

Q&A Session for MAG Webinar – Busbar Mapping Results for the proposed 2024-2025 TPP portfolios: 9 AM – Noon on 12/08/23

QUESTION: When will the CEC IEPR load projections be updated? How will any changes be included in the 24-25 TPP?

Ed Smeloff (edonthesunnyside@gmail.com) - 9:13 AM

RESPONSE: The portfolios that will be transmitted as inputs to the 24-25 TPP use the 2022 IEPR load projections, given the time constraints prevent CPUC staff from incorporating the final 2023 IEPR after its release since the TPP portfolios must be transmitted to the CAISO by mid-February. CAISO, as noted in a later response, does use the latest IEPR for the TPP analysis. This has been standard over the past several TPP cycles.

QUESTION: I'd like to make sure I understand slides 9 and 10: Is slide 9 saying that the 2024-25 base case includes 32.9 GW less of solar than the 2023-24 TPP base case in 2035? I appreciate the clarification.

Hillary Hebert (hillary@hmhenergy.com) - 9:20 AM

RESPONSE: The text numbers in those slides 9 and 10 of part 1 show the MWs in the previous TPP. There were 32 GW of solar in the 23-24 TPP (2035) results after subtracting resources added to the new baseline. The comparison is that the proposed 24-25 TPP has about 16 GW of solar in 2034.

QUESTION: Re Slide 10 Nevada Geothermal, GLW submitted comments to the Ruling re that there seems to be no on-CAISO geothermal resource type available for RESEOLVE's selection. Can you offer any details on whether this was intentional and, if so, why.?

Ellen Wolfe (ewolfe@resero.com) - 9:20 AM

RESPONSE: Ellen: Before we try to answer, can you clarify: are you saying you expected your ruling comments/replies re: this topic to have been reflected in the mapping that we are showing here?

RESPONSE: Please see response to clarification of question later in the Q&As.

QUESTION: Would it be accurate to say that there have been no changes to the proposed Base and Gas Retirement sensitivity portfolios compared to those included in the October ALJ Ruling?

Pushkar Wagle (pushkarwagle@flynnrci.com) - 9:21 AM

RESPONSE: Correct, the portfolios as presented in the part 1 slides are the ones released in the October Ruling.

QUESTION: There are a significant amount of baseline resources in the Bay Area (the baseline adjustment to the Vaca Dixon constraint has 578 MW of HSN and for the Tesla - Tracy Pumps) that I don't think is dissimilar from the last PSP but CAISO provided zero deliverability due to area constraints in the Bay Area in the last GIDAP. Has the CPUC been able to work with the CAISO to resolve this? The GIDAP might have a larger pool of resources but if zero deliverability is found it indicates a current constraint.

Ryan Tracey (rtracey@sonomacleanpower.org) - 9:26 AM

RESPONSE: This is an issue we've noticed in our mapping work. We have our updated baseline and in-development resources causing some exceedance in these constraints. Through our working group we are trying to assess that issue and its implications with CAISO staff.-

QUESTION: How will the CPUC treat out of state or in state resource counting for subscriber PTO resources, such as those using transwest express, since the SPTO project are technically part of the CAISO BAA - still be counted as part of the out of state portfolios?

Chris Devon (Cdevon@terra-gen.com) - 9:27 AM

RESPONSE: This is where the nomenclature is causing some issues. Wind resources connecting to Transwest would be classified as Wyoming Wind (which falls under the OOS wind umbrella). The OOS tag is derived from IRP modeling classification

and corresponds to capacity factors, costs, and transmission costs needed to get to the existing CAISO system. While they are classified differently, in-state and OOS wind, like Wyoming Wind, are treated the same for transmission analysis in busbar mapping. Both require in-CAISO transmission. Wyoming wind is modeled and mapped as needing capacity on existing CAISO transmission at the Eldorado-Harry Allen intertie. It also requires transmission to get to the Harry Allen-Eldorado intertie point. -

QUESTION: Since the last webinar, have you thought about the implications of providing the resource portfolios 2024-2025 TPP that are materially different from the 2023-2024 TPP portfolios in terms of resource mix and their locations? If so, what are your major takeaways? We can wait for your answer if you have covered this later in your presentation.

Pushkar Wagle (pushkarwagle@flynnrci.com) - 9:28 AM

RESPONSE: Given the cyclical nature of the portfolio development and mapping process we can expect various changes in the portfolios given we are always new or updated inputs and assumptions. Some changes like the updates to the ELCC curves and the lower demand scenario that shifted the resource mix and total MWs selected are justifiable improvements and the portfolio impacts are acceptable. Staff are still reviewing stakeholder comments to help assess whether other changes like various cost assumptions and available resource potential are accurate and justifiable.

Staff point to the February 2023 Decision transmitting the 23-24 TPP portfolios which noted the 23-24 TPP base case portfolio had significantly more resources based on a much higher load scenario than previous portfolios and would likely trigger more transmission. The decision stated that the reason for this was that generally transmission takes longer to plan and deploy than generation and it would be a case of when not if transmission would be needed. Some of the changes in this proposed 24-25 TPP portfolio reflect that with this portfolio showing some of that transmission need not being required until the 2039 modeling year.

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QUESTION: Has there been any conversation with CAISO with regards to the proposed acquisition of tx rights to the SWIP-North project that is up for CAISO Board approval in the next week or so?

Jonathan Rumble (jonathan.rumble@sce.com) - 9:29 AM

RESPONSE: Jonathan: We coordinate with CAISO staff on a regular basis, including big topics like the one you mentioned. Do you have a question that relates specifically to what we are presenting here, though?-

QUESTION: My question is when would the CAISO take into account the changes in loads in their analyses that are part of the 24-25 TPP?

Ed Smeloff (edonthesunnyside@gmail.com) - 9:29 AM

RESPONSE: Ed: The ISO will use the latest CEC forecast in its 202-2025 TPP

QUESTION: Which CAISO Whitepaper did Jared just mentioned was reviewed to update/incorporate the proper transmission assumptions?

kirsten eliasen (kirsten@gallatinpower.com) - 9:31 AM

RESPONSE: It's the 2023 CAISO's White paper on transmission capability estimates: <https://www.caiso.com/Documents/White-Paper-2023-Transmission-Capability-Estimates-for-use-in-the-CPUCs-Resrouce-Planning-Process.pdf>

QUESTION: In response to your clarifying question, Nathan, re NV geothermal, the preliminary bus bar mapping does map some NV geothermal on the CAISO grid, for example at Beatty. So in that sense GLW does not have objections. However, if RESOLVE is assigning wheeling costs to NV geothermal then RESOLVE may be under allocating MWs to NV geothermal, and that is more the nature of my question. If that aspect is out of scope of this workshop that is fine.

Ellen Wolfe (ewolfe@resero.com) - 9:31 AM

RESPONSE: Understood, Ellen. My first answer is that not all issues from comments that might result in changes to the portfolio/mapping have been implemented

yet. Re: your more detailed question, let us have a think and we'll try to respond later.

RESPONSE: To Nathan's point these results do not reflect any changes that may arise from stakeholder comments. For both central and northern Nevada geothermal RESOLVE assumptions include transmission cost estimates for new transmission needed to get the resources to the CAISO border.

QUESTION: Slide 19 - can you please expand on which proposed substations identified by interconnection queues were included?

kirsten eliasen (kirsten@gallatinpower.com) - 9:32 AM

RESPONSE: We will be releasing an updated dashboard after this webinar that does have the list of substations we consider in our mapping analysis. Proposed substations will have the format of Name (Proposed) or New Sub on X - Y line. These substations are ones that have been identified either through the CAISO's TPP or interconnection processes.

QUESTION: Specifically, have you discussed with CAISO how that SWIP-North acquisition aligns with or impacts the busbar mapping that you are presenting here?

Jonathan Rumble (jonathan.rumble@sce.com) - 9:32 AM

RESPONSE: Yes part of our mapping analysis is discussion and feedback from CAISO staff. And the SWIP-North implications are a part of that review and discussion.

QUESTION: The results are selecting 300 MW of Idaho wind. Previous portfolios had a greater amount which is being used to justify the [proposed agreement with CAISO, NV Energy, LS Power and Idaho Power for the SWIP-North project. Will this portfolio change have an impact on the proposed agreement for SWIP-North?

Dorland, Kanya (Kanya.Dorland@cpuc.ca.gov) - 9:33 AM

RESPONSE: Understood, Kanya. Just re-iterating here that our portfolios are not final yet, nor is their mapping. More information on that should come out in the proceeding later on. If you want to identify issues related to how resources relevant to SWIP-North are characterized, there should be an opportunity to do so at that point.

RESPONSE: In previous portfolios the Idaho wind resources were mapped there during the busbar mapping process as previous versions of the RESOLVE model did not include Idaho wind as a potential resource to be selected. For these new portfolios, Idaho wind has been added as a resource and the resulting RESOLVE portfolio does have 300 MW of wind selected. Staff in initial mapping results remapped an additional 700 MW of wind to Idaho Wind to align with previous TPP and to fully utilize the transmission upgrade necessary for Idaho Wind to reach the CAISO. This reflects the discrete capacity build out limitation of transmission and that transmission upgrade can't just provide 300 MW of capability, it will either not get built or provide more than 1,000 MW.

QUESTION: CAISO intends to make a decision on procuring entitlements for 1,000 MW of Idaho wind on SWIP-North at the December 14, 2023 CAISO board mtg.

Dorland, Kanya (Kanya.Dorland@cpuc.ca.gov) - 9:35 AM

RESPONSE: These portfolios are not final yet and so cannot be relied on to inform a CAISO decision this month.

QUESTION: Regarding slide 19, can you please clarify if "Recent Mapping" are ones conducted since the initial "preliminary" release, and ones therefore that we haven't seen yet?

And can you offer any further details about the transmission constraints which are being updated relative to the preliminary release?

Ellen Wolfe (ewolfe@resero.com) - 9:35 AM

RESPONSE: The recent mapping updates referenced on slide 19 of part 1 is referring to the information and analysis updates listed on that slide. Resources being relocated to different substations was not a part of these updates discussed in the workshop.

The transmission adjustments include: incorporating the VEA system upgrade as an approved upgrade from the 22-23 TPP, correcting several EODS capabilities and EODS upgrades capabilities to align with CAISO staff recommendations (Redbluff 500/230, Gates 500/230 TB #11, Gates-Panoche 230 kV #1 and #2 Lines), and adjusting which constraints several substations belong to in the PG&E areas.

QUESTION: Is there a hub height used in looking at the capacity factors for wind?

Ed Smeloff (edonthesunnyside@gmail.com) - 9:39 AM

RESPONSE: Hi Ed, We are assuming a 110 meter hub height for onshore wind.

QUESTION: Does the process for mapping offshore wind resources differ significantly than for other resources, given the very limited potential locations for these resources and lack of historic data on their development?

Orran Balagopalan Environmental Defense Fund (-
obalagopalan@smwlaw.com) - 9:39 AM

RESPONSE: Correct, there's only a few locations and substations to which it can be mapped. We also do not perform environmental/sea-use analysis, as that's something we don't have the data to yet implement. So the mapping analysis is focused mainly on transmission implications.

QUESTION: This comment is likely out-of-scope but my question is whether it is reasonable to look in the future at a high geothermal scenario given potential cost reductions in advanced geothermal technologies?

Ed Smeloff (edonthesunnyside@gmail.com) - 9:42 AM

RESPONSE: Ed: Questions re: which scenario to use for the mapping we're discussing here are a better fit for the comments/replies to the ruling and upcoming PD.

QUESTION: It looks like the busbar mapping reflects the SWIP-North as compared with the RESOLVE portfolio. Is that an accurate characterization?

Jonathan Rumble (jonathan.rumble@sce.com) - 9:43 AM

RESPONSE: The mapped amount was increased to 1,000 MW in reflection of seeking to fully utilize the discrete capacity of the transmission upgrade that would need to be built (SWIP-N) and it is also consistency with the previous TPP base case which had 1,000 MW mapped to Idaho wind. See response to similar query on page 6.

QUESTION: Can you further describe the "complexities in the PG&E territory" (slide 26)

Nancy Rader (nrader@calwea.org) - 9:45 AM

RESPONSE: There are multiple characteristics we are looking at including: the number and overlapping nature of the constraints; addressing some of the issues that CAISO staff note arose from the simplifying some of those constraints for the white paper; and the size of potential upgrades including the discrepancies in the white paper for amount of FCDS vs EODS capacity increases the upgrades provide.

QUESTION: Is it possible to examine grid enhancing technologies for increasing deliverability on some smaller exceedances? This may be a question for the CAISO?

Ed Smeloff (edonthesunnyside@gmail.com) - 9:46 AM

RESPONSE: Ed: Yes, it is possible. The ISO does consider grid enhancing technologies in its TPP as potential solutions depending on the nature of the constraint.

QUESTION: The exceedances in the October busbar mapping are far more extensive and different than what is triggered in RESOLVE. Is there any effort to

improve the representation in RESOLVE so that the optimization results are more meaningful and less remapping is required?

Ryan Tracey (rtracey@sonomacleanpower.org) - 9:46 AM

RESPONSE: Thanks Ryan. Have you already made clear in comments or elsewhere your view here? A general response is that yes, we're always seeking to improve how we characterize things in the models as well as in mapping. And that sometimes improvements are implementable the latter before the former, or vice versa.

QUESTION: Slide 26 - Can you expand on the planned upgrades that are already being exceeded on the capacity amount? (last bullet point)

kirsten eliasen (kirsten@gallatinpower.com) - 9:49 AM

RESPONSE: We'll get to this in a later part of the workshop.

QUESTION: In response to Jared's clarification... The numerical results in these workshop slides correspond to the Round 1 mapping and not that of Round 1.5, correct?

Ellen Wolfe (ewolfe@resero.com) - 9:50 AM

RESPONSE: Correct, the mapping locations presented in part one corresponding to Round 1 mapping results. What I was referencing with the 1.5 statement is that this webinar is discussing the analysis results and where staff are looking to remapping (both from and to) for the next round of mapping.

QUESTION: There are potentially a lot of synergies with the 1 GW Lassen/Modoc wind and Northern Nevada geothermal. You may want to evaluate mapping some Nevada geothermal capacity to Northern California if you haven't already.

Ryan Tracey (rtracey@sonomacleanpower.org) - 9:54 AM

RESPONSE: Thanks for noting that potential. Staff are considering the potential for that an additional resources like OOS wind to all utilize a transmission expansion in that area.

QUESTION: Is there a distinction in mapping for offshore and onshore wind?

Faith Yakovleva- RCEA (fyakovleva@redwoodenergy.org) - 9:54 AM

RESPONSE: Faith: Can you be a little more specific? Are you asking whether the two different resource types are subject to different criteria in our mapping process?-

QUESTION: For my previous question, I specifically am referencing the Northern California Area.

Faith Yakovleva- RCEA (fyakovleva@redwoodenergy.org) - 9:55 AM

RESPONSE: Yes, offshore wind and onshore wind are considered two different resources with different cost assumptions and capacity factors in modeling. In busbar mapping they also have different transmission utilization rates as assumed in the CAISO's transmission estimates white paper.

QUESTION: It looks like Moss Landing is mapped into the Central Valley zone?

Ed Smeloff (edonthesunnyside@gmail.com) - 9:54 AM

RESPONSE: Moss landing is one of those that is in the CAISO PGE zone but often in maps gets covered by the Central Valley diagrams. I will note that the summaries do include Moss Landing resources in the Bay area.

QUESTION: Slide #26: Can you provide specific examples of cases where the mapping has resulted in transmission exceedances? Separately, please provide examples of where large exceedances of even the upgrade capacity amounts are observed.

Pushkar Wagle (pushkarwagle@flynnrci.com) - 9:56 AM

RESPONSE: We'll have more on this later in the workshop

QUESTION: Are any of the new storage locations interconnecting where retired power plants are located.? Thinking of the reuse of existing transmission capacity for Oakland Clean Energy Initiative.

Dorland, Kanya (Kanya.Dorland@cpuc.ca.gov) - 9:58 AM

RESPONSE: There are some, as that availability is generally reflected by projects in the CAISO queue that have received TPD allocated, which is what we prioritize alignment with. We don't, however, have that specific info of MWs of batteries at retired sites easily available right now.

QUESTION: Slide - 40 (first bullet) what is the proposed new substation and where is it located?

kirsten eliasen (kirsten@gallatinpower.com) - 9:59 AM

RESPONSE: A new substation on the Lugo-Pisgah line.

QUESTION: Re slide 42 "ongoing evaluation" re OOS East of Pisgah wind, can you offer any further details on what aspects/attributes you are continuing to evaluate and contemplate?

Ellen Wolfe (ewolfe@resero.com) - 10:01 AM

RESPONSE: The two points of further analysis are how best to optimize the wind MW values mapped to ID, WY and NM wind areas and where should the wind interconnect to the CAISO. For the East of Pisgah area, should all the 2039 Wyoming and ID wind be interconnected at the Harry Allen-El dorado area or should some of it follow solutions like a new line to Northern California as shown in the 20-year outlook or elsewhere.

QUESTION: For the 500 MW of central Nevada geo at Beatty, has the CPUC and CAISO potentially looked at ways to interconnect to Green link West at that point? That might be more viable than a long gen-tie.

Ryan Tracey (rtracey@sonomacleanpower.org) - 10:02 AM

RESPONSE: There is some possibility of that. But from working group staff information of the Greenlink line, it appears NVEP is mostly sizing that line to meet its expected need and is currently not planning to allow much wheeling capacity.

QUESTION: Re slide 43 and the Beatty-interconnected geothermal, can you confirm your consideration of the long tie line recognizes the Beatty 230kV transmission project approved by the CAISO in the 2022-23 Transmission Plan?

Ellen Wolfe (ewolfe@resero.com) - 10:02 AM

RESPONSE: In our transmission fixes, CAISO staff have informed us the VEA system upgrade in the White Paper does correspond to the 230 kV Beatty upgrade approved in the TPP, and part of our 1.5 work here is reassessing the analysis with the updated information.

QUESTION: Has any consideration been given to geothermal in Baja that would interconnect into CA side of the border?

Ed Smeloff (edonthesunnyside@gmail.com) - 10:05 AM

RESPONSE: We don't have any Baja, MX, potential in our modeling assumptions currently. Do you have sources you could point to? The start of next cycle's Input assumptions development would be the likely time that we would consider incorporating such additions of resource potential locations into IRP modeling.

QUESTION: On slide 49 pumped storage is located in San Diego County even though there are no pumped storage projects in that area with a FERC preliminary permit, FERC license, or in the CAISO interconnection queue. That implies any pumped storage in SDGE area would see approx a 10-15 year

timeline to COD. The slide says that the pumped storage is" in alignment with identified development interest." Can you describe the development interest? Is this actually LDES even though it is described as pumped storage?

Tyson Siegele (tyson@cleanstrat.com) - 10:06 AM

RESPONSE: Resources with development interests, per the mapping methodology, does include resources identified by the busbar mapping working group that are not in the interconnection queue. The pumped storage mapped to the San Diego area aligns with development interest in pumped storage in the area that was identified as it received state funding in 2021 for planning and permitting. Staff note that because it received state funding in 2021 the resource falls under a resource category that is eligible for potential procurement by the DWR.

-Eric Little CalCCA (eric@cal-cca.org) - 10:07 AM

QUESTION: Under your high gas retirement scenario, do you assume anything about the additional resources in terms of location? Do you give preference to renewable resources in the local area that a gas resource retirement is assumed or do you use least cost of the resources regardless of the additional transmission costs that they may entail?

Priority: N/A-

-Barcic, Nathan - 10:41 AM

RESPONSE: Eric: Please let us know after we cover the gas retirement sensitivity slides later on whether we have not answered your question-

QUESTION: Is staff using the new cost estimate for SWIP north transmission entitlements in their analysis? The new cost estimate as of November 2023 is \$1,090 Million, \$3.8 M/ mile for 1,000 MW of transmission capacity.

Dorland, Kanya (Kanya.Dorland@cpuc.ca.gov) - 10:08 AM

RESPONSE: Kanya: No we have not updated that cost assumption.

QUESTION: Re: Slide 44, did Jared say that Hassayampa-mapped resources are in the Riverside area, (i.e., represented separately from the PV intertie)? Could you elaborate - the PV ITC includes PV and Hassayampa substations. Does the mapping lose any downstream constraint effects if an Arizona or OOS resource is mapped to Hassayampa instead of PV?

Lambert, Christian (christian.lambert@cpuc.ca.gov) - 10:08 AM

RESPONSE: Christian - The Hassayampa and Palo Verde substations are modeled as separate busbars for the mapping of resources, but all out-of-state (New Mexico) wind is modeled as connecting to Palo Verde. Because both substations have identical representation in the CAISO transmission constraints, there are no downstream effects for resources mapped to Hassayampa instead of Palo Verde.

QUESTION: Re your clarification: the slides you've been showing are the same as reflected in the Ruling?

Nancy Rader (nrader@calwea.org) - 10:09 AM

RESPONSE: Nancy: For all intents and purposes, yes. That's the info we've covered so far. In later slides we will cover some potential changes we were thinking of in the ongoing mapping process.

QUESTION: It seems that this presentation is intended to mimic what was released in the preliminary bus bar mapping (defined by Jared as V1.0). Please correct if I heard this wrong. (I'm trying to avoid the task of comparing in detail all the results shown in these slides to the Preliminary workbook results if they are intended to be the same.) Thanks.

Ellen Wolfe (ewolfe@resero.com) - 10:10 AM

RESPONSE: Ellen: You're correct re: the info we've presented so far. We have a little content later re: potential changes, though.

QUESTION: Jared mentioned a few times that there is still analysis being completed to determine if upgrading existing interties or new transmission should be constructed to access those resources. Can you please further expand on this process? Will the intertie upgrade or new transmission recommendation come from the CPUC or is that the decision of CAISO? Is there the ability to provide comment on this specifically?

kirsten eliasen (kirsten@gallatinpower.com) - 10:12 AM

RESPONSE: Upgrades and recommendations all come from the CAISO's TPP process and the CAISO board. In our analysis we're trying to assess what potential upgrades are likely to be triggered and if those are necessary/cost effective or if re-mapping resources to other areas that wouldn't require transmission or more optimal transmission would be a better solution.

QUESTION: Some parties noted the disparity between RESOLVE's upgrade options in So. Cal. v. Nor. Cal. that limit the ability to trigger major upgrades in Nor.Cal. Are you considering addressing that?

Nancy Rader (nrader@calwea.org) - 10:13 AM

RESPONSE: Staff are still working to review and incorporate any changes that may arise from stakeholders' comments and replies into the portfolios and mappings. Staff in general are working with CAISO to better understand the transmission constraints from the white paper and update them where necessary. CAISO have already identified some corrections to White Paper constraint capabilities and will be further review mapping results and exceedances.

QUESTION: Is there additional information related to the land use screening process used for resources in Nevada?

kirsten eliasen (kirsten@gallatinpower.com) - 10:14 AM

RESPONSE: Kirsten - Because the CEC screens do not extend to Nevada, the Nevada resource potential uses the techno-economic land use screen and WECC environmental land use screen, and is discussed in the Final Inputs and Assumptions Document available on the IRP website.

-Tyson Siegele (tyson@cleanstrat.com) - 10:15 AM

QUESTION: Can you describe the way that the pumped storage location selections were made that are described on page 16. Commercial interest? Other? If commercial interest, can you provide the commercial interest metric used for selection? Thank you!

RESPONSE: The location of mapped pumped storage was determined by multiple factors including identified development interest as discussed in a response to a query on p13. Also factoring into the selection are the other mapping criteria of consistency with previous base case and transmission capability availability. For pumped storage projects in general we look not only at interconnection queues but also FERC licensing information to identify potential mapping locations for pumped storage.

QUESTION: Is a 10-mile radius buffer used for all substations?

Ed Smeloff (edonthesunnyside@gmail.com) - 10:18 AM

RESPONSE: We perform the geospatial analysis at 5, 10, 15 and 20 mile buffers for solar and 10, 15, 20 and 30 mile buffers for wind. The final radius that is used in the mapping is listed in the LandUse_Env_Summary_2039 sheet of the busbar mapping dashboard.

QUESTION: When do you plan to re-release the updated busbar mapping dashboard?

Kirsten eliasen (kirsten@gallatinpower.com) - 10:23 AM

RESPONSE: It will be early next week.

QUESTION: Slide #26: Can you provide specific examples of cases where the mapping has resulted in transmission exceedances? Separately, please provide

examples of where large exceedances of even the upgrade capacity amounts are observed.

Pushkar Wagle (pushkarwagle@flynnrci.com) - 10:24 AM

RESPONSE: Pushkar - One example is the South of Magunden Area Constraint, where the mapped portfolio shows an HSN exceedance of 660 MW. This data can be reviewed in the Busbar Mapping Dashboard, on the "Tx_Calculator" tabs. An updated workbook will be posted in the coming days.

QUESTION: e.g. Where is Olive substation?

Kate Kelly (kate@kgconsulting.net) - 10:28 AM

RESPONSE: It's west of hwy 99 between Bakersfield and Tulare. 119.4459 W and 35.8981 N

-Ed Smeloff (edonthesunnyside@gmail.com) - 10:32 AM

QUESTION: Is 10 acres per MW the standard land coverage ratio used for all solar, fixed and tracking?

Priority: N/A-

-E3 SF Office - 11:04 AM

RESPONSE: Ed - All of the utility-scale solar modeled in the IRP is assumed to be single-axis tracking with a 10 acre/MW density factor.-

QUESTION: Does the mapping criteria use a maximum gen-tie length in determining the mapping radius?

Ed Smeloff (edonthesunnyside@gmail.com) - 10:35 AM

RESPONSE: The lower limit of the buffer radius for solar was supported by an analysis CEC performed of existing projects. This showed that a large portion of solar footprints were within 8 miles from a substation. The upper limit of the buffer radius was chosen because typically after about 20 miles from a substation, any

resource potential would actually be closer to another substation, so the geospatial evaluation for a particular substation would be muddled at this point.

QUESTION: Will all of the Q&As be available online after this webinar?

kirsten eliasen (kirsten@gallatinpower.com) - 10:37 AM

RESPONSE: Kirsten: Yes, the Q&A transcript will be made available on the website

QUESTION: Jared: you responded to Kirsten above that you'll be looking at what upgrades might be "triggered" and if "more optimal transmission would be a better solution." I noted above that RESOLVE hinders the ability to "trigger" upgrades, so are you looking at re-evaluating those assumptions in the model (which come from the CAISO's whitepaper)?

Nancy Rader (nrader@calwea.org) - 10:41 AM

RESPONSE: please see response to earlier question.

QUESTION: Jared, Re the updates to the VEA transmission capabilities you identified (as well as others you are making) do you expect staff will re-run RESOLVE or just emulate the results as part of updated bus-bar mapping?

Ellen Wolfe (ewolfe@resero.com) - 10:41 AM

RESPONSE: Ellen - Yes, we will re-run RESOLVE to reflect the approved VEA area upgrade. Some of the challenges that others have identified with PGE area constraints were too complex to incorporate into RESOLVE for this cycle, but updates will be emulated in the next rounds of bus-bar mapping results in the coming weeks.

QUESTION: Thanks. Will review the updated dashboard and let you know for follow-up questions. But briefly, what was the decision-making process to allow for the exceedance in the South of Magunden area versus remapping those resources elsewhere?

Pushkar Wagle (pushkarwagle@flynnrci.com) - 10:45 AM

RESPONSE: Generally for exceedances we ask CAISO staff to review the mapping results creating those exceedances and seek information if CAISO staff estimate that those exceedances correspond to the White Paper identified transmission upgrade. CAISO staff can potentially note that the mapped resources will likely not trigger the upgrade or only require a smaller upgrade solution. The working group will also assess if relocating the mapped resources to alternative locations is a solution. If there are other locations with similar alignment with criteria that have available transmission then staff will seek to remap the resources.

QUESTION: Slide 15: can you explain what the implications would be of switching to a 5 mile radius for substations with a low volume of allocation v. the total low implication area?

Hillary Hebert (hillary@hmhenergy.com) - 10:46 AM

RESPONSE: For certain substations, a 5 mile radius was sufficient for analysis because there was enough lower implication (constraint) land area to accommodate the mapped capacity. Generally, if resources can be mapped closer to substations, the interconnection costs are less, thus the criteria do favor closer to the interconnection substations, particularly for smaller amounts of MWs.

QUESTION: Does the CEC review the acreage being used for existing projects in setting these factors, by using CEQANet documents of existing EIRs for example??

Sterkel, Merideth "Molly" (Merideth.Sterkel@cpuc.ca.gov) - 10:46 AM

RESPONSE: The CEC has not used data from existing EIRs from CEQANet documents in busbar mapping, but the CEC does use existing project data in

several ways to inform the land use evaluation for busbar mapping. 1) Existing project data informs the selected capacity density metrics (MW/acre) used in the evaluation. The selected metrics are drawn from literature review, public comment, and an evaluation of existing projects from the Renewable Portfolio Standard (RPS), Quarterly Fuel and Energy Report (QFER) and Energy Information Administration (EIA)-860 databases. 2) Existing project footprints are removed from the baseline calculation of total resource potential land area and low implication land area. CEC uses the CEC Solar Footprints data set to remove solar projects and the USWTDB with a 750m buffer to remove existing wind projects. 3) In selecting the metrics for the environmental and land use evaluation, CEC staff consulted previous metrics used in busbar mapping, as well as public and agency feedback to the datasets selected for the land use screens for electric system planning. Further, CEC staff did an informational overlap analysis using the CEC Solar Footprints dataset and key datasets used in the land use screens, such as High Connectivity, Critical Habitat, Wetlands, Technoeconomic Exclusions, Protected Areas, number of parcels, and parcelization.

QUESTION: With slide 13 solely focused on wind development near Devers sub, is the current CEC data viewer useful/able to identify solar and battery development potential? How does in-development and operational resources interplay with the data viewer and the results used for busbar mapping?

Eusebio Arballo (eusebio.arballo@edf-re.com) - 10:47 AM

RESPONSE: The CEC data viewer provides the exclusion datasets used to define the Core Land Use screens for solar and wind. The area remaining outside of these layers show the low implication areas. If you view only the base exclusions (the protected area and techno-economic exclusion layers), the area remaining outside of these layers is the total resource potential area. Note, the technoeconomic exclusion layer (and base exclusion) for wind uses a 20% capacity factor lower limit not a 28% capacity factor limit that is being considered in busbar mapping. The in-development and operational resources are not shown in this data viewer.

QUESTION: From a big picture perspective, there were a number of parties that commented on needs to re-map locations of wind resources. Presuming you are looking at doing so, is Saffia's info suggesting that there are updates planned for the assessments that will be used, or will you be doing this more qualitatively?

-Ellen Wolfe (ewolfe@resero.com) - 10:47 AM

RESPONSE: Staff have several options, which have been implemented in the past, for portfolio adjustments that we are weighing. Staff could make inputs and assumptions updates and rerun RESOLVE, staff can make manual adjustments to the portfolio, and staff can remap resources with updated analysis. Staff are considering all three options based on stakeholder feedback.

QUESTION: Will there be another webinar once final mapping is complete?

Hillary Hebert (hillary@hmhenergy.com) - 10:51 AM

RESPONSE: Hillary: We were not planning for that, no.

QUESTION: Some RESOLVE regions may be rich in resource potential but sparse in existing substations. This suggests that new substations within the RESOLVE region, near high quality/low impact resource areas, might be justified. Where would consideration of the creation of new substations fit into this process?

-Andrew Mills (andrew@cal-cca.org) - 10:53 AM

RESPONSE: Generally, most of the resource potential is near an existing substation. However, we are looking at new substations in some instances. First, through the CAISO's transmission information and interconnection information, we've identified several proposed substations with commercial interest that we conduct analysis for and potentially map to. Second, when mapping to existing substations produces poor compliance with criteria, we look at areas of potential staff have identified without substations and conduct analysis there. This is what we did for wind resources mapped in the initial results to the eastern edge of Northern California. There is resource potential there, but no CAISO connected transmission infrastructure.

QUESTION: Where can I find the rationale/citations for the fire threat criteria?

Nancy Rader (nrader@calwea.org) - 10:57 AM

RESPONSE: Nancy: Please see the busbar mapping methodology doc we posted on 10/5/23: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/2023-2024-tpp-portfolios-and-modeling-assumptions/mapping_methodology_v10_05_23_ruling.pdf

QUESTION: Fire, continued... Thanks, Nathan. However, there is no rationale for screening out renewable energy projects based on their location in a high-fire threat area in the busbar mapping document. We can supply evidence that fire threat can be reduced with project mitigations. for wind projects.

Nancy Rader (nrader@calwea.org) - 11:09 AM

RESPONSE: The fire threat criteria is not to definitively declare where resource can or cannot be built. Rather, it along with the other criteria are to identify more favorable locations for resources to be built. Staff have identified fire threat as a potential factor that can make the development process more challenging and potentially more costly. Staff would appreciate any information you can provide that shows more visibility into these risks or potential mitigations that limit the risks.

QUESTION: It appears that these mapping results are already informed by the CAISO's guidance on specific transmission and interconnection issues as well as the CEC's guidance and recommendation to improve land-use compliance issues. Is that correct? For subsequent iteration(s), would there be further CAISO/CEC reviews that would potentially require changes to resource selection or mapping before the busbar mapping is finalized?

Pushkar Wagle (pushkarwagle@flynnrci.com) - 11:11 AM

RESPONSE: Yes, for the initial round we received significant input from CEC and CAISO. We will be asking both to do additional analysis and provide additional information before finalizing the mapping. Busbar mapping is an interactive process with significant input from staff at both CEC and CAISO.

QUESTION: Will there be an opportunity to comment on this "further mapping"?

Nina Robertson (nrobertson@earthjustice.org) - 11:18 AM

RESPONSE: We anticipate releasing the updated mapping of the proposed base case with the Proposed Decision, expected in January.

QUESTION: It seems to be that slide 17 of the CEC presentation says that solar areas generally don't conflict with land use and environmental considerations while wind has a higher tendency to do so. Jared's current presentation (second deck) seems to support that. So can these findings that seem to only become clear in the busbar mapping process allow for a reconfiguration of the resource mix, or do these findings and the remapping process only allow for the geographic relocation?

-Ian Kearney (ian@goldenstatecleanenergy.com) - 11:25 AM

RESPONSE: Staff see several options, all which have all been implemented in past portfolio development, for portfolio adjustments. Staff could make inputs and assumptions updates and rerun RESOLVE, staff can make manual adjustments to the portfolio, and staff can remap resources with updated analysis. Staff are considering all three options based on stakeholder feedback.

QUESTION: There have been a number of comments in the CPUC and CAISO processes related to the significant deviation of the resource portfolios currently being studied by the CAISO in 2023-2024 TPP and this PSP which will be used in the next TPP. Does CPUC have any direction to CAISO in the current cycle to

plan accordingly for the big change? (specifically thinking about the decrease Offshore wind and the increase in Nevada wind in this PSP).

kirsten eliasen (kirsten@gallatinpower.com) - 11:33 AM

RESPONSE: Kirsten: Those are bigger policy questions better addressed in the proceeding itself. Nonetheless, we have been considering what to do re: those issues (e.g., what, if any additional guidance would CAISO need in the upcoming PD re: differences between the PD portfolios and those transmitted for 23-24).

QUESTION: Jared, thanks re the clarification the CAISO's constraints around Beatty and your plans to re-run. Do you also plan to include the additional expansion opportunity for that previously approved transmission upgrade to Beatty such that RESOLVE can further expand that capability if it is cost-effective?

Ellen Wolfe (ewolfe@resero.com) - 11:33 AM

RESPONSE: Based on the comments and replies feedback staff may implement a rerun of RESOLVE or do more qualitative manual adjustments to the portfolio or mapping results. With transmission upgrades staff generally stick to identified CAISO White paper upgrades in portfolio development and busbar mapping. However, in busbar mapping, staff do sometimes consider alternative upgrades in the mapping process and rely on CAISO staff's information and recommendations if diverging from the White Paper information.

QUESTION: Can you offer any more details about the East of Pisgah? Is that Lugo-Victorville or something else and if the latter, what constraint?

Ellen Wolfe (ewolfe@resero.com) - 11:37 AM

RESPONSE: The East of Pisgah Study Area includes the GLW and VEA subsystems, as well as the Lugo-Victorville constraint. The geographic extent roughly overlaps with the Southern NV Eldorado RESOLVE region.

QUESTION: Will staff consider hosting another workshop ahead of the PD to discuss the final mapping results? This presentation highlights the complexity of mapping resources in alignment with overlapping criteria. The decisions staff will make in the final round of mapping are the most critical and most subjective. Providing the results with the PD when there will be limited time for comment and further adjustment is problematic, especially considering the increased ties to the CAISO interconnection applications.

Hillary Hebert (hillary@hmnenergy.com) - 11:41 AM

RESPONSE: Hillary: Note above that we are not planning to have another workshop re: mapping, etc. We acknowledge the difficulties you describe but have to manage a delicate balance between the right amount of process vs. keeping deadlines to keep our planning processes going and transmitting portfolios to CAISO TPP.

QUESTION: Slide 19 - "This part of the transmission analysis focuses only on the existing CAISO footprint needs. Portfolio and mapping also likely trigger out-of-CAISO transmission needs or potential transmission expansion that staff are continue to analyze." Can you provide more detail on the additional transmission projects that staff is continuing to analyze? are these specific projects already in development?

kirsten eliasen (kirsten@gallatinpower.com) - 11:42 AM

REPSONSE: Since the portfolios include resources mapped outside of the CAISO system, staff have to factor in potential transmission needs beyond CAISO. This includes identified projects in planning and development such as the transmission lines mapped OOS wind resources will utilize to get to the CAISO system. Staff rely on publicly released cost, capacity, and timing, information on such projects or information included in recent transmission studies by CAISO and other BAAs. This analysis also includes potential transmission that is less defined by an existing project in development such as potential additional transmission needs in IID to interconnect geothermal or new transmission that would be needed to interconnect any wind mapped to the eastern areas of Northern California.

QUESTION: The presentation does not discuss the mapping of battery storage very much. Should we take that to mean that Round 1 of storage mapping may not change very much?

Hillary Hebert (hillary@hmhenergy.com) - 11:43 AM

RESPONSE: Staff highlighted some commercial criteria alignment that could be improved for battery mapping and some battery resources may need to be remapped to address transmission exceedances. Additionally, any shifts in mapped solar resources would likely require remapping of storage co-located with that solar. Generally, though, battery storage was in good alignment with the criteria.

QUESTION: Slides #18-#19: Have you assessed how many of the transmission constraints identified under the current draft mapping were also exceeded in the 2023-2024 TPP portfolios?

Pushkar Wagle (pushkarwagle@flynnrci.com) - 11:43 AM

RESPONSE: We do not have that readily available to share at this moment, but it is something that staff will look to implement and release as part of the release of the mapping supporting analysis for the upcoming PD.

QUESTION: Will there be an additional opportunity to comment on the retirement mapping when more details are released?

Deborah Behles (deborah.behles@gmail.com) - 11:44 AM

RESPONSE: Probably not, Deborah. Sorry, but see my note to Hillary above re: trying to balance the right amount of process vs. keeping our timelines.

QUESTION: Is age of gas plants in the criteria based on continuous operation since original commercial operation date? thank you!

Emily Turkel (emily.turkel@calpine.com) - 11:48 AM

RESPONSE: The age of a unit is based on the CAISO's master generating capability's list identified COD.

QUESTION: The ALJ's Ruling indicated staff has been developing "new local area modeling capabilities," specifically to aid in modeling the retirement and replacement of gas plants – have these capabilities been developed and have they/will they inform the mapping of the High Gas Retirement scenario?

Orran Balagopalan Environmental Defense Fund (-
obalagopalan@smwlaw.com) - 11:48 AM

RESPONSE: Orran: The capabilities the Ruling mentions are still in development and were not used to inform development of the proposed High Gas Retirement case.

QUESTION: Similar to Kristin's question regarding the CAISO's 2023-24 TPP, the Lugo Victorville constraint was one binding in every sensitivity case the CPUC issued in the December release. The CAISO initially proposed to upgrade it in the 2022-23 TPP but then paused the specific recommendation to gather more info. Will the CPUC's coordination with CAISO, also share the impacts that are continuing to be seen in your analysis regarding this constraint?

Ellen Wolfe (ewolfe@resero.com) - 11:49 AM

RESPONSE: CPUC will be transmitting mapped portfolios and the various potential transmission implications to the CAISO in February in line with the CAISO's process for starting the 24-25 TPP. It is then CAISO's discretion to decide how such information may or may not relate to prior or ongoing TPP analysis.

QUESTION: At Wednesday's IEPR CED workshop, CEC staff stated that CHP capacity and generation/energy will be assumed constant over the study horizon of the 2023 IEPR CED. That sets up immediate capacity and load differences between the draft 2023 IEPR CED and the proposed PSP. Would it be possible that staff could re-run the portfolio to adjust for the BTM and IFOM load and IFOM capacity of CHP resources in the 2023 IEPR?

Lambert, Christian (christian.lambert@cpuc.ca.gov) - 11:50 AM

RESPONSE: Christian: Unfortunately, those sorts of differences are going to come up from time to time in a planning environment such as ours. I highly doubt we'll have time to re-run any cases given the timing of 2023 IEPR adoption in relation to our own process here.

QUESTION: Would it make sense to rank plants by their emissions rate without inclusion/weighting by the capacity factor? It seems that the capacity factor of retained plants will increase to back-fill for the retired plants. Essentially gas generation will likely shift between plants rather than disappear with retirement.

-Andrew Mills (andrew@cal-cca.org) - 11:53 AM

RESPONSE: Staff appreciate the feedback to the proposed criteria. These criteria are not finalized, and staff are still considering options on how to weigh/implement the data. We do recognize that possibility if plants were to retire in real operations.

QUESTION: For clarification: did you incorporate only 2018 NOx emission data, or also 2018 PM2.5 emission data? Is the selection based on nonattainment zone unlinked to actual plant-level emissions?

Emily Turkel (emily.turkel@calpine.com) - 11:53 AM

RESPONSE: Staff have currently only incorporated NOx emissions into the factors and not PM2.5. The criteria based on non-attainment zones is independent of the emissions data criteria. As noted in the webinar, staff shared an example where all criteria were treated independently and equally weighted. Staff are considering potential other weighting options that could link criteria.

QUESTION: Do you have an estimated time frame for when you expect the webinar recording and QA transcript will be posted?

Ellen Wolfe (ewolfe@resero.com) - 11:53 AM

RESPONSE: We're targeting next week, Ellen. Some of these detailed questions might take some time to provide a proper response for. :)

QUESTION: Why are the highest CF resources prioritized for retirement? Largest emissions reduction?

Matt OConnell (moconnell@sdge.com) - 11:54 AM

RESPONSE: Yes, staff are looking at the CF as a rough stand in for how much the plant runs and therefore how much emissions would be stopped if modeled as offline in the studies.

QUESTION: Are the "not in LCR" plants predominantly in either one of NP15 or SP15?

Lambert, Christian (christian.lambert@cpuc.ca.gov) - 11:57 AM

RESPONSE: We don't have that analysis readily set, but we work to include that kind of info in the future release of this analysis.

QUESTION: slides #24-#28: These slides are very informative/helpful. Great job!

Pushkar Wagle (pushkarwagle@flynnrci.com) - 11:57 AM

RESPONSE: Thank you!

QUESTION: Will gas plant-level retirement selections be shared prior to the PD?

Emily Turkel (emily.turkel@calpine.com) - 11:57 AM

RESPONSE: As with other questions regarding additional information release prior to the PD, it is unlikely that staff will be able to release anything related to this before the PD.

QUESTION: Thanks to all who supported. The materials were helpful and the opportunity for Q and A is especially helpful in this process!

Ellen Wolfe (ewolfe@resero.com) - 11:59 AM

RESPONSE: Thank you!

QUESTION: Thank you for all of your work!

kirsten eliasen (kirsten@gallatinpower.com) - 12:01 PM

RESPONSE: Thank you!

QUESTION: Hi Nathan, I asked three questions, but I did not receive any acknowledgments/responses to my questions. Just want to make sure you are seeing those questions. If not, please allow me to ask those questions verbally. Thanks for your consideration.

Pushkar Wagle (pushkarwagle@flynnrci.com) - 10:12 AM

RESPONSE: Pushkar: These questions will be answered in the final Q and A doc, if not already, when it is posted.