

The ISO received comments on the PRR 1259 “detailed descriptions of network upgrades” from the following:

1. San Diego Gas & Electric Company (SDG&E Generation Interconnections)
2. Large-scale Solar Association (LSA) and the Solar Energy Industries Association (SEIA)

The following are the ISO’s responses to the comments.

1. San Diego Gas & Electric Company (SDG&E) Submitted by SDG&E Generation Interconnections		
No	Comment Submitted	CAISO Response
1a	Multiple editorial changes	Accept the edits
2. Large-scale Solar Association (LSA) and the Solar Energy Industries Association (SEIA) Submitted by Susan R. Schneider		
No	Comment Submitted	CAISO Response
2a	<p>The changes are not properly made through a PRR without further due process. Generally, the changes proposed in PRR 1259: (1) Go far beyond the limited Off-Peak Network Upgrade (OPNU) changes approved by FERC; and (2) have not been discussed with stakeholders. Likewise, the implications of these changes are not explained and have not been discussed with stakeholders.</p>	<p>The PRR reflects the implementation of the OPNU changes approved by FERC. It is being discussed with stakeholders in the BPM CM process for transparency.</p>
2b	<p>PRR 1259 proposes material changes in the current Area Deliverability Constraint (ADC) definition. The ADC is used to distinguish on-peak Local Deliverability Network Upgrades (LDNUs) from Area Delivery Network Upgrades (ADNUs). These changes were not considered or approved by FERC or discussed with stakeholders.</p> <p>For example, it appears that these changes would make it easier to classify an on-peak deliverability constraint as an ADC, i.e., classify more mitigation upgrades as ADNUs instead of LDNUs. While this might reduce upgrade financing costs for new generation seeking Full Capacity Deliverability Status (FCDS), it would likely reduce the number of constraints relieved, reduce deliverability awards in the annual allocation process, and increase congestion.</p>	<p>The ADC criteria are general guidelines for identifying area constraint based on FERC approved definition of ADNU and LDNU, and on-peak deliverability assessment methodology. They are modified in this PRR to</p> <ul style="list-style-type: none"> • Provide clarity of many details of implementation • Align the criteria with the principle of the on-peak deliverability assessment and the off-peak deliverability assessment. The on-peak deliverability assessment is for the purpose of system resource adequacy, i.e. system reliability. The off-peak deliverability assessment addresses excessive renewable curtailment. • Align the criteria with the new on-peak deliverability methodology.
2c	<p>PRR 1259 proposes an Area Off-Peak Constraint (AOPC) definition that suffers from the same issues as the proposed modified ADC definition. The AOPC would distinguish Local</p>	<p>The AOPC criteria are general guidelines for identifying area constraint based on the FERC approved definition of AOPNU and LOPNU, and off-peak deliverability assessment methodology. The proposal to revise</p>

No	Comment Submitted	CAISO Response
	<p>Off-Peak Network Upgrades (LOPNUs) from Area Off-Peak Network Upgrades (AOPNUs). While the AOPC concept was approved by FERC after vetting with stakeholders, the proposed AOPC definitions were not considered or approved by FERC or discussed with stakeholders.</p> <p>The proposed AOPC definition reflects the proposed ADC definitions, including the proposed lower ADC thresholds. As such, they would make it relatively easy to classify an on-peak deliverability constraint as an AOPC, i.e., classify more mitigation upgrades as AOPNUs instead of LOPNUs. As with DNUs, this might reduce upgrade financing costs for new generation seeking Off-Peak Deliverability Status (OPDS), but it would likely also reduce the number of constraints relieved, providing less congestion mitigation than if the AOPC definition had a higher threshold.</p>	<p>the deliverability assessment methodology that was vetted with the stakeholders and attached to the tariff filing approved by FERC states the following principles of the off-peak deliverability methodology:</p> <ul style="list-style-type: none"> • Identify transmission bottlenecks that would cause <u>excessive</u> renewable curtailment, but the study assumptions should focus on system conditions when oversupply is not likely. • Identify transmission upgrades for local constraints that tend to be <u>less expensive</u>. The need for such upgrades are highly dependent on the development of specific generation projects interconnecting in a small localized area. These local constraints are hit by a relatively high simultaneous output of local generation before the system-wide over supply situation occurs. • It is prudent to rely on the <u>TPP framework</u> to approve transmission upgrades for area constraints that tend to be expensive. For area constraints, the general placement of new renewable generation in the portfolio is sufficient to identify the need. <p>The proposed AOPC guidelines align with the principles above. The concerns raised are addressed by coordination between the generation interconnection and the TPP framework.</p>
2d	<p><u>Detailed comments on proposed Area Deliverability Constraint changes</u></p> <p>The current and proposed ADC definitions are shown below, followed by LSA/SEIA questions.</p> <p style="text-align: center;">AREA DELIVERABILITY CONSTRAINT DEFINITIONS (Types 1-4 = current definitions; Types ADC1-4 = proposed definitions)</p>	<p>The ADCs are based on the –</p> <p>1. Definition of ADNU¹</p> <p>An Area Deliverability Constraint means a transmission system operating limit that would constrain the deliverability of a <u>substantial number of generators</u> if the CAISO were to assign Full Capacity or Partial Capacity Deliverability Status to additional Generating Facilities in one or more specified geographic or electrical areas of the CAISO Controlled Grid in a total amount that is greater than the TP Deliverability for those areas. The definition also states that an Area Deliverability Constraint may be a</p>

¹ ISO Tariff, Appendix A

No	Comment Submitted					CAISO Response
	ADC TYPE	OF GENERATORS CONTRIBUTING TO CONSTRAINT	CONSTRAINT EXCEEDANCE	MITIGATION COST	OTHER	<p>transmission system operating limit that constrains a quantity of generation in a local area of the grid that is larger than the generation amount identified in the applicable Transmission Planning Process portfolio for the entire portfolio area, or a transmission system operating limit that constrains all or most of the same generation already constrained by a previously identified area deliverability constraint.</p> <p>2. Filing with FERC on how to identify ADNUs and LDNUs²</p> <p>Q. How will ADNUs and LDNUs be identified?</p> <p>A. Under the GIDAP, in situations where the interconnection queue volume greatly exceeds the TP Deliverability amount provided under the most recent comprehensive Transmission Plan, each Phase I study will identify incremental ADNUs needed to provide deliverability for a target amount of generation above the TP Deliverability. The Phase II study will identify ADNUs only for Option (B) projects. In each Phase I and Phase II study the ISO will perform two rounds of deliverability assessments to, first, identify any transmission system operating limits that constrain the deliverability of the modeled generators, and second, determine LDNUs and ADNUs to relieve those constraints. The transmission system operating limits identified during the assessment are divided into two categories: local deliverability constraints and area deliverability constraints.</p> <p>Local deliverability constraints tend to have the following attributes:</p> <ul style="list-style-type: none"> The generators whose deliverability they constrain (i.e., generators inside the 5% shift factor circle for a constraint) are all located on a few buses electrically close to each other. <u>Relieving these constraints does not trigger high cost upgrades.</u> <p>Area Deliverability Constraints tend to have the following attributes:</p>
<i>CURRENT DEFINITIONS: Constraint meets one of the following criteria:</i>						
1	Transmission system operating limit that constrains all/most of generation already constrained by a previously identified ADC					
2	>20	Total MWs of new generation among the contributing buses exceeds the Renewable Base Portfolio		---	---	
3	<20			>\$100M	---	
4	---	---		>\$100M	Contributing generators not in a Renewable Base Portfolio	
<i>PROPOSED DEFINITIONS: Constraint meets one of the following criteria:</i>						
ADC-C1	Transmission system operating limit that constrains all/most of generation already constrained by a previously identified ADC					
ADC-C2	>20	Total MW of new generation contributing to constraint exceeds MWs in Renewable Base Portfolio mapped w/in 5% DFAX circle, as defined in On-Peak Deliverability		---	---	
ADC-C3	---			>\$50M	---	
ADC-C4	>10			>\$20M	Constraint caused by contingencies	
Questions about proposed changes						
<ul style="list-style-type: none"> Number of generators criterion: There is no minimum number of generators required for Criteria 3, nor is one proposed for ADC-C3. However, while Criteria 4 requires no minimum number of generators, ADC-C4 would require a minimum of 10 generators. What is the reason for the change? 						

² <http://www.aiso.com/Documents/May252012GIDAPAmendmentER12-1855pdf.pdf>

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	<ul style="list-style-type: none"> • <u>Constraint exceedance criterion:</u> The definitions for both Criteria 2-4 and ADC-C2 through C4 seem similar, but the latter also mention the 5% DFAX circle from the On-Peak Deliverability Assessment Methodology while for former do not. Is the proposed new definition simply the same as the current definition but with some additional detail added, or is the modification a change in substance? • <u>Mitigation cost threshold:</u> This seems to be the most notable change. The \$100 million cost thresholds for Criteria 3 and 4 would be lowered to \$50 million and \$20 million for ADC-C3 and ADC-C4 respectively. What is the rationale for reducing the thresholds to these much lower levels? • <u>“Other criteria:”</u> The proposed change seems logical but need to be explained. • <u>Impact on LDNU and ADNU categorization:</u> As noted above, lowering the dollar thresholds would seem to lead to more constraints being classified as ADCs instead of local constraints, and thus more upgrades to mitigate those constraints being classified as ADNUs instead of LDNUs. Combined with Option A election by virtually all new generation projects (i.e., no funding for ADNUs to mitigate ADCs), this would seem to indicate less constraint mitigation and, in turn, less deliverability available in the annual TPD Allocation process. <p>Does the CAISO agree with this likely outcome? If so, was this considered in the CAISO’s recommendation to lower the ADC cost thresholds, and how?</p>	<ul style="list-style-type: none"> • The generators whose deliverability they constrain (generators inside the 5% shift factor circle) are spread over at least one and possibly more grid study areas or resource areas identified in a resource portfolio used in the TPP. • <u>In the first round of the Phase I or Phase II deliverability assessment, relieving these constraints may trigger high cost upgrades, driven by excessively large MW amounts of new generation behind the area deliverability constraint.</u> • In some potential situations the ISO may classify as an area deliverability constraint a constraint that constrains the deliverability of generators electrically close to each other and is triggered by an exceptionally large volume of generation. This could occur, for example, when there is an exceptionally large volume of Interconnection Requests in a relatively smaller local sub-area within one of the resource development areas identified in the TPP portfolios and relieving the constraint requires expensive upgrades. This potential situation was raised as a concern by some stakeholders, and we determined that in such cases, if they occur, the appropriate remedy would be to reclassify the constraint as an area deliverability constraint based on the recognition that it would serve a substantial volume of generation projects within the study area. <p>The categorization of ADNU vs. LDNU is based on the deliverability constraint that triggers the need of the DNU. ADNUs are transmission upgrades or additions to relieve Area Deliverability Constraints and LDNUs are to relieve Local Deliverability Constraints.</p> <p><u>ADC-C4:</u> The previous criteria 4 is a special case of criteria 3. In a non-renewable zone, portfolio amount is 0. Contributing MW greater than portfolio is always met. Therefore criteria 4 is removed in the revision.</p>

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		<p>The new ADC-C4 is added to fill in the gap between “substantial” and “non-substantial” and “expensive” and “inexpensive”. Besides contributing MW greater than the portfolio amount, the criteria are built around substantial number of generators and expensive mitigation. More than 20 contributing generators is considered substantial while less than 10 contributing generators is non-substantial. Greater than \$50M is expensive and less than \$20M is inexpensive. For situations falling between the thresholds, are considered to be marginally substantial and therefore both factors are considered. A marginally substantial number of generators combined with a marginally high mitigation cost is considered an area constraint. To ensure it impacts a subarea than just one or two interconnection points, the criteria of bulk contingency is added.</p> <p><u>Constraint exceedance criterion:</u> 5% DFAX circle is clarification on what are contributing generators. There is no change in substance.</p> <p><u>Mitigation cost threshold:</u> \$50M is the threshold between management approval and board approval for transmission upgrades. It is a better measure of expensive mitigation. Also it aligns with the principles of area upgrades. These upgrades shall be approved through prudent TPP analysis. The response under ‘Number of generators criterion’ provides more explanation on how the cost threshold is combined with the number of generators criterion. \$20M is the typical cost range for a sub-transmission reconductoring upgrade for a small local pocket. Below \$20M is considered inexpensive mitigation. Unless there are more than 20 contributing generators, constraints with mitigation below \$20M are local constraints.</p> <p><u>Impact on LDNU and ADNU categorization:</u> The CAISO does not agree with LSA’s/SEIA’s statement. The amount of TPD to be allocated depends on the CPUC IRP and CAISO TPP processes. TPD available at the system level increased due to the</p>

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		<p>deliverability methodology changes. Through the TPP process, the ISO ensures the TPD is sufficient to support the renewable portfolio for all ADCs. With the lower mitigation cost threshold for ADC, TPD is allocated to more competitive generation projects. Ensuring LDNUs are truly localized and cost effective upgrades is in the best interest of rate-payers. Assigning upgrades to generators that are not in the best interest of ratepayers will disadvantage that generator in the procurement process.</p>																
2e	<p><u>Detailed comments on proposed Area Off-Peak Deliverability Constraint definitions</u></p> <p>The current and proposed AOPC definitions are shown below, followed by LSA/SEIA questions.</p> <p style="text-align: center;">AREA OFF-PEAK CONSTRAINT DEFINITIONS (proposed)</p> <table border="1" data-bbox="268 755 1127 1149"> <thead> <tr> <th data-bbox="268 755 394 867">AOPC TYPE</th> <th data-bbox="394 755 611 867"># OF LCRIGs CONTRIBUTING TO CONSTRAINT</th> <th data-bbox="611 755 793 867">CONSTRAINT EXCEEDANCE</th> <th data-bbox="793 755 1127 867">MITIGATION COST</th> </tr> </thead> <tbody> <tr> <td data-bbox="268 867 394 943">AOPC-C1</td> <td colspan="3" data-bbox="394 867 1127 943">Transmission system operating limit that constrains all/most of generation already constrained by a previously identified AOPC</td> </tr> <tr> <td data-bbox="268 943 394 1149">AOPC-C2</td> <td data-bbox="394 943 611 1149">>20 LGRIGs* w/a fuel/energy source "substantially occurring" in off-peak conditions</td> <td data-bbox="611 943 793 1149">Total MW of new generation contributing to constraint exceeds MWs in Renewable Base Portfolio mapped w/in 5% DFAX circle, as defined in Off-Peak</td> <td data-bbox="793 943 1127 1149">--- ---</td> </tr> <tr> <td data-bbox="268 1149 394 1149">AOPC-C3</td> <td data-bbox="394 1149 611 1149">---</td> <td data-bbox="611 1149 793 1149"></td> <td data-bbox="793 1149 1127 1149">>\$50M</td> </tr> </tbody> </table>	AOPC TYPE	# OF LCRIGs CONTRIBUTING TO CONSTRAINT	CONSTRAINT EXCEEDANCE	MITIGATION COST	AOPC-C1	Transmission system operating limit that constrains all/most of generation already constrained by a previously identified AOPC			AOPC-C2	>20 LGRIGs* w/a fuel/energy source "substantially occurring" in off-peak conditions	Total MW of new generation contributing to constraint exceeds MWs in Renewable Base Portfolio mapped w/in 5% DFAX circle, as defined in Off-Peak	--- ---	AOPC-C3	---		>\$50M	<p><u>Mitigation cost threshold, number of generators criterion, and constraint exceedance criterion for AOPC-C4:</u></p> <p>Unlike the first three criteria, AOPC-C4 does not mirror ADC-C4. It is an implementation of following what the ISO filed with FERC³:</p> <p>The CAISO developed the study methodology and dispatch assumptions during the stakeholder process. To determine what constitutes "excessive curtailment," the CAISO considers the amount of the curtailment as a percentage of the annual energy production. Currently, approximately three percent of the relevant generation is curtailed due to transmission constraints or system oversupply. For purposes of the off-peak deliverability assessment, the curtailment of ten percent will be considered excessive. The off-peak deliverability assessment identifies local transmission bottlenecks that would cause excessive curtailment, but the study assumptions focus on system conditions when system-wide oversupply is unlikely. Each interconnection customer's Phase I and Phase II study reports will contain the following information regarding off-peak constraints and any identified off-peak network upgrades to relieve those constraints:</p> <ul style="list-style-type: none"> • Explanation of the constraints causing curtailment during off-peak hours; • Estimated percentage of MW capacity curtailment for the generating facility due to transmission constraints;
AOPC TYPE	# OF LCRIGs CONTRIBUTING TO CONSTRAINT	CONSTRAINT EXCEEDANCE	MITIGATION COST															
AOPC-C1	Transmission system operating limit that constrains all/most of generation already constrained by a previously identified AOPC																	
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AOPC-C3	---		>\$50M															

³ <http://www.caiso.com/Documents/Mar20-2020-DeliverabilityAssessment-DeficiencyLetterResponse-ER20-732.pdf>

No	Comment Submitted			CAISO Response
	AOPC-C4	---	<p>Mitigation cost > avoided curtailment cost.</p> <p>Mitigate cost is based on previous interconnection studies or Per-Unit Cost, adj. for construction duration. Avoided curtailed energy is based on a complicated formula described in the PRR. NPVs assume a 40-year life & 7%</p>	<ul style="list-style-type: none"> • Estimated net present value of curtailed energy; • Total costs of identified upgrades to relieve the constraints, and allocated share of those costs for the interconnection customer (for Local Off-Peak Network Upgrades only); • Estimated cost-to-benefit ratio of the upgrades relative to expected level of curtailment. <p>Fundamentally the difference between on-peak and off-peak deliverability assessments is that the former is for system reliability and the latter is to manage renewable curtailment when such curtailment does not impose reliability risk. Therefore, the primary criteria for on-peak ADC is the number of generators, as an indicator of the reliability risk. The more generators are behind the constraint, the higher reliability risk it is not to mitigate the constraint. For off-peak AOPC, number of generators and mitigation cost threshold are screens that identify obvious area congestions. As discussed through the stakeholder process and reinstated by FERC in the deficiency letter, identification of AOPNU vs LOPNU should be based on high confidence of LOPNU benefitting the ratepayers in lieu of a benefit-cost analysis. AOPC-C4 is carefully designed to achieve this. It is not limited by the number of generators or MW behind the constraints, i.e. it is broader than ADC-C4 to identify area constraints and more stringent on local constraints resulting in LOPNUs.</p> <p><u>Mitigation cost threshold for AOPC-C4:</u> The criteria are applied in sequence. If one of the first three criteria is met, AOPC-C4 test is not performed. Only if the constraint failed first three criteria, i.e. it impacts less than 20 generating units and costs less than \$50M to relieve, AOPC-C4 will be applied. If the mitigation cost is higher than estimated avoided curtailment cost, such constraints and upgrades shall be evaluated more thoroughly in TPP. The steps described in AOPC-C4 are to ensure higher confidence of only inexpensive upgrades that addresses excessive renewable curtailment and benefit not only the generators but also the rate-payers are LOPNUs.</p>
<p>* Location-Constrained Resource Interconnection Generator (mostly wind or solar).</p>				
<p><u>Questions about proposed definitions</u></p> <ul style="list-style-type: none"> • <u>Number of generators criterion:</u> Proposed ADC-C4 would require a minimum of 10 generators, but there is no minimum for AOPC-C4. Why is there a difference? • <u>Constraint exceedance criterion:</u> Currently applies to Criterion 4 and would apply to ADC-4, but is not proposed to apply to AOPC-C4. Please explain the difference. • <u>Mitigation cost threshold for AOPC-C3:</u> This is the same proposed threshold as for ADC-3, and the same questions about the reduction from Criterion 3 apply. • <u>Mitigation cost threshold for AOPC-C4:</u> This is among the issues of greatest concern in PRR 1529. The CAISO is proposing a complex and entirely new cost-effectiveness test; applicability of a cost-effectiveness concept here is entirely new, and neither the methodology nor the assumptions have been vetted with stakeholders. There is no way this proposal can be characterized as simply a “tariff interpretation,” and it should not be added to CAISO rules through a PRR with no open process for its development. 				

No	Comment Submitted	CAISO Response
		<p><u>Mitigation cost threshold for AOPC-C3:</u> See response to 2d on \$50M threshold.</p>