

## Flexible Ramping Product Refinements Draft Final Proposal Stakeholder Comments Summary

Market participant	Proxy Demand Response Eligibility	Ramp Management between fifteen minute and real-time dispatch	Minimum Flexible Ramping Product Requirement for BAA	Nodal Procurement	FRP Demand Curve and Scarcity Pricing	Calculating FRP Requirements	Additional Comments	CAISO Response
<b>California Energy Storage Alliance</b>	Supports proposal because it guarantees the correct operation of the FRP scheme. Supports implementing this piece of the proposal in Fall 2021 to minimize the administrative burden associated with the nodal deliverability portion of the proposal.	Supports	Partially supportive of the simplified approach. Suggests the CAISO consider establishing a reduced requirement for non-pivotal BAAs as the penetration of VER resources increases. Further suggests the CAISO define a mandatory nominal minimum requirement for non-pivotal BAAs.	Supports and urges the CAISO to consider how uncertainty will be distributed among different VER technologies and classes. Suggests using historical data to determine the distribution.	No comment	Supports proposal and agrees that the quantile-based methodology will be a better approach to calculating the FRP requirements that are driven by the tails of the probability distribution.	N/A	To address the concerns related to minimum FRP requirement, the CAISO reiterates that this requirement is only temporary. The requirement will be replaced when nodal procurement is implemented. In the interim, this is a bare minimum requirement for non-pivotal BAAs.  The CAISO plans on using historical data to determine the distribution on the uncertainty requirement among all technologies and classes of resource types.
<b>Department of Market Monitoring</b>	Supports proposal because procurement of flexible reserves should be restricted to resources that are dispatchable in real-time market intervals.	No comment	No comment	Supports proposal and acknowledges that although the deployment scenarios will not ensure all procured flexible ramping capacity is deliverable in every case; using the deployment scenarios will be a vast improvement compared to the current approach. Additionally, supports proposal to enforce transmission constraints in FRP as it is consistent with the purpose of the FRP design to have energy prices include the cost of reducing available flexible reserves.	No comment	Supports proposal as it improves the accuracy of estimating uncertainty. Requests the CAISO continue to inform stakeholders and seek feedback on the regression formulation during the stakeholder and BPM processes.	Recommends the CAISO enhance its real-time FRP product to address uncertainty in net load forecasts over longer time horizons to increase the procurement and pricing of flexible reserves through the real-time market.	The CAISO acknowledges the recommendation to enhance the real-time FRP product to look out over longer time horizons. This recommendation would have to be considered in a future stakeholder process once the current proposed enhancements are implemented. This recommendation has been added to the 2021 Draft Policy Initiatives Catalog.
<b>Joint Select EIM Entities (PacifiCorp, Idaho Power)</b>	No comment	Supports	Generally support proposal; however, request clarification on how the market optimization will	Supports	Supports	Generally support proposal; however, requests the CAISO explore adding an	Seek clarification on how the proposal will affect the flexible ramping sufficiency test. Additionally, request	The CAISO clarifies that the minimum requirement does change from hour to hour and this requirement does not impact the EIM diversity benefit. Additionally, the

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<b>Company, Puget Sound Energy)</b>			<p>change from hour to hour when the minimum requirement is triggered in the CAISO's BAA. Additionally, seek to understand the impact of the minimum requirement on the EIM diversity benefit.</p> <p>Further, request clarification regarding the percentage the CAISO intends to use for the nominal portion of the non-pivotal BAA that may be allocated to support the minimum requirement in each non-pivotal BAA. Finally, request more information on the reasoning for needing to have a portion of the remaining requirement procured locally in each non-pivotal BAA when there is sufficient NIC/NEC with adjacent BAAs.</p>			<p>asymptotic component to the quantile regression methodology to account for load. Additionally, request the CAISO suggest the "bounds" be applied individually to each component to provide for a specified minimum uncertainty is procured for wind and solar forecast error.</p>	<p>the CAISO provide details on how the resource sufficiency evaluation will be impacted. Further, request that the inconsistency regarding the treatment of transfers in the event an EIM entity fails the flexible ramp sufficiency test in Appendix B and the EIM BPM be corrected.</p>	<p>CAISO reiterates that this requirement is only temporary. The requirement will be no longer needed when nodal procurement is implemented. In the interim, the nominal requirement for non-pivotal BAAs will be evaluated during market simulation. If a nominal requirement is needed, the CAISO will updated the BPM.</p> <p>The CAISO appreciates the recommendations for adding an asymptotic component and applying the "bounds" to each component individually in the regression formulation. The CAISO will assess these recommendations in the BPM process and will describe the entire methodology.</p> <p>The CAISO clarifies that the mechanics of the flexible ramping sufficiency test, which is performed before the market, are not changing with this proposal. This proposal is changing how the flexible ramping product requirement is enforced in the market.</p> <p>Further, to the extent there is an inconsistency between Appendix B and the EIM BPM, the CAISO will address it accordingly in the BPM process.</p>
<b>Middle River Power</b>	No comment	Supports	Supports	Supports	Supports and acknowledges that moving to nodal procurement will	Partially supportive of quantile regression approach; however, question that this	N/A	The CAISO will provide more documentation on the quantile regression formulation and methodology in the BPM process.

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					help ensure FRP is more deliverable.	approach provides greater coverage than the histogram approach. Request the CAISO provide further explanation on the two configurable parameters in the quantile regression.		
<b>Pacific Gas and Electric</b>	Supports proposal and is supportive of changing the implementation date to Fall 2021 to accommodate the necessary tariff change.	Supports	Generally supportive of proposal; however, requests the CAISO to clarify its motivation for enforcing the minimum FRP requirement for BAAs.	Partially supportive of proposal. Requests the CAISO clarify how virtual and physical supply will be settled in the deployment scenarios.	No comment	Supports	N/A	<p>The CAISO has recognized that awarded FRP in adjacent BAAs, which is meant to cover uncertainties in the CAISO, is trapped behind transmission congestion. This is why the CAISO has proposed to enforce the minimum FRP requirement for BAAs.</p> <p>As discussed in the MSC meeting on 5/29/2020, the provisions for not including deployment scenario congestion in virtual supply real-time market close-out settlement will be eliminated from the proposal.</p>
<b>Powerex</b>	No comment	No comment	Partially supportive of proposal. Requests the final proposal include a qualitative discussion on the reasonableness of assuming the full amount of diversity credit that can be delivered from adjacent BAAs.	Partially supportive of proposal. Seeks clarification on the reasoning behind why the evaluation of the FRP award performance is tied to the implementation of nodal deliverability. Requests the CAISO monitor the performance of resources receiving FRP awards when called to deliver energy.	Request the CAISO explore enhancements improve the accuracy and effectiveness of scarcity pricing in its markets.	No comment	N/A	<p>The CAISO clarifies that it does not limit the diversity benefit beyond the transfer capability between adjacent BAAs.</p> <p>The CAISO believes evaluation of energy dispatch performance related to FRP is more appropriate after nodal FRP implementation because FRP awards will be transmission feasible. In any case, the CAISO believes provisions to penalize resources for dispatch non-performance</p>

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								<p>would be an uninstructed deviation framework, in which the CAISO has a penalty structure for resources that do not respond to dispatch instructions.</p> <p>The CAISO plans to address scarcity pricing in the EDAM Bucket 3 initiative.</p>
<b>Southern California Edison</b>	Supports proposal because it is an appropriate approach to allow Scheduling Coordinators the ability to self-select PDR dispatch rates to help reduce the amount of undeliverable FRP to resources incapable of performing.	Supports proposal as it will ensure the availability of the procured FRP capacity during market runs.	Supports proposal and requests that if a change in the proposed percentage should occur in the future, corresponding data supporting the change should be provided for stakeholders to review.	Partially supports proposal. Requests the CAISO confirm there will be an increase in LMPs if no excess supply exists at the LAPs and nodes in constrained areas. Additionally, seeks clarification on if LMP loss and congestion components will arise when constraint relaxation is deployed during supply scarcity of FRP.	Partially supports proposal. Requests the CAISO clarify if FRP constraint relaxation solely depends on the likelihood of PBC relaxation when no more additional FRP can be procured. Additionally, requests to understand the probability of relaxation of the FRP constraints can be triggered if the relaxation of the PBC is necessary.	Partially supports proposal. Requests the CAISO confirm if the performance metrics of the quantile regression methodology are standard measures of performance or fit. Encourages the CAISO investigate incorporating an autoregressive form of the quantile model to determine if there are further improvements compared to the histogram approach.	N/A	<p>If changes to the proposed percentage value for the minimum FRP requirement are needed, the CAISO is committed to providing corresponding analysis to support the changes to stakeholders for their review.</p> <p>The CAISO clarifies that the energy and FRP marginal prices would include congestion components from binding transmission constraints in the FRU/FRD deployment scenarios. These contributions are positive for resource locations that relieve congestion and negative for resource locations that cause congestion. The FRP demand price does not reflect scarcity, but economic relaxation of FRP requirements. When the FRP procurement constraint shadow price (without marginal loss/congestion components) reaches the demand price, the latter would effectively cap the price within that segment of the economic relaxation.</p> <p>The CAISO clarifies that FRP constraint relaxation does depend on the likelihood</p>

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								<p>of a power balance constraint relaxation. However, the CAISO acknowledges that if FRP is working as intended, all FRP will be relaxed prior to the power balance constraint being relaxed.</p> <p>The CAISO will provide more documentation on the quantile regression formulation and methodology in the BPM process.</p>
<b>Six Cities</b>	Supports	Supports	Partially supportive of proposal. Request the CAISO clarify how it proposes to establish minimum internal procurement requirements for both pivotal and non-pivotal BAAs. Further request the CAISO continue to evaluate the impacts of the minimum requirements to make sure they do not impose unreasonable or disproportionate burdens on any BAAs including the CAISO.	Partially supportive of the nodal procurement approach; however, concerned that the CAISO has not evaluated the costs of implementing nodal procurement in relation to the projected benefits. Additionally, expects to see the revised proposal include revisions to the treatment of virtual bids in the context of nodal procurement of FRP based on the 5/29/2020 MSC discussion. Further concerned that including congestion costs from the FRP deployment scenarios in the real-time congestion offset will lead to differences between allocations of FRP and congestion costs. Request the CAISO observe impacts to FRP-related congestion costs once the new FRP approach is implemented.	Supports and requests the CAISO provide additional detail on how it will distribute the demand curve surplus variable as a decision variable at load aggregation points versus at BAAs will affect the implementation of stepped scarcity prices.	No comment	N/A	<p>To address the concerns related to minimum FRP requirement, the CAISO reiterates that this requirement is only temporary. The requirement will be replaced when nodal procurement is implemented. In the interim, this is a bare minimum requirement for non-pivotal BAAs that will be determined during market simulation.</p> <p>As discussed in the MSC meeting on 5/29/2020, the provisions for not including deployment scenario congestion in virtual supply real-time market close-out settlement will be eliminated from the proposal.</p>

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<b>Western Power Trading Forum</b>	No comment	No comment	Generally supportive of proposal. Seeks clarification on if having a pre-defined specified static trigger (i.e. at 60%) introduces unintended market volatility. Additionally, requests more clarification on the criteria that is used to determine if/when a nominal requirement will be enforced in other areas and if this requirement will be a flat MW value or be based on a percentage of the BAA's minimum requirement.	Generally supportive of proposal. Seeks clarification on how the LAP level demand curve surplus variable will impact energy market prices when it is relaxed. Concerned there could be significant market pricing implications depending on the impact to energy prices. Additionally, request more information on how uncertainty requirements will be distributed to VERs in the deployment scenarios, how the demand curve surplus variable will be allocated to each LAP within the CAISO, and how often the CAISO will update the values used to determine the distribution.	Concerned that nodal procurement is not an effective shortage/scarcity pricing mechanism. Requests the CAISO open a robust scarcity pricing effort outside of the Bucket 3 EDAM topics.	No comment	N/A	The CAISO acknowledges the recommendation for a more comprehensive and robust stakeholder process focused on improving the accuracy and effectiveness of scarcity pricing in its markets. This recommendation will be addressed in the EDAM Bucket 3 initiative.