2019 Project Statistics

Transmission Expansion Advisory Committee
May 12, 2020
Each slide summarizes the estimated costs for projects presented at the TEAC or Sub-regional TEAC meetings:

- Baseline project was approved by the PJM Board
- Supplemental Project was presented at the TEAC or Sub-regional TEAC meetings
- Costs are provided by the Designated Entity or Transmission Owners. Cost estimation methods may vary by company. Estimated costs in this document may include cost caps or cost containment even though it isn’t specifically noted
- Cost estimates may change over time as new information is known and incorporated into the estimate by the project sponsor, this document reflects the current estimates that are provided to PJM
- A single cost is provided for each project identifier, without any additional breakdown (for example, cost by state)
- Cost is based on estimation in January 2020, and is adjusted by inflation rate of 2.44%
Baseline and Supplemental Projects by Year

Estimated Cost Inflation Adjusted ($M)

Baseline: $1,178,592, $3,329, $2,396, $75, $1,139, $1,261, $5,472, $1,803, $2,135, $1,846, $3,928, $3,308, $6,444, $8,335, $6,849
Supplemental: $67,592, $395, $2,396, $75, $1,139, $1,261, $5,472, $1,803, $2,135, $1,846, $3,928, $3,308, $6,444, $8,335, $6,849
Project Status as of December 31, 2019

Estimated Cost Inflation Adjusted ($ M)

<table>
<thead>
<tr>
<th>Category</th>
<th>Baseline</th>
<th>Network</th>
<th>Supplemental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering/Planning</td>
<td>$5,635</td>
<td>$5,221</td>
<td>$13,952</td>
</tr>
<tr>
<td>On Hold</td>
<td>$253</td>
<td>$217</td>
<td>$70</td>
</tr>
<tr>
<td>Under Construction</td>
<td>$2,244</td>
<td>$29</td>
<td>$4,499</td>
</tr>
<tr>
<td>In Service</td>
<td>$27,811</td>
<td>$1,411</td>
<td>$15,160</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$35,944</td>
<td>$6,878</td>
<td>$33,680</td>
</tr>
</tbody>
</table>
2019 Baseline Project Drivers

**Project Drivers**

- Baseline Load Growth Deliverability & Reliability: $230
- Congestion Relief - Economic: $32
- Generator Deactivation: $192
- Operational Performance: $135
- Short Circuit: $4
- TO Criteria Violation: $866
- **Total**: $1,459

**Projects Driven by TO Criteria Violations**

- Voltage violation: $260
- End of Life: $243
- Thermal violation: $169
- Thermal and Voltage Violation: $125
- MW-Mile Criteria: $49
- Short Circuit: $1
- Stability: $1
- **Total**: $866
2019 Supplemental Project Drivers

**Project Driver**
- Equipment Material Condition, Performance and Risk: $1,461
- Operational Flexibility and Efficiency: $151
- Customer Service: $835
- Other: $87
- Multiple Drivers: $883
- Infrastructure Resilience: $1
- **Total**: $3,397

**Projects Driven by Multiple Drivers**
- Equipment Material Condition, Performance and Risk / Operational Flexibility and Efficiency: $212
- Equipment Material Condition, Performance and Risk / Operational Flexibility and Efficiency / Customer Service: $166
- Equipment Material Condition, Performance and Risk / Operational Flexibility and Efficiency / Infrastructure Resilience: $3
- Infrastructure Resilience / Customer Service: $16
- Operational Flexibility and Efficiency / Customer Service: $9
- Operational Flexibility and Efficiency / Infrastructure Resilience: $155
- Operational Flexibility and Efficiency / Infrastructure Resilience / Customer Service: $27
- **Total**: $883
Baseline and Supplemental Project since 2005
by Designated Entity
Baseline & Supplemental Projects since 2005
Adjusted by Peak Load

*Peak load is the average of forecasted summer peak load from 2021 to 2024 for each TO*
Baseline and Supplemental Project since 2005
Adjusted by Transmission Line Circuit Miles

*Transmission line circuit mile is based on TO’s FERC Form 1 filed in 2019 or EIA-411 Schedule 6A for 2019
Baseline and Supplemental Project 2019
by Designated Entity

<table>
<thead>
<tr>
<th>Entity</th>
<th>AEC</th>
<th>AEP</th>
<th>APS</th>
<th>ATSI</th>
<th>BGE</th>
<th>ComEd</th>
<th>Dayton</th>
<th>DEOK</th>
<th>DL</th>
<th>Dominion</th>
<th>DPL</th>
<th>EKPC</th>
<th>JCPL</th>
<th>MAIT</th>
<th>ME</th>
<th>NIPSCO</th>
<th>ODEC</th>
<th>PECO</th>
<th>PENELC</th>
<th>PEPCO</th>
<th>PPL</th>
<th>PSEG</th>
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</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>$0</td>
<td>$62</td>
<td>$96</td>
<td>$14</td>
<td>$18</td>
<td>$95</td>
<td>$1</td>
<td>$24</td>
<td>$87</td>
<td>$40</td>
<td>$1</td>
<td>$45</td>
<td>$7</td>
<td>$0</td>
<td>$1</td>
<td>$0</td>
<td>$1</td>
<td>$1</td>
<td>$0</td>
<td>$1</td>
<td>$15</td>
<td>$15</td>
</tr>
<tr>
<td>Supplemental</td>
<td>$1,335</td>
<td>$600</td>
<td>$204</td>
<td>$18</td>
<td>$95</td>
<td>$24</td>
<td>$87</td>
<td>$40</td>
<td>$11</td>
<td>$476</td>
<td>$55</td>
<td>$48</td>
<td>$175</td>
<td>$8</td>
<td>$7</td>
<td>$330</td>
<td>$25</td>
<td>$87</td>
<td>$252</td>
<td>$25</td>
<td>$15</td>
<td>$425</td>
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</table>
Baseline and Supplemental Project 2019
Adjusted by Transmission Line Circuit Miles

The chart shows the estimated cost per mile ($/Mile) for various entities under the Baseline and Supplemental categories. The y-axis represents the estimated cost per mile, ranging from 0.00 to 0.20. The x-axis lists different entities, such as AEC, AEP, APS, ATSI, BGE, ComEd, Dayton, DEOK, DL, Dominion, DPL, EKPC, JCPL, ME, PECO, PENELIC, PEPCO, PPL, and PSEG.

The chart uses two colors to distinguish between Baseline and Supplemental categories. Baseline is represented by blue bars, while Supplemental is represented by green bars. The entities are arranged in a way that makes it easier to compare the costs between the two categories for each entity.
Baseline Projects by Voltage
2015 - 2019

Estimated Cost Inflation Adjusted ($M)

- <100 kV
- 100-200 kV
- 230 kV
- 345 kV
- 500 kV
- 765 kV

Colors:
- 2015
- 2016
- 2017
- 2018
- 2019
Supplemental Projects by Voltage
2015 - 2019

The diagram shows the estimated cost inflation adjusted ($M) for different voltage levels from 2015 to 2019. The voltage levels are categorized as follows:

- **<100 kV**
- **100-200 kV**
- **230 kV**
- **345 kV**
- **500 kV**
- **765 kV**

The cost is represented by different colors for each year:

- **Blue** for 2015
- **Orange** for 2016
- **Red** for 2017
- **Teal** for 2018
- **Green** for 2019

The cost values are as follows:

- **<100 kV**: $8,000
- **100-200 kV**: $7,000
- **230 kV**: $6,000
- **345 kV**: $5,000
- **500 kV**: $4,000
- **765 kV**: $3,000

Each voltage level shows a decrease in cost from 2015 to 2019.
PCLLRW Count by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
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<tbody>
<tr>
<td>2010</td>
<td>721</td>
</tr>
<tr>
<td>2011</td>
<td>523</td>
</tr>
<tr>
<td>2012</td>
<td>288</td>
</tr>
<tr>
<td>2013</td>
<td>602</td>
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<td>2014</td>
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<td>2017</td>
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<tr>
<td>2018</td>
<td>365</td>
</tr>
<tr>
<td>2019</td>
<td>195</td>
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</table>
Renewable Production and Wind Curtailments

MWh (millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Wind</th>
<th>Solar</th>
<th>Curtailments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>15</td>
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<tr>
<td>2014</td>
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<tr>
<td>2015</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>30</td>
<td></td>
<td>4.5%</td>
</tr>
<tr>
<td>2018</td>
<td>35</td>
<td>10</td>
<td>4.0%</td>
</tr>
<tr>
<td>2019</td>
<td>40</td>
<td>15</td>
<td>3.5%</td>
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</tbody>
</table>
• V1 - 5/5/2020 – Original slides posted