

**Q & A Session for TPP Webinar- Busbar Mapping Results for the Proposed 2025-2026  
TPP portfolios: 9 AM – Noon on 11/05/2024**

**Answers made post-workshop are found in green.**

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QUESTION: Are there any changes anticipated in the interface between IRP and TPP in response to FERC Order 1920? Specifically, do Order 1920's requirements for a 20-year plan and scenario planning change the scope of what the CPUC plans on sending to CAISO to indicate state policy goals?

Ryan Tracey (rtracey@sonomacleanpower.org) – 9:18 AM

RESPONSE: Yes, likely some changes to address in due course (after the transmittal of portfolios for the 25-26 TPP)

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QUESTION: What does it mean for biomass additions to be negative? Are you projecting a shrinking of biomass capacity?

Gregg Morris (gmorris@emf.net) – 9:19 AM

RESPONSE: So the portfolios have a small increase in biomass in the past few portfolios 100-200. It's the natural gas resources that are negative in some of the portfolios. In those cases a certain amount of MW of natural gas is not retained/retired.

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QUESTION: Can you provide more detail on the generic transmission upgrades for resources that are beyond the new substation voltage constraints? Is that upgrade available for all resources at a set hurdle cost? Are different resources able to share that cost? How often does the model need to use those generic upgrades?

Ryan Tracey (rtracey@sonomacleanpower.org) – 9:30 AM

RESPONSE: Generic transmission upgrades provide RESOLVE with options to select additional resources at an otherwise desirable location, that is overly constrained by CAISO transmission constraints and/or interconnection limits. Each candidate resource region is allotted 5 GW of incremental transmission capability at an upgrade cost informed by the cost of a new high-voltage transmission. The cost in \$/kW is based on the HSN deliverability factor of the resource. These upgrades are not selected in the 25-26 TPP.

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QUESTION: The 2024 NREL ATB included significant cost increases for pumped storage. Approximately 29% similar to geothermal changes. Can you talk about when that update will be made to the CPUC's I&A?

Tyson Siegele ([tyson@cleanstrat.com](mailto:tyson@cleanstrat.com)) – 9:31 AM

RESPONSE: We will be updating all resource costs to the 2024 NREL ATB in our next I&A update. IRP Staff will issue a draft I&A in Q1-2025, hold a workshop and take stakeholder comments, and then issue the final I&A from there.

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QUESTION: Regarding the new \_IX constraints, later in the slide deck (slide 46) you all discuss substation level interconnection criteria. Can you please explain the relationship between the RESOLVE's application of the IX constraints and this interconnection level criteria mapping application? Similarly, did the staff review the outcome of the IX constraints in the mapping process to check reasonableness? Can you offer any findings if so?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) – 9:31 AM

RESPONSE: So they are correlated, the best alignment levels correspond to values at or lower than those limits in RESOLVE. We flag but still map to higher amounts with the goal of having further discussion and getting further info from CAISO and PTOs about actual interconnection conditions at those subs. This cycle is the first time we're doing both items this robustly so are definitely focused on analysis the veracity of such assumptions through the rest of the review/mapping effort. Additionally, more long term we are hoping to better refine the assumptions in RESOLVE for the next I&A and future cycles. With these mapping results being a key source of guidance.

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QUESTION: If LSEs didn't have 4 hour batteries in their plans, would RESOLVE choose more or less 8 hour batteries?

Soumya Sastry ([svs6@pge.com](mailto:svs6@pge.com)) – 9:37 AM

RESPONSE: The proposed sensitivity portfolio and the 2023 PSP modeling least cost (no LSE plans) sensitivities reveal some information on this. In both those we do see RESOLVE selecting less 4-hr and more 8-hr storage.

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QUESTION: Jared, following up on your \_IX answer,...It is the case then that the \_IX constraints will be in scope for the upcoming I&A work?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) – 9:41 AM

RESPONSE: Yes, this, along with general transmission updates with the new White Paper and other information will be done under the upcoming I&A.

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QUESTION: are there details on the transmission constraints difference in any of the documentation?

Soumya Sastry ([svs6@pge.com](mailto:svs6@pge.com)) – 9:41 AM

RESPONSE: What details are you referring to specifically (e.g. what upgrades get triggered in RESOLVE, the constraint difference between the 2023 White Paper used in RESOLVE vs the updated 2025 White Paper)?

REPLY: I meant the constraint difference between 2023 and 2025 by constraint, but a pointer for where to go on upgrades triggered in RESOLVE would also be great!

Soumya Sastry ([svs6@pge.com](mailto:svs6@pge.com)) - 11:01 AM

POST-WORKSHOP RESPONSE: So the RESOLVE results viewer with the RESOLVE package does have transmission constraint utilization and selected transmission upgrade utilization on its “Transmission” tab. The upgrades triggered by RESOLVE can be reviewed in the results viewer for the 25-26 TPP, available on the CPUC website:  
<https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2024-26-irp-cycle-events-and-materials/assumptions-for-the-2025-2026-tpp>

I will note that approved upgrades identified at the time (so before the 23-24 TPP and based on the 2023 White Paper) are still shown but have an assumed zero cost. This is to limit RESOLVE from utilizing the upgrade until its estimated COD.

We don’t have a direct comparison between constraints and how they changed. There were multiple variables that got updated (e.g. online date baseline, approved, new studies) so while most of the constraints are the same we do have some new ones and don’t have some old ones. One could look at the tables released as appendices for both the 2023 and 2024 White Papers. Also the tab ‘TxCapabilityEstimates\_2024’ in the mapping dashboard

has those constraints and you could compare that to the same tab 'TxCapabilityEstimates\_2023' from the 24-25 TPP mapping dashboard.

For a comparison between the 2023 and 2024 CAISO White Papers, these can be downloaded and compared directly:

2023: <https://www.caiso.com/documents/transmission-capability-estimates-for-use-in-the-cpucs-integrated-resource-planning-process.xlsx>

2024: <https://www.caiso.com/documents/attachment-a-transmission-capability-estimates-for-use-in-the-cpuc-irp-process-v2024.xlsx>

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QUESTION: Sarah G., I believe you said that costs in the CPUC I&A will be updated to the 2024 NREL ATB costs. Does that include updating the lithium-ion battery costs in the CPUC I&A will be updated to match the 2024 NREL ATB lithium-ion battery costs?

Tyson Siegele ([tyson@cleanstrat.com](mailto:tyson@cleanstrat.com)) – 9:41 AM

RESPONSE: Tyson: I'll let Sarah answer in more depth, but just noting that some of what she just covered re: upcoming I&A refinements is scoped for a future discussion, and not this one. Do you have a question re: which inputs & assumptions are used for the 25-26 TPP portfolios? If not, and your questions are re: what future I&A changes we may propose, it'd be better to address those questions when we come back to stakeholders with new I&A information early next year.

POST-WORKSHOP RESPONSE: I would echo what Nathan said. We will workshop all inputs and assumptions for the filing requirements modeling, including resource costs, in early 2025. We will be taking stakeholder input at that juncture.

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QUESTION: Why wouldn't the 7.6 GW of ordered OSW be part of the base case? Why still model just 4.6 GW like in the previous years?

Mohamed El Chehaly Equinor ([melc@equinor.com](mailto:melc@equinor.com)) – 9:45 AM

RESPONSE: Mohammed: This may come down to the specifics of what "ordered" means. The relevant IRP decision (D.24-08-064) made a need determination for those resources to be solicited for by a central procurement entity. A decision on what of that 7.6 GW to

actually purchase on behalf of CPUC-jurisdictional ratepayers would happen later on, after the CPE has solicited for those resources and submits relevant results back to the CPUC. "

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QUESTION: The 2023 ALJ Ruling on the 2024-2025 TPP portfolios indicates staff was in the process of developing "new local area modeling capabilities," specifically to aid in modeling the retirement and replacement of gas plants - were these capabilities used in the Busbar Mapping process at issue in this webinar?

Orran Balagopalan ([obalagopalan@smwlaw.com](mailto:obalagopalan@smwlaw.com)) – 9:50 AM

RESPONSE: Orran: I'd break this into two parts. The first part is whether the new modeling tools you referenced were used in developing the portfolios we're discussing today. The answer is no, but that we still hope to bring the new modeling tools in front of stakeholders soon so they can understand them. The second part is how things pertaining to improvements in busbar mapping, such as disadvantaged community geography, has evolved over time. Jared may be able to add a little more info on that.

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QUESTION: Are there results for how much MIC expansion is required at each import point to support the selected OOS resources?

Sara Maatta ([smaatta@peninsulacleanenergy.com](mailto:smaatta@peninsulacleanenergy.com)) – 9:59 AM

RESPONSE: The CAISO studies if there is any MIC expansion required to support the selected OOS resources; it is not a result of the RESOLVE analysis or the busbar mapping analysis.

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QUESTION: In mapping potential resource locations, do the database have the ownership of the candidate parcels? Does it identify parcels already owned by energy development companies? Does it consider how parcels might be aggregated for the purpose of building plants and transmission lines?

Richard McCann ([mccann@mcubed-econ.com](mailto:mccann@mcubed-econ.com)) – 10:03 AM

RESPONSE: We don't have that level of information at the parcel level.

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QUESTION: What infrastructure constraints considered for OOS resources beyond MIC expansion? As an example, for the 3.7 GW of solar mapped in Arizona, is the infrastructure in Arizona reviewed to understand if its feasible to deliver that amount of capacity to the CAISO intertie?

Ryan Tracey ([rtracey@sonomacleanpower.org](mailto:rtracey@sonomacleanpower.org)) – 10:06 AM

RESPONSE: For the out-of-state resources still within the CAISO system we do have the same level of detail for that as we do for instate resources. So, for the Western Arizona area where we map solar and the Southern Nevada area we have CAISO Tx constraint information that helps assess that. For other out-of-state out-of-CAISO resources we have two categories. Some like Wyoming wind/New Mexico wind we have new transmission line assumptions and cost associated with those. Other smaller resources like out-of-state geothermal we are working with CAISO staff to see what info/limitations we can assess.

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QUESTION: Re commercial interest and the TPD allocation – How much does this TPD allocation influence mapping? Given the CAISO's revised interconnection process, the TPD allocation will only be available where there is excess headroom. Would not using it as a mapping limit prevent let IRP & TPP test whether policy upgrades could result in more optimal planning assumptions?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) – 10:09 AM

RESPONSE: Ellen, this is one of many issues we need to consider going forward now that we have the interconnection reforms. With this current cycle we still have most of these TPD resources under the existing interconnection process so we have not changed, also noting that the reforms were being approved concurrently with this mapping effort.

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QUESTION: Re slide 50 about consistency with the prior TPP portfolio, did staff adjust this alignment test at all for the fact that this cycle's portfolios are larger generally (e.g., given adjusted load forecast)?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) – 10:15 AM

RESPONSE: We did not, however, qualitatively it does point to a more significant reason why resources are reduced.

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QUESTION: Does RESOLVE show increased transmission revenue requirements consistent with the increases that have occurred over the last two decades? Has the model been calibrated to be consistent with transmission RRQ as shown in the FERC Form 1 and the utilities' FERC transmission rate applications?

Richard McCann ([mccann@mcubed-econ.com](mailto:mccann@mcubed-econ.com)) – 10:17 AM

RESPONSE: RESOLVE uses transmission costs provided by CAISO as part of the TPP; the 25-26 TPP uses costs from the CAISO 2024 Transmission Deliverability Estimates whitepaper. To the extent those costs are consistent with FERC Form 1, then RESOLVE would reflect them.

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QUESTION: Does the high cropland layer factor in the latest hydrological projections for the various Groundwater Sustainability Areas?

Shannon Eddy ([shannon@largescalesolar.org](mailto:shannon@largescalesolar.org)) – 10:24 AM

RESPONSE: No. The high implication cropland areas are defined by the CEC Cropland Index Model created in 2023.

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QUESTION: Jared, you wrote "We did not, however, qualitatively it does point to a more significant reason why resources are reduced." Do you mean that if the portfolio in an area is not increasing this cycle that it warrants more scrutiny on your part? Please clarify if that is not what you meant.

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) – 10:28 AM

RESPONSE: So, if we had less solar mapped to an area in a scenario where the portfolio had less solar overall, that's unavoidable. Whereas in this situation with more solar, that does not have to occur. Thus when it does there needs to be explicit justification and other criteria that justify it (e.g. if we have need to map other more geographic restrictive resources to the area instead; commercial interest has declined with projects withdrawing, the new white paper updates show less transmission availability) the alignment flags being consistent still show what buses we need to assess that for still, so altering them isn't necessarily going to improve the mapping.

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QUESTION: Does the CEC have an estimate of how many MWs could be built in the "low implication" land areas?

Hillary Hebert ([hillary@hnhenergy.com](mailto:hillary@hnhenergy.com)) - 10:31 AM

RESPONSE: We use the capacity density value of 10 acres/MW and 40 acres/MW for solar and wind, respectively, to estimate the amount of area that would be required to produce a certain amount of MW.

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QUESTION: You show "Low Implication Land" in designated Mojave Desert tortoise critical habitat, which is concerning based on my understanding of your process. Is it possible for "Low Implication Land" to occur in designated critical habitats for threatened and endangered species?

Kerry Holcomb ([Kerry\\_holcomb@fws.gov](mailto:Kerry_holcomb@fws.gov)) - 10:38 AM

RESPONSE: For lower implication area defined by the Core land use screen, no, the lower implication area would not include USFWS critical habitat areas for threatened and endangered species because those areas are used as an exclusion for the Core Screen. The lower implication area of each of the individual environmental and conservation factors could include some critical habitat areas.

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QUESTION: Could you remind me: in IRP, is there any consideration of the land use implications/siting difficulty of specific transmission upgrades? Are such considerations reflected in the cost estimates provided by CAISO to the CPUC?

Matt Barmack ([barmackm@calpine.com](mailto:barmackm@calpine.com)) - 10:36 AM

RESPONSE: We don't conduct any analysis on potential routes of the identified transmission upgrades, that would be several orders of increased complexity and uncertainty than we currently implement. As I understand the White Paper upgrades include some difficulty assumptions but are relatively coarse and high-level relying on assumption of terrain difficulty shown in the CAISO's per unit cost guides for each PTO.

POST-WORKSHOP RESPONSE: The CAISO used best available cost estimates from previous generation interconnection cluster studies and TPP studies in most cases. Those are high level cost estimates with some siting/routing difficulty taken into account.

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QUESTION: When there are several upper reservoir locations under consideration for a PSH development site, will a 5-mile buffer be created for each center point of the locations under consideration or a center point when considering all possible reservoir locations?

Tyson Siegele ([tyson@cleanstrat.com](mailto:tyson@cleanstrat.com)) - 10:40 AM

RESPONSE: This is something we're still assessing. In some cases, we'll likely need multiple analysis (Potential Option A and Potential Option B), but in most cases we seen so far the 5-mi radius is fairly robust at capturing the location. Additionally, again, we aren't doing project permitting analysis, the goal of this like the rest of the criteria is to assess a general level of potential implications in the area., so the shifting of the central location by a little doesn't impact things to significantly

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QUESTION: Why isn't "Lower Implication Area (Protected Area Layer)" applied to all resource types?

Kate Kelly ([kate@kgconsulting.net](mailto:kate@kgconsulting.net)) - 10:41 AM

RESPONSE: We apply it to utility-scale solar, onshore wind, and geothermal. We don't currently do it for storage given it's relatively dense land-use, but that is something we are

considering for future cycles. We don't conduct land-use/env impact for other types of resources, if there are specific recommendations for other resources please include in comments, but timing wise it's unlikely something we can implement for this cycle.

POST-WORKSHOP RESPONSE: The Protected Area Layer (PAL) is incorporated into the lower implication area defined by the Core Land Use screen and the total resource potential area for solar and onshore wind resources. However, unlike for geothermal, we don't solely apply the PAL to define the lower implication land for solar and wind. This is because the techno-economic exclusions are considered to be at the same level of severity of an exclusion as the PAL components, so we group those two exclusions sets together (the CEC has termed these the base exclusions). For geothermal resources, a techno-economic exclusion layer wasn't produced in the last round of screen updates because of the flexibility of project placement for this technology. Because of that, we use the PAL layer alone to define a base level of 'lower implication area.' (It could be called a total resource potential area, because within that area we consider, at a large scale, development to be feasible.) We then partition that area into individual lower implication areas for each of the six environmental factors that are considered.

For pumped storage hydropower resources, the protected area layer is not used at all. We wanted to focus on the specific potential impact factors of the build out, and we assumed that there wouldn't be interest by developers in areas that were too heavily inundated by protected areas.

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QUESTION: So you are not sure if the transmission costs in the TPP are consistent with FERC filings? Have the CAISO transmission costs from the TPPs been calibrated against the FERC filings?

Richard McCann ([mccann@mcubed-econ.com](mailto:mccann@mcubed-econ.com)) - 10:44 AM

RESPONSE: Are you referring the existing TAC costs for current and approved transmission or the estimated costs of potential new transmission projects identified in the CAISO Tx White Paper.

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QUESTION: On slide 13 it looks like anything over 10,601 MWs fails the land use screen. Can you please provide more explanation about what this means? Do these numbers

correspond to a specific substation radius? Or does this mean that any MWs above 10,600 across all substations will fail the land use screen?

Hillary Hebert ([hillary@hmfenergy.com](mailto:hillary@hmfenergy.com)) - 10:53 AM

RESPONSE: So for that example it was explicitly within the 10-mile radius shown on slide 12. That number shows that 10,600 MW and above will be the highest level of non-alignment. We ideally would want to keep resource amounts to the MWs noted for level-1 or -2 alignment.

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QUESTION: What is "parcelization"?

Richard McCann ([mccann@mcubed-econ.com](mailto:mccann@mcubed-econ.com)) - 10:56 AM

RESPONSE: As a quick summary. It's a dataset developed by the CEC parcelization dataset that assesses how fragmented into separate property tracks land for potential resource development is. An area of many small parcels has high parcelization while an area of fewer large parcels has low parcelization. CEC staff describe this factor further and its potential use in busbar mapping in this staff paper:

<https://www.energy.ca.gov/publications/2023/calculating-parcelization-electric-system-planning>

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QUESTION: The CAISO has posted estimated costs for new TX projects for most of the last two decades. The question is whether 1) the historic estimated transmission costs have been calibrated against the realized costs that are in the TAC? and 2) whether the estimated costs used in the current planning process have been compared to this calibration of past estimated costs with realized costs?

Richard McCann ([mccann@mcubed-econ.com](mailto:mccann@mcubed-econ.com)) - 10:59 AM

RESPONSE: We will coordinate offline to answer this question.

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POST-WORKSHOP RESPONSE: CAISO Staff Reply: I assume the "estimated costs" refer to the costs in the CAISO transmission capability estimate white paper. Those costs are estimated to the same level of accuracy as the transmission capability estimates for information and planning purpose. We used best available cost estimates from previous

generation interconnection cluster studies and TPP studies. Because of that, they haven't been calibrated against the realized costs.

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QUESTION: Please add designated critical habitat into your Environmental implication analysis. Also, you mentioned links to the data you provided, but I did not see the link.

Kerry Holcomb ([Kerry\\_holcomb@fws.gov](mailto:Kerry_holcomb@fws.gov)) - 11:03 AM

RESPONSE: Kerry: You may have missed my note at the beginning of the webinar that this Q&A is for clarifying questions, and not advocacy. If you have points you'd like to advocate for and whatever justification you may have, we're curious to hear them in comments (due 11/19/24)

REPLY: I'm attempting to one understand and improve the map exercise being presented, not advocate. I have asked a simple question and would like a response on whether "Low implication Land" includes designated critical habitat for threatened and endangered species. Thank you.

Kerry Holcomb ([Kerry\\_holcomb@fws.gov](mailto:Kerry_holcomb@fws.gov)) - 11:08 AM

RESPONSE: For lower implication area defined by the Core land use screen. No, the lower implication area would not include USFWS critical habitat areas for threatened and endangered species because those areas are used as an exclusion for the Core Screen. The lower implication area of each of the individual environmental and conservation factors could include some critical habitat areas.

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QUESTION: For PSH locations, are there any considerations for where the actual reservoirs are located? For example, a reservoir location could have 95% overlap with the area that has connectivity ranks of 4-5. However, areas without reservoirs could have ranks of 1-3.

Tyson Siegele ([tyson@cleanstrat.com](mailto:tyson@cleanstrat.com)) - 11:06 AM

RESPONSE: The point chosen to represent the approximate project location is usually very close to both reservoirs, and consideration is made to position the point to include the two reservoirs within the 5-mile buffer area of analysis.

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QUESTION: Re slide 57, some of the SCE Eastern area increases occurred in busbar mapping. Why this area for higher levels of mapping? (This is also evident in further slide 71).

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) - 11:09 AM

QUESTION: Re my prior question about slide 57, it should refer to slide 58, and the other slide # referenced may be 72.

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) - 11:12 AM

POST-WORKSHOP RESPONSE: So the SCE Eastern Area includes portions of the CAISO area in Arizona, particularly along the DCRT line. That's the key area where more solar and storage resources were mapped, we particularly had large increase of in-development resources in this area of Arizona compared to the 24-25 TPP mapping. Additionally, the area had an increase in higher confidence commercial interest.

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QUESTION: I'm also interested in links to the datasets presented by the previous presenter

Kerry Holcomb ([Kerry\\_holcomb@fws.gov](mailto:Kerry_holcomb@fws.gov)) - 11:19 AM

RESPONSE: Slide 31 in the CEC presentation includes links to all of the data sets used in the evaluation. The lower implication area defined by the Core Land Use screen is given in the supporting materials of slide 3.

REPLY: Thank you, Saffia. I wanted to make sure that designated critical habitat was included in your filter, as it was not explicitly listed.

Kerry Holcomb ([Kerry\\_holcomb@fws.gov](mailto:Kerry_holcomb@fws.gov)) - 11:37AM

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QUESTION: How does the CPUC reconcile the CAISO Merchant Zones for SCE North of Lugo, SCE Eastern Area, and the SCE East of Pisgah Area, with planned new resources for these areas?

Bo Buchynsky ([b.buchynsky@dgc-us.com](mailto:b.buchynsky@dgc-us.com)) - 11:16 AM

POST-WORKSHOP RESPONSE: The objective of the CAISO's policy-driven transmission analysis is to identify and approve transmission upgrades to accommodate the base renewable portfolio provided by the CPUC and non-CPUC local regulatory agencies. A merchant zone is a zone where the ISO has allocated all available deliverability within that zone. The amount of deliverability already allocated in a merchant zone should meet or exceed the amount needed by the previously studied renewable portfolio in that zone. If future portfolio amounts in that zone increase beyond the capability of the transmission system then the policy-driven transmission analysis should identify and approve additional transmission upgrades, and additional deliverability should become available to be allocated.

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QUESTION: What is the difference between an IRA Energy Community and DAC?

Roschen, Jane ([Jane.Roschen@cpuc.ca.gov](mailto:Jane.Roschen@cpuc.ca.gov)) - 11:19 AM

POST-WORKSHOP RESPONSE: Inflation Reduction Act Energy communities were explicitly defined by the IRA as being eligible for certain tax benefits. They are federal and state designations, respectively.

DAC is a state designation: <https://oehha.ca.gov/calenviroscreen/sb535>

IRA Energy Community: <https://energycommunities.gov/energy-community-tax-credit-bonus/>

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QUESTION: Have you examined siting storage at the sites of gas facilities that are projected to retire?

Deborah Behles ([deborah.behles@gmail.com](mailto:deborah.behles@gmail.com)) - 11:19 AM

POST-WORKSHOP RESPONSE: In short, yes partially, we have and are looking at further analysis for future cycles as well in how to site storage at existing resources and retiring resources. For already retired or recently retired OTC plants we see commercial interest at those locations.

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QUESTION: In the proceeding, CESA proposed including Distributed Storage from the WDATs in the portfolio/mapping in addition to the Distributed Solar. Is this something staff has considered or completed yet?

Anne Capper ([annie.capper@gdsassociates.com](mailto:annie.capper@gdsassociates.com)) - 11:19 AM

POST-WORKSHOP RESPONSE: We do include storage resources from the WDAT queues in our commercial interest, however, we include it all under a single battery resource. The reason we separate out a distributed solar is that we don't perform the utility-scale solar land-use and environmental impacts analysis on those small amounts.

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QUESTION: Is there a plan to better align storage mapping to community criteria before a proposed decision? Or what is the timeline?

Deborah Behles ([deborah.behles@gmail.com](mailto:deborah.behles@gmail.com)) - 11:20 AM

POST-WORKSHOP RESPONSE: In our further rounds of mapping before the PD, we will seek to improve alignment of the mapped resources amongst all the criteria. So, if we can remap batteries to improve the community criteria alignment without significant reductions in alignment with the other criteria, we will do so.

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QUESTION: re biogas near disadvantaged communities - are you doing a net analysis, ie looking at the energy impacts less the avoided impacts of the alternative fate of the resource?

Gregg Morris ([gmorris@emf.net](mailto:gmorris@emf.net)) - 11:22 AM

POST-WORKSHOP RESPONSE: We are not, we have a set amount of biomass/gas in the portfolio and we are seeking to map it as best aligned with our criteria. We don't increase or decrease the amount in the portfolio through our mapping criteria. Looking at life-cycle energy impacts and alternative energy impacts is more complex and detailed than we implement.

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QUESTION: Can you please describe how you will update the mapped "In Development" projects that are in the queue (prior to C15), in advanced development, w/ Phase II study and progressing toward GIA, have contracts with LSE(s), but will come on-line after 2024 and prior to 2035. However, they are not yet mapped, so it appears, these important projects are not being adequately considered in the TPP process. Happy to provide details/examples. Thank you

Mark Turner, Terra-Gen ([mturner@terra-gen.com](mailto:mturner@terra-gen.com)) - 11:26 AM

RESPONSE : Mark, pls give an example that helps me follow the various conditions you've listed in your question (I'm having a hard time parsing it)

REPLY: Neil, sure, can I provide you an example to your e-mail address as this is company specific information?

Mark Turner, Terra-Gen ([mturner@terra-gen.com](mailto:mturner@terra-gen.com)) - 11:36 AM

RESPONSE: Mark, ok but also try giving an example with reference to one of the "Study area focus" slides Jared is presenting now. I note his explanation at slide 60 that generally the amount of battery storage that has been allocated Transmission Plan Deliverability far exceeds the amount of battery storage in the portfolio. Not sure if that is what your question is getting at, but I want to highlight that busbar mapping would not involve adding battery storage to the portfolio, beyond what has already been included.

POST-WORKSHOP RESPONSE: In-development resources are resources contracted, online, or in the active interconnection process (e.g. with resources IDs in the CAISO NRI report). For these resources in-development the MW amount is related to the amount contracted or identified as coming online; we do not include the full MW amount identified in the interconnection queue. The rest of the queue project is classified under the commercial interest status that it meets. So, if we have a 200 MW project in the queue that has an executed IA, that isn't in the NRI, but for which we've identified a 50 MW contract, then we will have 50 MW of the project as "in-development" and the remaining 150 MW would be included in our "higher-confidence" commercial interest.

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QUESTION: The small table on slide 66, is that availability based on the upgraded system when an upgrade is indicated? That is, if substations are enhanced with upgrades, are



those upgrades factored into the assessment of how much interconnection headroom there is?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) - 11:30 AM

POST-WORKSHOP RESPONSE: That table is based on the current system with all already approved upgrades. It does not factor in the capacity that is potentially available from the white paper upgrades that the working group may mark as likely and in support of being triggered.

With respect to substation interconnection headroom, we base the substation voltage on the white paper matrix substations we have, which include existing and approved substations, and some proposed substations. So we now have both a Trout Canyon 230 kV and a Trout Canyon 500 kV which can be mapped to.

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QUESTION: Regarding these transmission constraint exceedances - will the CPUC mapping be intended to address these constraints with transmission upgrades to allow for the excess to receive deliverability in the future?

Chris Devon ([cdevon@terrigen.com](mailto:cdevon@terrigen.com)) - 11:31 AM

POST-WORKSHOP RESPONSE: This is something that we assess on a case-by-case basis. In some cases the working group will determine the upgrade is the more effective solution in others not triggering an upgrade and remapping some of the resources causing the exceedance is the solution. In an area where an exceedance is mapped and upgrade identified that does not guarantee an upgrade will be triggered. The full analysis of an upgrade need is done in the CAISO TPP, and the actual size and extent of the upgrade if the TPP analysis finds it is needed may be different than the assumptions from the White Paper, which we used in the mapping.

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QUESTION: Transmission Constraints Mapping (slide 66) question: In the CAISO's post 2024 TPD Allocation constraints mapping they show that 173 of the 175 POI's within the NGBA are behind the Collinsville to Tesla 500kV constraint, such that not a single MW of TPD is available for future resources at 173 of the NGBA POI's. Can you please explain how

this constraint is being addressed in this TPP process and, if not being addressed, explain. Thank you.

Mark Turner, Terra-Gen ([mturner@terra-gen.com](mailto:mturner@terra-gen.com)) - 11:35 AM

POST-WORKSHOP RESPONSE: The constraint is included in our transmission analysis. The preliminary mapped resources do not result in an exceedance currently, but in the start of our review within the busbar mapping group, CAISO staff have recommended some updates to the membership of the constraint which may result in an exceedance. If the nature of the exceedance and the extent of the upgrade is a cost-effective solution, we would map with the assumption of an upgrade being triggered; alternatively, we could remap resources away from the constraint to reduce the likely need for the identified upgrade. The discrepancy between the amount, type, and location of TPD allocated resources vs the resources mapped is another issue we are considering. In the GBA and NGBA areas there is significantly more storage with TPD than we have storage mapped, which does factor into how the available capacity can be allocated to projects.

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QUESTION: Re slide 70, can you please explain further the issues being considered regarding geothermal mapping for Central and Northern Nevada?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) - 11:38 AM

POST-WORKSHOP RESPONSE: We currently have the Central Geothermal mapped as interconnecting to the Beatty substation. We have mapped Northern Nevada geothermal connecting and potentially connecting to a various array of interties (Summit, Mona, Gondor, Merchant, etc.) based on the in-development resource contract information we have. We are working to assess both what interties have capability to enable increase imports, what potential upgrades would be needed to allow an increase in imports, and what Out-of-CAISO existing or new transmission would these resources utilize to get to the CAISO interties.

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QUESTION: Also regarding slide 70, it seems from the workbook that the staff reduced the EofP results between Resolve and mapping. Do any of the factors on this slide depict why

the staff did that? Or can you otherwise provide an explanation for why you are suggesting reducing the resource mix that Resolve found optimal in this area?

Ellen Wolfe ([ewolfe@resero.com](mailto:ewolfe@resero.com)) - 11:38 AM

POST-WORKSHOP RESPONSE: In 2035, RESOLVE puts almost half the solar into its Southern Nevada area. In mapping, we shift a lot of it to other areas to align with in-development (particularly for battery storage in-development alignment utilized a lot of the 2035 portfolio) and other higher-confidence commercial interest locations and to provide additional geographic diversity to the resources, In 2040, an additional concern is the exceedance in the EOP constraints and need for additional working group discussion of potential upgrades compared to the potential upgrades in other areas with lots of commercial interest.

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QUESTION: Can you please provide more detail about what the next rounds of mapping will entail? What criteria do you generally use to make these more subjective decision about remapping?

Hillary Hebert ([hillary@hnhenergy.com](mailto:hillary@hnhenergy.com)) - 11:40 AM

POST-WORKSHOP RESPONSE: In further rounds of mapping, we're trying to reduce the non-alignment in general without increasing non-alignment for other criteria. We're also bringing in more analysis and will also hopefully be able to include some updated data for things like in-development resources. Additionally, a key factor we assess is the transmission upgrades potentially be triggered and if remapping can utilize certain upgrades more effectively while reducing the need for upgrades in other locations. Again, though we seek to limit increasing misalignment if possible.

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QUESTION: We noticed these results have columns for Distributed Solar, but not for Distributed Storage

Anne Capper ([annie.capper@gdsassociates.com](mailto:annie.capper@gdsassociates.com)) - 11:31 AM

RESPONSE: See below.

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QUESTION: We noticed these results have columns for Distributed Solar, but not for Distributed Storage. CESA proposed including Distributed Storage from the WDATs in the portfolio/mapping in addition to the Distributed Solar. Is this something staff has considered or completed yet?

Anne Capper ([annie.capper@gdsassociates.com](mailto:annie.capper@gdsassociates.com)) - 11:40 AM

RESPONSE: So the storage mapping does include storage from the WDAT queue on the distribution network, and that is mapped to and included in the storage column. The key difference for the distributed solar is that we don't conduct the environmental and land-use analysis for distributed solar as it often is on buildings/brownfields not covered by our land-use screens.

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QUESTION: Is there a schedule with CAISO on the consideration of MIC expansions noted for geothermal LLT?

Andy Brown ([abb@eslawfirm.com](mailto:abb@eslawfirm.com)) - 11:41 AM

POST-WORKSHOP RESPONSE: MIC expansion goes through the regular CAISO process as part of the transmission study. Particularly for this cycle, we are working with CAISO staff to make sure the portfolio's identified need for potential MIC expansion is clear and able to be studied in the TPP. We are also planning to coordinate with the CAISO to ensure that the MIC expansion needs will align with the updated expansion request they receive at the start of the TPP planning cycle.

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