Proposed Changes to PJM Manual 21: Calculation of Capacity Values for Wind and Solar Capacity Resources

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Intermittent Resources Subcommittee
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• PJM is proposing to replace its current wind/solar capacity value calculation with an Effective Load Carrying Capability (ELCC) approach
• This is one of several proposed changes to PJM Manual 21
• The first read occurred at the March 7th Planning Committee
• The proposed changes impact Appendix B in Manual 21 (redline version of the Manual has been posted with the rest of meeting materials)
ELCC Proposal – General Considerations

• ELCC will be calculated for existing and future wind/solar capacity resources scheduled to be in-service by the beginning of the Delivery Year for which a Base Residual Auction is next to be run.
• The ELCC runs will use the 10 most recent load, wind and solar 8,760 hourly shapes
  – If 10 years worth of data are not available, all data available will be used.
• The ELCC runs will use the capacity model from the most recent Reserve Requirement Study.
• Future wind/solar capacity resources will be able to request project-specific capacity credits (provided they supply supporting data). Those requested project-specific capacity credits will be incorporated in the ELCC runs.
• Step 1: Calculate Composite ELCC of wind and solar capacity resources combined
• Step 2: Calculate ELCC of wind resources and solar resources separately
• Step 3: Allocate the Composite ELCC from Step 1 in a prorated manner based on the results from Step 2 to derive the Wind ELCC and Solar ELCC.
• Step 4: Allocate the Wind ELCC and Solar ELCC from Step 3 to existing individual wind and solar units based on the individual unit’s output during the top 10 daily peak load hours in the 10 most recent DYs

• Step 5: Future units will get the class average capacity credit (if they did not request a project-specific capacity credit) or an adjusted version of the project-specific capacity credit (if they did request a project-specific capacity credit)
• Step 1: Composite ELCC (2018 RRS Capacity Model, Projected Wind and Solar Nameplate MW for 2022/23 = 19,910 MW)

<table>
<thead>
<tr>
<th>Delivery Year</th>
<th>Projected Nameplate Solar &amp; Wind Capacity 2022 (MW)</th>
<th>ELCC (MW)</th>
<th>ELCC (% of Nameplate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/13</td>
<td>19,910</td>
<td>3,762</td>
<td>18.9%</td>
</tr>
<tr>
<td>2013/14</td>
<td>19,910</td>
<td>3,784</td>
<td>19.0%</td>
</tr>
<tr>
<td>2014/15</td>
<td>19,910</td>
<td>5,213</td>
<td>26.2%</td>
</tr>
<tr>
<td>2015/16</td>
<td>19,910</td>
<td>3,761</td>
<td>18.9%</td>
</tr>
<tr>
<td>2016/17</td>
<td>19,910</td>
<td>4,443</td>
<td>22.3%</td>
</tr>
<tr>
<td>2017/18</td>
<td>19,910</td>
<td>4,090</td>
<td>20.5%</td>
</tr>
</tbody>
</table>

Average 21.0%

The ELCC result indicates that the Capacity Credit of 19,910 MW of wind and solar resources is 21% x 19,910 MW = 4,181 MW
Steps 2 and Step 3: In previous PC meetings, PJM showed that the average ELCC for wind and solar resources analyzed separately are

- Wind: 11.5% or 11.5% x 14,620 = 1,681 MW
- Solar: 42.3% or 42.3% x 5,290 = 2,238 MW

The Composite ELCC is greater than the sum of the two values above: 4,181 MW vs 3,919. If the difference is allocated on a pro rata basis

- Wind ELCC = 1,681 MW + 112 MW = 1,793 MW or 12.3%
- Solar ELCC = 2,238 MW + 150 MW = 2,388 MW or 45.1%

The Wind and Solar ELCCs are then allocated to the individual units based in Steps 4 and 5
Timeline

- PC First Read – 3/7/2019
- MRC First Read – 3/21/2019
- Request for PC Endorsement – 4/11/2019
- Request for MRC Endorsement – 4/25/2019
- Manual 21, Revision 13, effective date – 5/1/2019