

[10:18 AM] David (Guest)

Can you post that

[10:18 AM] Karazuba, Amy

Will you please send out the updated slide deck? Thank you

[10:19 AM] Sue Mara (Guest)

Please send the presentation out.

[10:22 AM] Nuo Tang

Same request as Carrie, would be good to show if there's a pattern of selection based on the 2 Slice vs 24 Slice framework

[10:25 AM] Marie Fontenot (Guest)

where are the slides posted?

[10:26 AM] Wan, Lisa

all slides have been or will be posted on the CPUC website

[10:26 AM] Wan, Lisa

here is the link: [Resource Adequacy History \(ca.gov\)](#)

[10:29 AM] Julia Prochnik (Guest)

Should we resend the survey after the two workshops this week?

[10:32 AM] Nuo Tang

Agree with Peter's request, just remove the company info

like 2

[10:32 AM] Gregg Morris (Guest)

Please resend the link for the survey.

[10:33 AM] Sue Mara (Guest)

The postings on the CPUC RA web site are not uploaded very quickly. I would appreciate having the slides sent to the e-mail list.

[10:34 AM] David (Guest)

Agree with Sue's comment - it would be great to get them ahead of Friday (like may be tonight?).

[11:05 AM] Carrie Bentley

To facilitators: SCE started I think about 5 minutes late, happy to let them go 5 minutes into my time if needed, as I've had the opportunity to present my framework twice now and not much has changed.

like 1

[11:22 AM] Scott Murtishaw

Re the showings, this sounds like a lot of data for the CPUC to review every month. If an LSE has adequate resources for September, what is the added value of requiring it to show adequate resources for August?

[11:22 AM] Scott Murtishaw

Assuming the SL

[11:23 AM] Scott Murtishaw

Sorry, assuming the LSE is required to have those resources under contract for both August and September.

[11:29 AM] Carrie Bentley

Where is the capacity column coming from? Is that the max across hours? Or from a particular hour?

[11:29 AM] Svoboda, Alva (Merchant)

It seems that the SCE approach might cause difficulties for out-of-area contracts (they would almost have to be residual to the internal portfolio optimization)

[11:38 AM] Nuo Tang

negative NQC may be appropriate as a check to ensure that charging energy isn't all bunched up in 1 Slice and the battery can't physically charge above its own limits

like 1

[11:43 AM] Gregory Klatt

Test

like 1

[11:43 AM] David (Guest)

chat not muted if you see this

[11:43 AM] Scott Murtishaw

I see it.

[11:43 AM] Wan, Lisa

test

like 1

[11:44 AM] Lambert, Christian

Q from Cal Advocates: just to confirm, is SCE proposing that an LSE that purchases a pro rata share of a supplier's total hourly capacity must then show the same proportion (rather than the same megawatts) across all other slices? Example: an LSE that needs 10MW in HE16 choose to contract with a generator for those 10MW. But say the generator has a total HE16 NQC of 40MW. Is the LSE obligated to show 25% of this capacity in all other hours, regardless of the MW level, or does the LSE have flexibility to contract for and to show 10MW of this generator's capacity across all hours?

[11:44 AM] Doug Karpa (Peninsula Clean Energy)) (Guest)

It's a microsoft teams issue that it will sometimes turn off chat and you have to restart

[11:44 AM] Doug Karpa (Peninsula Clean Energy)) (Guest)

I think

[11:47 AM] Lambert, Christian

Another Cal Advocates Q: SCE's summary slide presumes that choosing 24 hourly slices does not necessarily constrain the choice of resource counting methodology. Does SCE have a sense of how an "hourly ELCC" methodology would be implemented? Is it technically feasible? If not, should RA reform confront the tradeoffs associated with exceedance vs hourly ELCC vs other in conjunction with the slice structure (i.e., now), rather than bump to further workshopping where we might risk finding out that hourly ELCC might not be viable.

[11:49 AM] Scott Murtishaw

Lambert, Christian My understanding is that 24-hour framework necessitates exceedance or a similar methodology that produces a diurnal gen profile.

[11:49 AM] Brian Theaker

Scott, I don't know why you could not hear me. I am using my phone for audio, and my phone was not on mute and the Teams microphone was not muted.

In any case, my questions for SCE were:

1. As I recall, SCE was NOT proposing to change the four-hour duration requirement to be able to provide RA capacity. Is that still the case?
2. Do I understand SCE to allow a battery to count based on its energy duration (i.e., a 60 MWH battery with a 15 MW inverter could count for at most 15 MW but also could be shaped to count for 10 MW for six hours)?

[11:50 AM] Lambert, Christian

Scott Murtishaw I had the same understanding - wondering now if SCE has other thoughts, given the inclusion of "hourly ELCC" in their slides

[11:50 AM] Brent Buffington

Lambert, Christian Another Cal Advocates Q: SCE's summary slide presumes that choosing 24 hourly slices does not necessarily constrain the choice of resource counting methodology. Does SCE have a sense of how an "hourly ELCC" methodology would be implemented? Is it technically feasible? If not, should RA reform co... Hourly effective load carrying capacity (how much load can be served by a resource in that hour) would be some exceedance. Can be based on historical capacity contribution.

[11:51 AM] Lambert, Christian

Thanks!

like 1

[11:51 AM] Scott Murtishaw

My question for solar and wind is how to capture synergistic/antagonistic interactive effects that ELCC can reveal when using exceedance.

[11:52 AM] Brent Buffington

Lambert, Christian Q from Cal Advocates: just to confirm, is SCE proposing that an LSE that purchases a pro rata share of a supplier's total hourly capacity must then show the same proportion (rather than the same megawatts) across all other slices? Example: an LSE that needs 10MW in HE16 choose to contract with a g... We're proposing contracts be in MW.

[11:53 AM] Brent Buffington

Brian Theaker Scott, I don't know why you could not hear me. I am using my phone for audio, and my phone was not on mute and the Teams microphone was not muted. In any case, my questions for SCE were: 1. As I recall, SCE was NOT proposing to change the four-hour duration requirement to be able to provide RA c... SCE is still proposing any resource have the capability to produce for 4 hours to count as RA

[11:54 AM] Brent Buffington

Brian Theaker Scott, I don't know why you could not hear me. I am using my phone for audio, and my phone was not on mute and the Teams microphone was not muted. In any case, my questions for SCE were: 1. As I recall, SCE was NOT proposing to change the four-hour duration requirement to be able to provide RA c... 2. Yes, a resource would just need to be shown within capabilities

[11:55 AM] Lambert, Christian

We're proposing contracts be in MW.

So then, a contract for 10MW across all hours that the generator operates (regardless of the generator's NQC in any given hour) would be exempted from the generation profile in the CPUC showing template?

[11:56 AM] Nuo Tang

Has the CAISO considered whether it would be able to publish the use-limitation information suggested by SCE?

[11:57 AM] Scott Murtishaw

Lambert, Christian I think all LSE procuring from a given variable resource would get a proportional share of its generation shape.

like 2

[11:57 AM] Brent Buffington

Nuo TangHas the CAISO considered whether it would be able to publish the use-limitation information suggested by SCE?Nou, we're suggesting the resource owner provide info to CPUC to be able to count as RA

[11:57 AM] Brent Buffington

Sorry, Nuo

[11:59 AM] Brent Buffington

Lambert, ChristianSo then, a contract for 10MW across all hours that the generator operates (regardless of the generator's NQC in any given hour) would be exempted from the generation profile in the CPUC showing template?For a flat resource, yes, 10 MW would count in all hours. For a 10 MW wind resource, it'd have a corresponding shape but the contract would be a single MW amount.

like 1

[12:03 PM] Sergio Dueñas

Can you explain what you mean by "deliverable nameplate" in slide 10? It is unclear if it is related to deliverability or availability.

[12:03 PM] Brent Buffington

From the decision, emphasis mine: Principle 2 is the concept that any RA framework must balance the need for hourly energy sufficiency to ensure reliable operations with advancing California's clean energy, greenhouse gas emission reduction, and air pollution reduction goals. As California advances its clean energy goals through the directives mandated by Senate Bill (SB) 100 and SB 350, we recognize that the current RA MCC bucket construct, which aims to limit overreliance on use-limited resources, does not account for energy storage charging needs and is non-binding on LSEs. With the growing penetration of renewable resources, the Commission seeks a framework that can better manage reliance on use-limited resources to meet reliability needs.

like 2

[12:04 PM] Nick Pappas

Hi Carrie, regarding MCC buckets and leaning - as mentioned at the previous workshop, I will defer to Energy Division regarding their perspective on the need for the new framework to address leaning between LSEs. We are operating under the assumption that addressing leaning (which exists in the current framework via MCC) is a starting point for any new framework based on longstanding CPUC implementation of MCC (plus statutory reqs), not the specific directional decision.

[12:05 PM] Doug Karpa (Peninsula Clean Energy)) (Guest)

This proposal has a massive reliance on ELCC accurately measuring contributions of different resources, but the CEC has actually (accidnetally) pretty convincingly shown that isnt true.

like 1

[12:05 PM] Doug Karpa (Peninsula Clean Energy)) (Guest)

Also, it's hard to see how it guarantees energy sufficiency in all hours.

[12:06 PM] Sergio Dueñas

It is quite unclear how we could get ELCCs (Incremental or average) to work with resources that can be flexibly shown as storage. WOULD we do ELCC studies for all durations and efficiencies?

like 1

[12:35 PM] Ric O'Connell (GridLab) (Guest)

Sergio: Yes, you would need to do ELCC studies for all durations. And for hybrids you would need to calculate ELCC for all configurations - e.g. 150 MW solar/100 MW battery/500 MWh/100 MW interconnection.

like 1

[12:35 PM] Nuo Tang

didn't the IRP already do this?

[12:36 PM] Nick Pappas

Ric O'Connell (GridLab) (Guest)Sergio: Yes, you would need to do ELCC studies for all durations. And for hybrids you would need to calculate ELCC for all configurations - e.g. 150 MW solar/100 MW battery/500 MWh/100 MW interconnection. Multiply this by the number of regions / technology configurations you may wish to differentiate, e.g. northern wind vs southern wind vs offshore, tracking vs non-tracking solar, etc. That's a lot of ELCC model runs!

[12:36 PM] Ric O'Connell (GridLab) (Guest)

GE did ELCC studies for 4-hour batteries in NYISO that came up with very different values than Astrape's calculation...so ELCC is very sensitive to assumptions about load shape, other resources in the portfolio, etc.

[12:37 PM] Wan, Lisa

Reminder: these workshops are recorded

[12:38 PM] Nuo Tang

Nick PappasMultiply this by the number of regions / technology configurations you may wish to differentiate, e.g. northern wind vs southern wind vs offshore, tracking vs non-tracking solar, etc. That's a lot of ELCC model runs!! don't think there's a lack of computing power

[12:38 PM] Scott Murtishaw

Ric O'Connell (GridLab) (Guest)Wouldn't you expect storage to have different ELCC in NY given a different portfolio and load shape?



[12:41 PM] Scott Murtishaw

For folks trying to better understand use of ELCC in a high renewable paradigm, I recommend E3's August 2020 paper "Capacity and Reliability Planning in the Era of Decarbonization."

[12:42 PM] Ric O'Connell (GridLab) (Guest)

To be clear, in my NYISO example, both Astrape and GE were studying NY's system - I wasn't comparing Astrape's ELCC for storage in CA with GE's ELCC in NY. It's ELCC of storage in NYISO - just two different consultants making different assumptions in their calculation.

[12:43 PM] Scott Murtishaw

Got it.

[12:45 PM] Ric O'Connell (GridLab) (Guest)

+1 on Scott's suggestion for E3's paper. It is excellent and clear.

[12:51 PM] Jeff Nelson

Brian TheakerScott, I don't know why you could not hear me. I am using my phone for audio, and my phone was not on mute and the Teams microphone was not muted. In any case, my questions for SCE were: 1. As I recall, SCE was NOT proposing to change the four-hour duration requirement to be able to provide RA c...Per 2: Yes, you could shape/show that battery for 6 hours. You just have to stay within the 15MW max and the 60MWh limit (assuming a single cycle)

[12:52 PM] Jeff Nelson

Carrie BentleyTo facilitators: SCE started I think about 5 minutes late, happy to let them go 5 minutes into my time if needed, as I've had the opportunity to present my framework twice now and not much has changed.Thank you Carrie for the extra time. Thanks.

[12:59 PM] Brent Buffington

Carrie BentleyWhere is the capacity column coming from? Is that the max across hours? Or from a particular hour?Initially, I think the single "MW" will be peak deliverable MW to match with CAISO's process. Hourly profiles will be relative to that number.

like 1

[1:04 PM] Ed Smeloff (Guest)

It is important to enable hybrid resources that are operated as a single resources in the wholesale market to be recognized these as flexible resources that can be shaped to LSE's RA requirements.

[1:10 PM] Carrie Bentley

Sorry too all who asked me chat questions - I just back now and didn't see the chat questions while I was speaking. I will be happy to answer/address during Q and A portion of call.

[1:14 PM] Andrew Cole

How would DR get allocated to the MCC bucket? Would it be similar to the current system where IOU DR gets allocated before third party DR?

[1:16 PM] Ed Smeloff (Guest)

Hybrids also lessen the need for unbundling.

like 2

[1:16 PM] Julia Prochnik (Guest)

Long duration energy storage also lessens the need for unbundling- good point Ed.

like 1

[1:17 PM] Scott Murtishaw

Any storage reduces the need for unbundling, right?

[1:17 PM] Scott Murtishaw

Any storage reduces the need for unbundling, right?

[1:18 PM] Nick Pappas

Agreed - counting storage efficiently across hours really reduces the likelihood of the "one or two bad hours" example IMO

[1:21 PM] Ed Smeloff (Guest)

Once a template has been established and used for a single month, how challenging is it to do the showing for subsequent months?

like 1

[1:23 PM] Ed Smeloff (Guest)

For flexible resources like storage and hybrids the showing could be different because the load shape is different.

[1:30 PM] Ric O'Connell (GridLab) (Guest)

Scott - on your question about ELCC and portfolio effects, note that ELCC doesn't allocate portfolio effects among resources. You have to make a choice - e.g. E3's delta method.

like 1

[1:31 PM] Brent Buffington

I'll also add the 24 slice framework allows LSE's to directly utilize those resource portfolio effects to optimally meet their RA requirements

like 1

[1:33 PM] Ed Smeloff (Guest)

Getting rid of the MMC buckets and flexibility capacity with remove layers of complexity and reduce costs.

[1:34 PM] Carrie Bentley

Gridwell's proposal is for ELCCs to include the resource diversity benefit. I don't know of any way to retain the resource diversity benefit without first calculating it, but am very open to suggestions.

[1:35 PM] Brent Buffington

Carrie BentleyGridwell's proposal is for ELCCs to include the resource diversity benefit. I don't know of any way to retain the resource diversity benefit without first calculating it, but am very open to suggestions. Carrie, the big issue with "single monthly" ELCC is it doesn't tell us anything about the resource's reliability contribution in any single slice

[1:35 PM] Carrie Bentley

Large LSEs will be able to take advantage of portfolio effects as Brent suggests. The 73 LSEs with less than 1000 MW of peak load will have a much harder time.

like 1

[1:37 PM] Lambert, Christian

I'll also add the 24 slice framework allows LSE's to directly utilize those resource portfolio effects to optimally meet their RA requirements

How will LSEs optimize if the resource counting conventions are not explicit as to the method for measuring and allocating portfolio benefits to resources? Even if LSEs make their own judgment calls about diversity benefits, ratepayers could still face higher costs from overprocurement if the Lack of allocation of diversity benefits in the resource counting convention leads to a portfolio with an LOLE below 0.1

like 2

[1:37 PM] Carrie Bentley

The biggest issue with exceedance is that planning based on averages leads to a significantly higher PRM to get to a 1 in 10 LOLE. ELCC, Exceedance, there is no perfect methodology. But we know exceedance overvalues solar. I think Tom (SEIAs) proposal is the only viable one for 24 slice proposal.

[1:37 PM] Chris Devon

Brent - if you use exceedance for each hour you are not capturing the diversity of the entire fleet of resources that an ELCC approach captures. it is actually not societally optimal to have each LSE making its own diversity benefit applicable to its own portfolio, as compared to the system /fleet ELCC diversity benefits can be used to reduce the requirements or give more credit to resource classes on a system wide basis.

like 1

[1:37 PM] Nuo Tang

Is SCE's proposal on gross Load the same as PG&E? is it the max hourly requirement or the CEC's worst day 1-in-2 requirement?

[1:39 PM] Brent Buffington

Carrie Bentley The biggest issue with exceedance is that planning based on averages leads to a significantly higher PRM to get to a 1 in 10 LOLE. ELCC, Exceedance, there is no perfect methodology. But we know exceedance overvalues solar. I think Tom (SEIAs) proposal is the only viable one for 24 slice proposal. I think you're mistaken about the proposal. The old "single monthly" exceedance did not work because it tried to represent the entire resource contribution across the month. Going hourly solves this problem. Also, exceedance is not average.

[1:40 PM] Brent Buffington

Nuo Tang Is SCE's proposal on gross Load the same as PG&E? is it the max hourly requirement or the CEC's worst day 1-in-2 requirement? Nuo, SCE's proposal is gross load. Up to CEC to define worst day

[1:41 PM] Brent Buffington

Chris Devon Brent - if you use exceedance for each hour you are not capturing the diversity of the entire fleet of resources that an ELCC approach captures. it is actually not societally optimal to have each LSE making its own diversity benefit applicable to its own portfolio, as compared to the system /fleet...Chris, you get the diversity benefits at showing rather than in modeling assumptions.

[1:42 PM] Matthew Barmack

When and how was this deck circulated?

[1:42 PM] Nuo Tang

So this isn't a proposal?

[1:46 PM] Carrie Bentley

Brent Buffington I think you're mistaken about the proposal. The old "single monthly" exceedance did not work because it tried to represent the entire resource contribution across the month. Going hourly solves this problem. Also, exceedance is not average. I understand it's hourly. It will still over-count solar in each hour a portion of the time depending on the exceedance used (50%, 75%) by definition. PG&E

[1:47 PM] Carrie Bentley

(per \*PG&E data)

[1:48 PM] Brent Buffington

Lambert, ChristianHow will LSEs optimize if the resource counting conventions are not explicit as to the method for measuring and allocating portfolio benefits to resources? Even if LSEs make their own judgment calls about diversity benefits, ratepayers could still face higher costs from overprocurement if the Lac...The hourly counting in 24 slice proposal allows resources to count for their expected capacity contribution in each hour. The hourly diversity benefits (different shapes/characteristics) can be used by LSE's to optimize RA procurement

[1:50 PM] Brent Buffington

Carrie BentleyI understand it's hourly. It will still over-count solar in each hour a portion of the time depending on the exceedance used (50%, 75%) by definition. PG&ENo way to get 100% certainty without going to 99.9% exceedance. No matter which framework is used there will be some uncertainty that will need to be incorporated in PRM

[1:55 PM] Brent Buffington

Carrie Bentley at least in 24 slices that uncertainty is explicit

[2:06 PM] Doug Karpa (Peninsula Clean Energy)) (Guest)

I also think that diversity benefit is defined only with respect to ELCC based systems. in a 24 slice system, we expressly track discharge in each hour, which explicitly captures how resources interact, for example, in storage discharge in light of what wind or solar are doing.

[2:06 PM] Ed Smeloff (Guest)

Wouldn't the question of over or under procurement only be determined after the LOLE study?

like 1

[2:07 PM] Sergio Dueñas

agreed Jeff, RA cannot continue to ignore the reality of an evolving mix by basing reqs on single point estimates

like 2

[2:08 PM] Nuo Tang

Ed Smeloff (Guest)Wouldn't the question of over or under procurement only be determined after the LOLE study?Parties seem to back 1 proposal vs another based on the statement of overprocurement

[2:08 PM] Ed Smeloff (Guest)

If we see over procurement by aggregating LSEs' portfolios wouldn't we lower the PRM.

[2:12 PM] Ed Smeloff (Guest)

Isn't Carrie's hypothetical somewhat of a straw man? For CCAs is this likely to happen that one CCA would procure all solar and another all wind?

[2:13 PM] Jeff Nelson

Ed Smeloff (Guest)Isn't Carrie's hypothetical somewhat of a straw man? For CCAs is this likely to happen that one CCA would procure all solar and another all wind?Subject to check - yes the PRM will take into account the diversity benefits of the portfolio (system-wide) mix.

[2:14 PM] Nuo Tang

the PRM for all 3 proposals could be significantly different

[2:15 PM] Ed Smeloff (Guest)

How much over procurement would come from very small LSEs?

[2:15 PM] Lambert, Christian

If we see over procurement by aggregating LSEs' portfolios wouldn't we lower the PRM.

System/PRM adjustments will tilt benefits away from the specific resources/resource types causing the benefits, and therefore the specific LSE counterparties of the benefit-causing resources

like 1

[2:19 PM] Nick Pappas

I need to step away for a moment, Sergio Dueñas please go ahead if you hit me in the queue.

like 1

[2:21 PM] Ed Smeloff (Guest)

How is 4 hour storage degraded if it can be shown in different ways rather than 4 continuous hours?

[2:23 PM] Doug Karpa (Peninsula Clean Energy)) (Guest)

good point about averaging v incremental. Thanks

like 1

[2:23 PM] Ric O'Connell (GridLab) (Guest)

ELCC is complicated!

like 1

[2:24 PM] Ed Smeloff (Guest)

Vintaging ELCC would be a headache. Would we vintage by month the resource comes on line?

[2:25 PM] Sergio Dueñas

even yearly vintaging could be complex with the amount of storage expected to come online...

[2:25 PM] Scott Murtishaw

Ed Smeloff (Guest)Vintaging ELCC would be a headache. Would we vintage by month the resource comes on line?Maybe annual or biennial.

[2:26 PM] Nuo Tang

IRP has a table for incremental ELCCs for the next 6 to 10GW(?)

[2:26 PM] Sergio Dueñas

Yes, and their analysis is supremely deficient

[2:26 PM] Scott Murtishaw



At any rate, ELCC issues are moot if you don't use ELCC. 4-hour storage will become less valuable to all LSEs as they saturate their peaks with it.

[2:28 PM] Julia Prochnik (Guest)

there is a lot of great questions and discussion points here- can we save the chat? esp as prep for Friday too...

[2:28 PM] Ric O'Connell (GridLab) (Guest)

But as we procure more solar to go along with that storage we make the peak "more peaky" and keep the value of storage

[2:29 PM] Wan, Lisa

Julia Prochnik (Guest)there is a lot of great questions and discussion points here- can we save the chat? esp as prep for Friday too...chats are saved and also posted to the CPUC's website.

[2:29 PM] Julia Prochnik (Guest)

Thanks Lisa!

[2:33 PM] Ed Smeloff (Guest)

Under the two slice proposal would each LSE have to show how their resource portfolio contributes to the peak and net peak system load?

[2:33 PM] Sergio Dueñas

Great point, Brent. Specially since the Decision explicitly mentions "hourly energy sufficiency".

like 1

[2:34 PM] Nuo Tang

under the 2 slice proposal, all resources meet the peak load and all non-solar resources meet the net peak load

[2:36 PM] Doug Karpa (Peninsula Clean Energy)) (Guest)

The real question is whether we can construct a portfolio that meets the requirements but fails to meet load in each hour

[2:36 PM] Sergio Dueñas

Carrie, I would argue that your proposal may "take the two points when you are most likely to experience LOLP today" The hours with substantial LOLP are mix-dependent, that will change as we move away from fossil generation. Does not seem durable.

like 1

[2:37 PM] Carrie Bentley

Happy to talk with you more about this Sergio.

[2:37 PM] Carrie Bentley

Let's set up a call

[2:37 PM] Sergio Dueñas

Gladly

[2:38 PM] Matthew Barmack

Right but ELCC adjusts dynamically to reflect resource performance in periods of LOL risk whenever they happen to occur.

like 1

[2:38 PM] Matthew Barmack

Right but ELCC adjusts dynamically to reflect resource performance in periods of LOL risk whenever they happen to occur.

like 1

[2:38 PM] Nuo Tang

and PRM will need to update as well to ensure 0.1 LOLE

[2:39 PM] Nuo Tang

Gridwell's 2 Slice proposal incorporates both dynamic changes and can be durable