

CAISO Energy Storage Enhancements Workshop: Co-Located Resources

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Co-Located Enhancements

- ⚡ In order to retain ITC value, many co-located resources restrict grid charging, including building in grid charge protections
 - While the CAISO enhancements account for grid charging for a 5-year period, many existing contracts with storage do not explicitly allow for grid charging after a 5-year period
 - Contracts may extend grid charging restrictions beyond 5 years, depending on possible extension of the ITC, and different property tax benefits, etc.
- ⚡ Market dispatches should avoid co-located storage grid charging, including times of renewable curtailment so that resources are not disconnected / forced offline
- ⚡ CAISO should adjust curtailment orders so that co-located storage can fulfill its complete market-awarded charging schedule
- ⚡ Optimizing curtailment orders with respect to the characteristics of co-located resources would result in greater state of charge (SOC) in subsequent periods, improving reliability and value-capture by market participants

Proposal

Equation 1: Co-Located Facility Energy Balance (assuming Discharging = 0 MW)

$$\textit{Scheduled Production} - \textit{Scheduled Charging} - \textit{Curtailment} = \textit{Export to Grid}$$

Equation 2: Optimal Curtailment when Grid-Charging is Prohibited

$$\textit{Curtailment}^* \equiv (\textit{Scheduled Production} - \textit{Scheduled Charging})$$

Equation 3: Recommendation for Optimal Co-Located Curtailment

$$\textit{Scheduled Production} - \textit{Scheduled Charging} - \textit{Curtailment}^* = 0$$