Proposed ELCC Design Components with Examples of Solution Options

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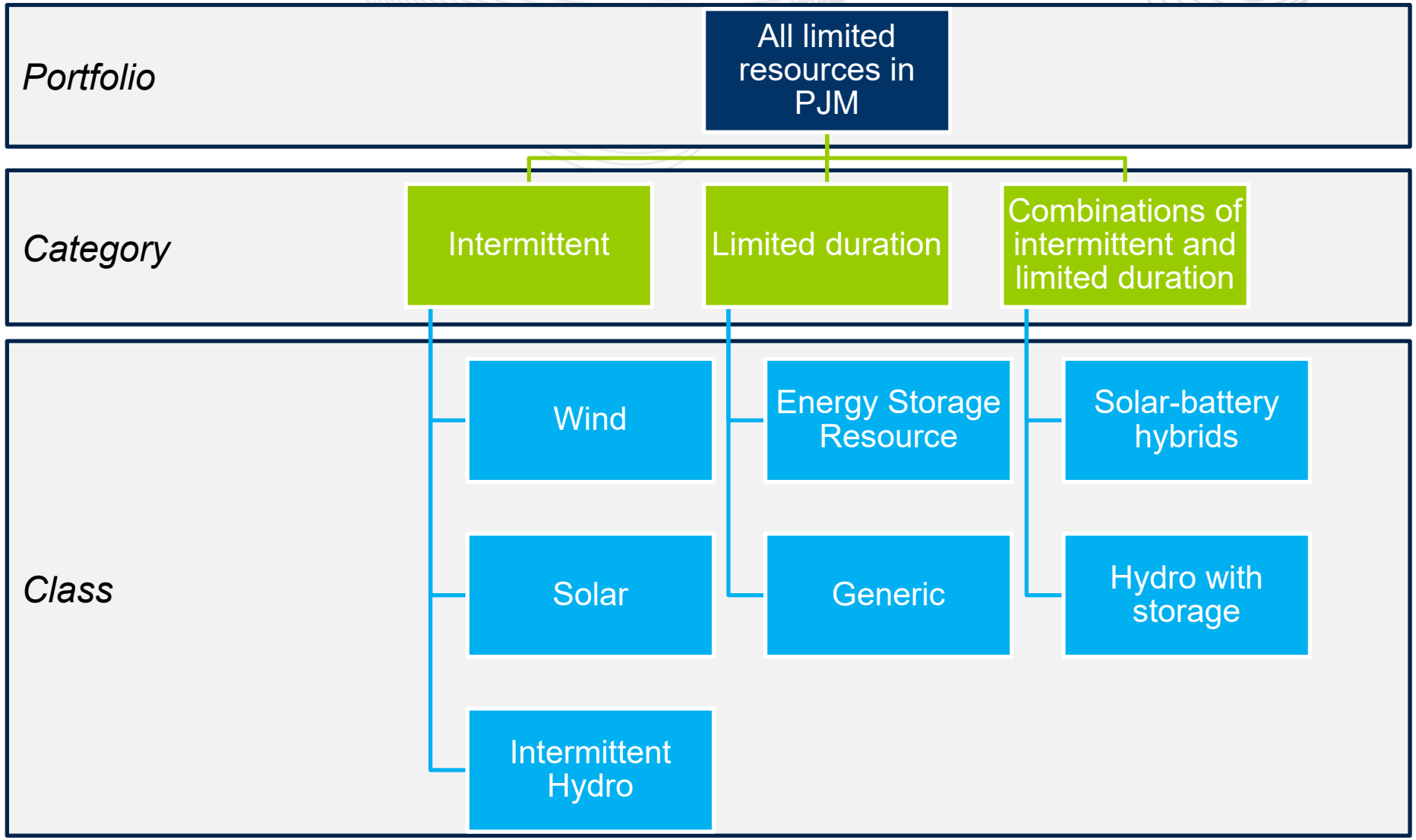
Capacity Capability Senior Task Force

ELCC Taxonomy



List of Proposed Design Components

Some design components are expected to have solution options that are applicable to any resource class or category ("generic"), while others will vary by category.

1. Class distinctions/definitions
2. Timing of ELCC class assessment (generic)
3. Consideration of Declining ELCC (generic)
4. Technical considerations of ELCC (generic)
5. Performance adjustment (category specific)
6. Simulated dispatch of limited-duration & combination resources (category specific)

1. Class Distinctions/Definitions

- Example from California utility procurement

Table 6: Marginal ELCC Values by Region and Technology

	Northern Cal	Southern Cal	Northwest	Southwest
33% RPS Case Marginal ELCC Values				
Wind	21%	14%	40%	24%
Tracking PV	21%	15%		12%
Fixed Axis PV	13%	10%		8%
Distributed PV	12%	8%		
43.3% RPS Case Marginal ELCC Values				
Wind	27%	22%	43%	20%
Tracking PV	8%	4%		3%
Fixed Axis PV	4%	4%		1%
Distributed PV	5%	2%		

http://www.astrape.com/wp-content/uploads/2019/01/Joint-IOUs-Update-on-ELCC.pdf

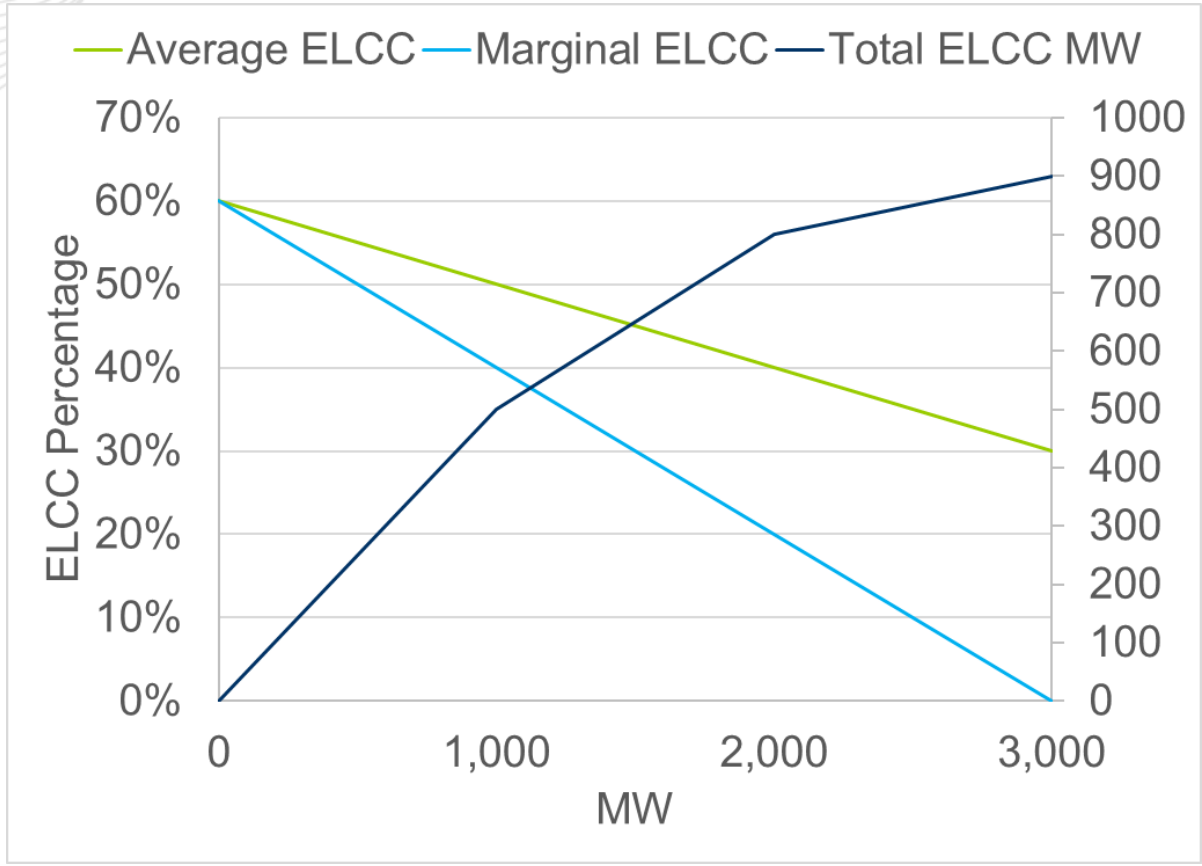
2. Timing of ELCC Class Assessment (generic)

- The ELCC analysis can be run at a particular interval and with a given forward-looking time horizon.
  - If forward horizon exceeds frequency of run (e.g., 2030 gets assessed in 2026, then again in 2027, then again in 2028, etc.), does the ELCC value for a given delivery year for committed resources change or stay fixed?
- CPUC resource adequacy policy example: ELCC results updated every two years with a 2-year forward horizon.
- MISO example: ELCC results updated each year with a single-year policy horizon and a decade-scale forward looking indicative horizon.

3. Consideration of Declining ELCC (generic)

All else equal, greater deployment within a class results in lower ELCC. The marginal ELCC declines faster than the average ELCC.

	Total ELCC of Fleet	Average ELCC	Marginal ELCC
1 MW	0.6 MW	60.00%	60%
1,000 MW	500.0 MW	50.00%	40%
1,001 MW	500.4 MW	49.99%	40%
2,000 MW	800.0 MW	40.00%	20%
2,001 MW	800.2 MW	39.99%	20%
3,000 MW	900.0 MW	30.00%	0%
3,001 MW	900.0 MW	29.99%	0%



3. Consideration of Declining ELCC (generic)

- Capability values are applied in various contexts, e.g.:
  - Capacity Interconnection Rights
  - Capacity Market offers
  - Capacity Market replacement transactions
  - FRR zone resource credit towards zonal requirement
- Should the average ELCC or marginal ELCC be used for these? Or another approach?
- California example: new resource bids are evaluated using marginal ELCC; existing resource contribution to reliability uses average ELCC.

4. Technical Considerations of ELCC (generic)

- Composition of the unlimited resource mix prior to and after addition of the portfolio of limited resources.
- Consideration of resources that do not clear the auction or do not participate in the auction (i.e., Energy Resources).
- Etc.

5. Performance Adjustment (category specific)

Referred to as "allocation of ELCC" at prior PC meetings

- ELCC simulation grants a certain capability value to a class of broadly similar resources (e.g., wind power).
- Performance adjustment then adjusts that value for a particular unit, for example based on actual historical performance.
- E.g.: MISO policy grants an adjustor to wind units based on their actual output over the 8 daily coincident peak hours relative to the MISO wind fleet for the last 15 years (or as many years as data is available for a unit).

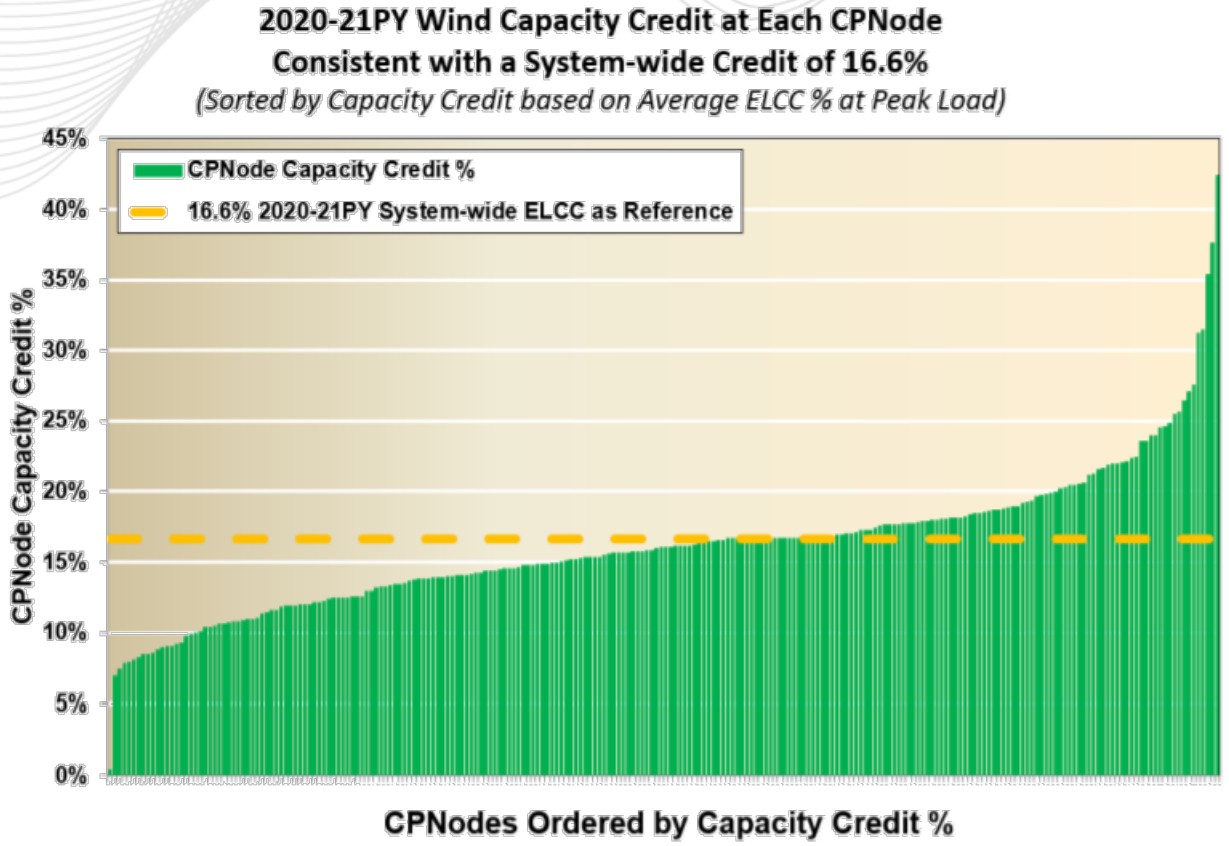
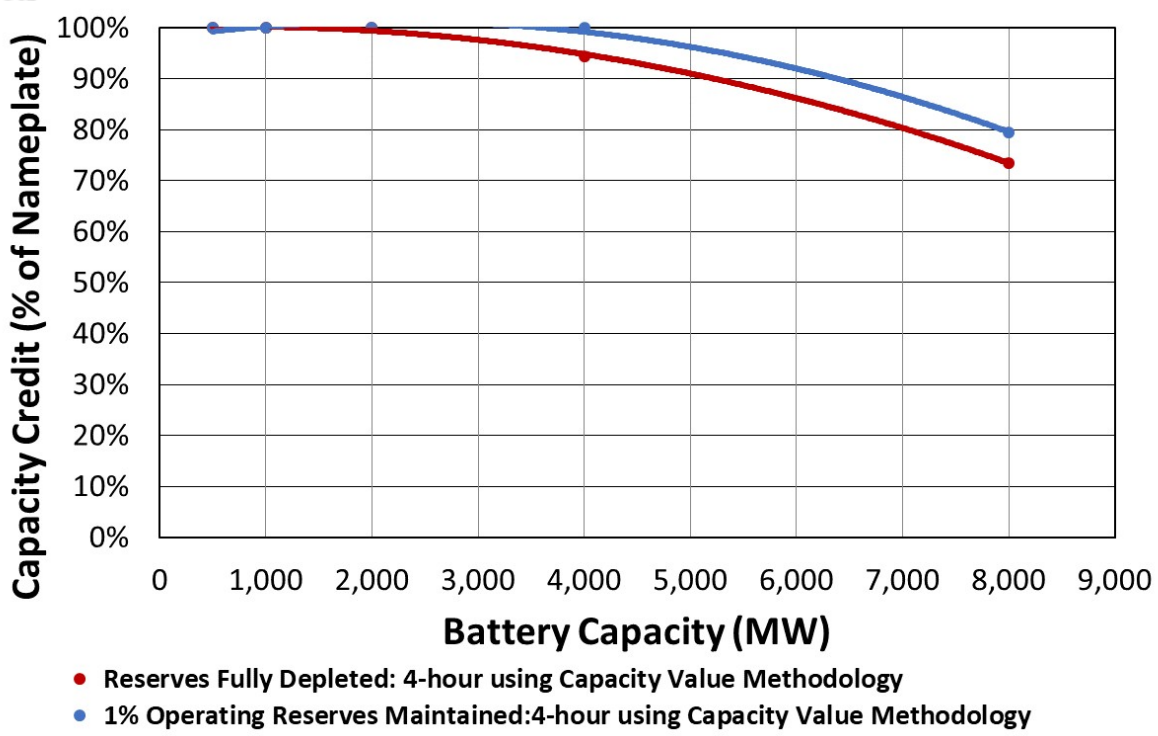


Figure 3-1 – Allocation of Capacity Credit % over 222 CPNodes Consistent with a System-Wide Credit of 16.6%

6. Simulated dispatch of limited-duration & combination resources (category specific)

- The hourly ELCC model will need a simulated dispatch for limited duration resources (including Energy Storage Resources) and for combination intermittent+limited duration resources.
- This can be accomplished in various ways:
  - For example, SPP* hired Astrape to conduct a comparison of ELCC for storage resources that are dispatched to optimize profit vs. those that are dispatched to maximize reliability.



**04_Energy Storage ELCC Accreditation.docx in*
https://www.spp.org/Documents/61378/SAWG%20Agenda%20and%20Background%20Materials%2020200129.zip