

Recap of 24-Hourly Slices Framework

RA Slice of Day Workshop
December 15, 2021

Overall Findings and Recommendations

SCE believes 24-hourly slices is still the most viable option and recommends moving forward with this framework. Certain elements warrant further discussion and can be determined in a subsequent forum.

- CPUC can move forward with the 24-hour framework and answer the following in a subsequent forum:
 - Appropriate reliability standard (e.g., 1-in-10; 1-in-[?]);
 - Appropriate monthly wind/solar profiles to use within the 24-hour framework; and
 - Corresponding planning reserve margin (PRM)
- Larger-slice frameworks create inefficiencies and do not properly account for renewables and batteries
- Other proposals discussed in workshops fail to ensure hourly requirements are satisfied and meet CPUC criteria for durability

Summary of 24 Hourly Slices Framework

Component	SCE Proposal
Slice Definition	24 Hourly Slices
Showings	Single monthly using a standardized template (to be developed)—LSEs must meet their load + PRM in all 24 hours and show sufficient capacity to charge batteries to pass showing
Resource Counting	<p>Solar and wind will count based on their hourly profiles—specific methodology (e.g., exceedance, hourly ELCC, or other) to be determined in subsequent forum; must be fully deliverable</p> <p>Standalone batteries count based on their capacity and duration as shown by the LSE; Must demonstrate there is sufficient “excess capacity” in other hours for their dispatch (plus losses)</p> <p>Hybrid resources: Requires additional stakeholder discussion due to the unique and complex issues</p> <p>Use-limited resources count based on their capacity and available duration as shown by the LSE</p> <p>Other resources will have a single counting value (e.g., NQC)</p> <p>Contracted resources (e.g., 16-hour imports) must be shown in their available hours</p>
Load Forecast	Gross; specific level (e.g., 1-in-2, 1-in-5 weather year) to be determined in subsequent forum
Need Allocation	Bottoms-up; shaped based on LSEs’ historical load and adjusted by the CEC to ensure system demand is met in each hour on the monthly worst-day
Market Product	Resource attributes and capabilities are bundled (i.e., no unbundling of hourly slices) but resources can be split (e.g., 70% to LSE 1, 30% to LSE 2); SCE is not proposing load trading “swaps” but does not oppose others proposing it as a potential enhancement to SCE’s 24-hour framework
Energy Market Obligation	“Full capability/all-hour” must offer obligation (MOO)
Use-limitations	Use-limited 24-hour allocation; retain min 4-hour daily output availability requirement; eliminate flex requirements and MCC buckets
Penalties for Non-Compliance	Same principles as today: CPUC penalty for failing showing; CAISO first allocates backstop costs to LSEs who fail their showing and remaining costs (if any) are allocated to all LSEs

Changes to framework based on workshop discussions

- Resource counting for wind and solar and their impact on reliability planning should be determined in a subsequent forum, including:
 - Appropriate reliability standard (e.g., 1-in-10; 1-in-?);
 - Appropriate monthly wind/solar profiles to use within the 24-hour framework; and
 - Corresponding planning reserve margin (PRM)
- Resource counting rules for standalone batteries and hybrid resources
 - SCE is open to allowing standalone batteries to assume multiple cycles for showing purposes instead of limiting to a single-cycle
 - Need a process to recognize hybrid resources' full capability; do not need to use pre-defined shapes
- Based on feedback from CEC, open to bottoms-up LSE-specific need determinations
 - Must be adjusted by CEC to meet system demand in each hour
 - Suggest using historical 24-hour load shapes for each LSE as a starting point
- LSEs must use a standard template for their CPUC showings
 - Parties can use any method they want to optimize their portfolio (i.e., don't need to use SCE's tool)
- SCE does not propose "load trading"
 - However, SCE does not oppose others proposing it as a potential enhancement to SCE's 24-hour framework

CPUC RA Resource Database

- CPUC will need to gather and publish new information on RA resources
 - Will be used for valuation/transactions, showings, and validation

Resource Name	Technology	Capacity (MW)	Maximum Daily Run Hours	Storage Efficiency	Maximum Continuous Energy	First Available Hour (HE)	Last Available Hour (HE)	Profile	Hybrid Renewable MW	Hybrid Battery MW	Hybrid Battery MWh	Hybrid Interconnection
Resource 1	BIOMASS	15	24			1	24					
Resource 2	SUN	31.36	24			1	24	Riverside East PV				
Resource 3	Solar Battery Hybrid	100	24			1	24		120	100	500	100
Resource 4	WIND	10	24			1	24	Altamont				
Resource 5	LESR	10	11	0.8740	40	1	24					
Resource 6	WATER	19.024	24			1	24					
Resource 7	WIND	30.52	24			1	24					
Resource 8	GEOTHERMAL	85	24			1	24					
Resource 9	NATURAL GAS	200	11			1	24					
Resource 10	DR	0.7	4			18	22					
Resource 11	LESR	20	11	0.8740	80	13	22					

Illustrative Compliance Showing

- Showings will be similar to today
- Added step of demonstrating resources meet 24-hour requirement within the capabilities of the resources

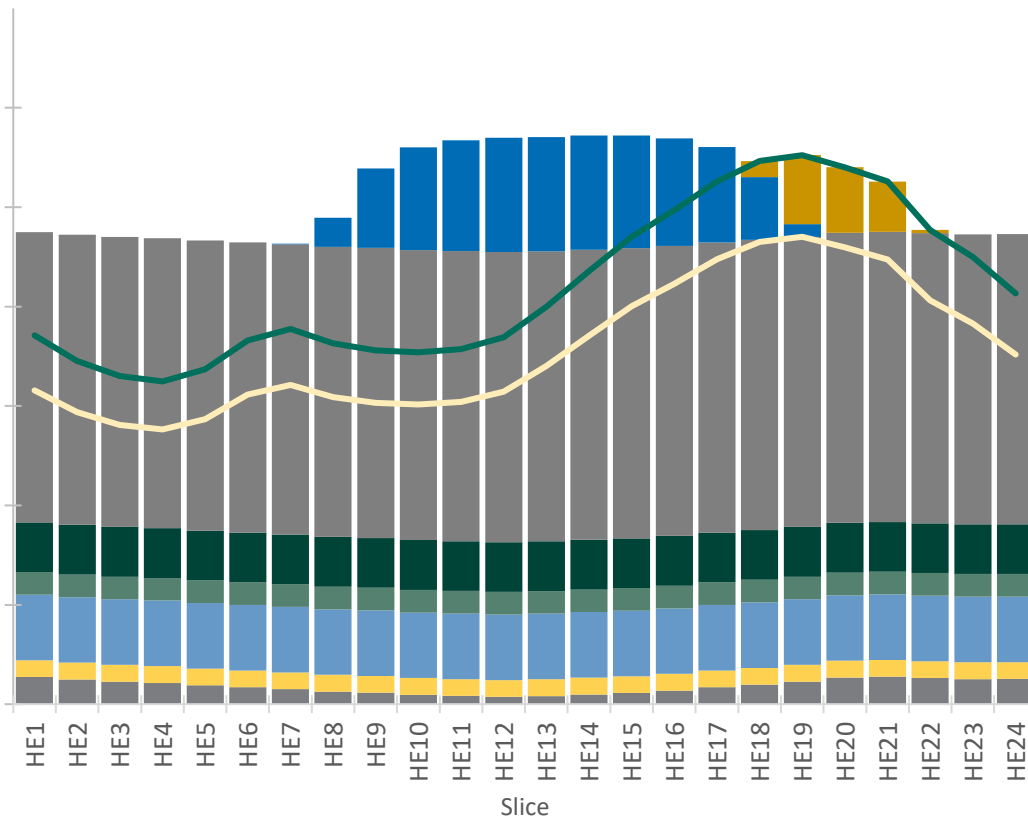
Resource Name	Resource Type	Shown MW
Resource 1	HL IMPORT	150
Resource 2	BIOMASS	15
Resource 3	SUN	31.36
Resource 4	SUN	17.92
Resource 5	SUN	15.68
Resource 23	WIND	33.12
Resource 24	WIND	24.48
Resource 25	GEOHERMAL	85
Resource 26	GEOHERMAL	85
Resource 28	WATER	129.6
Resource 29	WATER	407
Resource 30	NATURAL GAS	47
Resource 31	DR	0.7
Resource 65	LESR	20
Resource 66	LESR	10
Resource 67	LESR	50
Resource 68	LESR	100
Resource 69	LESR	10
Resource 70	LESR	10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	HE12	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	HE24
0.00	0.00	0.00	0.00	0.00	0.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	0.00	0.00
15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.09	6.25	19.20	25.77	27.92	28.30	28.32	28.08	27.70	26.51	22.64	12.77	2.01	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.05	3.57	10.97	14.73	15.95	16.17	16.18	16.05	15.83	15.15	12.94	7.30	1.15	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.04	3.12	9.60	12.89	13.96	14.15	14.16	14.04	13.85	13.25	11.32	6.39	1.00	0.00	0.00	0.00	0.00	0.00
15.68	14.34	13.05	12.32	10.99	9.81	8.65	7.31	6.62	5.46	4.88	4.28	4.74	5.69	6.54	7.85	9.76	11.28	13.07	15.45	15.87	15.13	14.56	14.68
11.59	10.60	9.65	9.10	8.12	7.25	6.40	5.40	4.90	4.04	3.61	3.16	3.50	4.20	4.84	5.80	7.21	8.33	9.66	11.42	11.73	11.19	10.76	10.85
85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60	129.60
407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.70	0.70	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	20.00	20.00	20.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	50.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	10.00	0.00	0.00

Appendix of key slides from prior presentations

24-Hourly Slices: Basic Framework and Resource Counting

Illustrative LSE Resource Showing



- For each month, each LSE must demonstrate it has enough capacity to satisfy its load profile + PRM in all 24 hours on the CAISO's "worst day" in that month
- Resource counting will generally be defined in the following manner:
 - **Solar and wind** will count based on their hourly profiles; Must be fully deliverable
 - **Standalone batteries** count based on their capacity and duration as shown by the LSE
 - **Use-limited resources** count based on their capacity and available duration as shown by the LSE
 - **Other resources** will have a single counting value (e.g., NQC)
 - **Contracted resources** (e.g., 16-hour imports) must be shown in their available hours
- Additional checks will be applied to confirm run-hour feasibility of use-limited resources:
 - **Standalone batteries** must demonstrate there is sufficient "excess capacity" in other hours for their dispatch (plus losses)
 - **Hydro** must have sufficient energy to support the shown capacity

Conclusion: 24-Hourly Slices Deserves Consideration

CPUC's Guiding Principles	Hourly Slices
1. Balance ensuring a reliable electrical grid with minimizing costs to customers	<ul style="list-style-type: none"> Ensures sufficient capacity for each hour of the day while reducing risk of over-procurement Preserves value of resources that do not fit neatly into the pre-defined slices
2. Balance addressing hourly energy sufficiency for reliable operations with advancing California's environmental goals	<ul style="list-style-type: none"> LSE requirements match hourly load+PRM Allows all resources (including renewables) to count at their expected hourly capacity Incorporates additional capacity needed to charge storage
3. Balance granularity and precision in meeting hourly RA needs with a reasonable level of simplicity and transactability	<ul style="list-style-type: none"> Retains existing transactions and products where possible Single showing (Pass/Fail)
4. Be implementable in the near-term (2024)	<ul style="list-style-type: none"> Existing contracts and resource types can be used in showings Measures to standardize showing can be implemented in the near term
5. Be durable and adaptable to a changing electric grid	<ul style="list-style-type: none"> Robust to peak and net peak needs Robust to changes in grid resource mix Eliminates need to update slice definition as grid evolves

From 10/6 Workshop – NO CHANGES