

Day 2 of Track 3.B.2 Workshops

Tuesday, February 9, 2021

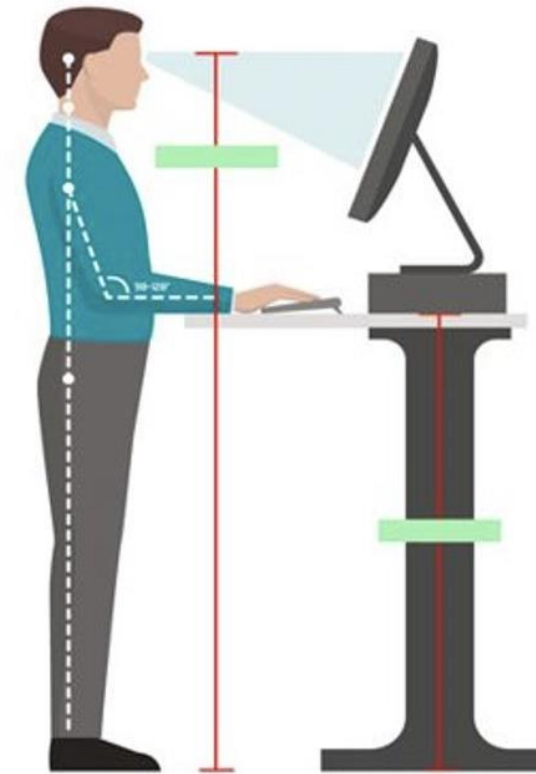
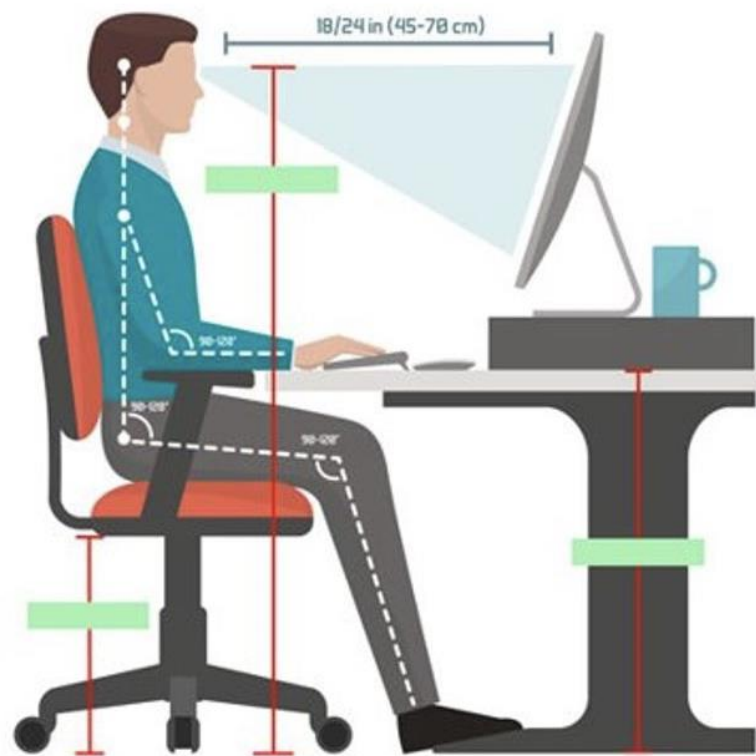
9:30 a.m. – 4:30 p.m.



California Public
Utilities Commission

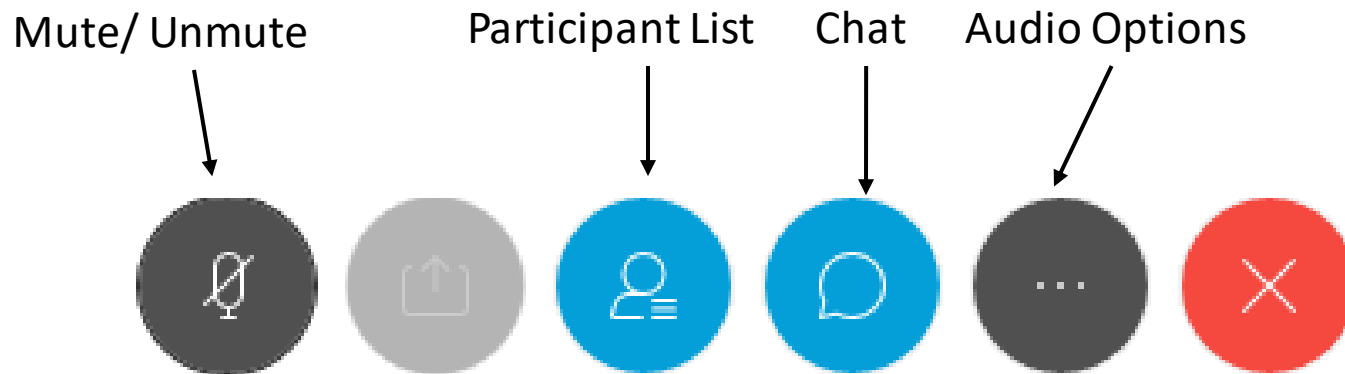
Logistics

- Online and will be recorded
- Today's presentation & recording will be uploaded onto RA history website
 - <https://www.cpuc.ca.gov/General.aspx?id=6316>
- Hosts (Energy Division Staff)
 - Jaime Rose Gannon
 - Linnan Cao
- Safety
 - Note surroundings and emergency exits
 - Ergonomic check

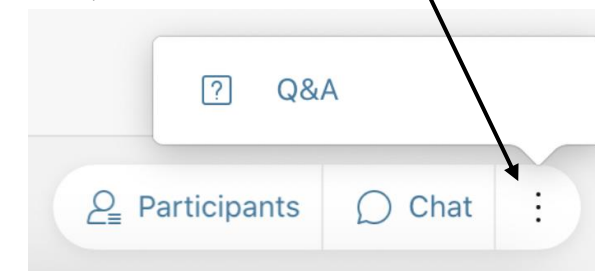


Logistics

- All attendees have been muted
- Presenters for each topic will be identified as panelists only when their topic is being addressed
- To ask questions, please use the "Q&A" function (send "To All Panelists") or raise your hand
- Questions will be read aloud by staff; attendees may be unmuted to respond to the answer. (Reminder: Mute back!)



"Q&A": on the bottom right of screen, click "3 dots"



Ground Rules

- Workshop is structured to stimulate an honest dialogue and engage different perspectives.
- Keep comments friendly and respectful.
- Please use Q&A feature only for questions, or technical issues.
- Do NOT start or respond to sidebar conversations in the Chat.

Agenda Day 1

Time	Day 1 - Monday Workshop Topics	Presenters/Time Duration
9:30-9:40 a.m.	Introduction & Safety	Energy Division, 10 min
9:40-11	Gridworks Report “Resource Adequacy: Reliability Through the Clean Energy Transition”	Arthur Haubenstock, Gridworks, 80 min
11-12 p.m.	PG&E Contract Hedge Proposal	Peter Griffes, PG&E, 60 min
12-1	Lunch	
1-1:30	PG&E “Slice of Day” Proposal Introduction	Peter Griffes, PG&E, 30 min
1:30-2:20	Determining Seasons and Slices	Luke Nickerman, PG&E, 50 min
2:20-2:30	Stretch Break	
2:30-3:10	Resource Counting	Peter Griffes, PG&E, 40 min
3:10-3:30	Need Determination and Allocation	Luke Nickerman, PG&E, 20 min
3:30-4	Must Offer Obligation	Peter Griffes, PG&E, 30 min
4-4:30	Q&A	

Agenda Day 2

Time	Day 2 - Tuesday Workshop Topics	Presenters/Time Duration
9:30-9:45 a.m.	Introduction & Safety	Energy Division, 15 min
9:45-10:15	SCE/CalCCA Proposal Mechanics Review + Q&A	Eric Little, 30 min
10:15-10:30	How Should the Commission Evaluate and Compare Proposals? + Q&A	Nick Pappas 15 min
10:30-10:40	Is the Proposal Compatible with Federal & State Law? + Q&A	Nick Pappas, 10 min
10:40-10:50	Stretch Break	
10:50-12 p.m.	Will the Proposal Improve Reliability? + Q&A	Eric Little + Stakeholder Panel, 70 min
12-1	Lunch	
1-2	Is the Proposal Compatible with Existing Policy & Programs? + Q&A	Nick Pappas + Stakeholder Panel, 60 min
2-2:30	What Other Implementation Issues Require Consideration? + Q&A	Eric Little + Nick Pappas, 30 min
2:30-3	Can the Proposal Be Implemented Timely with Minimum Market Disruption? + Q&A	Eric Little + Stephanie Tanenhaus, 30 min
3-3:15	Does the Proposal Provide Wholesale Energy Price Mitigation? + Q&A	Eric Little + Nick Pappas, 15 min
3:15-4:30	Catch Up & Wrap Up	

Agenda Day 3

Time	Day 3 - Wednesday Workshop Topics	Presenters/Time Duration
9:30-9:40 a.m.	Introduction & Safety	Energy Division, 10 min
9:40-11:20	Frank Wolak Presentation on Q&A Document	Frank Wolak, 1 hour 40 min
11:20-11:30	Stretch Break	
11:30-12 p.m.	Energy Division Bid Cap Proposal	Michele Kito, 30 min
12-1	Lunch	
1-2	CAISO UCAP Proposal	CAISO, 60 min

Track 3B.2 - December 11, 2020 revised Scoping Memo

- The scope of Track 3B.2 includes the following issues:
 1. Examination of the broader RA capacity structure to address energy attributes and hourly capacity requirements, given the increasing penetration of use limited resources, greater reliance on preferred resources, rolling off of a significant amount of long-term tolling contracts held by utilities, and material increases in energy and capacity prices experienced in California over the past years.
 - a) Specifically, address the direction the Commission intends to move in with respect to larger structural changes (e.g., capacity construct addressing energy attributes and reliance on resource use-limitations forward energy requirement construct). Set forth the necessary milestones and additional details that must be determined in order to implement the adopted direction for a compliance year no earlier than 2023.

Track 3B.2 Calendar

TRACK 3B.2 CALENDAR	
Event	Date
Revised Track 3B.2 proposals due*	December 18, 2020
Comments on Track 3B.2 proposals	January 15, 2021
Workshop on revised Track 3B.2 proposals	Early - mid February 2021
Second revised Track 3B.2 proposals due	February 26, 2021
Comments on Track 3B.2 proposals	March 12, 2021
Reply comments on Track 3B.2 proposals	March 23, 2021
Proposed Decision on Track 3B.2	May 2021

SCE-CalCCA Track 3B2 RA Reform Proposal Workshop Slides

FEBRUARY 9, 2021 CPUC RA REFORM WORKSHOP

R.19-11-009

Discussion Outline

Introduction & Safety	Energy Division	9:30-9:45
SCE-CalCCA Proposal Mechanics Review + Q&A	Eric Little	9:45-10:15
How Should the Commission Evaluate and Compare Proposals? + Q&A	Evelyn Kahl	10:15-10:30
Is the Proposal Compatible with Federal & State Law? + Q&A	Evelyn Kahl	10:30-10:40
BREAK		10:40-10:50
Will the Proposal Improve Reliability? + Q&A	Eric Little Stakeholder Panel	10:50-12:00
LUNCH BREAK		12:00-1:00
Is the Proposal Compatible with Existing Policy & Programs? + Q&A	Nick Pappas Stakeholder Panel	1:00-2:00
What Other Implementation Issues Require Consideration? + Q&A	Eric Little + Nick Pappas	2:00-2:30
Can the Proposal Be Implemented Timely with Minimal Market Disruption? + Q&A	Eric Little + Stefanie Tanenhaus	2:30-3:00
Does the Proposal Provide Wholesale Energy Price Mitigation? + Q&A	Eric Little + Nick Pappas	3:00-3:15
Catch Up & Wrap Up		3:15-4:30

SCE-CalCCA Proposal Overview and Mechanics

Until 10:15 a.m.

SCE-CalCCA Track 3B.2 Proposal

Key Elements:

- Net-Peak Capacity Test
- Energy Sufficiency Test
- Storage Charging Test
- Wind and Solar Treated as Net Load
- LSE-Specific Load Profiles

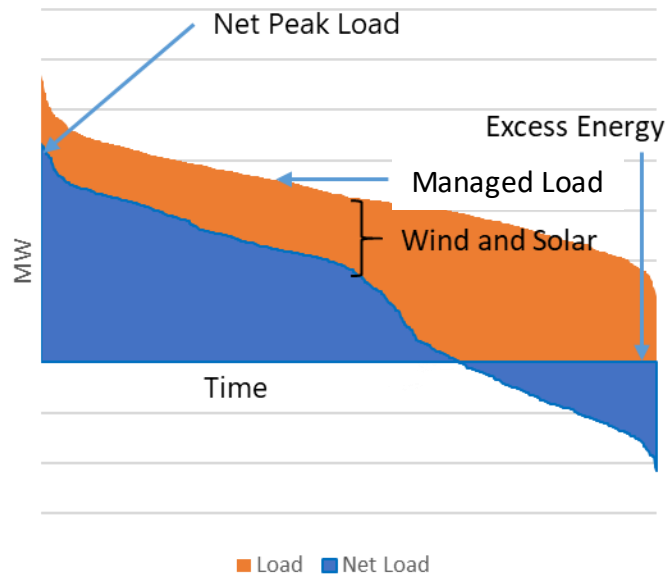
SCE-CalCCA propose critical structural reforms targeting consensus RA program deficiencies

The SCE-CalCCA proposal appropriately balances the need for program reform with the need for compliance feasibility and market fluidity

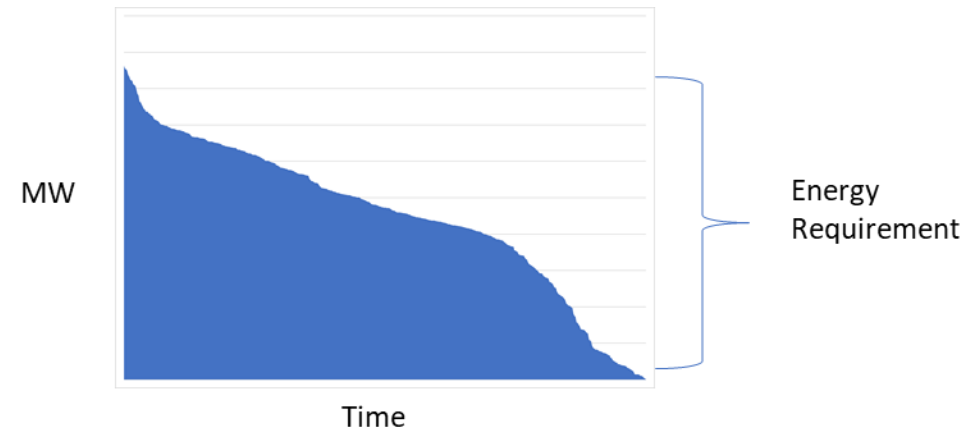
The SCE-CalCCA proposal is compatible with further program calibration and reform (e.g. modifications to PRM, MOO, resource counting, etc.)

Necessary simplifying assumptions are mitigated by existing IRP and CAISO processes which reinforce and mitigate “edge case” reliability risk

Net-Load Duration Curve Methodology



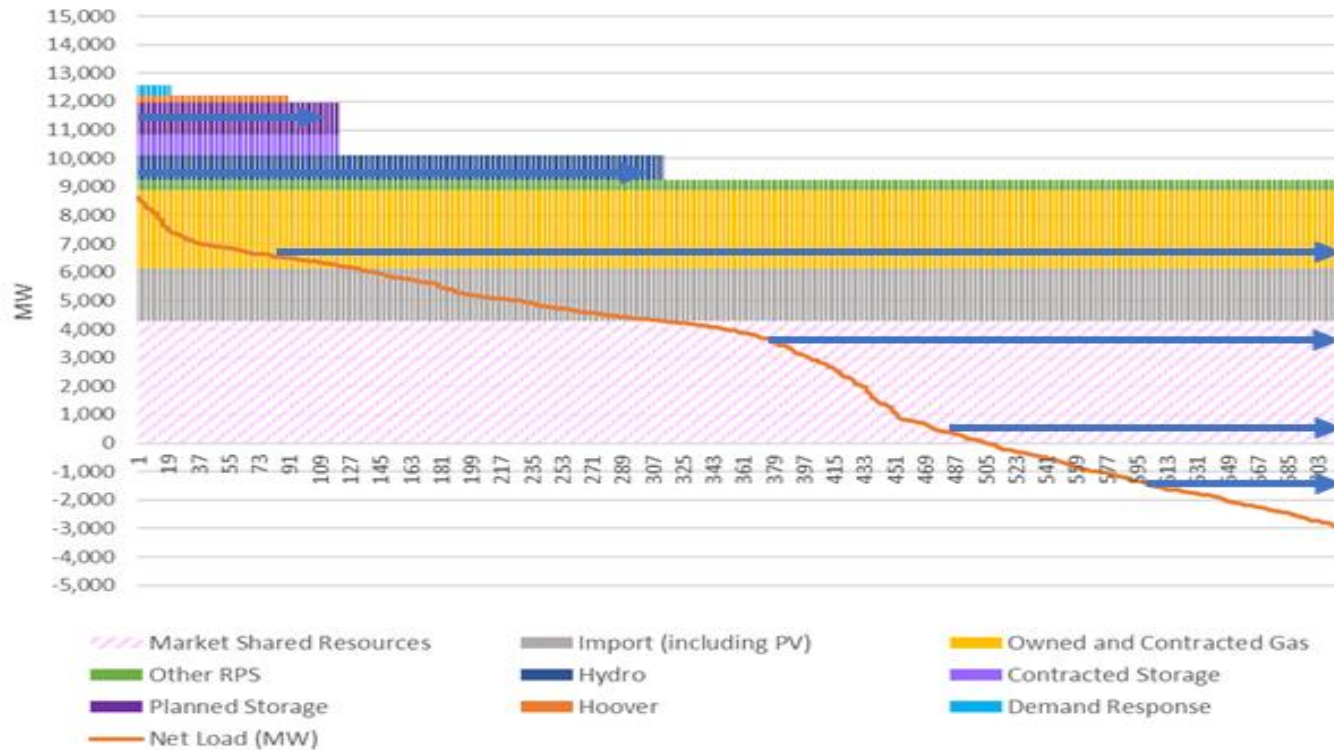
Capacity Requirement:
Monthly Net Load Peak



Energy Requirement:
Sum of Positive Monthly
Net Energy

Compliance Example

Load Duration Curves - August, 2030



Simplified example of monthly compliance for August 2030.

- Net load reflects netted solar and wind resources (not shown).
- Blue arrows reflect excess energy available for storage charging requirement.

Consensus Deficiencies, Consensus Reforms?

- ✓ SCE-CalCCA proposal represents **significant, balanced durable reform** to the RA program structure while limiting incremental complexity.
- ✓ SCE-CalCCA proposal **does not preclude further reforms** to refine and calibrate the RA program to improve reliability and promote economic dispatch.

Current Program Consensus Deficiencies	Structural Evolutions in SCE-CalCCA Proposal	Calibration Not Precluded by SCE-CalCCA Proposal
<ul style="list-style-type: none">• Limited to assessment of gross peak capacity sufficiency• Does not assess energy sufficiency• Poorly suited to non-conventional resources	<ul style="list-style-type: none">• Refocuses on LSE-specific monthly net peak• Adds assessment of energy sufficiency• Novel treatment of as-available renewables; explicit accounting for storage charging needs	<ul style="list-style-type: none">• Revised load forecast / extreme weather sensitivity• Revised Planning Reserve Margin• Revised Must Offer Obligations• Revised resource counting rules

Is the SCE-CalCCA Proposal *More Complex* or *More Developed*?

“Implementation Challenges” identified in SCE-CalCCA proposal exist across all proposals, but stakeholder outreach has resulted in more “daylight” for SCE-CalCCA proposal.

Problem	SCE-CalCCA NQE	PG&E Slice-of-Day	ED Energy Hedging	ED MCC + Bid Caps
Use-Limitations	Use Limitations Need to be Addressed or Calibrated			
Agency Oversight and Counting (NQC, NQE, LSE-Specific Forecasts)	Similar Agency Involvement Required			
Commercial / Product Details (Trading, Requirements)	Commercial Details Need Development and Resolution			
Market Participation Rules	Market Participation Rules Need Development and Resolution			
Durability	Designed for future grid	Timing and size of slice could need to evolve	Looks to market suppliers to solve energy need	MCC and ELCC likely to need constant revision

How Should the Commission Evaluate and Compare Proposals?

RA Reform Evaluation and Comparison Criteria

- ✓ Is the proposal compatible with federal and state law?
- ✓ Will the proposal improve reliability with growing renewable penetration?
- ✓ Is the proposal compatible with existing policies and programs?
- ✓ What other implementation issues remain that will need to be addressed?
- ✓ Can the proposal be implemented timely with minimal market disruption?
- ✓ Does the proposal incorporate an energy price mitigation function?

Is the Proposal
Compatible with
Federal and State law?

SCE-CalCCA
Proposal Presents
No Legal
Impediments or
Complications

Does the proposal avoid FERC oversight? Maintains a bilateral, capacity-driven framework; does not encroach on FERC jurisdiction compared with current framework

Does the proposal avoid CFTC oversight? Does not create a financial derivative product; avoids Commodity Futures Trading Commission jurisdiction

Does the proposal maximize CCA right to self-procure RA? Maintains California's resource adequacy procurement as a load-serving entity requirement; complies with Public Utilities Code §380

Does the proposal support and complement the existing RPS program? Requires no change to California's Renewable Portfolio Standard program; enables the Commission and LSEs to comply with §§399.11-399.33

Does the proposal support continued planning via IRP? Requires limited changes to California's Integrated Resource Planning process; enables the Commission and LSEs to comply with §454.52

Stretch Break :)



Will the Proposal Improve Reliability with the Evolving Resource Mix?

TEMPORAL
ALIGNMENT OF
SUPPLY AND DEMAND

USE-LIMITED
RESOURCES

Eric Little +
Stakeholder Panel
until 12:30 p.m.

SCE-CalCCA
Proposal Will
Improve Reliability
by Addressing Net
Peak Demand,
Adding Granularity
to Supply and
Demand Matching,
and Provide an
Opportunity to
Address Energy
Needs

Does the proposal address net-peak demand while continuing to address peak demand?

- ✓ Mathematically, meeting the net peak need and having an offer obligation on the wind and solar for that amount netted will meet the peak load as well
 - ✓ $RA = \text{Peak Net Load} \rightarrow \text{Peak Net-load} = \text{Maximum over the compliance period} (\text{Managed Load} - \text{Wind} - \text{Solar})$
 - ✓ Since Wind and Solar are non-negative, $RA + \text{Wind} + \text{Solar} \geq \text{Managed Load}$

Does the proposal address load forecast variability, resource outages, and variable resource generation?

- ✓ Directly incorporates estimated hourly loads and variable resource output and utilizes a calibrated PRM to address uncertainty while allowing for varying methods to account for uncertainty (e.g. load forecast method and forced outage rates combined with the PRM)
- ✓ See following slide on temporal aspects

SCE-CalCCA
Proposal Will
Improve Reliability
by Addressing Net
Peak Demand,
Adding Granularity
to Supply and
Demand Matching,
and Provide an
Opportunity to
Address Energy
Needs (2)

Does the proposal assess energy sufficiency on a granular enough time scale to address constraints?

- ✓ Explicitly models energy sufficiency for each LSE's monthly portfolio, including explicit assessment of energy sufficiency for shown storage

Does the proposal ensure resources participate effectively in CAISO markets?

- ✓ Maintains current participation requirements (MOO, AAH, etc.) and is adaptable to continued market refinements adopted in parallel (e.g. UCAP)

Does the proposal address use limited resources?

- ✓ Addresses use limitations explicitly through the measurement of energy addressing the issues of when and for how long will the CAISO use the resource
 - ✓ Appropriate solutions through NQC and MOO will be critical in addressing all limitations but is feasible

Temporal and Use Limitation Issues

Incorporating all real-world constraints into the NQC / NQE accounting is a design choice that must be weighed against increased complexity.

In its proposed form, SCE-CalCCA's proposal does not explicitly reflect all real-world limitations:

- Is it possible for a resource producing 24/7 at peak capacity appear to produce an entire month of energy to meet a single hour need?
- If so, how likely is this to occur and what is the magnitude of the issue?

For resources with Use Limitations, how is the amount of NQE calculated?

Temporal Issues and Use-Limited Resources: Special Considerations

- Tension has always existed between the planning nature of an RA program and the daily operation of the CAISO grid
 - RA is performed annually and monthly with MCC buckets recognizing the shaping to load that LSEs will naturally procure
 - This resulted in:
 - Must-offer in all hours even though the RA program did not require such
 - Stringent substitution requirements
 - Complex Master-files to depict use limitations and make sure that the resource operates to its full potential
- Any proposal will need to address how the RA program can remain simple enough to be practical while having sufficient mechanisms in place to ensure sufficient capacity exists to satisfy load needs

CAISO Preliminary Portfolio Assessment is Informative in Understanding Temporal Aspects

- The CAISO Portfolio Assessment (under development) is intended to rigorously test the shown RA portfolio and procure backstop resources if deficiencies exist. Results from the initial Portfolio Assessment (July 2020) illustrate how such a process would review shown RA resources under the SCE-CalCCA Proposal.
- The July 2020 RA Portfolio Assessment:
 - Evaluated July 2020 shown RA portfolio against Peak load, Net Peak load, and energy needs of the grid
 - 2,000 iterations involving 175 hourly load profiles including 1-in-5, 1-in-10, 1-in-20, load conditions
 - Assumptions about resource availability based upon existing mechanisms:
 - Wind/solar based on summer assessment hourly profiles
 - Historic outage rates
 - Model respects Master File data on minimum run time and minimum down time
 - Hydro capped at NQC while utilizing similar historic hydro year production
 - Imports limited to intertie capability (not based on historic MIC)
 - DR assumed to be available for full NQC in all hours

CAISO Study Results Suggest Workability of SCE-CalCCA Proposal

Probability of a shortfall greater than X MW			MW shortfall at X probability		
MW shortfall	RA Showing	Thermal	Probability	RA Showing	Thermal
500	1.98	2.82	4	12	56
1000	1.49	2.14	3.5	15	147
2000	0.75	1.27	3	21	397
3000	0.54	0.97	2.5	94	709
4000	0.26	0.63	2	483	1124
5000	0.15	0.39	1.5	983	1636
6000	0.09	0.23	1	1585	2905
7000	0.04	0.1	0.5	3183	4487
8000	0.02	0.03	0.01	5706	7035

“In the CPUC’s RA proceeding, SCE has proposed to transition to only a net-load peak requirement. The CAISO agrees that a net-load peak RA requirement is essential, but believes it is premature to remove the gross load peak requirement. For this interim period, these additional net load RA requirements could be set on deterministic modeling with a planning reserve margin. Therefore, the CAISO will work LRAs and market participants to develop a net-load RA procurement requirement for the 2022 RA year.”

Approaching the Temporal Issue

Perform studies of the nature of the temporal issues

- Various CAISO studies could help to formulate the issue such as the Preliminary Portfolio Assessment and/or the LCR
- Longer-term, the IRP should be developing the portfolio of resources necessary to meet the temporal needs for grid reliability

Once the studies are conducted and the probability and magnitude known, then the discussion can turn to solutions which may include:

- A form of MCC buckets to address the hours of energy need
- Must-offer obligations to ensure that energy from certain resources is provided at the points of energy need (e.g. storage)
- Established specific hours for which energy capability must be demonstrated
 - Potentially informed by the CAISO Portfolio analysis
- Factored into the PRM

Utilize the IRP to ensure that the fleet development is consistent with the RA needs so that the resources available to the RA program as technology progresses are capable of meeting peak, net-peak, and energy needs

Next Steps

Solutions to the temporal issue are available

- Studies of the level of reliability (i.e. LOLE) can be performed to determine which of the methods identified is most effective and practical in meeting the reliability need

Prior to the LOLE studies, the CAISO should work with market participants to:

- Ensure the assumptions of resource performance match the RA requirements and proposal structure
- Evaluate additional months within the portfolio assessment
- Discuss structure and how both Net and Gross load peaks are treated under the proposal

Use Limited Resources

	Environmental Restrictions	Operational Minimums	Energy/Capacity	SOC	Hours of Operation
Thermal	X	X	X		X
Hydro	X		X		
Wind/Solar			X		X
DR		X	X		X
Storage				X	

Impacts

- Ability to meet Peak, Net Peak capacity
- Ability to meet energy need

Single v. multiple aspect evaluation

- This multiple application of a resource will make a single evaluation point impractical
- Which path a resource follows (high capacity for short duration or low capacity for longer duration) will depend on market economics
- Ensuring the RA fleet is capable of meeting either need will require analytics similar to that of the CAISO Portfolio Evaluation as well as treatment of uncertainty in the PRM evaluation

Reliability Panel Discussion

If you had to list your highest priority reliability concerns, what are they and why?

As you review the proposals out there, do any of them fail to address your high priority concerns?

Is there any reliability concern that you have that you believe the SCE-CalCCA proposal does not adequately address?

In your opinion, can the methods suggested sufficiently address the reliability issues already identified with the SCE-CalCCA proposal (i.e. Temporal issues, Use Limitations, etc.)?

Is there anything else you would like to add to the discussion of the ability of the proposal to meet reliability needs?



Lunch **Break**

Until 12:50



CAISO MARKETS

INTEGRATED RESOURCE
PLANNING

RENEWABLE PORTFOLIO
STANDARDS /
DECARBONIZATION

LOCAL RESOURCE
ADEQUACY PROCUREMENT

POWER CHARGE
INDIFFERENCE
ADJUSTMENT CALCULATION

Is the Proposal Compatible with Existing Frameworks?

Nick Pappas + Stakeholder Panel

SCE-CalCCA
Proposal
Compatibility with
Current
Operational,
Planning, and
Decarbonization
Frameworks

Does the proposal work within existing CAISO operational markets?

Maintains existing resource participation and dispatch framework and compatible with further must offer and availability refinements.

Does the proposal support the existing RPS program and other decarbonization efforts?

Retains and refines accuracy of reliability incentive for preferred resources, including variable renewables, baseload renewables, and demand-side solutions; retains current LSE-driven renewables market

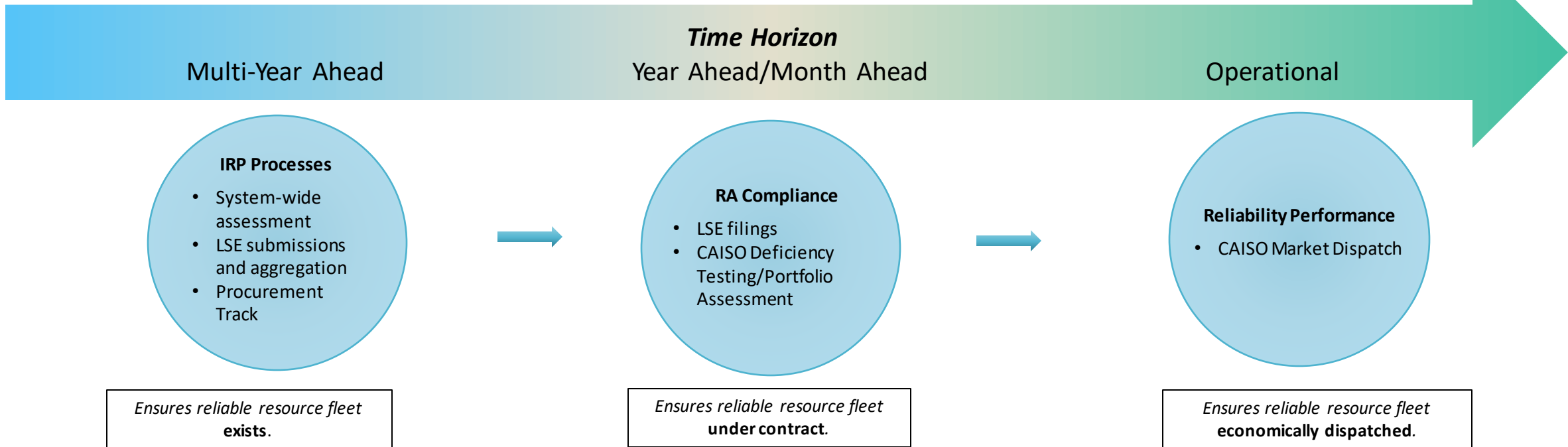
Does the proposal work with local RA procurement by CPE?

Resource allocation from CPE would feed into long-term LSE planning and short-term RA compliance

Does the proposal support long-term planning through the IRP?

Designed to work in tandem with IRP resource planning and procurement, supports improved reliability assessment within IRP

RA in the Reliability Policy Ecosystem



- RA is **one of several** mutually reinforcing elements of California’s multi-part reliability policy framework.
- While RA requirements should strive to mimic grid needs, simplifications are:
 - Necessary for compliance feasibility and market fluidity
 - Non-disruptive given more robust modeling and backstop procurement via IRP and CAISO Portfolio Assessment / Capacity Procurement Mechanism

Integration with CAISO Market Operations:

No Significant Changes or Impediments

RA has historically been implemented within the CAISO market through a Must-Offer Obligation

- The CAISO has also implemented opportunity costs within its default energy bids to enable use limited resources to provide the most valuable service possible
 - The periodicity of the RA program will have to consider opportunity cost as a methodology
- The CAISO is currently evaluating energy storage and potentially a state of charge restriction to meet net peak load
 - Will this method need change or benefit from change under the proposed RA structure?
- The CAISO is also considering changes to import rules within the RA Enhancements Stakeholder Process
 - Does this proposal require or benefit from any additional changes or should any changes be abandoned under this proposal?

While these questions should be addressed, it does not appear the structure under the SCE-CalCCA proposal would preclude implementation of CAISO proposed RA enhancements items

The proposal would require the CAISO to evaluate the energy-based use limitation associated with NQE and provide a method to deal with such a restriction with regard to its MOO

Integration with Integrated Resource Planning: No Change to Purpose; Limited Refinements and Integration

The SCE-CalCCA proposal contemplates integration of the IRP and RA processes to ensure that the resources being planned for are those necessary to reliably operate the grid:

- The RA program has not historically been sufficient to develop new resources and therefore, the IRP will continue to be a critical process to ensure that resources are developed to meet state policy goals in a reliable manner
- The IRP process will continue to serve as the overarching process to ensure new resource development to meet state reliability and decarbonization goals
- The RA process will ensure that LSEs contract with available resources (existing and developed through the IRP) to meet reliability needs

Additionally, to improve IRP oversight, the IRP should assess portfolios using SCE-CalCCA reliability tests.

Integration with Renewable Portfolio Standard: No Change to Program or Added Complexity in Compliance

The RPS could be used as an input to the RA net load calculation

- In addition, having an integrated view of how renewable resources provide reliability as well as what other measures can be taken in concert with renewable resources can be informed by the RA and IRP processes

The SCE-CalCCA proposal would refine and improve reliability value signals for LSE procurement

- SCE-CalCCA proposal will continue to show solar and wind energy value after peak / net-peak capacity value is saturated or eliminated
- SCE-CalCCA proposal will recognize baseload renewable contributions for peak, post-peak, and energy contributions
- SCE-CalCCA proposal will incentivize LSEs to invest in storage at levels proportional to variable renewable resources

Integration with Local Resource Adequacy Central Procurement: No Change Required

Moving forward, a growing share of reliability resources will be procured via Central Procurement Entity with system reliability attributes (NQC and NQE) allocated to LSEs as a result of the Local RA CPE Decision.

The SCE-CalCCA proposal is consistent with continued allocations via CAM and CPE which fulfill a share of LSE RA requirements.

Early notice of centrally procured resources will be critical to successful LSE portfolio management

The SCE-CalCCA RA framework may be a useful overlay to incorporate in RA CPE portfolio development for local reliability areas

Power Charge Indifference Charge Calculation:

Limited Refinements May Be Necessary

- No change to PCIA framework
- Compatible with PCIA Working Group 3 Final Report Framework
- Capacity product treatment in market price benchmark continues without change
- If NQE is traded as a separate product, should the value of the product be accounted for within PCIA MPB?

Implementation and Compatibility Discussion

As we transition to a new RA structure, what are your highest priority implementation / transition concerns?

As you review the proposals out there, are any of them structurally incompatible with other policies?

What are your most significant implementation concerns for the SCE-CalCCA proposal?

Would the SCE-CalCCA proposal pose barriers to existing contracts or development of new resources?

Is there anything else you would like to add to the discussion of the ability of the proposal to be implemented and integrated with other policies?

What Other
Implementation
Issues Require
Consideration?

Energy Expectations Can be Addressed Through the MOO and the NQE Calculation

Use limitations for NQE can be addressed through the MOO or other methods

- The solution to this will be dependent on a number of elements:
 - Time frame for RA (annual v. seasonal v. monthly)
 - Must-offer obligation
 - Does the must offer end once the energy limit has been met?
- Converting some use limits to hours of operation will not be perfect
 - Start limits may or may not limit the amount of energy from a resource depending on how many consecutive hours it is economic to operate the resource
 - CAISO portfolio assessment or other economic dispatch evaluation could help with determining these values
 - Whatever the level of uncertainty in energy output, the PRM will need to be set in accordance to achieve the desired level of reliability

Forced outages for NQE can be addressed similar to NQC

- Depending on the model selected (RAAIM v. UCAP), the amount of available energy will need to account for forced outage rates
- The UCAP method may be a very good manner to address this as the capacity is derated for forced outages and if then multiplied by available hours will provide the expected energy after forced outages from a resource

LSE Specific Bottom-Up Forecasting Requires Changes

Each LSE will need an hourly load forecast

- The sum of all hours load for all LSEs (i.e. energy) will need to meet the total forecast of the CEC for the state
- The peak loads will be non-coincident and will thus overstate the coincident peak forecast

Theoretically, the sum of LSE load for any hour should be equal to the CEC load for the system as a whole

- Methods need to be developed to ensure that the sum of individual load forecasts do not excessively deviate from the system load forecast

CAISO Portfolio Assessment may also provide check on aggregate load assumptions

This is not a trivial task and will require significant thought and joint work of the CEC, CAISO, CPUC, and LSEs to ensure that the process arrives at the correct result

Netting and Deliverability Can be Addressed Within the RA Methodology

Netting

- Since the proposal depends on netting the wind and solar expected output from the gross load, it will be necessary to estimate expected wind and solar production profiles
 - Various solar/wind profiles exist, including from the IRP and CAISO Portfolio Assessment
 - Indexing weather between production profiles and demand profiles will be important in addressing covariance
- Variability in output will introduce an element of variability (in addition to load forecast error and forced outage rate) to be accounted for within the PRM

Deliverability

- Appendix Y of the CAISO tariff identifies an On-Peak and Off-Peak deliverability assessment
 - Since this proposal shifts from a Peak Load metric to a Peak, Net Peak, and energy need assessment, the deliverability of resources in all hours will become important
- It is possible to assess deliverability more granularly than just the peak as the CAISO has already shown
- The question then would appear to be what granularity is necessary to evaluate peak, net peak, and energy over all hours

Hybrid/Co-located Resources Can be Accounted for Consistent with Stand-Alone Resources

The proposal has battery storage as a method to move capacity from one time to another to serve energy needs

The portfolio is evaluated for its ability to serve load and if using a battery to meet capacity needs, is the remainder of the portfolio sufficient to charge the battery (including losses) to meet this need

The question around hybrid and co-located is whether the restriction to charge from the host renewable differentiates this accounting

Since the storage of a hybrid/co-located can discharge at any time (including while the renewable is generating), it is not clear that the same counting methodology will not work for hybrid

- SCE and CalCCA are open to further discussion if a deficiency can be identified

Variability is a Combination of PRM and RA Forecasting Methodology Considered Comprehensively

With an increase in use limited resources and resources whose production is dependent on fuel supplies, the ability to evaluate uncertainty and the impacts of diversity of resources in the ability to provide reliable operation is crucial

Historically, the PRM has been implemented to address:

- Ancillary Services (known)
- Forced Outages (variable)
- Load Forecast Error (variable)

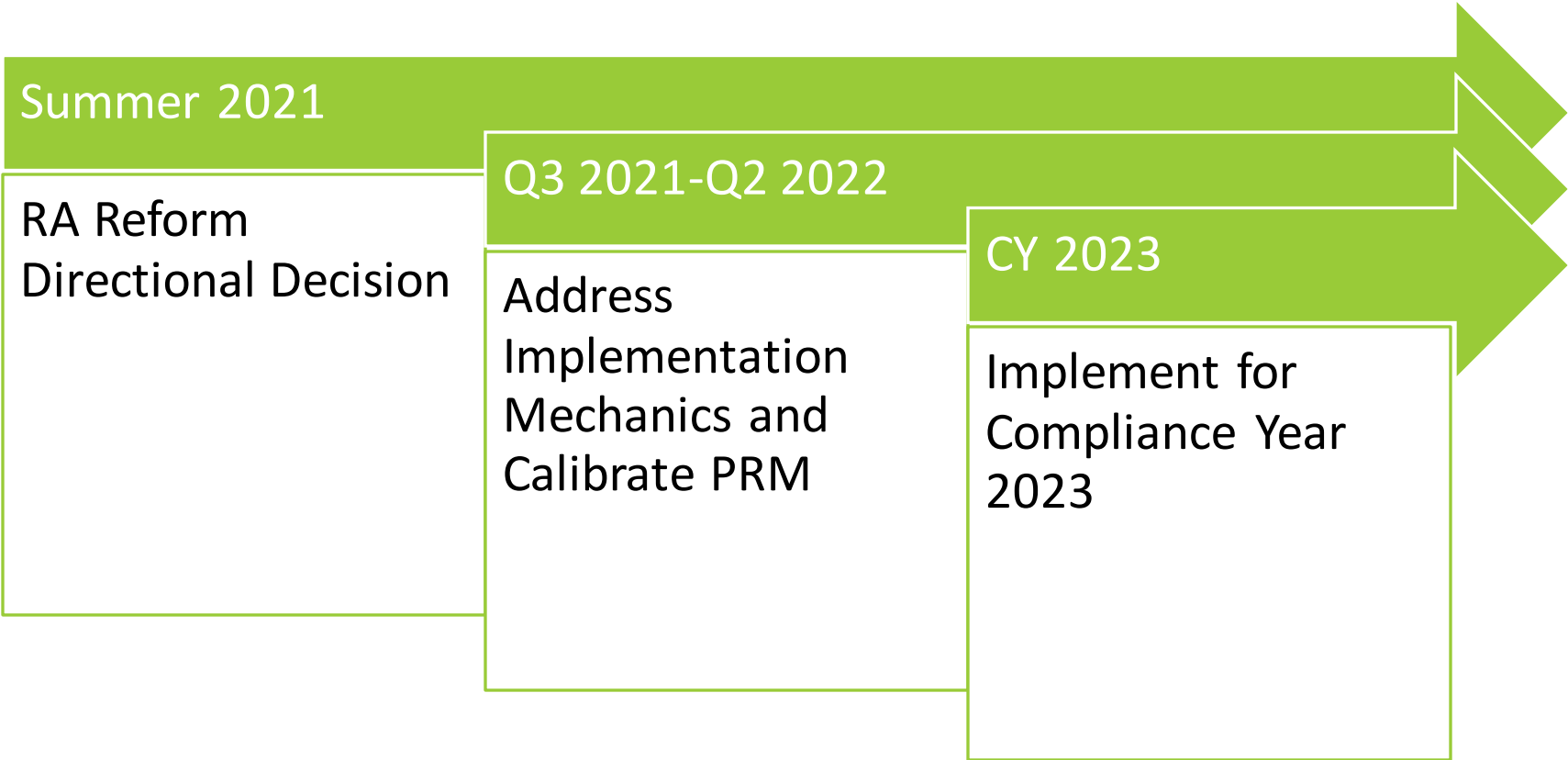
Under the SCE-CalCCA proposal, there is an additional variability of the renewable generation forecast (which exists today and will be addressed under this proposal explicitly) to calculate net load

Opposing that is the use of a bottom-up non-coincident peak measure

In total, the proposal will require analysis to evaluate LOLE and to set a combination of methods to address uncertainty to arrive at the desired LOLE

Can the Proposal
Be Implemented
Timely with
Minimal Market
Disruption?

Implementation Steps and Timeline



Implementation Steps and Timeline

Q3 2021-Q2 2022



Address Implementation Mechanics and Calibrate PRM

Finalize Policy Design Elements (CPUC Proceeding):

- The NQE Product – Counting, Assignment, Product Trading
- NQE Must Offer Obligation Considerations
- LSE-Specific Hourly Load Forecasting
- Wind and Solar Netting, Deliverability
- Hybrid / Co-Located Resource Counting
- Calibration – Diversity Benefits, Uncertainty, Planning

Agency Process Changes and Implementation Activities (CEC, CPUC, CAISO):

- LSE-specific load forecasting (CEC)
- Resource-Specific NQC / NQE Assignment (CPUC / CAISO)

Implementation in Compliance Year 2023 is aggressive but potentially feasible.

Outcome is Dependent on Contracting Parties

Ease of implementation is likely dependent of two factors:

- Existing Contract Terms
 - Will the inclusion of an energy measure create contractual disputes?
- Product Trade-ability
 - Will the market quickly and efficiently become capable of transacting an additional RA product

Does the
Proposal Provide
Wholesale
Energy Price
Mitigation?

Energy Market Hedging/Price Mitigation Could Be Bolted on to SCE-CalCCA Proposal

Three distinct proposals have been submitted with the intent of mitigating system market power exercise by RA resources:

- RA Resource Bid Cap of \$300 or Default Energy Bid (Energy Division)
- RA Resource Quasi-Tolling Contracting Requirement (PG&E)
- Multi-year forward full energy hedging requirement (Energy Division / Dr. Frank Wolak)

While the SCE-CalCCA proposal does not modify existing RA resource bidding obligations, it is compatible with refinements to the existing must-offer obligation requirement if deemed necessary for a competitive wholesale market:

- Any system market power mitigation requirement should consider the role of different bidding strategies in “sorting” use-limited resources to ensure they are not used prematurely
- Bidding requirements should be applied on a going-forward basis only to avoid disrupting existing contracts

Wrap Up

Until 4:30 p.m.