



Why The CRR Market Needs the 30-Day Rule

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Outages Workshop
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Outline

- Briefly review Congestion Revenue Rights (CRRs)
- Show examples of how CRRs will work in the new market
- Review the definition and importance of “revenue adequacy”
- Discuss importance of modeling “significant” outages

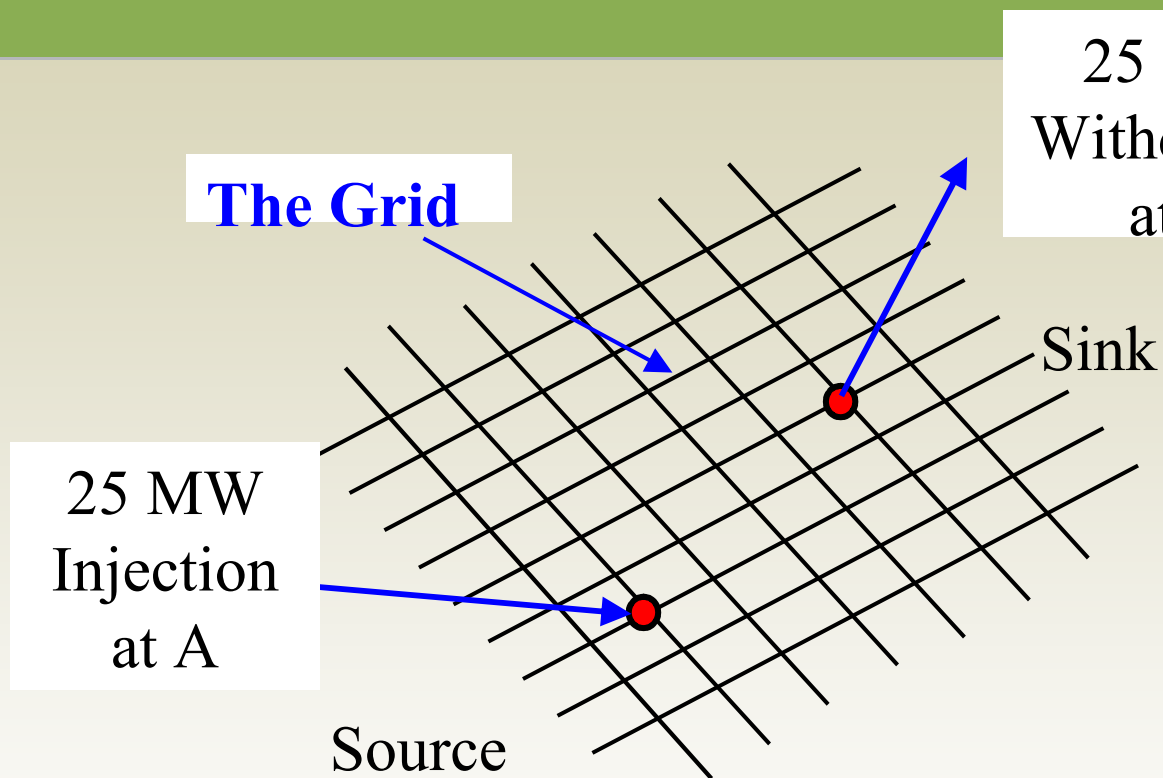
What is a Congestion Revenue Rights

- A Congestion Revenue Right (CRR) is a Day-Ahead financial instrument that allows holders to manage financial risk associated with transmission line congestion
 - Purely financial product – no reliability implications at all
- Owning CRRs can provide cash payments from the CAISO to offset or eliminate transmission congestion charges incurred when scheduling energy in the Day Ahead market
- Current congestion market is approximately \$12 million per month

CRRs and LMPs

- Locational Marginal Pricing (LMP) will be used as the approach to transmission congestion pricing under MRTU
- LMPs are nodal and consist of three parts, energy, congestion and losses
 - Energy component is the same across footprint
 - Congestion is more volatile
 - Losses will most likely be less volatile
- LMPs will be calculated at every load and generator bus on the grid in both the Day-Ahead and Real Time markets

CRR Examples



Assumptions –

1. Market Participant has been allocated 25 MW of CRRs from point A to point B.
2. Market Participant schedules 25 MW of energy from A to B consistent with his CRR.

Example A: LMP higher at Sink than

Source



Day-Ahead Energy Settlement =

$$(LMP_A) \times (\text{Scheduled Source MW}_A) - (LMP_B) \times (\text{Scheduled Sink MW}_B)$$

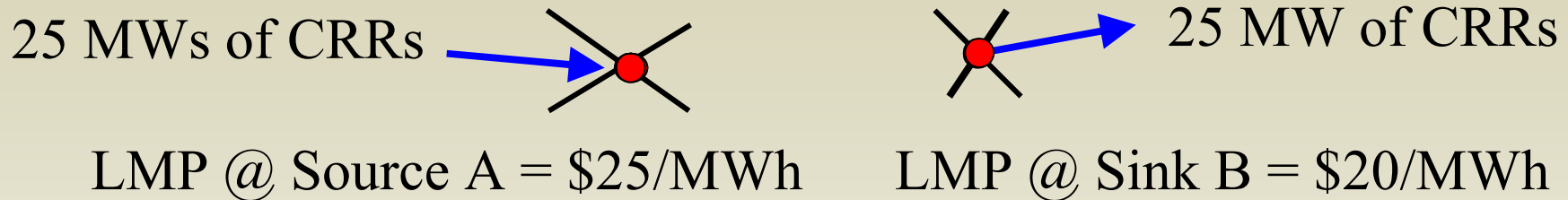
$$(\$20 \times 25 \text{ MW}) - (\$25 \times 25 \text{ MW}) = -\$125 \quad (\text{LSE Pays to ISO})$$

Day-Ahead CRR Entitlement Settlement =

$$(LMP_B - LMP_A) (\text{CRR MWs owned})$$

$$(\$25 - \$20) \times 25 \text{ MW} = +\$125 \quad (\text{LSE Receives from ISO})$$

Example B: LMP higher at Source than Sink



Day Ahead Energy Settlement =

$$\begin{aligned}
 & (\text{LMP}_A) \times (\text{Scheduled Source MW}_A) - (\text{LMP}_B) \times (\text{Scheduled Sink MW}_B) \\
 & (\$25 \times 25 \text{ MW}) - (\$20 \times 25 \text{ MW}) = +\$125 \quad (\text{LSE Receives from ISO})
 \end{aligned}$$

Day-Ahead CRR Entitlement Settlement =

$$\begin{aligned}
 & (\text{LMP}_B - \text{LMP}_A) \times (\text{CRR MWs owned}) \\
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 \end{aligned}$$

Revenue Adequacy (Conceptually)

- Presume two areas are connected via a 600MW line. Based on this we could allocate up to 600 MWs of CRRs
- If the line stays at 600MW and participants have 600MW of CRRS then there is revenue neutrality. The congestion component of the LMP is refunded directly to CRR holders
- If participants have 500MW of CRRs then there is a revenue surplus as there is an excess of $100\text{MW} \times \text{Congestion Component}$
- If participants have 500MWs of CRRs and the line operates at 400MW, then there is a revenue inadequacy as we will only collect $400\text{ MWs} \times \text{Congestion Components}$, but will need to pay out 500 MWs in CRRs
 - In reality the network is nodal and the actual conceptual calculation is more complex

Revenue Adequacy

- Load area connected via 500kV line with a thermal limit of 500MWs and encumbered with 500 MWs of CRRs
- If line is derated to 200MW then congestion will cause the LMPs in load pocket to rise, pushing up the sink LMP
- All CRRs are still valid and the 500 CRR holders will be kept whole, despite the fact that we can only collect 200 MWs due to the derate
- Revenue inadequacy will result unless the outage is known beforehand

Revenue Adequacy

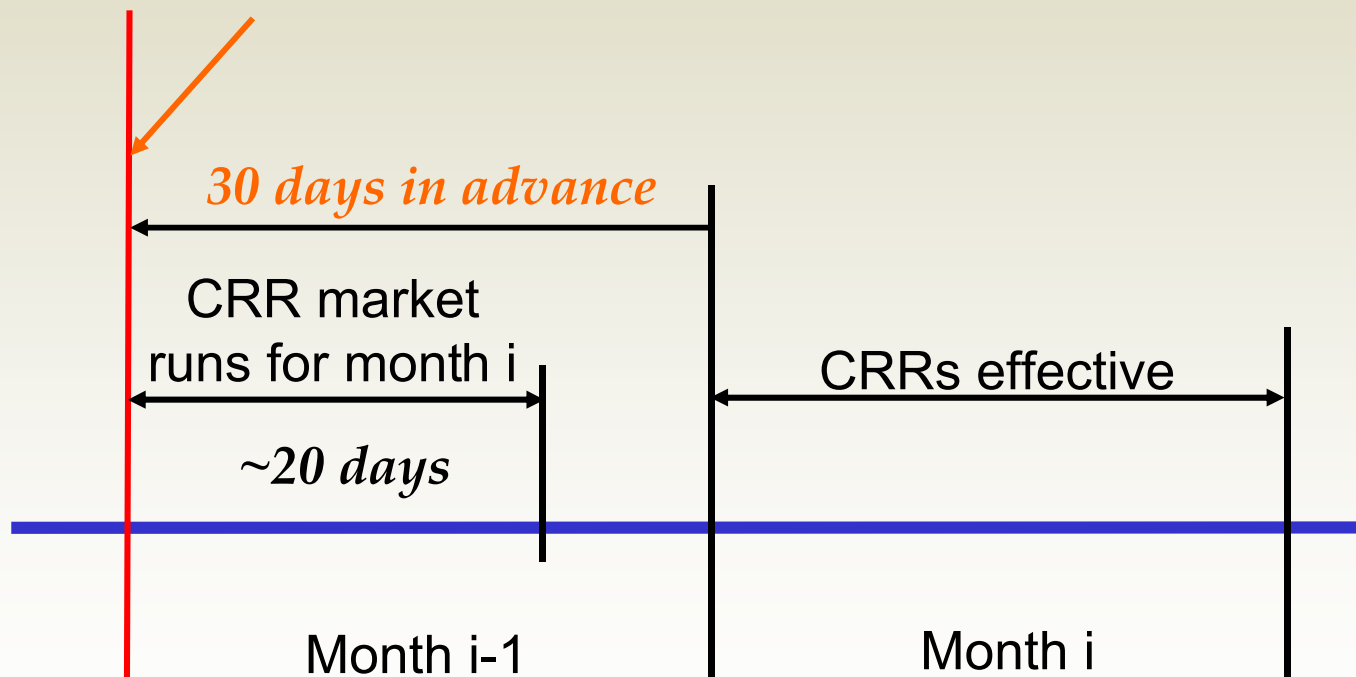
- The purpose of the CRR Revenue Adequacy constraint is that the CRR balancing account should be revenue neutral, neither in surplus nor deficit
- If the CRR group knows about transmission outages then it can derate or remove the line in the monthly allocation process to account for the outage and avoid revenue inadequacy
- Therefore the CRR system needs to model outages in its monthly FNM

Outages and Revenue Adequacy

- Do all outages equally affect revenue adequacy
 - No – 30-day rule only applies to “significant” facilities
 - Concentrate on the big rocks
- The monthly CRR process starts about a two months before GO-LIVE

Congestion Revenue Rights –

Timeline for consideration of outages
in the monthly CRR process



How do other ISOs handle outages?

PJM	MISO	ISO New England	New York ISO
<p>For the annual auction, lines taken out of model if an outage of two or more months is expected. For monthly auction, take lines out if outage is equal or greater than five days, unless line is one critical to revenue adequacy. In which case, it is taken out of the model regardless of the duration of the outage.</p>	<p>For annual process, lines taken out of model for the full season if , in one or more months of the season, a line outage is expected to last seven or more days and one of the days includes the 15th of the month. For monthly process, lines taken out of model if outage is expected to last seven or more days and one of the days includes the 15th of the month.</p>	<p>For 345 kV lines, will take lines of importance out of FNM for outages equal or greater than three days. Will derate constraint limits for outages less than three days.</p>	<p>If a line is scheduled to be out for more than half the term of the upcoming TCC auction, it is a candidate to be removed from the full network model. The NYISO then asks the transmission owner whether it should be taken out or remain in the model.</p>