



California ISO

Adding reserve prices to CRR auction

Department of Market Monitoring

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September 30, 2026

Adding reserve prices to CRR auction would resolve a design flaw

The ISO offers financial contracts, backed by transmission ratepayers, at \$0 offer prices in the CRR auctions (no reserve prices)

The absence of reserve prices is a design flaw

Many believe that the ISO needs to intervene to provide ratepayer backed liquidity in CRR auction

Adding reserve prices would still allow the ISO to offer ratepayer backed liquidity without the flawed \$0 offer price design

The ISO's previous reserve price proposal

The ISO's previous reserve/minimum bid price proposal recognized that selling contracts is not costless for ratepayers

The ISO's specific reserve/minimum bid price proposal created problems

- The proposal would limit trade between willing buyers and sellers whose bids did not align with the allowable minimum bids
- A single price for all flow CRRs and single price for counterflow CRRs would create significant adverse selection problems

Constraint specific reserve prices

Constraint specific reserve prices are the most straightforward and efficient way to add reserve prices

Constraint specific reserve prices avoid the problems with the ISO's previous reserve price proposal

- Would not limit trade between willing buyers and sellers
- Multiple prices depending on the constraint reduces the potential adverse selection problems

Setting Constraint Specific Reserve prices

Set the constraint limit to 0 MW and create a relaxation variable

- Set relaxation max to constraint limit
- Add relaxation amount and reserve price to objective function
- Same way ISO implements penalty prices

Current no reserve prices

$$\begin{aligned} \max \sum_i mw_i p_i \\ \text{s.t. } \sum_i mw_i SF_i^k \leq Limit^k \end{aligned}$$

Constraint specific reserve prices

$$\begin{aligned} \max \sum_i mw_i p_i - \sum_k R^k * ReserveP^k \\ \text{s.t. } \sum_i mw_i SF_i^k - R^k \leq 0 \\ \text{where } 0 \leq R^k \leq Limit^k \end{aligned}$$

Constraint specific reserve price examples

CRR	Bid MW	SF	Case 1: No reserve price		
			Bid Price	Award	CRR Price
A-B	100	1.00	\$0.05	30	\$0.05
B-A	100	-1.00	-\$2.50	0	-\$0.05
Reserve	30	-1.00	\$0.00	30	-\$0.05

Constraint Shadow Price	\$0.05
Bid surplus (incl. R)	\$1.50

Constraint specific reserve price examples

CRR	Bid MW	SF	Case 2: ISO sales only		
			Bid Price	Award	CRR Price
A-B	100	1.00	\$3.00	30	\$3.00
B-A	100	-1.00	-\$3.25	0	-\$3.00
Reserve	30	-1.00	-\$2.75	30	-\$3.00

Constraint Shadow Price	\$3.00
Bid surplus (incl. R)	\$7.50

Constraint specific reserve price examples

CRR	Bid MW	SF	Case 3: MP trades only			Case 4: Mixed		
			Bid Price	Award	CRR Price	Bid Price	Award	CRR Price
A-B	100	1.00	\$3.00	100	\$2.75	\$3.00	100	\$2.75
B-A	100	-1.00	-\$2.75	100	-\$2.75	-\$2.75	70	-\$2.75
Reserve	30	-1.00	-\$3.25	0	-\$2.75	-\$2.50	30	-\$2.75

Constraint Shadow Price

\$2.75

\$2.75

Bid surplus (incl. R)

\$25.00

\$32.50

Setting Constraint Specific Reserve prices

Constraint specific prices are the most straightforward and efficient way to add reserve prices

- Relatively easy to implement in auction
- Smaller set of reserve prices to generate than for all paths

ISO could set reserve prices for constraints with a combination of

- Historic prices potentially adjusted with electric futures prices
- Forward looking congestion modeling over the term of the auction

Reserve prices through a backstop to a willing seller design

If the ISO wants to:

- avoid issues caused by different transmission models in the auction than day-ahead markets
- but still intervene to provide ratepayer backed liquidity

ISO could set reserve prices on point-to-point contracts sold in or after a Willing Seller auction

- avoids issues with ISO's previous reserve price proposal

The ISO should continue assessing options for adding reserve prices to CRR auction

The lack of reserve prices is a design flaw

If the ISO continues to offer ratepayer backed contracts, it should at least use reserve prices

The most straightforward and efficient way to add reserve prices is to add constraint specific reserve prices

The ISO should develop and analyze methods for setting constraint specific reserve prices for the products it offers in the auction