



## **FERC Order No. 881 - Managing Transmission Line Ratings**

Stakeholder Comments Matrix and ISO Responses to the  
Draft tariff language and May 24, 2022 stakeholder call discussion

The stakeholder comments below are summarized.

The full content of the comments can be found [here](#)

Comments submitted June 7, 2022

Entity (Name)	Stakeholder Comment	CAISO Response
CA Wind Energy Association	Supports CAISO's efforts. CalWEA believes that there are immediate steps the CAISO can take to achieve the objectives of Order No. 881 and that such steps should only involve CAISO implementing simple changes in its systems and operating practices. CalWEA proposes CAISO change its operating practices before calendar year 2023 as follows: For those transmission facilities where seasonal ratings are available to CAISO, use the same temperature forecast used for its day-ahead market scheduling to determine the relevant seasonal facility rating that would be used for day-ahead market scheduling (and later for real-time market operation). This process would replace the existing CAISO practice of changing the rating of its transmission facilities based on calendar dates and instead base the rating on the actual ambient temperature forecast.	Within the CAISO balancing authority, participating transmission owners establish and communicate facility ratings to the CAISO for use in the CAISO's market and reliability application. CalWEA's proposal would modify this practice to allow the CAISO to use a seasonal rating established by a participating transmission owner not based on the date of the year but based on the CAISO's day-ahead temperature forecast. The CAISO currently has the ability to update equipment ratings for a preset amount of time on an element specific basis. This occurs through a manual process. Developing the internal systems and processes to update large volumes of transmission equipment automatically is something the CAISO is looking to do within the context of complying with Order No. 881. Given the potential for varying line rating methodologies from its participating members, the CAISO prefers to update ratings in its models and markets based on submissions from transmission operators rather than a forecast.
Cal Wind Energy Association	CalWEA prefers that CAISO create methodology requirements that are consistent across its PTOs and WEIM entities.	Public utility transmission providers participating in the WEIM will have independent obligations to comply with Order No. 881. Like CAISO participating transmission owners that are subject to Order No. 881, WEIM entities that are subject to Order No. 881 will need to develop and implement transmission line rating methodologies that comply with Order No. 881. The CAISO plans to coordinate with WEIM entities throughout all stages of Order No. 881 implementation.

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Cuyama Solar LLC	<p>Cuyama urges the CAISO to begin implementing Order No. 881 as quickly as possible. Cuyama paid for the necessary studies and upgrades that resulted in the Project obtaining full capacity deliverability status (FCDS). Despite having received FCDS, soon after the Project began operations PG&amp;E adopted a seasonal transmission line rating that triggered the imposition of a nomogram by the CAISO which causes the Project's generation to be curtailed anywhere from 30% to more than 50% each month from April through October. Efforts by Cuyama to obtain from CAISO the exact source of the problem and detailed information regarding the seasonal line rating and nomogram to determine whether they are reasonable have been unsatisfying. When asked for details, the CAISO has referred requests for further information to PG&amp;E, the responsible Participating Transmission Owner, with little response from PG&amp;E. Cuyama's efforts to obtain information regarding the seasonal transmission line ratings and associated nomogram suggests there is a need for the CAISO and participating transmission owners to examine whether they are in compliance with already existing FERC regulations relating to transparency. Referring inquiries regarding transmission line ratings and nomograms to PG&amp;E has yielded no information.</p>	<p>To meet the requirements of Order No. 811 within the time allowed for implementation, the CAISO anticipates addressing this work in multiple tracks. The CAISO plans to publish a draft plan to help guide this work and coordinate with affected stakeholders through all stages of implementation. The CAISO commits to work with Cuyama to ensure it has a clear understanding of how seasonal line ratings and congestion may affect Cuyama's project.</p>
Cuyama Solar LLC	<p>The CAISO should determine the methodology participating transmission owners use to set transmission line ratings, particularly for</p>	<p>Pursuant to Order No. 811, participating transmission owners will continue to establish facility ratings and communicate them to the CAISO. As part of its</p>

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	<p>ambient average temperature and emergencies. The CAISO should act as quickly as it can to develop the methodology to have it available for use in interconnection and transmission planning processes; and should ensure participating transmission owners implement the methodology in a fully transparent and equitable manner.</p>	<p>compliance with Order No. 881, the CAISO intends to coordinate with participating transmission owners on the development of their transmission line rating methodologies, including seasonal and emergency line ratings. The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.</p>
Cuyama Solar LLC	<p>The CAISO must be proactive in determining the methodologies the PTOs use to determine transmission line ratings.... The CAISO must be the entity responsible for developing the methodologies and ensure participating transmission owners implement them. The CAISO should provide guidance on how to apply the methodologies and resolve disputes, subject to appeal to FERC. This likely means there is a need for changes to the TCA and tariff.</p>	<p>The CAISO will not propose to establish the transmission line rating methodologies itself or serve in a role to resolve disputes involving transmission line rating methodologies or transmission line ratings.</p>
Cuyama Solar LLC	<p>Even though changes are not required as part of the Order 881 compliance filing, the CAISO should take transmission line ratings into account in the interconnection and transmission planning processes to avoid situations like that faced by Cuyama. At a minimum, this will make it more likely that interconnection customers whose projects have FCDS can reasonably expect to be able to deliver their output. . . There is lack of coordination between the interconnection process and the deliverability process, on the one hand, and the administration by participating transmission</p>	<p>The CAISO will continue to use seasonal ratings transmission planning and interconnection studies. Order No. 881 does not direct the CAISO to modify this practice.</p>

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	owners of line ratings. Implementation of Order 881 might provide some greater coordination.	
EDF Renewables	EDF-Renewables requests that CAISO continue to engage stakeholders in the stakeholder process through the development of the Business Requirements Specification document as well as the first draft of any Business Practice Manual Proposed Revision Requests arising from this effort. EDF-Renewables also requests that the CAISO provide a rough outline of that engagement when it publishes any implementation schedule. EDF-Renewables requests that CAISO publish a stakeholder response document summarizing and responding to stakeholder questions.	The CAISO plans to publish a draft plan to help guide implementation work associated with Order No. 881 and will coordinate with affected stakeholders throughout all stages of implementation. The CAISO offers responses to stakeholder comments in this matrix.
EDF Renewables	How will CAISO ensure information equity between the DA and RT markets? Suggestions on the call included a temperature forecast for the next day or temperature forecast for the next operating hour and use the relevant seasonal rating for those transmission facilities in DA scheduling or RT dispatch. EDF-Renewables does not support or oppose that proposal in particular, but appreciated the idea to align DA and RT line ratings if possible.	Order No. 881 requires specific transparency reforms, including maintaining a database that include a record of all transmission line ratings, used in real-time operations, and for all future market periods for which transmission service is offered. Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to coordinate with participating transmission owners on the development of their transmission line rating methodologies, The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.
EDF Renewables	Given this proposal is that the transmission owners will be calculating ratings and then communicating those to the CAISO, will this	Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to

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	proposal come with a discussion on the processes participating transmission owners use similar methodology to identify line rating adjustments? Disparate calculation methodologies could potentially result in disparate market outcomes or congestion that is not objective necessary for reliability.	coordinate with participating transmission owners on the development of their transmission line rating methodologies, The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible. The CAISO will make transmission line methodologies available through the database required by Order No. 881.
EDF Renewables	EDF-Renewables supports the suggestion that the CAISO at a minimum validate dynamic rating submissions.	The CAISO plans to propose to undertake data quality checks to validate submitted transmission line ratings but also plans to propose a requirement for its participating transmission owners to undertake validation steps prior to transmitting ambient adjusted ratings to the CAISO. The CAISO expects this validation would involve an automated process that confirms that the rating transmitted to the CAISO accurately reflects the applicable temperature forecast for a specific transmission line.
EDF Renewables	Will the CAISO perform and publish analysis on the expected impacts of dynamic line ratings on congestion or remedial action schemes?	Undertaking analysis on expected impacts of dynamic line ratings on congestion and remedial action schemes will depend on the scope of the work involved as well as other CAISO and stakeholder priorities. The CAISO remains willing to discuss the scope and timing of any such effort with stakeholders.
EDF Renewables	EDF-Renewables strongly encourages the CAISO re-activate the RAS review in this forum or in a separate initiative. EDF-Renewables is very interested in system congestion and how line ratings and RAS effect that transmission. EDF-Renewables summarized these questions in its comments on the CAISO's now-inactive Planning Standards – Remedial Action Scheme Guidelines Update. EDF-Renewables encourages the CAISO to take a holistic look at	Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to coordinate with participating transmission owners on the development of their transmission line rating methodologies, including their impacts on remedial action schemes. The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.

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	known RAS challenges in a timely matter, as the implementation of dynamic line ratings may further complicate future RAS reviews.	
Pacific Gas and Electric	Agrees with CAISO that no modification to the TCA is necessary. Agrees with CAISO that no additional tariff requirements on WEIM entities are necessary. Agrees with CAISO that no additional tariff requirements on RC Customers are necessary. Agrees with CAISO's approach to use seasonal ratings for any long-term transmission service (i.e., more than 10 days in the future). Looks forward to working with CAISO and the other Participating Transmission Owners (PTOs) on coordinating on the development of transmission line methodologies. Coordination will be critical at transmission tie-points that connect two PTO service areas and ensuring that the methodologies align at these connections.	Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to coordinate with participating transmission owners on the development of their transmission line rating methodologies, including how those methodologies address transmission tie-points that connect participating transmission owner service territories. The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.
Pacific Gas and Electric	Requests clarification on "validate" in this proposal and what will be required of PTOs to validate ambient adjusted ratings prior to submission.	The CAISO plans to propose to undertake data quality checks to validate submitted transmission line ratings but also plans to propose a requirement for participating transmission owners to undertake validation steps prior to transmitting ambient adjusted ratings to the CAISO. The CAISO expects this validation would involve an automated process that confirms that the rating transmitted to the CAISO accurately reflects the applicable temperature forecast for a specific transmission line.
Pacific Gas and Electric	Recommends CAISO not include at this time tariff language governing dynamic line ratings (DLRs) since the issue of requiring use of DLRs, and when, is currently under	The work to deploy electronic systems and processes to accept hourly transmission lien ratings will support the submission of dynamic line ratings as well as ambient adjusted ratings. Even though there is no requirement to

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	consideration by FERC via a Notice of Inquiry. If FERC adopts a rule requiring the use of DLRs, at that time CAISO would likely need to make another compliance filing to update its tariff to align with the definition and use cases in the FERC order.	utilize dynamic line ratings, the CAISO plans to clarify in its compliance filing that Order No. 881 reforms will allow participating transmission owners, WEIM entities and RC customers may submit dynamic line ratings for use in the CAISO's market and reliability applications.
Pacific Gas and Electric	Supports CAISO's plan to coordinate with PTOs on implementation of AARs in RAS. Recommends RAS specific power flow studies to identify any potential impacts associated with the use of AARs in an area where RASs are located. For example, studies should not be limited to just transmission lines that will use AARs and are associated with a RAS, but if an adjacent line(s) not associated with the RAS uses AARs, studies should be performed to identify the potential impacts to that RAS.	Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to coordinate with participating transmission owners on the development of their transmission line rating methodologies, including their impacts on remedial action schemes. The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.
Pacific Gas and Electric	Recommends that CAISO allow both EMS and Inter-Control Center Communication Protocol (ICCP) functionalities for PTOs, EIM Entities and RC Customers to submit ratings.	The CAISO plans to allow for the use of both SCADA and ICCP functionality for the submission of transmission line ratings.
Salt River Project	Requests additional information on how WEIM entities and RC customers can stay engaged during the implementation phase of this initiative.	The CAISO plans to publish a draft plan to help guide implementation work associated with Order No. 881 and will coordinate with affected stakeholders throughout all stages of implementation.



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Silicon Valley Power  (The Bay Area Municipal Transmission Group (BAMx))	Supports proposed schedule to complete its compliance filing to use ambient-adjusted ratings and begin implementation discussions as soon as possible. Encourages the CAISO to explore using both DLR and AAR with the stakeholders in the third quarter of 2022. The CAISO can implement multiple aspects of AAR and DLR immediately, and perhaps as early as the fourth quarter of 2022, that can vastly improve the CAISO markets, transmission planning, and operations. Furthermore, the CAISO should conduct a study to evaluate DLR implementation's relative benefits and costs that would capture the incremental benefits of early implementation.	The CAISO plans to publish a draft plan to help guide implementation work associated with Order No. 881 and will coordinate with affected stakeholders throughout all stages of implementation. The CAISO's efforts to implement Order No. 881 will provide the foundation for the submission of dynamic line ratings. The CAISO will continue to discuss with stakeholders what additional activities it should undertake, including conducting a study of DLR implementation's relative benefits and costs.
Southern California Edison	Agrees there is no need to modify Sections 19 and 29 of the CAISO tariff or the transmission control agreement. Supports the CAISO's position in coordinating with PTOs on the development of exceptions criteria, alternate ratings and implementation methodologies of transmission ratings for all transmission facilities.	Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to coordinate with participating transmission owners on the development of their transmission line rating methodologies. The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.
Southern California Edison	Requests clarification on the validation process and details of the ISO proposal where PTOs validate ambient adjusted ratings prior to submission.	The CAISO plans to propose to undertake data quality checks to validate submitted transmission line ratings but also plans to propose a requirement for participating transmission owners to undertake validation steps prior to transmitting ambient adjusted ratings to the CAISO. The CAISO expects this validation would involve an automated process that confirms that the rating transmitted to the CAISO accurately reflects the applicable temperature forecast for a specific transmission line.

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Southern California Edison	Seeks clarification on how the CAISO will use the ambient adjusted ratings (AARs) in the Day Ahead (DA) and Real-Time (RT) markets, as well as how the transmission owner will transfer this data to the CAISO. Requests further explanation on how CAISO will operationalize AAR data in the day-ahead and real-time markets.	To meet the requirements of Order No. 811 within the time allowed for implementation, the CAISO anticipates addressing this work in multiple tracks. The CAISO plans to publish a draft plan to help guide this work and coordinate with affected stakeholders through all stages of implementation.
Southern California Edison	Requests the CAISO clarify what it means by the “most granular ambient adjusted ratings” as part of its RTCA analysis. SCE is unclear on how this will affect the RTCA analysis and how the CAISO will use the ratings in its RTCA. Requests further explanation on how the CAISO will coordinate its RTCA analysis with participating transmission owners.	<p>The CAISO real-time contingency analysis (RTCA) is designed to be run every 5 minutes. While utilizing the most recent rating information in its analysis is possible, the CAISO needs coordinate its analysis with both the CAISO market systems and the RTCA applications run by participating transmission owners.</p> <p>The CAISO real-time market pre-dispatch (RTPD) and real-time dispatch (RTD) run every 15 and 5 minutes respectively to issue security-constrained dispatch operating targets. The security constraints respected in those processes are then validated through observed real time flows in the RTCA. Today’s paradigm allows the CAISO to utilize its market application through constraint activation and/or conformance to address reliability concerns identified in the RTCA. Utilizing differing rating sets between these two environments may require additional coordination to ensure changes made in the market applications appropriately resolve issues observed in the RTCA. This coordination will also need to be replicated between the CAISO RTCA and participating transmission owners’ RTCA.</p>
Southern California Edison	Remedial action schemes should not to incorporate AARs in their operations. Currently, it is infeasible for SCE to implement AARs in	Order No. 881 directs specific requirements for the calculation of ambient adjusted ratings. As part of its compliance with Order No. 881, the CAISO intends to

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	our RAS schemes within the timeframe allocated by FERC Order 881. Moreover, the potential benefits of using AARs on RAS schemes would not justify the implementation effort.	coordinate with participating transmission owners on the development of their transmission line rating methodologies, including how those methodologies interact with remedial action schemes. The CAISO will seek to promote implementation consistency among participating transmission owners to the greatest extent possible.
Southern California Edison	In the absence of the required AAR data submission, SCE asks if it would be better to use the most recently submitted AAR ratings such as the prior day or the prior week's data, rather than seasonal ratings. Requests further explanation on the use of seasonal ratings such as use cases.	Order No. 881 directs the default rating should be the seasonal rating. To meet the requirements of Order No. 811 within the time allowed for implementation, the CAISO anticipates addressing this work in multiple tracks. The CAISO plans to publish a draft plan to help guide this work and coordinate with affected stakeholders through all stages of implementation. If the CAISO and stakeholders identify appropriate refinements to the use of transmission line ratings that remain consistent with Order No. 881, the CAISO will take steps to modify its compliance proposal.
Southern California Edison	SCE's assumption is that the CAISO would use seasonal ratings for most long-term transmission planning studies and requirements.	The CAISO will continue to use seasonal ratings for long-term transmission planning studies and requirements.
Southern California Edison	SCE does not have any concerns with using both functionalities to accommodate PTOs, EIM Entities and RC Customers. However, SCE will need to ascertain the technical viability of using these methods to communicate AAR data via the ICCP Protocol and EMS / SCADA systems	The CAISO plans to allow for the use of both SCADA and ICCP functionality for the submission of transmission line ratings. To meet the requirements of Order No. 811 within the time allowed for implementation, the CAISO anticipates addressing this work in multiple tracks. The CAISO plans to publish a draft plan to help guide this work

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	<p>due to the volume of data. Foresees significant technical challenges with achieving seamless data transfer using these two functionalities. Requests clarification on how the CAISO would accommodate other stakeholders and what these accommodations mean in terms of data communication.</p>	<p>and coordinate with affected stakeholders through all stages of implementation.</p>
<p>Southern California Edison</p>	<p>Recommends excluding tariff language governing Dynamic Line Ratings (DLRs) until FERC concludes its NOI proceeding on DLRs or there is ultimately a requirement to implement DLRs as part of FERC's transmission planning and cost allocation and generator interconnection NOPR.</p>	<p>The work to deploy electronic systems and processes to accept hourly transmission line ratings will support the submission of dynamic line ratings as well as ambient adjusted ratings. Even though there is no requirement to utilize dynamic line ratings, the CAISO plans to clarify in its compliance filing that Order No. 881 reforms will allow participating transmission owners, WEIM entities and RC customers may submit dynamic line ratings for use in the CAISO's market and reliability applications.</p>