requests in Eastern Kentucky that have requested capacity injection rights through the close of Queue W4 on January 31, 2011, excluding projects that are in-service and those that have withdrawn.

14.4.3 – Generation Deactivations


14.4.4 – Merchant Transmission Interconnection Requests

Through January 31, 2011, PJM’s interconnection queues did not contain any requests for merchant transmission interconnection in eastern Kentucky.

### Table 14.15: Queued Generation Interconnection Requests in Eastern Kentucky

<table>
<thead>
<tr>
<th>Queue</th>
<th>Project Name</th>
<th>MW</th>
<th>MWC</th>
<th>Status</th>
<th>Schedule</th>
<th>TO</th>
<th>Fuel Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>U2 - 080</td>
<td>South Portsmouth 138 kV</td>
<td>134</td>
<td>134</td>
<td>Active</td>
<td>7/1/2011</td>
<td>AEP</td>
<td>Coal</td>
</tr>
<tr>
<td>W2 - 063</td>
<td>Millbrook Park 138 kV</td>
<td>70</td>
<td>70</td>
<td>Active</td>
<td>1/1/2011</td>
<td>AEP</td>
<td>Hydro</td>
</tr>
<tr>
<td>W3 - 051</td>
<td>Dorton 138 kV</td>
<td>60</td>
<td>7.8</td>
<td>Active</td>
<td>9/30/2013</td>
<td>AEP</td>
<td>Wind</td>
</tr>
<tr>
<td>W3 - 162</td>
<td>Baker 345 kV</td>
<td>856</td>
<td>20</td>
<td>Active</td>
<td>11/1/2010</td>
<td>AEP</td>
<td>Natural Gas</td>
</tr>
<tr>
<td>W4 - 039</td>
<td>Engle 69 kV</td>
<td>63</td>
<td>63</td>
<td>Active</td>
<td>12/31/2013</td>
<td>AEP</td>
<td>Biomass</td>
</tr>
</tbody>
</table>

**NOTE**

In this table the MW and MWC columns represent two different values:

- The MW column represents the total site nameplate capacity of the generators including the existing generation as well as the requested up rate.
- The MWC column represents the installed capacity portion of the upgrade. For renewable projects the installed capacity portion of the project varies as described in Section 2.

**Map 14.20: Queued Generation Interconnection Requests in Eastern Kentucky**
14.4.5 – Transmission Expansion Plans

New RTEP planned transmission upgrades in eastern Kentucky greater than $5 million as approved by the PJM Board during 2010 are listed in Table 14.16. Map 14.21 shows the location of two upgrades both at Millbrook Park – South Portsmouth.

A complete listing and status of all PJM Board-approved BES reinforcements – baseline enhancements as well as network upgrades to accommodate interconnection requests – can be found on PJM’s website via the following URL: http://www.pjm.com/planning/rtep-upgrades-status.aspx.
### Table 14.16: Major 2010 RTEP Plans in Eastern Kentucky

<table>
<thead>
<tr>
<th>Upgrade</th>
<th>System Upgrade Drivers</th>
<th>Baseline Load Growth / Deliverability &amp; Reliability</th>
<th>Congestion Relief - Economic</th>
<th>Operational Performance</th>
<th>Generator Deactivation</th>
<th>TO Criteria Violation</th>
<th>Generation Interconnection</th>
<th>Long-term Firm Transmission Service</th>
<th>Criteria Compliance other than for Baseline</th>
<th>Date</th>
<th>Cost (M)</th>
<th>TO Zone(s)</th>
<th>2010 TEAC Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Add 3 ring breaker 138 kV ring bus interconnection substation at Millbrook Park - South Portsmouth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>June 2011</td>
<td>5</td>
<td>AEP</td>
</tr>
<tr>
<td>2</td>
<td>Construct double circuit 138 kV line facilities at Millbrook Park - South Portsmouth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>June 2011</td>
<td>14.3</td>
<td>AEP</td>
</tr>
</tbody>
</table>
14.4.6 – Interconnection Requests for Generation Powered by Renewable Fuel Sources

PJM’s RTEP process offers a structure that assures consistent, equal opportunity across fuel types while flexible enough to adapt to specific technical realities and market challenges.

Presently, as of the close of Queue W4 on January 31, 2011, PJM’s queue includes three interconnection requests in eastern Kentucky for generating plants fueled by wind, hydro and biomass, as listed in Table 14.17 and shown on Map 14.22.

**Intermittent Resources**

While some renewable resources can operate in a manner similar to the traditional fossil fueled power plants, other renewable energy sources, such as wind, are recognized as intermittent resources. Their ability to generate power is directly determined by the immediate availability and/or magnitude of their specific fuel. For example, wind turbines can generate electricity only when wind speed is within a range consistent with the physical specifications of the related turbines.

This presents challenges with respect to real-time operational dispatch and specific capacity value. To address the latter issue, PJM has established a set of business rules unique to intermittent resources that provide for the determination of capacity values sufficiently credible to represent capacity during the PJM summer peak period. These are described in PJM Manuals M21 (http://pjm.com/~media/documents/manuals/m21.ashx) and M14A (http://pjm.com/~media/documents/manuals/m14a.ashx).

### Table 14.17: Interconnection Requests for Generation Powered by Renewable Fuel Sources

<table>
<thead>
<tr>
<th>Queue</th>
<th>Project Name</th>
<th>MW</th>
<th>MWC</th>
<th>Status</th>
<th>Schedule</th>
<th>TO</th>
<th>Fuel Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2 - 063</td>
<td>Millbrook Park 138 kV</td>
<td>70</td>
<td>70</td>
<td>Active</td>
<td>1/1/2011</td>
<td>AEP</td>
<td>Hydro</td>
</tr>
<tr>
<td>W3 - 051</td>
<td>Dorton 138 kV</td>
<td>60</td>
<td>7.8</td>
<td>Active</td>
<td>9/30/2013</td>
<td>AEP</td>
<td>Wind</td>
</tr>
<tr>
<td>W4 - 039</td>
<td>Engle 69 kV</td>
<td>63</td>
<td>63</td>
<td>Active</td>
<td>12/31/2013</td>
<td>AEP</td>
<td>Biomass</td>
</tr>
</tbody>
</table>

### Map 14.22: Interconnection Requests in Indiana for Generation Powered by Renewable Fuel Sources