Resource Adequacy Modeling & Program Design Workshop

Slice of Day near-term implementation

November 8, 2023

Housekeeping Reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO's permission.
- These collaborative workshops are intended to stimulate open dialogue and engage different perspectives.
- Please keep comments professional and respectful.

Instructions for raising your hand to ask a question

- If you are connected to audio through your computer or used the “call me” option, select the raise hand icon located on the bottom of your screen. Note: #2 only works if you dialed into the meeting.
- Please remember to state your name and affiliation before making your comment.
- You may also send your question via chat to all panelists.

Today's discussion

CPUC is starting its 2024 Slice of Day test year and preparing for a 2025 implementation

Today: Review current CAISO RA processes and interactions with CPUC's Slice of Day

Goal: Provide stakeholders clarity around near-term (2024 test year and 2025 RA year) CPUC Slice of Day implementation

Today's discussion

1. Overview
2. Slice of Day summary
3. Resource counting rules & showings
4. Review CAISO processes under Slice of Day
    1. NQC determination
    2. Deliverability & MIC
    3. RA showings
    4. System, flex & local assessments
    5. Capacity procurement mechanism
    6. Substitution
5. Future considerations

Slice of Day near-term implementation

1. OVERVIEW

2. Slice of Day Summary
3. Resource counting rules
4. Review CAISO processes under Slice of Day
5. Future considerations

Overview

- RA showings - No CAISO system / process changes
- CAISO does not receive showings made to the individual LRAs (including CPUC); this will continue after Slice of Day implementation
- Today:
  - Clarifying existing CAISO processes and how these will function under Slice of Day
- In the coming months:
  - Review 2024 Slice of Day test year results in coordination with CPUC
  - RAMPD Working Group discussions on Slice of Day & CAISO RA program alignment

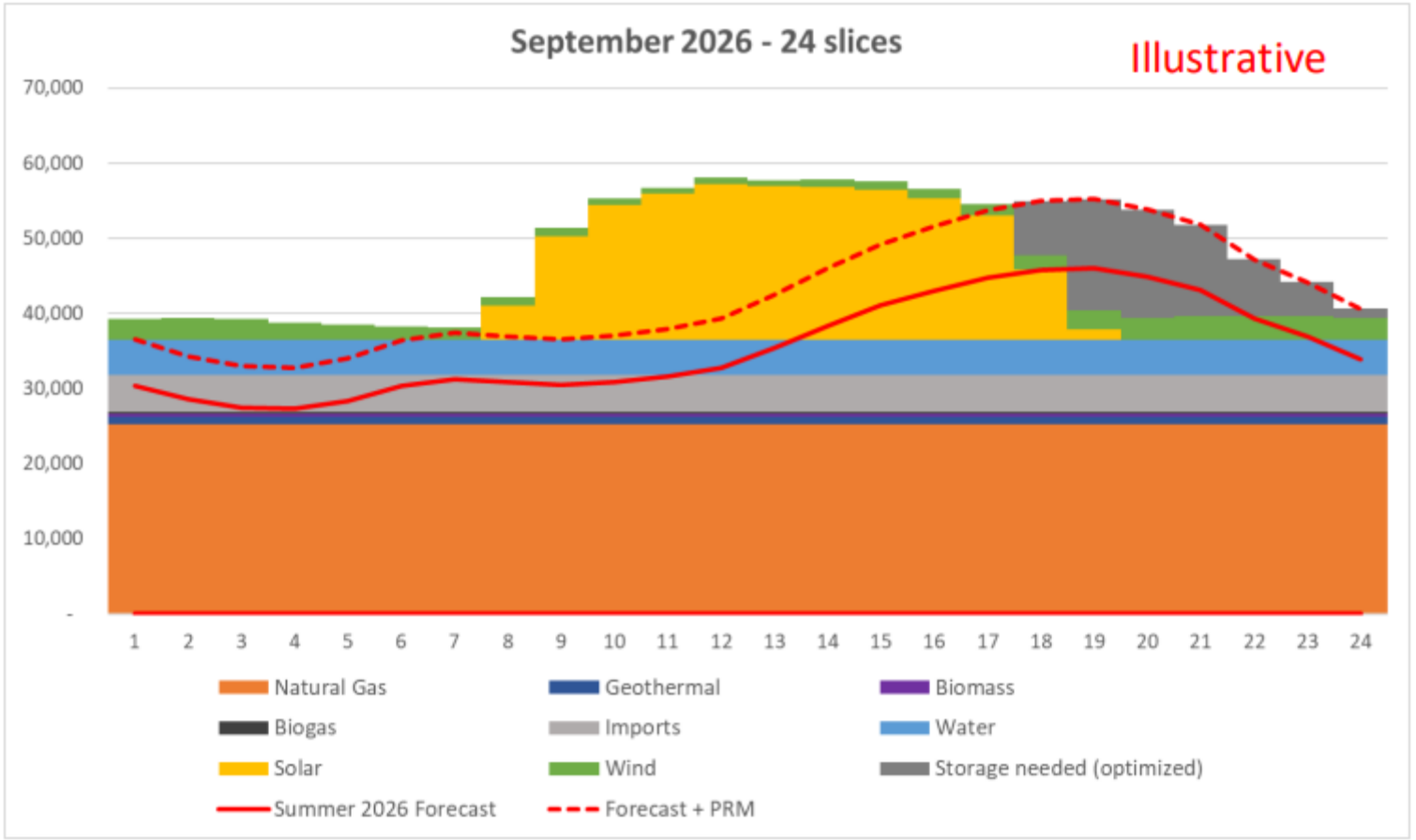
Slice of Day near-term implementation

1. Overview

2. SLICE OF DAY SUMMARY

3. Resource counting rules & showings
4. Review CAISO processes under Slice of Day
5. Future considerations

CPUC Slice of Day Summary



See PG&E slide 14: https://www.caiso.com/Documents/Presentation-CAISO-RA-Workshop-Current-Processes-and-Interoperability-Jun6-2023.pdf

Slice of Day near-term implementation

1. Overview
2. Slice of Day Summary

3. RESOURCE COUNTING RULES & SHOWINGS

4. Review CAISO processes under Slice of Day
5. Future considerations

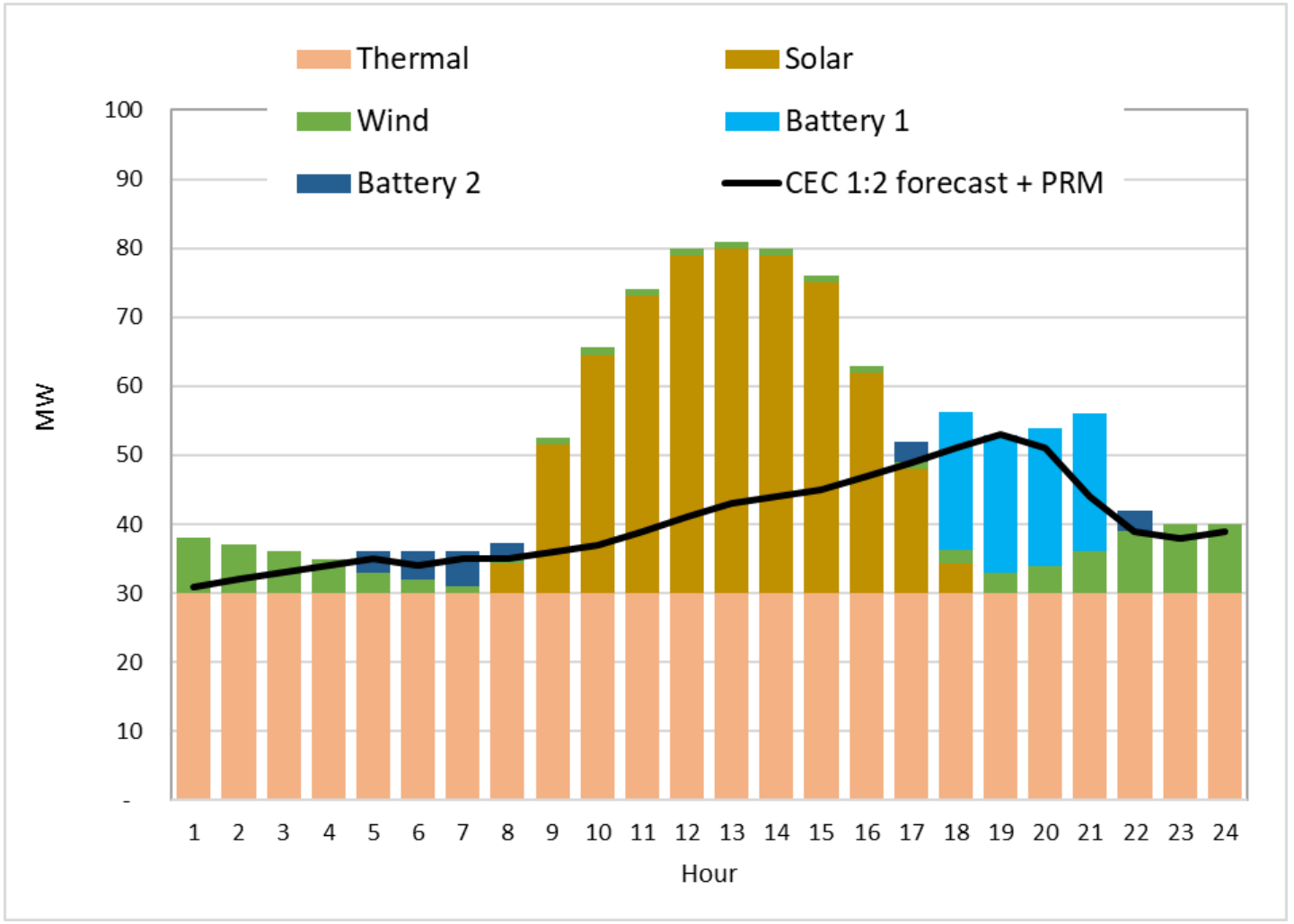
Qualifying Capacity (QC)

- The CAISO tariff defers to LRAs to establish QC criteria
- CAISO will continue to consume a single QC value from all LRAs
- Under Slice of Day, wind and solar counting methodologies will shift from ELCC to an exceedance-based approach
  - The QC values the CPUC will provide the CAISO for wind and solar will be based on the monthly gross peak hour
- CPUC's counting methodology for energy storage will not change; only how entities can show storage to the CPUC will change
  - Per CPUC rules, all RA resources must be able to operate for four or more consecutive hours
  - The QC value the CPUC will provide the CAISO is a MW level at which the storage resource is capable of discharging for four or more consecutive hours
- Dispatchable and non-dispatchable resource QCs will not change

CPUC counting rules, showings, QC values: Summary

Resource type	CPUC counting methodology	CPUC 24-hour showing	QC value to CAISO
Wind & solar	Shift to exceedance under SoD	24 hour profile	Monthly coincident gross peak hour
Energy storage	No change	Storage optimization	No change
Dispatchable resources	No change	Flat NQC value, subject to availability limits	No change
Non-dispatchable	No change	Flat NQC value, subject to availability limits	No change
Dispatchable hydro	No change	Flat NQC value	No change
Non-resource-specific Imports	No change	Flat value, subject to contract limits	No change
Demand response	No change for 2024 (LIP)	LIP profile	Monthly coincident gross peak hour

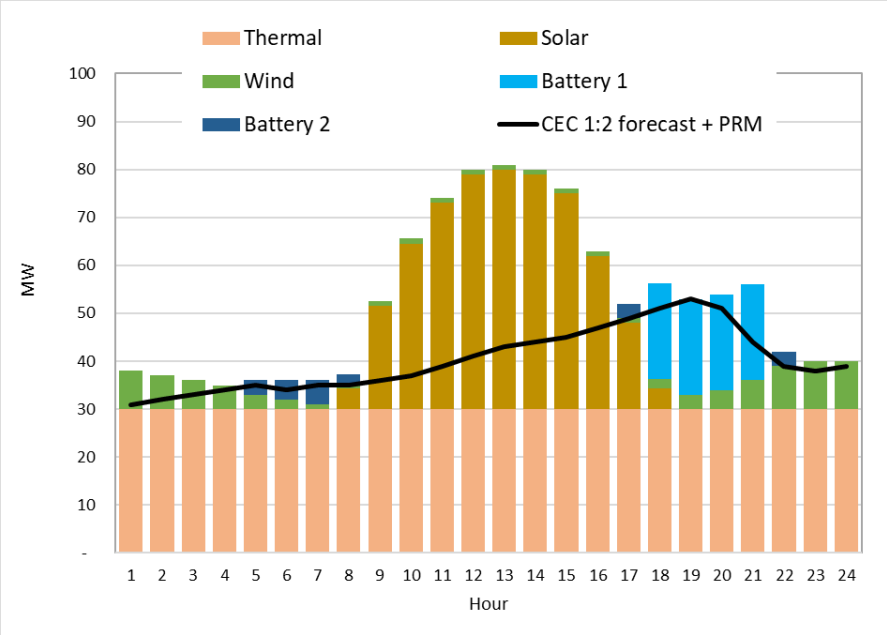
Example CPUC Slice of Day showing



Example of CPUC showings

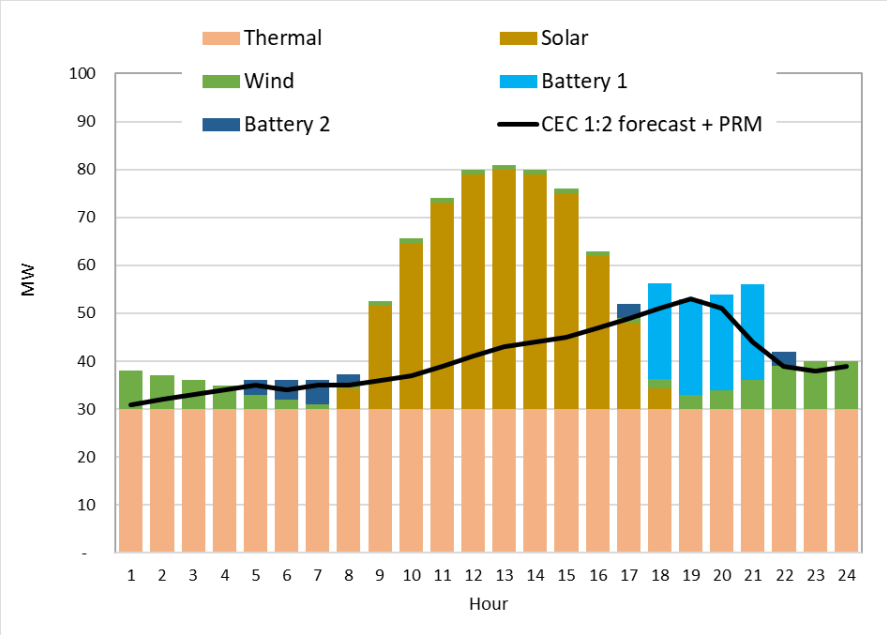
STORAGE

Example of CPUC showings: Storage



Hour	Battery 1	Battery 2
1		
2		
3		
4		
5		3
6		4
7		5
8		2
9		
10		
11		
12		
13		
14		
15		
16		
17		3
18	20	
19	20	
20	20	
21	20	
22		3
23		
24		
Energy	80 MWh	20 MWh
4-hour RA value	20 MW	5 MW

Example of CPUC showings: Storage



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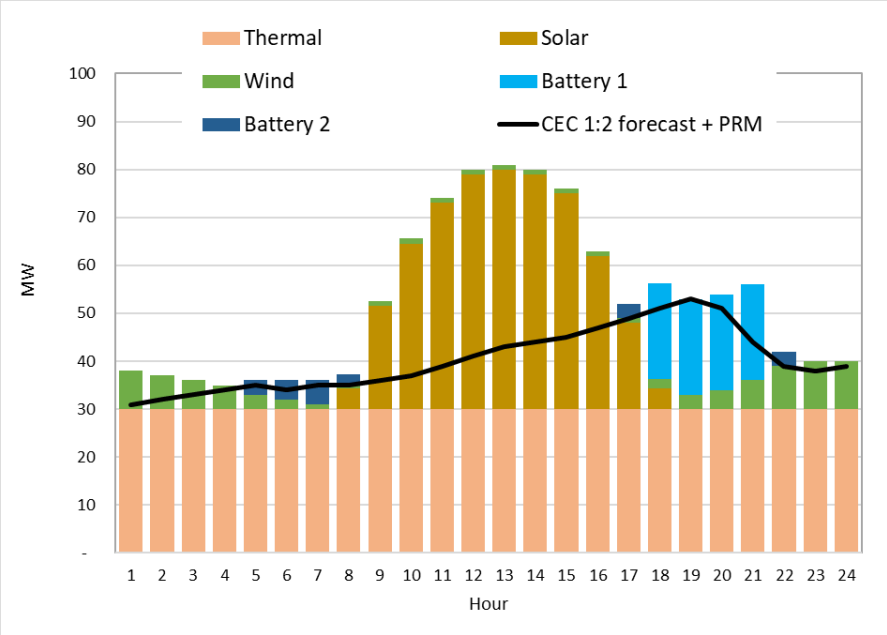
16		
17		3
18	20	
19	20	
20	20	
21	20	
22		3
23		
24		
Energy	80 MWh	20 MWh
4 hour RA value	20 MW	5 MW

Example of CPUC showing vs. CAISO showing for storage



	Battery 1	Battery 2
QC to CAISO	20	5

Example of CPUC showings

SOLAR

CPUC changes to QC Values:
Variable Energy Resources

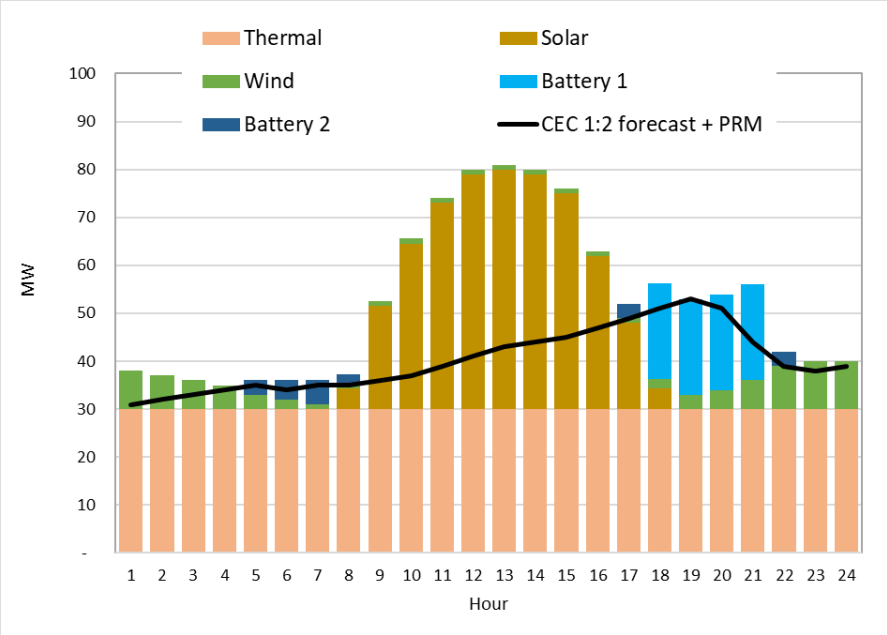
Solar

- Current: ELCC
- Slice of Day: Exceedance value at gross peak hour (not lower than 0.1)

Wind

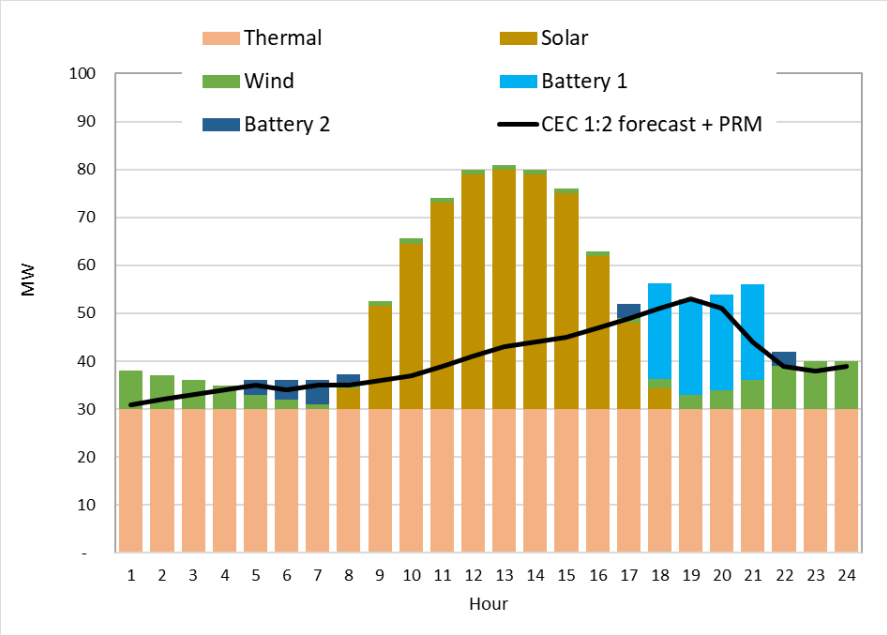
- Current: ELCC
- Slice of Day: Exceedance value at gross peak hour

Example of CPUC showings: Solar



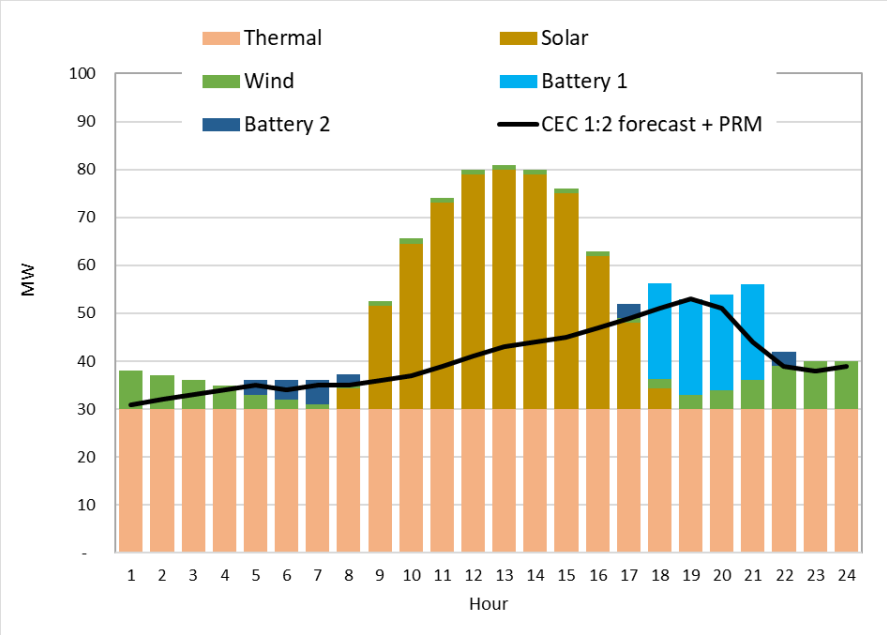
Hour	Solar
1	
2	
3	
4	
5	
6	
7	
8	4
9	22
10	35
11	43
12	49
13	50
14	49
15	45
16	32
17	18
18	4
19	
20	
21	
22	
23	
24	
Energy	Variable MWh
QC value	0.1 MW

Example of CPUC showings: Solar



Hour	Solar
1	
2	
3	
4	
5	
6	
7	
8	4
9	22
10	35
11	43
12	49
13	50
14	49
15	45
16	32
17	18
18	4
19	
20	
21	
22	
23	
24	
Energy	Variable MWh
QC value	0.1 MW

Example of CPUC showing vs. CAISO showing for solar

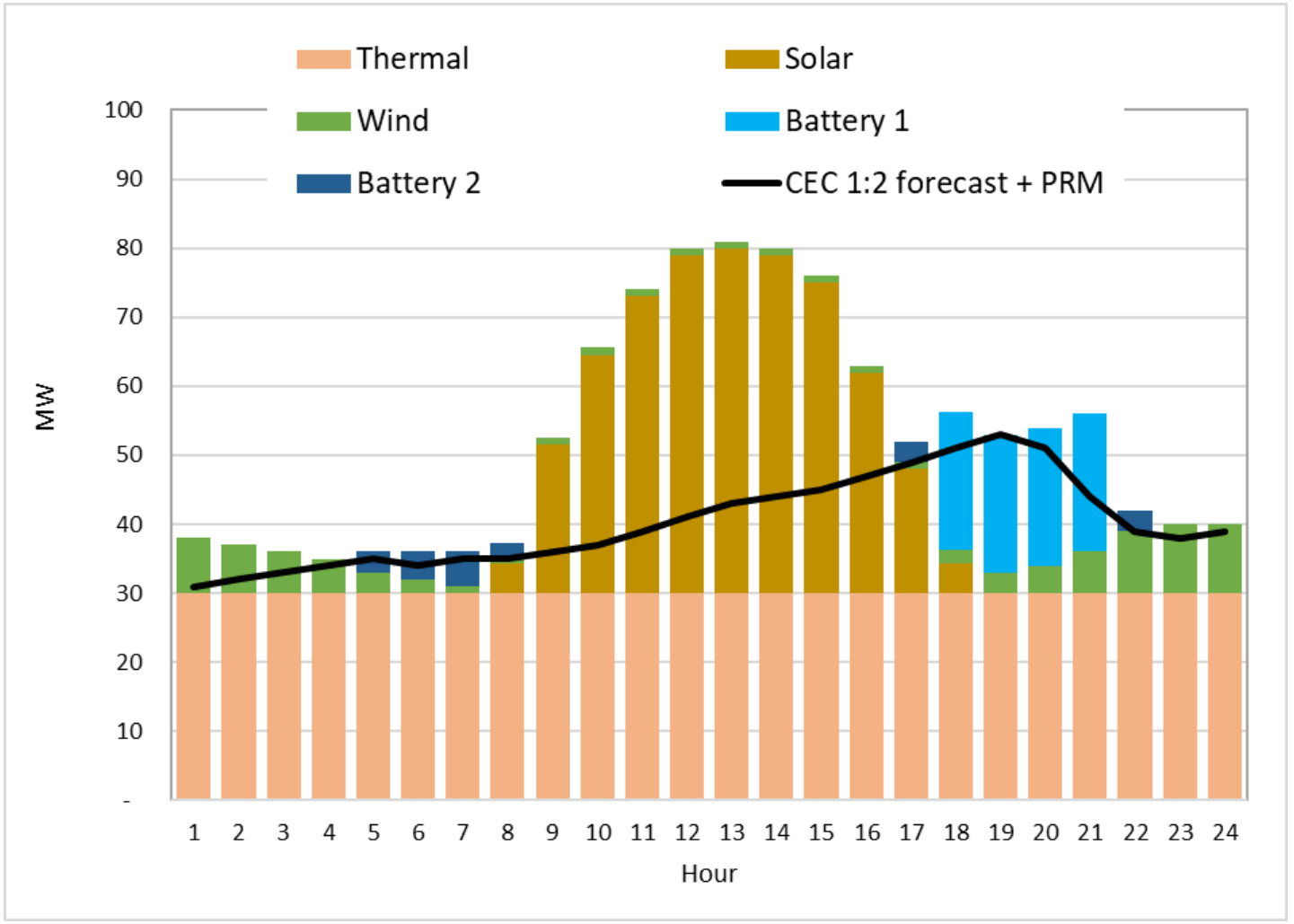


	Solar
QC to CAISO	0.1

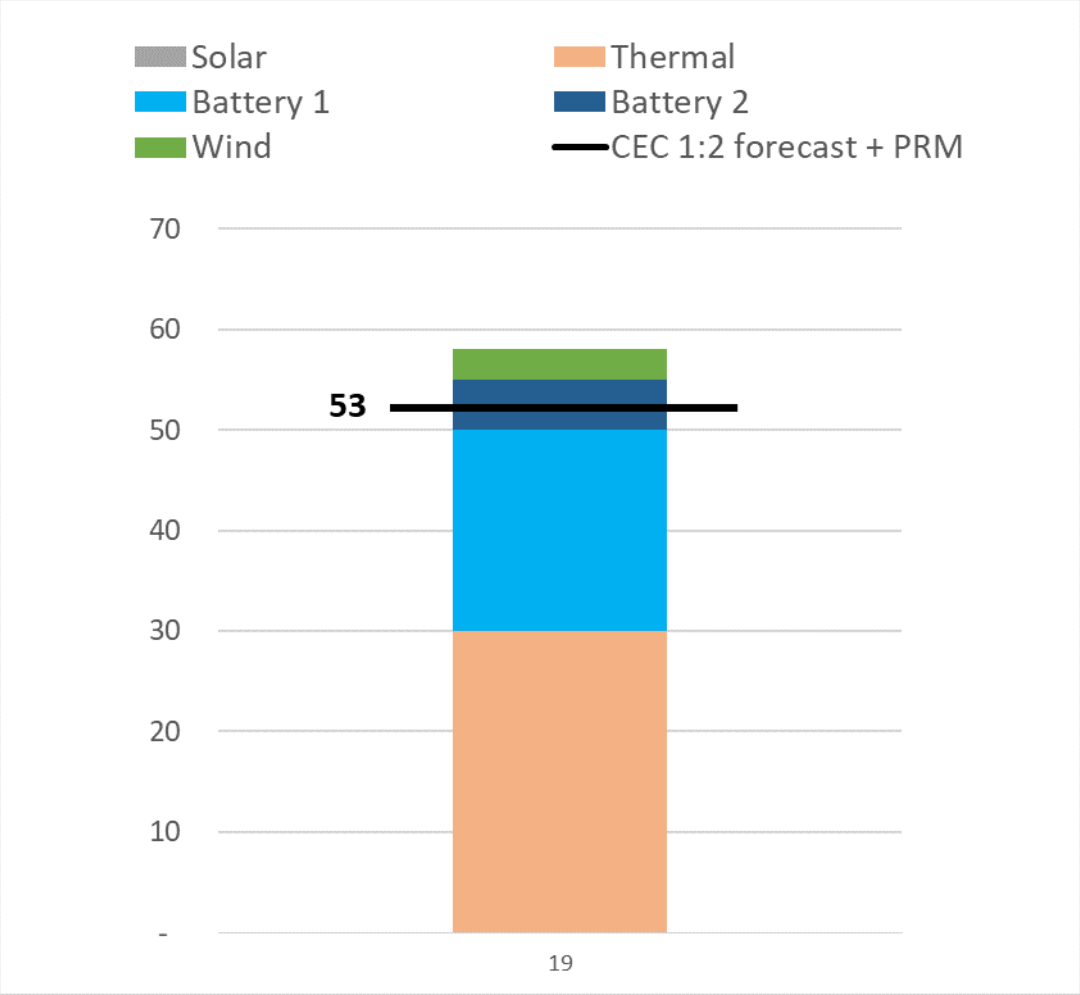
Example of CPUC showings

24 SLICES VS CAISO SHOWING

Example showing – 24 hour showing vs CAISO showing



Example showing – 24 hour showing vs CAISO showing



Slice of Day near-term implementation

1. Overview
2. Slice of Day Summary
3. Resource counting rules & showings

4. REVIEW CAISO PROCESSES UNDER SLICE OF DAY

5. Future considerations

CAISO NQC determination

- CPUC to provide **single monthly QC value** to CAISO
- Variable energy resources (the only change)
  - Due to Slice of Day change from ELCC to exceedance, CPUC established QC (in the peak hour) may be zero
  - QC to CAISO: greater of **gross peak hour value** or **0.1**
- CAISO may cut the QC values (to the NQC values) for:
  - 40.4.4 Reduction for Testing:
    - direct per latest Pmax Test and
    - indirect per Interconnection Agreement (Pmax<=IAmax)
  - 40.4.5 Reductions for Performance: Currently not used
  - 40.4.6 Reduction for Deliverability: Transmission constraints
- Suppliers & LSEs: show up to NQC value

Reduction for Deliverability

- Scope: to test that the transmission system can reasonably ensure that resource adequacy capacity can be delivered to load during *stressed system conditions in order to avoid potential system wide black-outs*
- The deliverability test results in:
  - Fully deliverable resources
  - Partial deliverable resources
  - Non-deliverable resources
- The “dispatch value” in the CAISO deliverability test has no direct correlation with the QC established by the LRAs (including CPUC) and it does not act as a cap to the QC values established by LRAs
- It is simply a “pass, partial, fail” type test

Reduction for Deliverability (cont.)

- A fully deliverable resource fully counts for RA (with the QC value established by the LRA). In the CPUC's Slice of Day its "energy" may also count during other hours (slices) of the day, as a "simplification" of the RA process.
  - Deliverability is generally the highest at peak load periods and when the load decrease there is less available resulting in potentially more congestion
  - This "extra" congestion should not meaningfully impact overall reliability because the system is not in stressed system conditions
- A resource may be partially deliverable and only counts for RA for that deliverable part.
  - Generally same % across the entire year
- Energy Only resources do not count for RA.

Deliverability for imports = MIC

Maximum Import Capability (MIC)

- Represents a quantity in MWs determined by the CAISO to be *simultaneously deliverable* to the aggregate of load in the CAISO Balancing Authority Area (BAA).
- ISO tests both the deliverability of internal resources and the deliverability of imports, to ensure all Resource Adequacy (RA) resources are *simultaneously deliverable*.
- Load Serving Entities (LSEs) RA import showings are limited for each intertie to its share of MIC.
- Calculated yearly by the ISO.
- Allocated yearly by the ISO to LSEs.

RA Showings at the CAISO

- No change from previous years
- LSEs and suppliers should show all RA resources to CAISO reflected in CPUC 24-hour showings (up to NQC value)
  - Partially contracted resources: show contracted amount (sum cannot exceed NQC)
- RA imports
  - Shown RA must be paired with MIC

Meeting system and flex RA requirements

- RA shown by LSEs/suppliers is compared to coincident peak demand plus LRA PRMs, to determine whether each LSE met their share of the **system** requirements
  - CAISO then compares aggregate showings to aggregate system RA requirements

- Flex RA shown by LSEs/suppliers is compared to their assigned flex requirement, to determine whether each LSE met their share of the **flex** requirements
  - CAISO then compares aggregate showings to aggregate flex RA requirements

Meeting local RA requirements

- Local RA shown by LSEs/suppliers is compared to their assigned CAISO local allocation (CPUC re-assigns their jurisdictional LSEs total local allocation among their jurisdictional LSEs and CPEs), to determine whether each LSE/CPE met their share of the **local** requirements
- All RA shown resources are dispatched in **technical local studies** based on their expected output at the time of that local area peak, up to the RA shown value (NQC) to determine whether all local requirements are met
  - If not then CAISO may issue back-stop (after 30 days cure period)
- Any necessary local CPM back-stop cost is:
  - First allocated to individual short LSEs/CPEs
  - Second allocated to the “collective” (load-share ratio bases)

Backstop procurement (CPM)

- Based on shown RA (up to NQC value)

Substitution

- Based on shown RA (up to NQC value)

Review CAISO processes under Slice of Day

Bid insertion/RAAIM

- Generally based on shown RA (up to NQC value)

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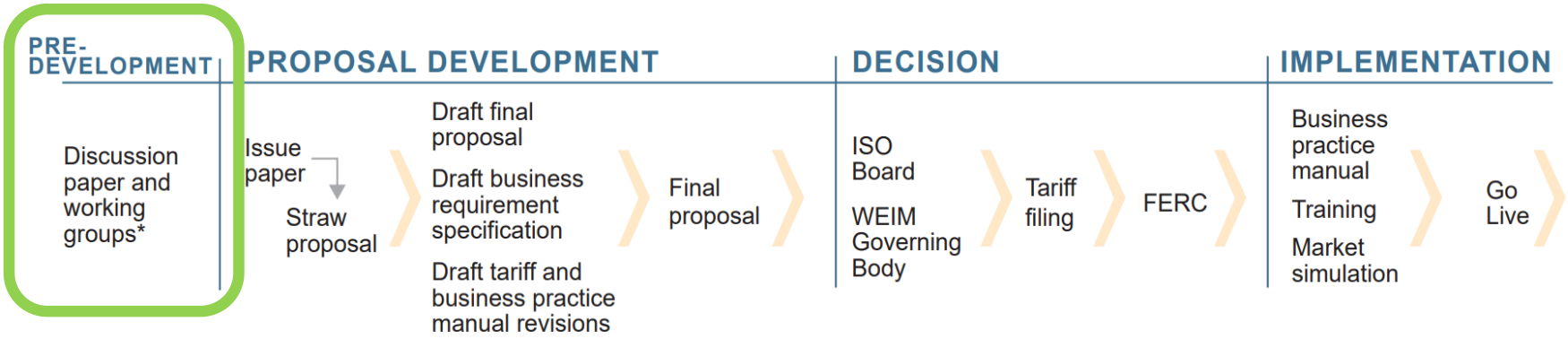
5. FUTURE CONSIDERATIONS

RA Modeling & Program Design Working Group



RA Modeling & Program Design Working Group

- No CAISO system / process changes
- Today: clarifying existing CAISO processes and how those would function under Slice of Day
- In the coming months
  - RAMPD Working Group discussions on Slice of Day & CAISO RA program alignment
  - Review 2024 Slice of Day test year results & report in winter/spring 2024

RA Modeling & Program Design Working Group

- Discussion

RA Modeling & Program Design Working Group

Upcoming Working Group meetings

- December 2023
- January 16, 2023