

The CAISO received comments on the topics discussed at the August 16th, 2023 stakeholder call from the following:

- A. ACP-California
- B. Bay Area Municipal Transmission Group (BAMx)
- C. California Public Utilities Commission - Public Advocates Office
- D. California Wind Energy Association
- E. EDF-Renewables
- F. Gallatin Power Partners
- G. Golden State Clean Energy
- H. Invenergy
- I. Middle River Power, LLC
- J. Pacific Gas & Electric
- K. RWE Renewables
- L. San Diego Gas & Electric

Copies of the comments submitted are located on the 20 Year Transmission Outlook (2023-2024) page at:

<https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/20-Year-transmission-outlook-2023-2024>

The following are the CAISO's responses to the comments

1. [Please provide your organization's comments on the 20-Year Transmission Outlook](#)
2. [Please provide your organization's comments on the approach to offshore wind](#)
3. [Please provide any additional comments](#)

1. Please provide your organization's comments on the 20-Year Transmission Outlook.

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| 1A | ACP-California | <p>ACP-California continues to appreciate CAISO's efforts to compile the 20-Year Outlook. The first 20-Year Outlook (which ran parallel to the 2021-22 Transmission Planning cycle) was invaluable for stakeholders seeking to understand the longer-term needs of the system and we appreciate CAISO's efforts to update that analysis in parallel the 2023-24 Transmission Planning Process. As the information from the 20-Year Outlook becomes more integrated into the resource and transmission planning processes, we hope the 20-Year Outlook can continue to inform other actionable processes by the CAISO, the CPUC and the CEC.</p> <p>We encourage CAISO to continue to prepare updates to the 20-Year Outlook on a biennial basis, as these outlooks provide the type of forward-looking analysis that the state needs as it plans the transition necessary to achieve SB100, retain reliability, and build resiliency. Continuing to update the 20-Year Outlook, and allow stakeholders to be involved in that process, is critical as the Outlook provides a high-level understanding of the transmission backbone that will be needed to support the grid in the long-term and also provides a critical piece of information for other state agencies to consider and utilize as they undertake their own planning efforts. Crucially, it also provides CAISO with useful information on the likely future buildout of the transmission system as CAISO looks to approve more near-term transmission projects and upgrades. Notably, CAISO can utilize the 20-Year Outlook to assess whether, among a suite of transmission alternatives, one might provide strategic long-term value and/or whether the size/voltage of a project that is being considered should be increased to better accommodate likely future system needs, which will ultimately reduce overall ratepayer costs.</p> <p>ACP-California appreciates CAISO's efforts to develop and update the 20-year Outlook. We look forward to future updates and engagement on this important endeavor. As discussed more below, modifications to the portfolios used in the 20-Year</p> | <p>The comment has been noted.</p> <p>The comment has been noted.</p> <p>The comment has been noted.</p> |

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| | | <p>Outlook may be required to better reflect the anticipated buildout of offshore wind and we look forward to engaging with the CEC, CPUC, and other parties in order to include better assumptions about the amount and geographic location of offshore wind in the future.</p> | |
| <p>1B</p> | <p>Bay Area Municipal Transmission Group (BAMx)</p> | <p>Introduction</p> <p>The Bay Area Municipal Transmission Group (BAMx)[1] appreciates the opportunity to comment on the CAISO 20-Year Transmission Outlook (20-Year Outlook Update, hereafter) and Approach to Offshore Wind, presented at the CAISO Stakeholder meeting on August 16, 2023. BAMx acknowledges the significant effort of the CAISO staff to develop this material.</p> <p>In these comments, BAMx raises some major concerns about the skyrocketing CAISO Transmission Access Charges (TAC) and the CAISO's financial fiduciary responsibilities to Californians and grid users. BAMx's comments should be construed as attempting to assist the State in its journey to achieve its climate goals and not as any opposition to taking the necessary steps. Further, BAMx recognizes that electric rates may continue to rise as a necessary outcome in achieving the State's climate goals. That said, it is imperative and incumbent on the CAISO to design and develop an appropriate and cost-effective electric grid to accomplish those goals.</p> | <p>The comment has been noted.</p> <p>The comment has been noted.</p> |

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| | | <p>installing these projects. Overall, BAMx believes that the subscriber model should be applied to the remaining OOS projects and offshore wind projects and would have a tremendous positive impact in containing the ever-growing TAC.</p> <p>Need to Utilize Resource Portfolios Based on Most Recent Transmission Capability and Cost Estimates</p> <p>From the August 16th stakeholder meeting, BAMx got the impression that just like the resource portfolios used in the 2022-2023 and 2023-2024 Transmission Planning Processes, the portfolios that would be studied as part of the 20-Year Transmission Outlook update will be based on the older version of the transmission capability estimates that were developed as part of the White Paper in July 2021.[5] The CAISO developed more recent estimates in June 2023.[6] The June 2023 estimates are based on the CAISO's most recent assessments and incorporate on-peak and off-peak limits and identified transmission upgrades for 104 transmission constraints compared to 44 in the 2021 White Paper. BAMx is concerned that the resource portfolios used in the 20-Year Outlook will not benefit from this latest information and, therefore, may result in identifying transmission upgrades that could have been avoided if the resource portfolios were adjusted based on the most recent transmission capability estimates. Therefore, BAMx urges that the CAISO screen the draft resource portfolios currently under consideration for the 20-Year Outlook and make the necessary adjustments if they are inconsistent with the latest June 2023 transmission capability limits.</p> <p>Need to Fully Understand the Extent of TAC Impact and Need for Robust Cost Estimates</p> <p>The 20-Year Transmission Outlook, dated May 2022, did a good job of providing the cost estimates associated with different types of transmission, including upgrades to the existing CAISO</p> | <p>The comment has been noted.</p> <p>High level cost estimates will be provided for all the proposed transmission concepts.</p> |

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| | | <p>footprint, Offshore wind integration, and OOS wind integration. However, we believe the 20-Year Outlook missed the costs associated with some system upgrades required for starting point generation interconnection, such as the Wheeler Ridge – Kern 230 kV DCTL Project and the Kramer –Victor –Lugo Path Upgrade Project.[7]</p> <p>It appears that the proposed 20-Year Outlook update will not include an estimate of future HV TAC, which BAMx recommends the CAISO reconsider. BAMx believes the stakeholders must be kept informed of the 20-Year transmission plan’s financial impacts. On the other hand, BAMx is encouraged that the CAISO will develop cost estimates for all transmission upgrades identified in this update. BAMx urges the CAISO to provide preliminary engineering/planning cost estimates with the appropriate level of contingency to account for cost uncertainties in this early study cycle. For example, one industry practice is to include 100% contingency to account for uncertainties when the cost estimate is based on a preliminary project scope. These estimates can then be further refined based on the stakeholder feedback by the time the 20-Year Transmission Outlook is finalized in May 2024. It is critical that the transmission cost estimates are robust and realistic so that the policymakers and decisionmakers can make informed decisions based on the 20-Year Transmission Outlook. One such example of preliminary transmission cost estimates rendering misleading transmission cost assessment is the Eldorado – Lugo 500 kV line, which was estimated to cost \$1 Billion in the last 20-Year Transmission Outlook issued in May 2022. However, the Draft 2022-2023 Transmission Plan identified another transmission project, i.e., Trout Canyon-Lugo 500 kV, which was similar in scope but was estimated to cost \$2 billion. In other words, a closer look at the transmission scope and cost yielded a 100% increase in the transmission cost within less than the year when the original cost estimates were developed.</p> | <p>Considering the focus and objective of the 20-year transmission outlook, the cost estimates are at a high level and are based on the per-unit cost of transmission enhancements and the cost estimate for similar projects.</p> |

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| | | <p>BAMx Supports the Alignment of Annual Transmission Plan and 20-Year Outlook</p> <p>BAMx requests the CAISO to fully explain how the transmission considerations and approvals in the 2023-2024 TPP would be aligned with the 20-Year Outlook. As BAMx explained in its comments on the CAISO 2022-2023 Draft Transmission Plan (April 25, 2023), more information was necessary to systematically compare the transmission upgrades recommended in the Transmission Plan and those envisioned in the 20-Year Transmission Outlook. Although BAMx could map some of the approvals in the 2022-2023 Transmission Plan to those in the 20-Year Transmission Outlook, there were others that could not be mapped. The CAISO needs to provide much-needed insights into how the 2023-2024 Transmission Plan would align with the 20-Year Outlook update. BAMx urges the CAISO to give an early indication of this alignment at the November 2023 stakeholder meeting, where the CAISO is expected to provide preliminary policy- and economic-driven assessment.</p> | <p>The 20-year outlook update and the 2023-2024 TPP processes will be carried out in parallel and the level of the coordination between the two processes will be different depending on the study area. The two processes will be closely coordinated in areas such as offshore wind in which a project is being considered to be recommended in the 2023-2024 TPP.</p> |
| 1C | California Public Utilities Commission - Public Advocates Office | <p>The Public Advocates Office at the California Public Utilities Commission (Cal Advocates) provides these comments on the California Independent System Operator's (CAISO) August 16, 2023 presentation on the 2023-2024 20-Year Transmission Outlook and Approach to Offshore Wind. Cal Advocates is an independent consumer advocate with a mandate to obtain the lowest possible rates for utility services, consistent with reliable and safe service levels, and the state's environmental goals.^[1]</p> <p>A. CAISO should analyze and discuss ratepayer impacts with respect to High-Voltage Transmission Access Charge (HV-TAC) increases in the 2023-2024 20-Year Outlook.</p> <p>All ratepayer impacts should be transparent and directly addressed in the CAISO's transmission planning process (TPP), which now includes a 20-Year Transmission Outlook. To this end, Cal Advocates requests CAISO provide the anticipated HV-TAC forecasts for years 2030, 2035, 2040 and 2045 with TPP</p> | <p>The comment has been noted.</p> <p>Transmission Access Charge assessment is done annually as part of the transmission planning process and included in the 10-year transmission plan. Given the assessment is at a higher level, the scope of 20-year transmission outlook analysis does not include TAC impact evaluation.</p> |

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| | | <p>approved transmission projects and the 20-Year Transmission Outlook projects. These HV-TAC forecasts should identify the potential transmission cost savings from interregional transmission projects that seek cost recovery through the subscriber-based model^[2] versus through the HV-TAC.</p> <p>B. CAISO should identify projects in CAISO’s Transmission Plans that directly align with the 20-Year Transmission Outlook.</p> <p>With information on Transmission Plan projects that align with the 20-Year Transmission Outlook projects, stakeholders would be able to understand and see the progress towards meeting the state’s climate change goals in the transmission arena. Stakeholders would also understand if the total costs for meeting the state’s climate change goals increases with Transmission Plan projects that align with those proposed in the 20-Year Transmission Outlook, but have higher costs. CAISO should also explain whether approved Transmission Plan projects eliminate the need for specific projects in the 20-Year Transmission Outlook or are needed in addition to projects in the 20-Year Transmission Outlook.</p> <p>CAISO stated in the April 11, 2023 CAISO TPP meeting that the Draft Transmission Plan will align with the 20-Year Transmission Outlook.^[3] Information to explain this alignment, however, was not provided.</p> <p>C. CAISO should identify the projects in CAISO’s 2022-2023 Transmission Plan that directly align with CAISO’s 2022 20-Year Transmission Outlook.</p> <p>Cal Advocates makes this request to confirm whether any of the 2022-2023 Transmission Plan projects replace and thus eliminate the need for any of the proposed 2022 20-Year Outlook projects. Specifically, Cal Advocates requests confirmation of whether the listed projects from the 2022-2023 Transmission Plan collectively replace and thus eliminate the</p> | <p>The 20-year outlook will model all the approved transmission projects as the base and will identify what additional transmission enhancements would be required to reliability serve the CEC load forecast and connect the resources in CPUC portfolio in 2045.</p> <p>The alignment between the two processes could be summarized as:</p> <ul style="list-style-type: none"> - All the projects approved in TPP will be included as base in the 20-year transmission outlook assessment - The transmission concepts developed in the 20-year transmission outlook will be considered as an alternative to address the need identified in the 10-year transmission plan. As more detailed analysis is performed in the 10-year plan, the detail scope of the project that will be recommended for approval in TPP may vary from concepts evaluated in the 20-year transmission outlook assessment. <p>Since the approved TPP projects will be modelled in the base cases for the 20-year transmission outlook, any need that will be identified in the 20-year transmission outlook assessment will be over and beyond what is already approved in the transmission plan.</p> |

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| | | <p>need for the listed projects from the 2022 20-Year Transmission Outlook (see Table 1).</p> | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th colspan="2" data-bbox="506 618 1207 724">Table 1. Approved 2022-2023 Transmission Plan projects that may have replaced 20-Year Transmission Outlook Projects</th> </tr> <tr> <th data-bbox="506 724 869 959">Southern Area Reinforcement Projects from the 2022-2023 Transmission Plan that collectively replace projects in the 2022 20-Year Transmission Outlook. (unconfirmed)</th> <th data-bbox="869 724 1207 959">Projects in the 20-Year Transmission Outlook that are eliminated by 2022-2023 Transmission Plan projects. (unconfirmed)</th> </tr> </thead> <tbody> <tr> <td data-bbox="506 959 869 1101">1. Imperial Valley – North of Songs 500 kilovolt (kV) line and substation at \$2,288 million</td> <td data-bbox="869 959 1207 1101">1. Devers – La Fresa High Voltage Direct Current (HVDC) Line at 1.2 billion</td> </tr> <tr> <td data-bbox="506 1101 869 1242">2. North Songs-Serrano 500 kV line estimated at \$503 million</td> <td data-bbox="869 1101 1207 1242">2. Lugo – LA Basin HVDC at \$1 billion</td> </tr> <tr> <td data-bbox="506 1242 869 1383">3. Serrano-Del-Amo-Mesa 500 kV Transmission Reinforcement at \$1,125 million</td> <td data-bbox="869 1242 1207 1383">3. Sycamore Alberhill HVDC at \$1 billion</td> </tr> <tr> <td data-bbox="506 1383 869 1471">4. Southern California Edison (SCE) Eastern Area</td> <td data-bbox="869 1383 1207 1471"></td> </tr> </tbody> </table> | Table 1. Approved 2022-2023 Transmission Plan projects that may have replaced 20-Year Transmission Outlook Projects | | Southern Area Reinforcement Projects from the 2022-2023 Transmission Plan that collectively replace projects in the 2022 20-Year Transmission Outlook. (unconfirmed) | Projects in the 20-Year Transmission Outlook that are eliminated by 2022-2023 Transmission Plan projects. (unconfirmed) | 1. Imperial Valley – North of Songs 500 kilovolt (kV) line and substation at \$2,288 million | 1. Devers – La Fresa High Voltage Direct Current (HVDC) Line at 1.2 billion | 2. North Songs-Serrano 500 kV line estimated at \$503 million | 2. Lugo – LA Basin HVDC at \$1 billion | 3. Serrano-Del-Amo-Mesa 500 kV Transmission Reinforcement at \$1,125 million | 3. Sycamore Alberhill HVDC at \$1 billion | 4. Southern California Edison (SCE) Eastern Area | | |
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| 1. Imperial Valley – North of Songs 500 kilovolt (kV) line and substation at \$2,288 million | 1. Devers – La Fresa High Voltage Direct Current (HVDC) Line at 1.2 billion | | | | | | | | | | | | | | |
| 2. North Songs-Serrano 500 kV line estimated at \$503 million | 2. Lugo – LA Basin HVDC at \$1 billion | | | | | | | | | | | | | | |
| 3. Serrano-Del-Amo-Mesa 500 kV Transmission Reinforcement at \$1,125 million | 3. Sycamore Alberhill HVDC at \$1 billion | | | | | | | | | | | | | | |
| 4. Southern California Edison (SCE) Eastern Area | | | | | | | | | | | | | | | |

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| | | upgrades estimated at \$386 million | | |
| | | 5. Other San Diego Gas and Electric (SDG&E) area upgrades at \$28 million. | | |
| | | Total Costs \$4.3 billion[4] | Total Costs \$3.2 billion[5] | |
| 1D | California Wind Energy Association | <p>Cal Advocates also seeks confirmation on whether the Colorado River – Devers 500 kV line in the 2022 20-Year Outlook, which is estimated to cost \$1.2 billion,[6] is still needed. The SCE Eastern Area upgrades and the new North Gila – Imperial Valley 500 kV line, approved in the 2022-2023 Transmission Plan, are expected to address the same identified issues with integrating the 2045 resource portfolio as the Colorado River – Devers 500 kV line.[7]</p> <p>CalWEA wishes to highlight the fact that one very important assumption for the deliverability element of the first Outlook study, which presumably will be used for the current study, is inconsistent with CAISO's current deliverability methodology. More specifically, the first Outlook study used transmission outage assumptions lesser than the N-2 assumptions (N-0 and N-1 was used for 230kV and above, and N-1-1 was used for 500kV), while the deliverability assessment methodology uses far more stringent N-2 assumptions. Should CAISO not adopt a reform to that assumption in its current stakeholder initiative addressing potential reforms to the deliverability methodology, the transmission plan and price tag coming out of the Outlook will fail to represent the full extent of the upgrades that would be deemed needed to integrate the SB 100 portfolio.</p> <p>CalWEA encourages CAISO to run a version of the Outlook study that assumes comprehensive deliverability reforms to</p> | | <p>The study results will determine whether additional enhancements beyond already approved projects would be required.</p> <p>The scope of the 20-year transmission outlook assessment is to perform a high level assessment to gain an insight into the required transmission enhancements and not the full extent of the upgrades needed to integrate the SB 100 portfolio.</p> |

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| | | <p>obtain an indication of how much they would reduce the required upgrades and associated costs of interconnecting and delivering the same amount of capacity, while remaining reliable under NERC standards. These assumptions would include eliminating the SSN study and raising the 5% DFAX threshold for 500 kV line overload constraints to 10% – reforms that the CAISO is currently proposing, as well as assuming sub-N-2 outage conditions and using the CPUC’s adopted QC levels for dispatch rather than values that greatly exceed QC levels, such as the 83% dispatch level being proposed for offshore wind. CalWEA expects the results of such a study to show that deliverability reforms beyond N-0/N-1 outage conditions will further reduce the upgrades needed to comply with NERC standards and will free up capacity for storage resources that will improve the integration of variable energy resources into the system.</p> <p>CalWEA requests clarification of any higher-level studies that will be conducted in this 20-Year Outlook. Rather than the pseudo-deliverability study (snapshot power flow analysis) that was conducted for the first Outlook, we hope to see higher-level technical studies performed that will evaluate stresses in every generation pocket. A fuller understanding of the potentially required upgrades will help CAISO and stakeholders identify opportunities for efficiencies and cost reductions.</p> <p>Lastly, we encourage CAISO to use the 20-year Outlook to inform the upsizing of transmission upgrades in its TPP cycles, as it did in the 2022-23 TPP.</p> | <p>The scope of the high level assessment in the current 20-year transmission outlook update is similar to the last 2022 outlook. As more refined input assumptions on load and resources become available, more detailed analysis could be performed in future 20-year transmission outlooks.</p> |
| 1E | EDF-Renewables | EDF-R appreciates CAISO’s plan to update the 20-Year Transmission Outlook to capture planning year 2045. The result will be a valuable piece of analysis that will assist California in charting the path to serve 100 percent of electricity retail sales and state loads from renewable and zero-carbon resources in California by 2045. | The comment has been noted. |
| 1F | Gallatin Power Partners | CAISO should evaluate Nevada utility scale solar resources separately from in-state utility scale solar resources, as their own resource category in the RESOLVE model. The cost of these out of state solar resources can be drastically lower than in state | The assumptions on type, volume, and location of resources used in the 20-year transmission outlook assessment are provided by CEC and CPUC. Comments and suggestions on resources are best addressed in CPUC IRP and CEC SB 100 processes. |

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| | | <p>utility scale solar, with lower land cost, higher land availability, lower labor rates, and the greater ability to to qualify for the Energy Community Tax Rate Bonus associated with the Inflation Reduction Act . These Nevada utility scale solar resources are also locationally diverse solar resources to California load centers and are more valuable to the CAISO at CAISO peak times.</p> <p>CAISO should evaluate higher amounts of out of state solar and wind renewable resources in the 2045 Scenario and 20 Year Transmission Outlook to facilitate the development of long lead time, interstate transmission that will make the targets in SB 100 achievable. The 2023-2024 TPP will be based on the recommendation of an additional 70 GW of renewable and carbon free resources by 2032. Meeting this need will require additional out of state utility scale resources that are geographically diverse from the CAISO load centers, and also require the long-haul transmission required for delivery. Modeling more out of state resources in the 2045 Scenario and 20-Year Transmission Outlook will demonstrate a need for additional long range transmission development, and facilitate both new interconnections to the CAISO and additional renewable development.</p> | |
| 1G | Golden State Clean Energy | <p>Golden State Clean Energy (“GSCE”) appreciates the opportunity to submit this comment on the California Independent System Operator’s (“CAISO”) web meeting held on August 16, 2023, to discuss the 2023-2024 update to the 20-Year Transmission Outlook (“Outlook”).</p> <p>As the integrated resource planning (“IRP”) process moves to a 15-year study horizon and 2045 approaches, the Outlook’s high-level study will be somewhat less forward looking and closer in time to the needs being studied in the transmission planning process (“TPP”). This raises the question of what the Outlook can do to continue to provide value to the IRP-TPP process. We urge CAISO to ensure this Outlook does not inhibit the 2023-24 TPP studies, which will drive actual transmission approvals, and not to call into question the results of the 2024-25 TPP, which</p> | <p>The CAISO will continue to assess the need for and the scope of any future 20-year transmission outlook updates.</p> |

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| | | <p>will be informed by crucial updates to the California Energy Commission (“CEC”) land use screens. The updated CEC land use screens are a critical input in future TPP, IRP, and interconnection processes because they identify where California can and should site new generation resources. With limited areas for scalable resource development, it will be increasingly important for the CAISO and CPUC to rely on the land use screens to drive the zonal planning approaches contemplated in the TPP and interconnection processes.</p> <p>GSCE recommends a few ways the updated Outlook study can provide important insights for the IRP-TPP and be a valuable use of CAISO transmission planners’ time. The following are some additional study approaches we recommend CAISO apply to the Outlook update:</p> <ul style="list-style-type: none"> • Focus on potential transmission development opportunities with other balancing authority areas (“BAAs”). <ul style="list-style-type: none"> ○ GSCE urges CAISO to coordinate the Outlook update with other California BAAs, and to identify and study possible projects that can allow CAISO to share the cost of transmission development and further access to clean energy resources. As CAISO examines possible transmission solutions, it should strive to provide stakeholders, the IRP process, and the SB 100 Report process with an understanding of what opportunities exist and how cost-effective certain transmission projects could be with BAA cost-sharing. ○ A substantial amount of load in California is not served by CAISO, yet this single transmission study may be the most important transmission insight provided to the SB 100 | <p>The comment is noted and the CAISO will continue to assess the need for and the scope of any future 20-year transmission outlook updates.</p> |

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| | | <p>Report process. Time should be taken to fully inform the 2025 SB 100 Report.</p> <ul style="list-style-type: none"> • Use the Outlook update to facilitate risk management options to cost-effectively address uncertainties and plan for nascent technologies. <ul style="list-style-type: none"> ○ The Outlook should not only illuminate transmission solutions that could be needed by 2045, but also assess how different groupings of transmission upgrades can interact to unlock resources in certain areas in a cost-effective manner. This type of information can allow regulators to better understand how proven technologies like solar and storage can address development risk associated with nascent technologies, like floating offshore wind or long-duration storage. Resources with established track records can be used to mitigate risks associated with nascent resources not coming online on the planned timeline. ○ One way to address this is to state how certain groups of upgrades can be phased in and their expected development timeline, where such groups of transmission upgrades correspond to pockets of new generation resources or an amount of additional capacity that can interconnect. ○ CAISO should also consider using sensitivity studies to understand what additional solar and storage could be needed if offshore wind is delayed, focusing on cost-effective opportunities to increase the scale of transmission development in areas where solar and storage is expected. Upgrades that only appear in the sensitivity study should then be assessed to determine how they interact with the base case solutions to show additional opportunities to scale development, | |

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| | | <p>opportunities to plan for different locational allocations of future generation and storage development, and possible least regrets solutions that will provide future optionality.</p> <ul style="list-style-type: none"> • Keep at the forefront CAISO’s new zonal approach in the TPP, the CEC’s new land use screens, and the potential for the 2023 Interconnection Process Enhancements initiative to limit future interconnection requests to zones of available transmission. <ul style="list-style-type: none"> ○ These policy components should guide the transmission solutions CAISO identifies in its Outlook update. Taking a zonal approach with a focus on the new land use screens will help ensure the Outlook update does not produce results that conflict with the 2024-25 TPP, which will be newly informed by the updated land use screens that could materially impact the IRP resource portfolios. ○ Further, a zonal approach to the new land use screens is reasonable because new transmission projects should be selected with an eye towards the new generation resources they allow to interconnect. The updated land use screens provide a better representation of land where resource development will either be more challenging or prohibited, and this must be a focal point as CAISO prepares to limit future interconnection requests to zones where there is available or approved transmission. To avoid generation development delays and other challenges interconnecting to future approved transmission, transmission studies should drive new transmission to areas where the land use screens show potential for scalable development. This de-risks the transmission investment and future reliability by increasing the potential for generation development to | |

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| | | <p>timely occur and make use of new transmission assets.</p> | |
| 1H | Invenergy | <p>Invenergy is one of the country's largest clean energy developers. Headquartered in the United States, Invenergy has experience developing, constructing, and operating some of the largest renewable projects in the country and operates 30 gigawatts (GW) of energy assets globally. Invenergy holds an offshore wind lease off California's Central Coast. In addition, Invenergy is also developing a 2,100 megawatt (MW) offshore wind project in the New York Bight and is engaged in offshore wind internationally.</p> <p>We support the CAISO in continuing to update the 20-Year Transmission Outlook on a biennial basis. Updates to the 20-Year Transmission Outlook are crucial to achieving the State's goals outlined in Senate Bill (SB) 100 and supporting future system transmission needs. Invenergy appreciates the opportunity to comment on the CAISO 20-Year Transmission Outlook stakeholder meeting held on August 16, 2023 and forthcoming report. Invenergy offers comments in response to the resource portfolios and updated load forecasts for 2045 presented in the 20-Year Transmission Outlook.</p> | <p>The comment has been noted.</p> |
| 1I | Middle River Power, LLC | <p>MRP offers comments on one aspect of the proposed 20-year transmission outlook ("20YTO") – the proposed retirement of 15 GW (more precisely, 14.4 GW, as proposed^[1]) of natural gas-fired generation.</p> <p>As MRP understands, both the 15 GW number and the 2040 retirement date were provided by the California Energy Commission. The CAISO arrived at the 14,408 MW detailed in the Presentation by considering a resource's age.</p> <p>MRP considers this a reasonable approach, but notes that this allocation leads to the retirement of resources within what are already capacity-deficient local capacity areas (e.g.,</p> | |

| No | Submitting Organization | Comment Submitted | CAISO Response | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|----------------------------|--|-----------------|----------------------------|----------------------------|-----------------|--|----------------------------|---------------|---------------|----------------|------------|------------|------------|-----------------|----------|---|-----|---|-----|-----|-----|------------------------|-----|-----|---|-----|-----|-----|--------|------|-----|---|------|------|-------|----------|-----|-----|---|-----|-----|------|-------------|-----|------|---|------|------|-------|----------------|-----|------|-----|------|------|-------|------|----|-----|----|-----|-----|------|--------------------|-----|------|-----|------|------|------|----------|------|------|----|------|------|------|----------------------------|---|------|-----|------|------|------|--------------|-------------|--------------|------------|--------------|--------------|--------------|-----------------|----------------------------|--|--|--|----------------------------|---------------|---------------|----------------|------------|------------|------------|-----------------|----------|---|-----|---|-----|-----|-----|------------------------|-----|-----|---|-----|-----|-----|--------|------|-----|---|------|------|-------|----------|-----|-----|---|-----|-----|------|-------------|-----|------|---|------|------|------|----------------|-----|------|-----|------|------|-------|------|----|-----|----|-----|-----|-----|--------------------|-----|------|-----|------|------|------|----------|------|------|----|------|------|------|----------------------------|---|------|-----|------|------|------|--------------|-------------|--------------|------------|--------------|--------------|--------------|--|
| | | <p>Stockton).[2] Below are the summaries of the 2024 and 2028 Local Capacity Technical Analyses by area:[3]</p> <p>2024 Local Capacity Needs</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th rowspan="2">Local Area Name</th> <th colspan="4">August Qualifying Capacity</th> <th>Capacity Available at Peak</th> <th>2024 LCR Need</th> </tr> <tr> <th>QF/ Muni (MW)</th> <th>Non-Solar (MW)</th> <th>Solar (MW)</th> <th>Total (MW)</th> <th>Total (MW)</th> <th>Capacity Needed</th> </tr> </thead> <tbody> <tr><td>Humboldt</td><td>0</td><td>176</td><td>0</td><td>176</td><td>176</td><td>133</td></tr> <tr><td>North Coast/ North Bay</td><td>137</td><td>852</td><td>0</td><td>989</td><td>989</td><td>983</td></tr> <tr><td>Sierra</td><td>1197</td><td>686</td><td>0</td><td>1883</td><td>1883</td><td>1212*</td></tr> <tr><td>Stockton</td><td>130</td><td>613</td><td>7</td><td>750</td><td>743</td><td>750*</td></tr> <tr><td>Greater Bay</td><td>617</td><td>7327</td><td>4</td><td>7948</td><td>7944</td><td>7329*</td></tr> <tr><td>Greater Fresno</td><td>206</td><td>2740</td><td>181</td><td>3127</td><td>2946</td><td>2028*</td></tr> <tr><td>Kern</td><td>10</td><td>374</td><td>43</td><td>427</td><td>384</td><td>427*</td></tr> <tr><td>Big Creek/ Ventura</td><td>406</td><td>3446</td><td>265</td><td>4117</td><td>4117</td><td>1971</td></tr> <tr><td>LA Basin</td><td>1179</td><td>7164</td><td>10</td><td>8353</td><td>8353</td><td>4413</td></tr> <tr><td>San Diego/ Imperial Valley</td><td>2</td><td>5204</td><td>182</td><td>5388</td><td>5206</td><td>2834</td></tr> <tr><td>Total</td><td>3884</td><td>28582</td><td>692</td><td>33158</td><td>32741</td><td>22080</td></tr> </tbody> </table> <p>2028 Local Capacity Needs</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Local Area Name</th> <th colspan="4">August Qualifying Capacity</th> <th>Capacity Available at Peak</th> <th>2028 LCR Need</th> </tr> <tr> <th>QF/ Muni (MW)</th> <th>Non-Solar (MW)</th> <th>Solar (MW)</th> <th>Total (MW)</th> <th>Total (MW)</th> <th>Capacity Needed</th> </tr> </thead> <tbody> <tr><td>Humboldt</td><td>0</td><td>176</td><td>0</td><td>176</td><td>176</td><td>148</td></tr> <tr><td>North Coast/ North Bay</td><td>137</td><td>852</td><td>0</td><td>989</td><td>989</td><td>891</td></tr> <tr><td>Sierra</td><td>1197</td><td>686</td><td>0</td><td>1883</td><td>1883</td><td>1415*</td></tr> <tr><td>Stockton</td><td>106</td><td>659</td><td>7</td><td>772</td><td>765</td><td>772*</td></tr> <tr><td>Greater Bay</td><td>617</td><td>7327</td><td>4</td><td>7948</td><td>7944</td><td>6261</td></tr> <tr><td>Greater Fresno</td><td>206</td><td>2740</td><td>181</td><td>3127</td><td>2946</td><td>2728*</td></tr> <tr><td>Kern</td><td>10</td><td>374</td><td>43</td><td>427</td><td>384</td><td>427</td></tr> <tr><td>Big Creek/ Ventura</td><td>406</td><td>3446</td><td>265</td><td>4117</td><td>4117</td><td>1216</td></tr> <tr><td>LA Basin</td><td>1179</td><td>7164</td><td>10</td><td>8353</td><td>8353</td><td>5940</td></tr> <tr><td>San Diego/ Imperial Valley</td><td>2</td><td>5204</td><td>182</td><td>5388</td><td>5206</td><td>3575</td></tr> <tr><td>Total</td><td>3860</td><td>28628</td><td>692</td><td>33180</td><td>32763</td><td>23373</td></tr> </tbody> </table> <p><small>* Details about magnitude of deficiencies can be found in the applicable section below. Resource deficient areas and sub-area implies that in order to comply with the criteria, at summer peak, load may be shed immediately after the first contingency.</small></p> <p>The CAISO projects the 2024 Stockton local capacity area deficiency at more than 545 MW:[4]</p> | Local Area Name | August Qualifying Capacity | | | | Capacity Available at Peak | 2024 LCR Need | QF/ Muni (MW) | Non-Solar (MW) | Solar (MW) | Total (MW) | Total (MW) | Capacity Needed | Humboldt | 0 | 176 | 0 | 176 | 176 | 133 | North Coast/ North Bay | 137 | 852 | 0 | 989 | 989 | 983 | Sierra | 1197 | 686 | 0 | 1883 | 1883 | 1212* | Stockton | 130 | 613 | 7 | 750 | 743 | 750* | Greater Bay | 617 | 7327 | 4 | 7948 | 7944 | 7329* | Greater Fresno | 206 | 2740 | 181 | 3127 | 2946 | 2028* | Kern | 10 | 374 | 43 | 427 | 384 | 427* | Big Creek/ Ventura | 406 | 3446 | 265 | 4117 | 4117 | 1971 | LA Basin | 1179 | 7164 | 10 | 8353 | 8353 | 4413 | San Diego/ Imperial Valley | 2 | 5204 | 182 | 5388 | 5206 | 2834 | Total | 3884 | 28582 | 692 | 33158 | 32741 | 22080 | Local Area Name | August Qualifying Capacity | | | | Capacity Available at Peak | 2028 LCR Need | QF/ Muni (MW) | Non-Solar (MW) | Solar (MW) | Total (MW) | Total (MW) | Capacity Needed | Humboldt | 0 | 176 | 0 | 176 | 176 | 148 | North Coast/ North Bay | 137 | 852 | 0 | 989 | 989 | 891 | Sierra | 1197 | 686 | 0 | 1883 | 1883 | 1415* | Stockton | 106 | 659 | 7 | 772 | 765 | 772* | Greater Bay | 617 | 7327 | 4 | 7948 | 7944 | 6261 | Greater Fresno | 206 | 2740 | 181 | 3127 | 2946 | 2728* | Kern | 10 | 374 | 43 | 427 | 384 | 427 | Big Creek/ Ventura | 406 | 3446 | 265 | 4117 | 4117 | 1216 | LA Basin | 1179 | 7164 | 10 | 8353 | 8353 | 5940 | San Diego/ Imperial Valley | 2 | 5204 | 182 | 5388 | 5206 | 3575 | Total | 3860 | 28628 | 692 | 33180 | 32763 | 23373 | |
| Local Area Name | August Qualifying Capacity | | | | Capacity Available at Peak | 2024 LCR Need | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | QF/ Muni (MW) | Non-Solar (MW) | Solar (MW) | Total (MW) | Total (MW) | Capacity Needed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Humboldt | 0 | 176 | 0 | 176 | 176 | 133 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| North Coast/ North Bay | 137 | 852 | 0 | 989 | 989 | 983 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sierra | 1197 | 686 | 0 | 1883 | 1883 | 1212* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stockton | 130 | 613 | 7 | 750 | 743 | 750* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Greater Bay | 617 | 7327 | 4 | 7948 | 7944 | 7329* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Greater Fresno | 206 | 2740 | 181 | 3127 | 2946 | 2028* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kern | 10 | 374 | 43 | 427 | 384 | 427* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Big Creek/ Ventura | 406 | 3446 | 265 | 4117 | 4117 | 1971 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LA Basin | 1179 | 7164 | 10 | 8353 | 8353 | 4413 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| San Diego/ Imperial Valley | 2 | 5204 | 182 | 5388 | 5206 | 2834 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 3884 | 28582 | 692 | 33158 | 32741 | 22080 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Local Area Name | August Qualifying Capacity | | | | Capacity Available at Peak | 2028 LCR Need | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | QF/ Muni (MW) | Non-Solar (MW) | Solar (MW) | Total (MW) | Total (MW) | Capacity Needed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Humboldt | 0 | 176 | 0 | 176 | 176 | 148 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| North Coast/ North Bay | 137 | 852 | 0 | 989 | 989 | 891 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sierra | 1197 | 686 | 0 | 1883 | 1883 | 1415* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stockton | 106 | 659 | 7 | 772 | 765 | 772* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Greater Bay | 617 | 7327 | 4 | 7948 | 7944 | 6261 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Greater Fresno | 206 | 2740 | 181 | 3127 | 2946 | 2728* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kern | 10 | 374 | 43 | 427 | 384 | 427 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Big Creek/ Ventura | 406 | 3446 | 265 | 4117 | 4117 | 1216 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LA Basin | 1179 | 7164 | 10 | 8353 | 8353 | 5940 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| San Diego/ Imperial Valley | 2 | 5204 | 182 | 5388 | 5206 | 3575 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 3860 | 28628 | 692 | 33180 | 32763 | 23373 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| No | Submitting Organization | Comment Submitted | CAISO Response | | | | | | | | | | | | | | | | |
|------|-----------------------------|---|-------------------|--------------------------|--------------------------|-----------------------------|------|-------|----------|-------------------|-------------|--------------------------|------|--|----|------------------|--|--------------------------|--|
| | | <p style="text-align: center;">Table 3.3-26 Stockton LCR Area Overall Requirements</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Year</th> <th style="width: 85%;">LCR (MW) (Deficiency)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2024</td> <td style="text-align: center;">1298 (548 NQC/ 555 Peak)</td> </tr> </tbody> </table> <p>The CAISO projects smaller deficiencies for 2028, though the deficiencies remain:[1]</p> <p style="text-align: center;"><small>Table 3.2-22 Stockton LCR Sub-area Overall Requirements</small></p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 8%;">Year</th> <th style="width: 5%;">Limit</th> <th style="width: 10%;">Category</th> <th style="width: 15%;">Limiting Facility</th> <th style="width: 10%;">Contingency</th> <th style="width: 52%;">LCR (MW) (Deficiency)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2028</td> <td></td> <td style="text-align: center;">P6</td> <td style="text-align: center;">Stockton Overall</td> <td></td> <td style="text-align: center;">1054 (282 NQC/ 289 Peak)</td> </tr> </tbody> </table> <p>Additionally, the table on slide 14 of the Presentation, in which there are no generation retirements in the 2035 portfolios but approximately 15 GW of retirements in the 2040 and 2045 scenarios, suggests that the retirements will occur after 2035 but before 2040.</p> <p>The allocation of generation retirements in the years after 2035 to local capacity areas that are already deficient raises these questions:</p> <ol style="list-style-type: none"> 1. Will proposed new resources be allocated to the deficient local areas to address the deficiencies prior to 2035? Or will the proposed gas-fired generation retirements exacerbate the existing deficiencies? 2. If the CAISO does not intend to address the local capacity area deficiencies through new resources, will the CAISO address the local capacity area deficiencies through directing the building of new transmission? | Year | LCR (MW) (Deficiency) | 2024 | 1298 (548 NQC/ 555 Peak) | Year | Limit | Category | Limiting Facility | Contingency | LCR (MW) (Deficiency) | 2028 | | P6 | Stockton Overall | | 1054 (282 NQC/ 289 Peak) | <p>The CPUC resource to busbar mapping process has already determined where the new resources should be modelled. The high level assessment in the 20-year transmission outlook will identify what new transmission enhancements will be required to reliably serve the CEC forecast load and connect the CPUC resource portfolio.</p> |
| Year | LCR (MW) (Deficiency) | | | | | | | | | | | | | | | | | | |
| 2024 | 1298 (548 NQC/ 555 Peak) | | | | | | | | | | | | | | | | | | |
| Year | Limit | Category | Limiting Facility | Contingency | LCR (MW) (Deficiency) | | | | | | | | | | | | | | |
| 2028 | | P6 | Stockton Overall | | 1054 (282 NQC/ 289 Peak) | | | | | | | | | | | | | | |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| 1J | Pacific Gas & Electric | <p>PG&E applauds the CAISO for undertaking this year’s update to 20-Year Transmission Outlook in parallel with the 2023-24 transmission planning process. PG&E believes this is an important and critical undertaking by CAISO for informing long-term resource and infrastructure planning for California and the West, especially as the need for integrating new resources rapidly increases to meet the state’s clean energy goals and increasing electrification load. PG&E continues to support the stated objective of this initiative, which is to develop long-term transmission information that will support and inform the CPUC’s IRP and the Joint Agencies’ SB100 efforts, as well as provide a reference point for longer term transmission needs that can help inform the current 12-year TPP process in right-sizing of transmission investments to meet future needs while balancing customer affordability. Below, PG&E provides two comments on the 20-Year Outlook and Approach to Offshore Wind.</p> <p><u>20-Year Transmission Outlook</u></p> <p>PG&E seeks clarification on the CAISO’s plan to extend the analysis and solution development to local systems below 200 kV. These local systems are typically more vulnerable to changes of flow patterns and load. Including such analysis would provide a more holistic view of capacity constraints and required local capacity requirements (LCRs) and upgrades, driven by resource mix changes and demand growth from electrification. PG&E recognizes locational granularity of resource and demand mapping will continue to be challenging and have a high degree of uncertainty, and recommends the CAISO work closely with CPUC, CEC, and PTOs to improve the assumptions in the current and future iterations of the 20-Year Outlook.</p> | <p>The focus of the high level assessment in this 20-year transmission outlook will be on 230 kV and 500 kV system. CAISO continues to assess the need for and the scope of any future 20-year transmission outlooks.</p> |
| 1K | RWE Renewables | No Comment | |
| 1L | San Diego Gas & Electric | <p>SDG&E would like to highlight the notable absence of the 22-23 TPP projects in the resource portfolio development process. As CAISO has previously noted, 22-23 TPP was one of the largest TPPs in history and most of those projects were driven by</p> | <p>The ISO has provided rough estimates of the impacts of the approved 22-23 TPP projects to the CPUC for use in the IRP process in response to CPUC’s request and stakeholder comments on the Transmission Capability White Paper. The updated estimates are</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>deliverability of new resources. Therefore, the absence of these in the resource planning process may result in incorrect siting of resources in less optimal areas of the system. SDG&E urges CAISO to expedite publishing Transmission Capability Estimates that include the 22-23 TPP projects to avoid suboptimal planning results. Further, a timetable for incorporation of the 22-23 TPP projects should be made public to inform stakeholders.</p> | <p>included in the CPUC's Busbar Mapping Dashboards: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials/assumptions-for-the-2024-2025-tpp</p> |

2. Please provide your organization's comments on the approach to offshore wind.

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| 2A | ACP-California | <p>ACP-California appreciates CAISO taking the time to review the approach to offshore wind for the 2023-24 update to the 20-Year Outlook. We recognize that the resource portfolios that CAISO will analyze for the 20-Year Outlook, including the amounts and location of offshore wind resources, were provided by the CEC, with input from and coordination with the CPUC, and, thus, CAISO is not responsible for making modifications to these portfolios. Nevertheless, it is important to note that the offshore wind assumptions used in the 20-Year Outlook may not accurately reflect the correct geographic representation of the anticipated build-out of this resource and are not fully reflective of the state's offshore wind planning goals in the 2045 timeframe.</p> <p>First, we note that the offshore wind capacity assumed in the 20-Year Outlook for 2045 (20 GW) is lower than the high-end of CEC's own planning goal of 25 GW of offshore wind by 2045.[1] Therefore, the portfolio of offshore wind resources being planned for in the 20-Year Outlook, as currently defined, is insufficient to meet the state's own offshore wind planning goals. ACP-California strongly advocates for CAISO to plan for the full 25 GW of offshore wind by 2045 to ensure the state can ultimately achieve its offshore wind goals and achieve needed resource diversity. We encourage the CEC and CPUC to update the resource portfolios now to ensure that the assumed capacity of offshore wind is in line with the state's 2045 planning goals. In doing so, however, the buildout capacity assumed for other resource types should not be reduced from the levels currently contained in the 2045 portfolios. In other words, planning to the full 25 GW of offshore wind resources must not come at the expense of upgrades needed to support clean capacity elsewhere on the system. ACP-California recommends that the CEC/CPUC portfolio used for the 20-Year Outlook incorporate a "buffer" (of 5 GW of additional offshore wind resources) to account for factors such as higher load growth and transmission project delays that consistently lead long-term planning efforts to</p> | <p>The CEC and CPUC provided the resource portfolio including the busbar mapping of the resources for the ISO to use in the 20-year transmission outlook..</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>undershoot the required transmission buildout, and true up the assumptions through the TPP.</p> <p>Additionally, ACP-California is concerned that the geographic distribution of the offshore wind resources in the 20-Year Outlook, the 2023-24 Base Case and Sensitivity case systematically underrepresents the amount of offshore wind capacity that will be built in the central coast. When the IRP portfolios were developed for use in the 2023-24 TPP, they included estimates of offshore wind capacity at the Morro Bay and Humboldt lease areas that we now know to underestimate the capacity potential in these zones given trends in technology development and layout design. Leaseholders now estimate that the capacities in Morro Bay will be at least 6,000 MW.[2] The buildout in the Morro Bay area could, therefore, easily exceed the highest end assumed in any of the studies that will be performed as part of the 2023-24 TPP or the 20-Year Outlook. As currently designed, these studies never assess more than 5,400 MW in the central coast. Similarly, the capacity proposed for Humboldt offshore wind development is too low, at 2,600 MW. This quantity should be revised up to 3,600 MW, reflecting a 7 MW/km² density factor. Again, ACP-California recognizes that these buildout assumptions were provided to the CAISO by the CEC, in coordination with the CPUC, but we encourage the state agencies and CAISO to explore more significant buildout of offshore wind resources in the central coast and the north coast, in line with developer and third-party expectations of offshore wind power densities in identified sea-space. Given the long lead time of offshore wind development and the pace of technology advances, the CAISO should study higher buildout scenarios for offshore wind to ensure proper long-term planning.</p> | <p>Please refer to CPUC IRP process for resource-related comments.</p> |
| 2B | Bay Area Municipal Transmission Group (BAMx) | <p>Need to Incorporate All Transmission Facility Cost</p> <p>The proposed plan for the 20-Year Outlook update does not distinguish between “gen-tie” facilities and network facilities in accessing OSW. BAMx believes it would be helpful for the CAISO to classify the envisioned transmission by definitions used in the CAISO tariff. We believe those characterizations</p> | <p>All the potential transmission enhancement concepts that will be identified in the 20-year transmission outlook assessment will be network facility type as they transfer power from a POI provided in the CPUC busbar mapping of resources to the rest of the system.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>would be interconnecting customer interconnection facilities (or gen-tie) that connect the OSW to appropriate onshore substations (points of interconnections) and other transmission facilities required to achieve an economically justified distribution of the new wind resources throughout the CAISO grid.</p> <p>Need More Clarity on the Scope of Transmission to Access OSW</p> <p>During the August 16th stakeholder meeting, the CAISO did not present the details on the scope of the following three transmission options.</p> <ul style="list-style-type: none"> • 500 kV AC line to Fern Road; • Onshore overhead VSC-HVDC to Collinsville; and • Offshore sea cable VSC-HVDC to Bay Area. <p>Although the May 2022 20-Year Outlook included the description of these transmission options, the detailed scope of these transmission options was missing. For example, one of the CAISO 20-Year Outlook presentations in 2021-2022 TPP, the Offshore sea cable VSC-HVDC to Bay Area project envisioned a VSC-HVDC subsea cable to a converter station in the Bay area (somewhere in the vicinity of SF) with 3 AC connections to Potrero, East Shore, and Los Esteros.[1] Please confirm this scope, and identify the capital cost of all the elements in each transmission option.</p> <p>Need for Least Regrets Approach and Cost-Benefit Assessment</p> <p>BAMx supports the CAISO’s approach for performing the high-level assessment in the 20-Year Outlook, Sensitivity Portfolio in the 2023-2024 TPP, and Base portfolio in the 2023-2024 TPP to recommend projects to integrate OSW in the three steps.[2] BAMx appreciates the CAISO’s efforts in the earlier 20-Year Transmission Outlook and the proposed plan to perform studies to access the OSW resources. However, as the “West</p> | <p>The capital cost details of the identified transmission concepts will be provided in the report.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>Coast Offshore Wind Transmission Literature Review and Gaps Analysis.” prepared by the Pacific Northwest National Laboratory (“PNNL Report,” hereafter)[3], a considerable amount of work needs to be completed before choosing the preferred transmission option(s) for OSW. In particular, the PNNL Report identifies a series of challenges to delivering, transmitting, and producing electricity from offshore wind plants, especially floating offshore wind.[4]</p> <ol style="list-style-type: none"> 1. Lack of prioritization for interregional coordination; 2. Limited representation of future supply and demand patterns; 3. Lack of technological readiness of floating transmission and offshore wind plant infrastructure, and undefined viable subsea cable routes; 4. No validation of OSW generation attributes, etc. <p>As the PNNL report summarizes, “If guided intentionally, offshore wind may provide critical contributions to the bulk electricity transmission system through geographic and technological diversity. However, modifying transmission systems to accommodate these resources incurs long planning processes, uncertain siting requirements and construction timelines, and potentially high costs.”</p> <p>BAMx supports the CAISO’s recommendation for approving transmission projects that are found needed to meet the needs of the Base portfolio in the 2023-2024 TPP only.[5] Approving the transmission upgrades that are found needed in the Sensitivity portfolio and not in the Base portfolio would be counter to the CAISO’s FERC-approved tariff.[6] Furthermore, there is significant uncertainty and challenges around the development of OSW wind resource development as identified in the PNNL Report, especially on the North Coast. Approving major transmission infrastructure based on speculative resource development may lead to underutilized assets at ratepayers’ expense, if not stranded. In summary, it is reasonable to consider approving a transmission project in the 2023-2024 TPP</p> | <p>The CAISO is considering to propose a project for approval that meets the base portfolio needs but has the flexibility to be expanded to accommodate higher levels of offshore wind development in future.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>that has the flexibility for expansion to higher levels in the sensitivity portfolio and the 20-year outlook. However, it should not lead to approval of the transmission project(s) that well-exceeds the need identified in the Base portfolio.</p> <p>During the August 16th meeting, the CAISO identified multiple transmission path alternatives based on the number of links from each transmission technology to meet deliverability requirements for the North Coast OSW assumed in the 2023-2024 Base Portfolio.[7] In addition to the synergy with the Sensitivity Portfolio and 20-Year Outlook, the identification for transmission to access OSW in the 2023-2024 TPP must be based on a robust cost-benefit assessment. As an example, the Offshore HVDC (Bay Area) option adding 2,000MW of transfer path capability needs to be compared with the Onshore HVDC (Collinsville) option adding 1,400MW of transfer path capability based on a benefit-cost assessment. BAMx urges the CAISO to present its benefit-cost methodology in the next stakeholder meeting and update it based on stakeholder feedback.</p> <p>Incorporate Deliverability Assessment Reforms in the 20-Year Outlook</p> <p>On August 22, 2023, the CAISO issued a straw proposal on the Deliverability Assessment Methodology Revisions.[8] Some of the changes proposed to the deliverability assessment methodology by the CAISO, such as the study of High System Need (HSN) and Secondary System Need (SSN) and excluding generators that have an insignificant impact on the high capacity and low impedance 500 kV constraint may have some meaningful impact of the need for delivery network upgrades to accommodate the resource portfolios. We recognize that the CAISO will not be able to implement these changes in time for the 2023-2024 TPP assessment, but given the “information only” nature of the 20-Year Outlook, we request the CAISO to implement these changes to the deliverability studies in the 20-Year Outlook. We also support the CAISO’s proposal to work with the National Renewable Energy Laboratory on OSW wind</p> | <p>The focus of the high level assessment in this 20-year transmission outlook will be on 230 kV and 500 kV system. CAISO continues to assess the need for and the scope of any future 20-year transmission outlooks.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | data to assess the potential impact of additional information on dispatch assumptions on deliverability studies.[9] | |
| 2C | California Public Utilities Commission - Public Advocates Office | At this time, Cal Advocates has no comments on the approach to offshore wind. | |
| 2D | California Wind Energy Association | <p>While a 20-year conceptual plan will almost certainly remain conceptual, given a multitude of uncertainties that will unfold in that timeframe, CAISO should strive to envision the best solution to all expected high-value needs to produce overall efficiencies that will reduce total costs as well as improve system reliability. CAISO has presented conceptual plans for Central and North Coast offshore wind that include a transfer path beginning from a single onshore substation for each area. CAISO should also develop conceptual offshore networks to collect the offshore wind generation and deliver it to the grid and should anticipate the resolution of downstream constraints. That is, CAISO should develop a single, integrated design that supports the efficient delivery of at least 20 GW of offshore wind to California’s coastal load centers. (Such an approach is underway in Great Britain in National Grid’s “Pathway to 2030 Holistic Network Design” – see: https://www.nationalgrideso.com/future-energy/pathway-2030-holistic-network-design.)</p> <p>Shared interconnection network facilities will make full use of the transfer path capacity, reduce total transmission costs, and reduce impacts to the seabed by reducing overall cabling requirements to shore. It would be inefficient and costly for several adjacent OSW projects to separately connect to the grid with parallel gen-ties. A single, shared collection network with interconnection hubs that all projects connect to would not only be more efficient and impose fewer impacts, but it would lower the pro-rata cost for each project and overcome a significant development hurdle. CAISO should begin to conceptualize such offshore networks both at the North and Central Coasts in this year’s 20-year Outlook.</p> | The CPUC busbar mapping process has identified POIs for the offshore wind connections in the North and Central coast. The focus of the this 20-year transmission outlook is to provide an insight into potential concepts for the transfer path and the required 230 kV and 500 kV system enhancements downstream of the transfer path based on a high level assessment. The CAISO continues to assess the need for and the scope of any future 20-year transmission outlooks. |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>Regarding downstream constraints, in the first 20-year conceptual plan, CAISO added system elements to the initial plan to address the constraints that would result from connecting planned resources to the grid. This year's draft plan begins to envision system enhancements at the Central Coast depending on the status of the DCP; however, CalWEA recommends that CAISO envision the full design at the outset, including two offshore wind hubs. The two proposed VSC-HVDC offshore sea cables, one to Humboldt and one to the Bay Area at the Collinsville substation, should be part of the northern wind hub. The Central Coast offshore projects would connect via the Central Coast wind hub to Central Coast substations (Diablo Canyon and/or an expanded Morro Bay, and the Bay Area via Moss Landing) and to Southern California via Redondo Beach and the SONGS substation using HVDC subsea cables. This system would deliver Northern and Central Coast wind to all major load areas, and help relieve several known transmission constraints (e.g., Path 26 and Path 15). All the onshore and offshore HVDC lines should be designed as bi-directional to create a parallel backbone network to the onshore north-south network, substantially increasing the transfer capacity of the entire grid under both normal conditions and transmission outage conditions. Such a network would also lend itself to strengthened interconnections with Oregon, which is also planning for offshore wind off its southern coast.</p> <p>Given the increasing risk of major wildfires, offshore networks will bring considerable risk-reduction benefits, and would also avoid the difficult task of obtaining siting approvals involving a large number of land owners along a statewide, land-based path.</p> | <p>The CAISO will continue to refine the offshore wind interconnection concepts presented in the August 16th meeting based on the results of the ongoing high level assessment to ensure the system can reliably serve the CEC load forecast and reliably connect the resources in the CPUC resource portfolio.</p> |
| 2E | EDF-Renewables | <p>The plan to address offshore wind in the 20-year transmission plan update is detailed and will result in useful information. For other resource types, EDF-R encourages the CAISO to also provide results that are equally detailed and actionable. The newest Memorandum of Understanding[1] ("MOU") between the CAISO, the CEC, and the CPUC ("Joint Agencies") contemplates the CAISO identifying Category 1 facilities which</p> | <p>The transmission enhancement concepts developed in the 20-year transmission outlook based on a high level assessment are for information only to provide an insight into the required system enhancements. Such concepts will then be used as an alternative in future TPP cycles to recommends projects for approval.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>merit unconditional approval versus Category 2 facilities which may be needed depending on the course of future generation development and are expected to be found to be needed in future planning cycles. EDF-R encourages the CAISO to provide an analysis in this 20-year plan using the same framework so that, in turn, the CPUC and CEC can use that information to inform longer term statewide resource planning efforts and (hopefully) trigger the approval for upgrades that will require longer development timelines.</p> | |
| 2F | Gallatin Power Partners | <p>West Coast offshore wind is unproven from a cost perspective, the CAISO 20-Year Transmission Outlook should consider offshore wind against alternative generation/transmission solutions for 20 GW of renewable resource procurement that is more cost effective</p> <p>The emphasis placed on offshore wind in the 2045 Scenario by the inclusion of 20 GW is tying up transmission planning in a resource scenario that is unproven and unlikely to materialize.</p> | <p>The 20-year transmission outlook assessment is based on a resource portfolio developed by CEC and CPUC.</p> |
| 2G | Golden State Clean Energy | No comment | |
| 2H | Invenergy | <p>CAISO noted in its August 16, 2023, meeting that offshore wind development will focus primarily on the build-out of the North Coast. Invenergy questions that assumption and believes the numbers forecasted for the Central Coast should be higher and offers the following information for the CAISO's record:</p> <ul style="list-style-type: none"> • The California Energy Commission (CEC) has recommended planning around 25 GW of offshore wind in California, not 20 GW as the Transmission Outlook states so the overall offshore wind figures should be higher in the 20-Year Transmission Outlook; • The power density of each existing California lease site is most likely higher than assumed; and • Floating wind turbine technology will undoubtedly evolve over the next several years, and the capacity of each individual turbine will very likely increase. <p>The CAISO 20-Year Transmission Outlook includes 20 GW of offshore wind, yet Invenergy observes that the assumptions for</p> | <p>The CEC and CPUC provided the resource portfolio including the busbar mapping of the resources for the ISO to use in the 20-year transmission outlook.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>the 20-Year Transmission Outlook limit the build-out in the Central Coast to just 5.4 GW. Assembly Bill (AB) 525 required the CEC to evaluate and quantify the maximum feasible offshore wind capacity and to establish offshore wind energy planning goals for 2030 and 2045, and the CEC recommended establishing a preliminary planning goal of 25 GW of offshore wind by 2045.[1] The 25 GW target signals that the state sees a need for additional offshore wind capacity. Invenenergy recommends the CAISO consider the target set forth by the CEC in AB 525 in the 20-Year Transmission Outlook for grid planning assessments, and apportion those additional GW between the Central and North Coasts.</p> <p>Recent studies indicate that wind turbine capacity and density figures may be higher than what is assumed in the CAISO 20-Year Transmission Outlook. As such, Invenenergy supports adding additional GW to the Central Coast offshore wind assumptions. Studies have highlighted that existing wind turbines may extract more wind power over less land or water than previously thought.[2] The estimated installed power density of offshore wind turbines indicates a range of 3 to 12 MW/square kilometer (km²) and a mean of 7.36 MW/km². [3] The National Renewable Energy Laboratory (NREL) offshore wind data used as a basis for the CAISO 20-Year Transmission Outlook has a density factor of 3 MW per km², on the low end, and 5 MW per square kilometer on the high end.[4] Specifically, the 2021 Energy for Sustainable Development report written by Peter Enevoldsen from the Center for Energy Technologies at Aarhus University and Mark Jacobson from the Department of Civil and Environmental Engineering at Stanford University estimated that the installed power density of offshore wind turbines is 7.2 MW/km². [5] If this mean number were applied to the approximately 975 square kilometers that the Central Coast leases cover, this would equate to over 7 GW of capacity based on density figures alone. Invenenergy believes a higher power density number is warranted, especially for the Central Coast.[6]</p> | |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>Finally, as the use of offshore wind energy continues to grow, we expect significant advancements in technology. The average onshore wind turbine from 2011 could produce 1.5 MW of power.[7] In 2019, the average nameplate capacity of newly installed land-based wind turbines in the United States was 2.55 MW, according to Wind Exchange, a United States Department of Energy platform for science and wind energy information. [8] This is a 70% percent increase in per turbine capacity. Given that this is a 20-Year Transmission Outlook, the CAISO should make assumptions about increased capacity from technological advancement for offshore wind turbines.</p> <p>Invenergy requests that CAISO adopt higher offshore wind figures for the Central Coast, relying on the mean turbine density assumptions from the Enevoldsen and Jacobson 2021 report previously mentioned, and greater turbine capacity figures due to the evolution of the turbine technology.</p> <p>Without higher Central Coast offshore wind assumptions, Invenergy is concerned that the CAISO will not adequately plan for the needed transmission to deliver these resources.</p> <p>Thank you for providing the opportunity to provide feedback on the CAISO 20-Year Transmission Outlook Stakeholder Meeting. We look forward to further engagement in supporting plans to achieve state greenhouse gas reduction and other state policy goals.</p> | |
| 2I | Middle River Power, LLC | MRP has no comments on this topic. | |
| 2J | Pacific Gas & Electric | <p><u><i>Approach to Offshore Wind</i></u></p> <p>PG&E appreciates the CAISO sharing its “Approach to Offshore Wind” and preliminary results. It appears the current study approach may be limited to deliverability assessment only with selected scenarios and selected contingencies. It is unclear if the Projects to be developed from such study process will be tested in a full reliability assessment which includes varying</p> | <p>The transmission enhancement concepts developed in the 20-year transmission outlook based on a high level assessment are for information only to provide an insight into the required system enhancements. Such concepts will then be used as an alternative in future TPP cycles in the complete detailed deliverability and reliability analysis to recommends projects for approval.</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>system conditions and scenarios, while also studying all the TPL-001 required P0 through P7 contingencies in power flow and transient stability studies. Additionally, the potential Adverse Impacts on neighboring systems should also be assessed. PG&E suggests the CAISO share detailed study results with pertinent PTOs for review before approving any project(s) resulting from this analysis.</p> | |
| 2K | RWE Renewables | <p>RWE greatly appreciate the effort that CAISO has put in studying the offshore wind interconnection and considering various alternatives. There are a few comments and clarification questions that we would like to provide.</p> <ol style="list-style-type: none"> 1. Per CAISO presentation, NREL provided CAISO with updated offshore wind generation estimates based on wind model information for year 2007-2013 that indicates offshore wind is 83% capacity factor for HSN hours. A recent NREL study shows that Humboldt lease area generally has higher capacity factor than Morro Bay lease area. We recommend CAISO to consider using lease area based capacity factor for offshore wind dispatch assumptions in deliverability studies to best capture the locational difference. 2. Slide 25, how does CAISO consider the integration Del Norte offshore wind(3.4GW sensitivity portfolio) into the multiple transfer path alternatives for Humboldt offshore wind? Will there be transfer path from Del Norte to CAISO controlled grid at Fern Road or Humboldt? If Del Norte offshore wind is delivered via Humboldt offshore transfer path to CAISO system, the reliance of 6.2GW offshore(2.6GW Humboldt and 3.4GW Del Norte) on Humboldt offshore transfer path will introduce a high risk of large amount offshore loss under certain contingency conditions. Also, per the PacificCorp study released in 2023, to integrate up to 1.0 GW offshore at Del Norte in PacificCorp system will require upgrading existing Del Norte 115kV substation in Crescent City, California to 500kV substation to connect Sams Valley 500kV substations via two new 500kV | <p>The CAISO continues to work with NREL to refine the offshore wind dispatch assumptions in our deliverability assessments.</p> <p>The CEC and CPUC provided the resource portfolio including the busbar mapping of the resources for the ISO to use in the 20-year transmission outlook.</p> <p>Other offshore transmission studies have considered transmission alternative to integrate offshore wind in northern Californian and Southern Oregon. The final report of one such study is posted on CEC website: CA Energy Commission AB 525 Reports: Offshore Renewable Energy web page (under Consultant Reports)</p> |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>lines. Are there any regional transmission coordination between CAISO and Pacific Corp on Del Norte Area offshore integration plan in the 20-year outlook study?</p> <p>3. Slide 41, transfer path capability is 4.5GW for alternative of two 500kV AC lines to Fern Road. Our understanding is that the two 500kV AC lines alternative will not be two adjacent lines on common structure so there is no P7 contingency associated with this alternative. Please clarify a bit more on the route consideration of two 500kV AC lines alternative.</p> | <p>The assumption for the two 500 kV ac lines to Fern Road is that they will be two single circuit lines on separate towers.</p> |
| 2L | San Diego Gas & Electric | None | |

| 3. Please provide any additional comments | | | |
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| No | Submitting Organization | Comment Submitted | CAISO Response |
| 3A | ACP-California | No Comment | |
| 3B | Bay Area Municipal Transmission Group (BAMx) | No comments at this time. | |
| 3C | California Public Utilities Commission - Public Advocates Office | <p>Cal Advocates appreciates that CAISO intends to start the 20-Year Transmission Outlook analysis assuming all approved TPP transmission projects in its existing transmission capacity estimate.</p> <p>Cal Advocates also appreciates that CAISO will rely on an updated California Energy Commission (CEC) load forecast with greater growth granularity than the forecast used for the prior 20-Year Outlook. For the prior 20-Year Transmission Outlook, CAISO lacked the necessary details from the CEC high electrification load forecast to determine load variations at individual buses.[1] As a result, CAISO uniformly scaled the load growth at each bus in the 2031 base case by 28.5 percent for the 20-Year Transmission Outlook. [2] Since it is likely that electrification will result in uneven increases in loads at individual buses, having additional details on the likely growth at individual buses will be an improvement.</p> <p>Cal Advocates believes these improvements will further refine the 20-Year Transmission Outlook results and avoid the identification of projects that may not be needed to support the 2045 resource portfolio.</p> | <p>The comment has been noted.</p> <p>The comment has been noted.</p> <p>The comment has been noted.</p> |
| 3D | California Wind Energy Association | No further comment | |
| 3E | EDF-Renewables | Relatedly, if this new 20-year plan is constrained by the procedural limitations used in the previous plan (the previous report was an informational report that did not direct or suggest approval for any new transmission), EDF-R encourages the Joint Agencies to consider what refinements are needed to the procedures to approve transmission projects that are certainly needed (Category 1) but that do not strictly occur in the 10 year window contemplated by the most-recent TPP. | The objective of the 20-year transmission outlook is an informational study to provide an insight into the required transmission enhancement concepts to reliably serve the load forecast by CEC and interconnect the resource portfolio by CPUC. While the concepts developed in the 20-year transmission outlook will be considered as an alternative in the annual transmission planning process, the approval of transmission projects will only be through the annual transmission planning process, as per existing framework. |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>As noted in the CPUC’s 2023-24 Modeling Assumptions report[1], “the busbar mapping effort for the 24-25 TPP will likely feature three major changes (including)... ..an expansion of time horizon for which the modeling and mapping is conducted. Per SB 887 (2022), CPUC staff will be working in collaboration with CEC staff to provide mapped portfolios out to a fifteen-year planning horizon.” This provides the opportunity for CAISO to revise the definition/qualifications of Category 1 to support California’s long-term goals. A Category 1 revision to reflect the new fifteen-year planning horizon would complement CAISO’s efforts in the 20-year transmission outlook to better provide longer term context for decisions made in the transmission plan process.</p> <p>EDF-R also encourages CAISO to prioritize transmission buildout to support resource amounts planned for year 2035 or earlier and which have a minimal difference (MW additions) needed for year 2045. To this point, the Colorado River – Devers 500 kV line has a time to construct period of 10 years. The strong commercial interest in the SCE Eastern Area reflected in both the 2035 and 2045 resource portfolios requires the identified transmission projects to be approved and ultimately built to meet the purpose of the MOU. Timing considerations for infrastructure buildout (including but not limited to generating facilities, interconnection facilities and network upgrades) are a critical implication to the Joint Agencies efforts.</p> <p>Lastly since this process is conducted in parallel to the 2023-2024 transmission planning process, it should also consider the CAISO Interconnection Process Enhancement’s Track 2 first principle[2] to “prioritize interconnection in zones where transmission capacity exists or new transmission has been approved, while providing opportunities to identify and provide alternative points of interconnection or upgrades.” This implies that commercial interest in identified Transmission Interconnection Zones requires associated transmission development. The sooner these associated transmission projects can be approved, the better it will serve the intent of the</p> | |

| No | Submitting Organization | Comment Submitted | CAISO Response |
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| | | <p>MOU to “establishing or reaffirming linkages between the CEC’s Integrated Energy Policy Report and SB 100 activities, the CPUC’s Integrated Resource Planning process and the ISO’s 20 Year transmission Outlook and annual transmission planning and approval process”.</p> <p>EDF-R looks forward to the continued dialogue offered through CAISO’s stakeholder initiatives.</p> | |
| 3F | Gallatin Power Partners | No comment | |
| 3G | Golden State Clean Energy | No comment | |
| 3H | Invenergy | No comment | |
| 3I | Middle River Power, LLC | MRP appreciates the opportunity to submit these comments | |
| 3J | Pacific Gas & Electric | No comment | |
| 3K | RWE Renewables | No comment | |
| 3L | San Diego Gas & Electric | No comment | |