

# Willing seller market design for congestion revenue rights

Department of Market Monitoring March 3, 2025

## The CRR auction design is fundamentally flawed

- ISO auctions off the rights to congestion revenues that otherwise flow back to transmission ratepayers, mainly Load Serving Entities (LSEs) who pay the Transmission Access Charge (TAC)
- ISO essentially offers to sell CRRs backed by transmission ratepayers at \$0 bid price in auction
- Auction revenues are systematically less than CRR payouts every year since the auction started in 2009
  - Losses averaged \$114 million per year from 2012 to 2018
  - Losses averaged \$62 million per year from 2019 to 2023
- A large majority of losses paid to purely financial traders, rather than entities that might be buying CRRs as hedges



## Changes made in 2019 have not solved the problem

- Changes made by ISO in 2019:
  - Transmission modeling improvements
  - Reduce global de-rate factor from 75% to 65% in annual process
  - Limit nodes at which CRRs can be purchased
  - Deficit offset charges (limits CRR payouts when congestion revenues insufficient)
- Reduction in CRR losses since 2019 have come mostly from *deficit offset charges* levied on CRR holders
- Deficit offset charges mean that CRRs are not fully funded
  - » Non-LSEs getting charged ~30% of "gross" CRR payouts
  - » LSEs getting charged ~24% of "gross" CRR payouts



## Most or all of reduction in losses are from deficit offset charges – which significantly reduce the "hedging" value of CRRs for all participants



## Transmission ratepayers still losing about \$62 million per year from auctioned CRRs since 2019 changes



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### CRRs still selling for \$.67 per \$1 of payouts





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## Proposed new CRR financial network market design

- CRR allocation method to LSEs can remain unchanged (but increased)
  - LSEs can offer allocated CRRs for sale in willing seller CRR market
- Treat CRR auction like standard financial market
  - CRR auction transactions only between willing counterparties with full financial exposure to contract outcomes
  - Do not rely on day-ahead congestion revenues to fund CRR payouts
  - No need for deficit offsets (or to make CRRs financially firm with outside funds)
  - LSEs can continue to offer allocated CRRs for sale in auction
- ISO serves as standard central counterparty clearing house
  - Manages counterparty credit risk
  - No direct financial exposure to the spot market

## Proposed market for CRRs between willing counterparties

- Market between willing counterparties removes the core auction design flaw
  - ISO does not offer to sell CRRs backed by ratepayers at \$0 bid price
  - All CRRs sold are from willing sellers who directly back the CRRs financially
  - Contracts are financially firm and fully funded by counterparty (no need for deficit offset charges or other mechanism to recover revenue insufficiency)
- ISO, MSC, and many stakeholders asserted that a market of willing counterparties will not clear many contracts without the ISO also selling CRRs through a transmission model
- Analysis shows this is not true and a CRR market based on willing counterparties can work
  - Using actual CRR bids from 2017-2018, a willing counterparty market design cleared a significant amount of CRRs
  - Counterflow CRRs (which provide hedges) would have to be "sold" by financial entities and LSEs under willing seller design



### Physical CRR network model formulation (current)



### Financial CRR network model formulation (used in analysis)

s.t.

 $x_i = 0$ 

(i) As-bid valuations:  $v_{ij}^{k,s}(z) = \begin{cases} b_{ij}^{k,s} + \left(\frac{b_{ij}^{k,s+1} - b_{ij}^{k,s}}{q_{ij}^{k,s+1} - q_{ij}^{k,s}}\right) \times z & \text{if } q_{ij}^{k,s+1} > q_{ij}^{k,s} \\ b_{ii}^{k,s} & \text{if } q_{ij}^{k,s+1} = q_{ij}^{k,s} \end{cases}$ 

Net injection created by CRRs at each node/hub must = 0

(ii) Bounds on quantity increment per bid curve segment:

 $0 \le x_{ij}^{k,s} \le q_{ij}^{k,s+1} - q_{ij}^{k,s} \qquad \forall k, i \ne j, s < S_{ij,k}$ 

(iii) Financial transmission capacity limits:

where

 $x_{i} = \sum_{k=1}^{K} \left( \sum_{\substack{j \neq i \\ \text{Source at node } i}}^{S_{ij,k}-1} x_{ij}^{k,s} - \sum_{\substack{n \neq i \\ n \neq i}}^{S_{ni,k}-1} x_{ni}^{k,s} \right) \quad \forall i$ 

Net injection at node i

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 $\forall k, i \neq j, s < S_{ii,k}$ 

### Physical vs. financial CRR network models

Suppose we want to clear 1 MW of a CRR from A to B

Physical network CRRs treated as physical power. Must respect: Power flow physics + transmission capacity limits



Financial network CRRs treated as financial assets. Must respect: Enough market participants as financial counterparties



All nodes in black have zero net injections

## Why did we use 2017-2018 data to assess willing seller market design?

- Changes made in 2019 would be <u>eliminated</u> under willing seller market design
- These changes make CRR bids since 2019 very unrepresentative of what would be expected under willing seller:
  - Amount of CRRs allocated to LSEs (many of which are voluntarily resold in auction) were significantly reduced
  - Bids for counterflow CRRs (from a load point to a generation node) were prohibited, so financial entities cannot submit bids to directly sell CRRs that can provide hedges for congestion
  - Deficit offset charges reduce payout of CRRs, so bid prices for CRRs are lower than bid prices expected under willing seller design
- Consequently, 2017-2018 CRRs bids are most recent data that can be used to provide a realistic assessment of how willing seller market would work



#### Analysis of willing seller design Total cleared CRR contracts during 2017-2018 (TWh)





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Analysis of willing seller design Net profits/losses by participant group





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Large volumes of negatively priced CRRs clearing under the willing seller design are "sold" by LSEs and non-LSEs

#### Auction revenues from negatively priced CRRs

Negative values = payments received from CAISO in auction from negatively priced CRRs

	Auction Revenues		% of 2017-18	Share of auction revenue	
	2017-2018 Wi	lling Seller	clearing willing	2017-2018	Willing Seller
Financial	-\$65	-\$62	97%	39%	40%
Marketer	-\$19	-\$18	98%	11%	12%
Generator	-\$8	-\$7	81%	5%	4%
Load	-\$74	-\$68	92%	45%	44%
Total	-\$165	-\$156	94%	100%	100%

#### CRR payments made for negatively priced CRRs

Negative values = payments made to CAISO for congestion on negatively priced CRRs "sold" in auction

	Day-Ahead Payouts		% of 2017-18	Share of day-ahead payouts				
	2017-2018 Wi	lling Seller	clearing willing	2017-2018	Willing Seller			
Financial	-\$120	-\$83	69%	41%	38%			
Marketer	-\$57	-\$37	66%	19%	17%			
Generator	-\$13	-\$7	52%	5%	3%			
Load	-\$101	-\$90	90%	35%	41%			
Total	-\$291	-\$218	75%	100%	100%			

#### \* Willing Seller Report, pp 20-21



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#### Willing seller analysis (2017-2018)

Auction payments and CRR payouts by participant





#### **Financial entities**

Willing seller analysis (2017-2018)





#### **Financial entities**

Willing seller analysis (2017-2018)



![](_page_17_Picture_4.jpeg)

#### **Financial entities**

Willing seller analysis (2017-2018)

![](_page_18_Figure_3.jpeg)

![](_page_18_Picture_4.jpeg)

#### **Marketers**

Willing seller analysis

![](_page_19_Figure_3.jpeg)

#### Generation

Willing seller analysis (2017-2018)

![](_page_20_Figure_3.jpeg)

## Load serving entities

Willing seller analysis (2017-2018)

![](_page_21_Figure_3.jpeg)

## Concerns raised by load serving entities

- Ironically, CRR restrictions and deficit offset charges implemented in 2019 have <u>reduced</u> ability of LSEs to hedge supply portfolio.
- With willing seller, all these 2019 restrictions can be removed without any risk of revenue loss to LSEs or overall revenue inadequacy.
  - Transmission limits in allocation model can be increased
  - Eliminate deficit offset charges on allocated CRRs
  - Allow entities to offer counterflow CRRs in willing seller auction (e.g., sourced at load node and sinking at gen node)
- DMM and CalCCA have requested that the ISO perform analysis of additional CRR nominations that would clear allocation process with 2019 transmission restriction removed from CRR allocation model.

![](_page_22_Picture_7.jpeg)

## LSEs continue to voluntarily sell back almost one quarter of allocated CRRs in the auction

![](_page_23_Figure_1.jpeg)

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#### LSEs are not "natural sellers" of non-allocated congestion revenue rights

Although congestion revenues vary from year to year more than auction revenues, auctioning CRRs backed by congestion revenues <u>reduces</u> the hedge against LSEs' total energy costs that is provided by refunding congestion revenues to LSEs.

![](_page_24_Figure_2.jpeg)