Summary of Package A

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September 17, 2020

What is the proposed ELCC analysis?

- ELCC analysis produces a class-based **derate factor** that, together with a unit-specific **performance factor**, sets the eligible MW (the "UCAP") that intermittent resource **classes** (including wind, solar, run of river hydro, etc), limited-duration resource classes (including energy storage resources), and hybrid classes (such as solar-battery hybrids) can provide in the Capacity Market.
- ELCC measures the reliability value of a given class of units and measures the impact on reliability of the class of adding additional units to the class (as well as other classes).
- ELCC replaces the static status quo derate factors which do not measure the reliability value of adding more units within the class to the overall reliability value of the class of units. The status-quo derate factors are based on summer tests, summer output, or the "10 hour rule", depending on resource type.
- ELCC results change when the resource mix and/or load shape changes.
- The ELCC analysis, derate factor, and performance factor would be updated each year.

ELCC Model Development

- PJM has developed a robust ELCC method and software tool over 2 years.
- Discussion at the CCSTF has yielded improvements to the ELCC method and policy, including:
  - The simulated output of limited-duration resources, hybrids, and hydro.
  - The appropriate unit-specific performance factor.
  - Transparency and ongoing stakeholder engagement regarding the methodological details.

Key Characteristics of Package A

1. Specifies the ELCC methodology, including simulated dispatch of Energy Storage Resources, hydro with storage, & other limited duration resources.
2. Provides an annual reassessment of derate factors, performance factors, and ultimately Accredited UCAP values for all applicable resources.
3. Accredits resources based on their share of the total resource adequacy value of the entire class of such resources (i.e., an “Average ELCC” approach, as distinct from a “Marginal ELCC” approach).
4. Accommodates a diversity of resource classes, including new technology types such as 4-hour Energy Storage Resources and hybrids.

Appendix: Second Draft Results

The Process to Develop Preliminary and Final Results

- ~~PJM internal, early draft results~~
  ~~*Significant revisions*~~
- ~~July 10 - Public 1st draft results~~
  ~~*Significant revisions*~~
- August 12 - Public 2d draft results
  -minor revisions-
- Q3 – Potential further round of preliminary results
  -Final data inputs and minor revisions-
- Currently targeting December 2020 for final ELCC results

We are here

The purpose of providing these results is in part to hear feedback on further revisions

These results may change in subsequent drafts

Observations

- The 2nd Draft ELCC Results
  - Reflect the new dispatch methodology discussed at the July 27th meeting of the CCSTF
  - Are based on the same portfolios used for the 1st Draft ELCC Results
  - Only include ESR and hybrids with 4-hour Duration (results for ESR and hybrids with 6-hour and 10-hour are not included)
  - Use generic features for Hydro with Storage resources (shown in next slide)

Deployment (in Gigawatts) for the 6 Scenarios

#	Wind	Tracking Solar	Storage (4 hour)	Storage (8 hour)	Solar + Storage Hybrid (Open Loop)	Solar + Storage Hybrid (Closed Loop)	Hydro w/o Storage	Landfill Gas	Hydro w/ Storage
1	12	7	0.4	5	0.3	0.3	0.7	0.3	2
2	15	11	0.9	5	0.5	0.5	0.7	0.3	2
3	19	16	1.5	5	0.8	0.8	0.7	0.3	2
4	22	22	2	5	1	1	0.7	0.3	2
5	23	31	3	5	2	2	0.7	0.3	2
6	25	40	5	5	2	2	0.7	0.3	2

2nd Draft ELCC Results w/ New ESR as 4-hour Duration

#	Wind	Tracking Solar	Storage (4 hour)	Storage (8 hour)	Solar + Storage Hybrid (Open Loop)	Solar + Storage Hybrid (Closed Loop)	Hydro w/o Storage	Landfill Gas	Hydro w/ Storage
1	10%	65%	92%	100%	97%	97%	49%	58%	100%
2	9%	59%	86%	98%	96%	96%	48%	59%	97%
3	9%	49%	74%	95%	86%	86%	51%	63%	97%
4	9%	40%	75%	93%	85%	85%	51%	62%	94%
5	9%	33%	81%	94%	74%	73%	51%	61%	92%
6	9%	27%	79%	94%	71%	71%	51%	59%	94%

Summary of Potential Direction of ELCC Results

	Status Quo Capacity Value	Potential Directional Results
Tracking Solar	~60%	Starts off higher, might be lower after around 10 GW of deployment, potentially dropping at over 1 percentage point per GW of deployment.
Wind	~13%	Potentially somewhat lower
4-hour Batteries	40%	Much higher (~2X)
Pumped Hydro	ICAP	Potentially slightly or somewhat lower (also may depend on black start commitments)
Non-Pumped Hydro	ICAP	Ranging from similar to lower depending on parameters
Intermittent Run of River Hydro	ICAP	Lower
Landfill Gas	ICAP	Lower

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