



California ISO

2020 to 2022 Ancillary Service
Scarcity Report
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1. Introduction

Through its markets, the California Independent System Operator Corporation (ISO) procures ancillary services (A/S), including regulation services (regulation up and regulation down) and operating reserves (spinning and non-spinning reserves), to meet NERC and WECC reliability standards and to support reliable electric system operations. In addition to the ISO system-wide procurement requirements, the ISO establishes minimum A/S procurement requirements in some of the A/S sub-regions, such as the ISO system (the entire ISO excluding the interties), SP26, NP26 and expanded sub-regions.

On December 1, 2010, the ISO implemented an A/S scarcity pricing mechanism in its markets. The scarcity pricing mechanism triggers when there is insufficient A/S supply to meet the requirement. Under this mechanism, the price of the scarce A/S will automatically rise to a pre-determined scarcity price, as described in the ISO tariff.¹ For the first three years of A/S scarcity pricing, the ISO published an annual report reviewing the events that occurred and conducted an assessment that determined the pricing mechanism did not require changes.² This report presents the details and impacts of the scarcity events that occurred in 2020, 2021 and 2022 and fulfills the requirement in Tariff Section 27.1.2.3 that the ISO review the scarcity pricing mechanism every three years.

2. Frequency of Scarcity Events

Table 1 below shows the frequency of the 2020, 2021 and 2022 scarcity events by year, A/S region and A/S type. All scarcity events occurred in the real-time market (RTM) and no events occurred in the integrated forward market (IFM).

Table 1: Count of Scarcity Events by Year, A/S region and Service

A/S Region and Service	Year		
	2020	2021	2022
CAISO Expanded			
Regulation Up	5		
Regulation Down	4	3	
Spin			
Non-Spin	17	7	
NP26 Expanded			
Regulation Up	5	5	
Regulation Down	1	27	6
SP26 Expanded			

¹ See the ISO tariff section 27.1.2.3.

² Past reports are located at: <http://www.aiso.com/Pages/documentsbygroup.aspx?GroupID=0DB07C0D-A0F9-4B81-BD66-4903D05798D0>

A/S Region and Service	Year		
	2020	2021	2022
Regulation Up	41	7	
Regulation Down	51	6	
Spin	3		
Non-Spin	15		
Totals	142	55	6

Table 2 shows the percentage of IFM and RTM intervals that have an A/S scarcity event.

Table 2: Frequency of A/S Scarcity Events

	2020	2021	2022
IFM Intervals with A/S Scarcity	0%	0%	0%
IFM Intervals without A/S Scarcity	100%	100%	100%
RTM Intervals with A/S Scarcity	0.40%	0.16%	0.02%
RTM Intervals without A/S Scarcity	99.60%	99.84%	99.98%

3. Causes and Trends in Scarcity Events

Table 3 below shows the frequency of the 2020, 2021 and 2022 scarcity events by year and primary reason.

Table 3: Frequency of Scarcity Events by Cause

Issue impacting A/S procurement	Year		
	2020	2021	2022
Resource outage or PMin re-rate	29	19	1
System conditions where energy is needed over A/S capacity	40	7	
Increase in A/S requirements in RTM	28	14	3
Telemetered limits reduce resource capacity	30	10	
Transmission issues block A/S delivery	7	3	
Multi-Stage Generator (MSG) transition issue	3	2	2
State of Charge Issues	5		
Totals	142	55	6

The RTM experiences changing conditions with respect to the IFM such as load forecast changes, resource outages or transmission congestion, making system conditions in RTM generally tighter than IFM for both energy and A/S. The main categories leading to RTM A/S scarcities include:

- Resource outage or Pmin re-rate – Resource outages, de-rates, re-rates on minimum operating level or outages on the ability to provide A/S.
- System conditions that require energy over A/S capacity – If the system needs large amounts of energy to maintain power balance, spin and non-spin reserves could be dispatched to a level where the A/S requirements cannot be met.
- Increase in A/S requirements in RTM – the ISO may increase A/S requirements in RTM based on the criteria in Operating Procedures or other system considerations.
- Telemetered limits reduce resource capacity – Resources may bid up to their certified amounts in the IFM for A/S. Resources with a must offer obligation have a requirement to bid their certified range in the IFM. The RTM uses the plant operating limits that are sent from the resource to the ISO’s Energy Management System to determine how much capacity is available on the resource. If the resource sends an upper limit that constrains its ability to provide the IFM A/S award then that A/S is unavailable and the RTM has to procure incremental A/S from other resources.
- Transmission issues block A/S delivery – in real-time, there can be transmission issues that necessitates blocking the provision of A/S from certain resources because the resources cannot deliver A/S or delivery would exacerbate a transmission issue if the market dispatched the A/S.
- MSG transition issue – MSG resources cannot provide A/S during transitions. Alternatively, an MSG resource may transition into a configuration that has a reduced A/S capacity range.
- State of Charge Issues – If a storage resource does not have sufficient State of Charge to support the A/S award, the RTM will rescind the A/S award.

4. Conclusion

In 2020, the amount of scarcity events was relatively high with 27 percent of the total annual events occurring during the heat wave events of August and September 2020 when energy supplies were insufficient to meet demand. The number of scarcity events decreased 61 percent in 2021 from 2020 and there were only six scarcity events in 2022. The low level of scarcity events in the past two years reflects that there is sufficient resources available and bidding A/S in the ISO markets. The ISO updated the Scarcity Reserve Demand Curves when it adjusted the energy bid cap to comply with FERC Order No. 831 in June 2021³. The current Scarcity Reserve Demand Curves in Tariff Section 27.1.2.3 provide adequate incentive to offer A/S in the ISO markets and the ISO does not see a need to change the Scarcity Reserve Demand Curves at this time. The ISO has a new policy initiative on Price Formation Enhancements that is further evaluating price formation during conditions of energy shortages and scarcity. This new initiative may consider A/S pricing parameters.

³ When conditions are appropriate to increase the energy bid cap from \$1000 to \$2000, the current Scarcity Reserve Demand Curves also double in magnitude.