Capacity Capability Senior Task Force

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Markets and Reliability Committee

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Procedural Timeline

Oct. 2019

FERC opens 206 paper hearing on the capacity capability of energy storage resources (i.e., the 10-hour requirement filed by PJM)

Jan. 2020

PJM solicits feedback from stakeholders on proposed alternatives to the 10 hour requirement

Feb. 2020

PJM submits motion to hold hearing in abeyance to pursue an Effective Load Carrying Capability (ELCC) construct with stakeholders

Mar. 2020

March MRC first read and endorsement of the Capacity Capability Senior Task Force (CCSTF) problem statement and issue charge

Apr. 2020

- **April 7** CCSTF kick-off
- **April 10** FERC grants abeyance motion, but with deadline of October 30, 2020* for all resources

*PJM requested deadline of January 29, 2021 in submitted motion

CCSTF Key Work Activities

- To develop provisions necessary to establish an ELCC method for calculating the capability of limited duration, intermittent, and combination (limited duration + intermittent) resources
- Provisions to be considered include:
  - Timing of ELCC analysis for a given Delivery Year
  - Allocation of ELCC capability of a resource class to a specific unit
  - Simulated dispatch of energy storage resources and hybrid resources
  - Determination of resource classes

High-Level Work Plan

Tasks	2020									
	Apr.7	Apr. 27	May 20	Jun. 4	Jun. 22	Jul. 10	Jul. 16	Jul. 27	Aug. 7	Aug. 12
Education										
Interest Identification										
Develop Design Components										
Develop Solution Options										
Develop Packages										
Consensus Testing (non-binding poll)										
Task Force Vote										★
Key Work Activity (KWA) #6*										Post-Aug. 12

*A description of the KWA#6 analysis can be found in the CCSTF Issue Charge: https://pjm.com/-/media/committees-groups/task-forces/ccstf/postings/issue-charge.ashx?la=en.
CCSTF Work Plan: https://pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200807/20200807-item-02-work-plan.ashx

CCSTF Progress

- Main areas of focus:
  - Timing of Class Assessment and Accreditation
  - Consideration of a Changing ELCC (marginal/average/vintage)
  - Simulated Dispatch
- Other components:
  - Class Distinctions & Definitions
  - Other Timing and Function Details
  - Technical Considerations
  - Performance Adjustment

Voting Summary

- Four solution packages proposed
- Voting results:
  - Main Motion: Package A – No Transition (64% support)
  - Alternate Motion: Package D – Joint Stakeholder (57% support)
  - Package B – Fixed or Flat 10-DY failed the 50% threshold requirement (24% support)
  - Package C – IMM failed the 50% threshold requirement (6% support)
  - 81% of voters prefer to make a change over retaining Status Quo*

*Please note that the results of this questions are non-binding

What is ELCC?

- 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 replaces the status-quo derate factor, which is 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.

Stakeholder Engagement on ELCC

- 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.
- Stakeholders have proposed various approaches to managing the changing ELCC results and derate factors.
- PJM views ELCC as a significant change, and supports the concept of a transition plan.

Summary of 4 Packages

A. **"No Transition"** – this includes the basic structure of PJM's proposed technical methodology for implementing ELCC. Other packages borrow from this package, with major changes as noted below. Each package also has minor variations not noted. Under package A, the ELCC derate factor would change each year.

B. **"Fixed or Float 10-Delivery Years" –** new and existing resources participating in the 2023/2024 BRA may elect a 5-delivery year transition prior to utilizing ELCC values. If not electing that transition, or for new and existing resources thereafter, each resource must decide how it should be considered within PJM's ELCC model. There are two choices. A Fixed 10-Delivery Year election provides a fixed value for ELCC (using the applicable year's forecast) that can only be maintained with good actual unit performance (similar to how accreditation is maintained today) and a must-offer obligation. Or, a Float 10-Delivery Year election in which PJM will provide annual ELCC values with modeled performance and accreditation assigned from the ELCC model itself. PJM will post forecast ELCC values 10 years into the future to help resources make elections and for future investment decisions.

C. **"IMM" –** applies to intermittent resources; the IMM method integrates the ELCC curve into the capacity market supply curve and clears resources consistent with competitive market principles, including the use of the marginal ELCC value by resource class that results from the market clearing process. A resource's ELCC value is dependent upon the cleared capacity resource mix and could change each year. There is no floor guarantee, there is no legacy treatment and there is no lock-in of ELCC values.

D. **"Joint ELCC Stakeholder Package" –** provides resources with a table listing conservative minimum ELCC derate factors for each of 10 years in the future. The table is extended for each of the next 3 years by appending one additional year's minimum ELCC value to the end of the table. PJM will evaluate the mechanism in 2026 quadrennial review and make recommendations as to whether some or all components of the mechanism should be reconsidered through a stakeholder process.

Additional Information

- Next Steps
  - First Read: August 31 MRC Special Session
  - MRC Vote: September 17
  - MC Vote: September 17
  - PJM Board Meeting: September 21
  - Deadline for FERC 205 filing: October 30

- CCSTF Materials: https://pjm.com/committees-and-groups/task-forces/ccstf.aspx

Appendix: 2d 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	Solar	Storage (4,6, or 10 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	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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