Analysis Report

Workshop on CRR Auction Initiative

Guillermo Bautista Alderete, Ph.D.
Director, Market Analysis and Forecasting
CAISO

December 19, 2017

CRR Auction Efficiency Initiative

Analysis Phase

- Analysis split in three stages to investigate the root causes:
  - Phase I: Auction performance and trends
  - Phase II: ISO practices/procedures and modelling
  - Phase III: Fundamentals and alignment between markets (constraint-level investigation)
- April 2017. Workshop held to define the scope of the analysis
- July 2017. Update provided for the first two stages of the analysis
- November 2017. Analysis report posted
- December 2017. Workshop to discuss the analysis

Policy Phase

- Analysis phase to provide the data and reference to guide the development of the Policy phase
- Policy phase starts on December 19
- Follow the standard policy process with Straw released on January 2018 and working group session on February 2018.

What is the purpose of this morning session?

This morning session IS to discuss the findings provided in the Analysis Report

This morning session IS NOT to discuss solutions and alternatives

What is the scope of the Analysis report?

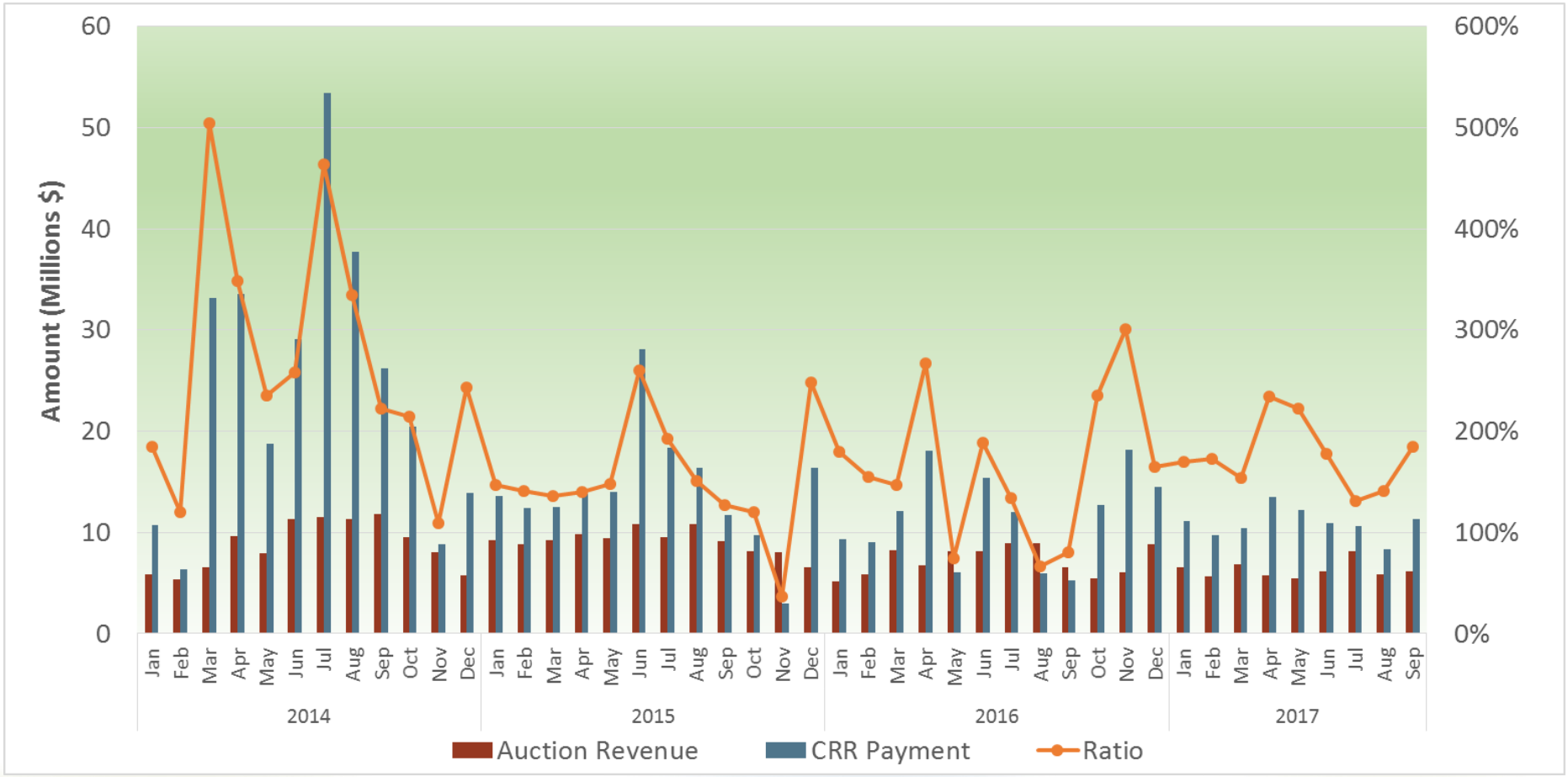
The analysis is limited to quantifiable metrics derived from ISO market data.

These findings do not include “intangible” benefits or downsides of the CRR auction, or metrics based on data beyond the ISO data.

The analysis was based on an open-end approach with no prescribed solution

Why was this initiative started?

CRR payments to auctioned CRRs are larger than Auction Revenues collected in CRR auctions



CRR payments to auctioned CRRs are larger than Auction Revenues collected in CRR auctions

Let's define

Net CRR payments= (CRR payments) - (Auction revenues)

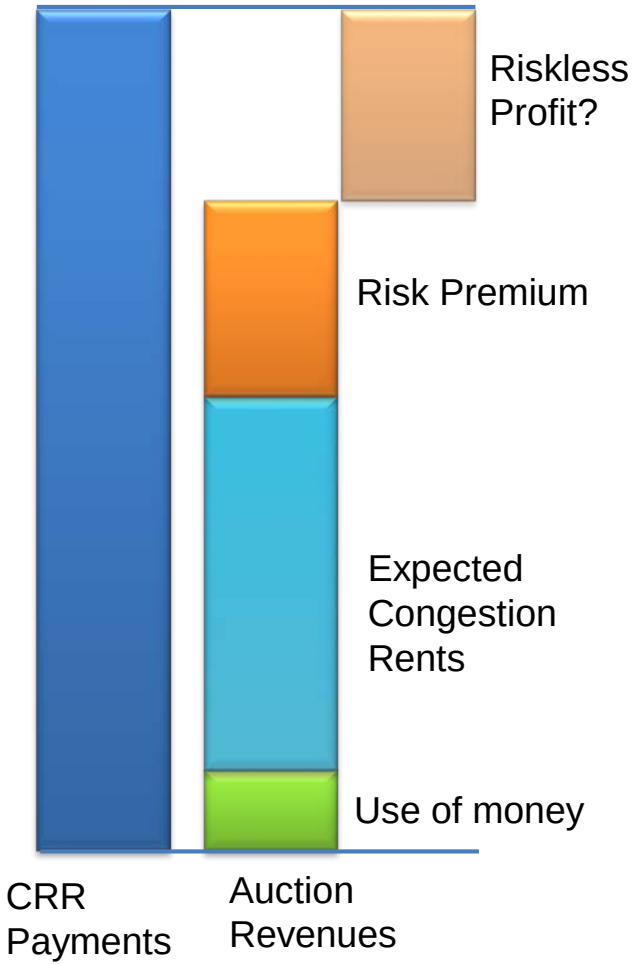
If Net CRR payments>0
Then CRR holders make an excess profit?

What level of profit is considered reasonable to claim to have an efficient auction?

0%, 10%, 50%, 200% on the dollar?

Is the risk premium overstated?

CRR payments to auctioned CRRs are larger than Auction Revenues collected in CRR auctions



If the value of money and risk premiums do not justify large profits, and if levels of profits are considered too high

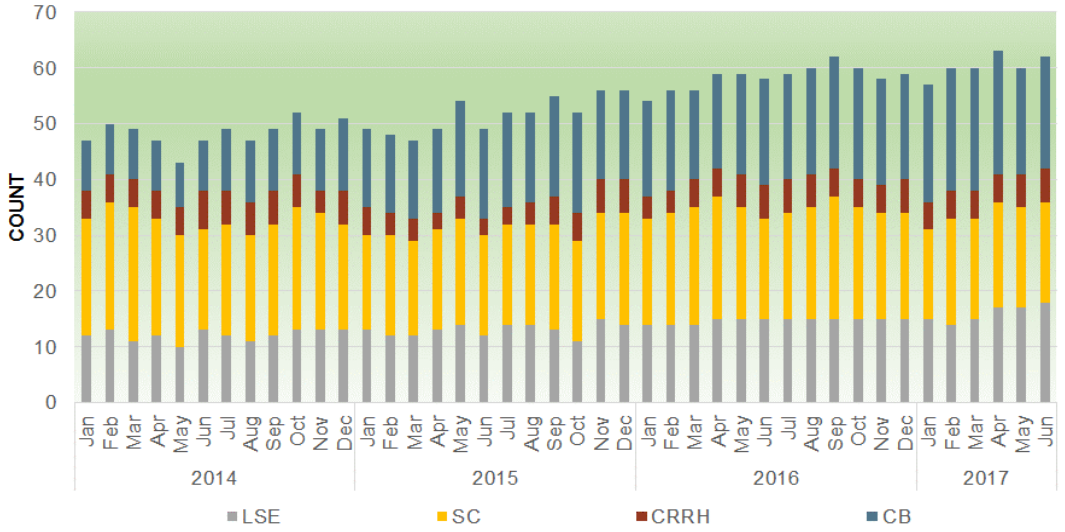
Then

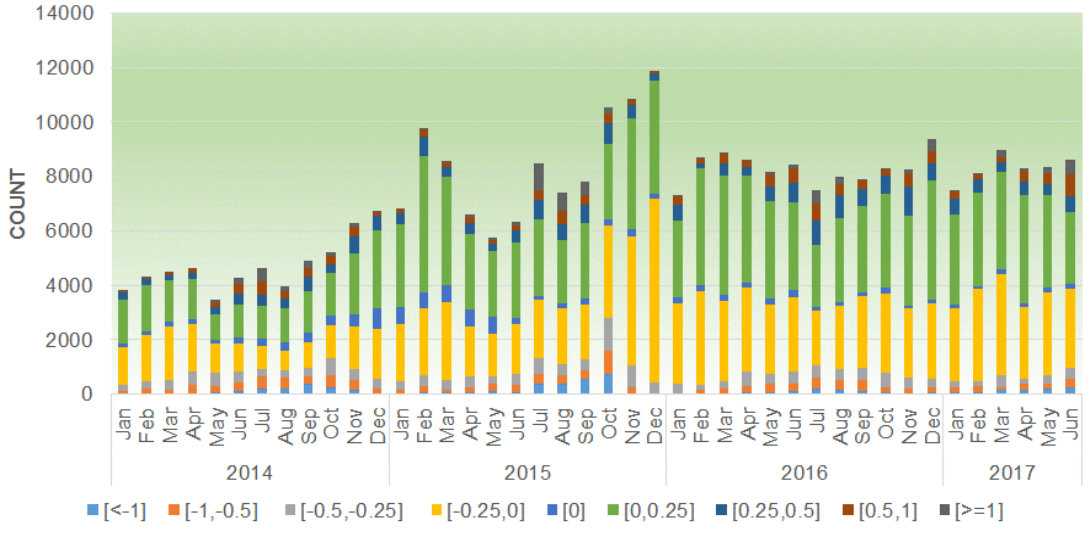
Why we do not have a flurry of participants coming into the auction to get a share of this easy-to-get and and risk-free profits?

Why there is still risk-free money left on the table ?

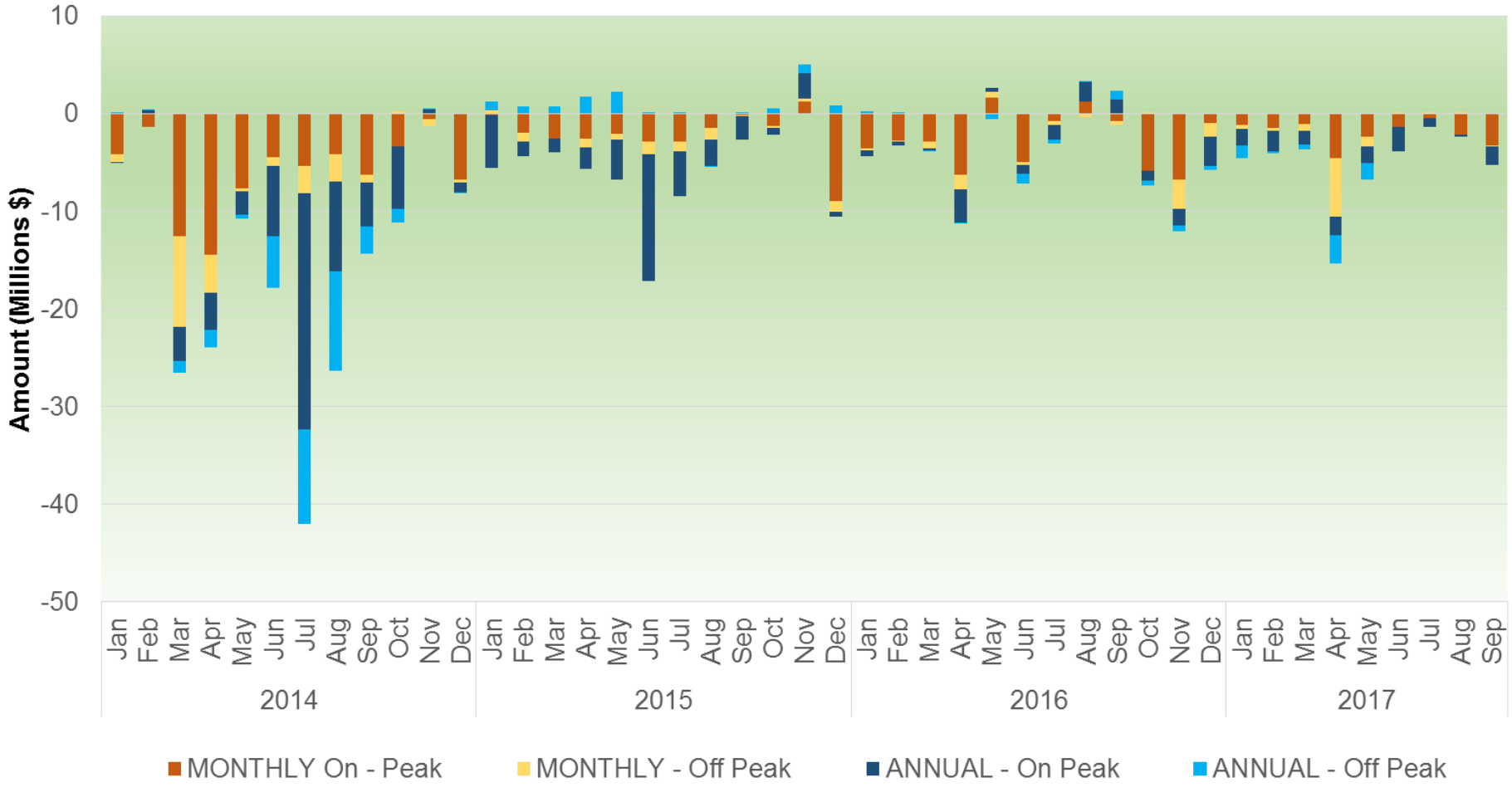
Why has not the increase in participation in CRR auctions resulted in higher auction revenues?

- Why CRR prices have not come closer to DAM prices?
- Why CRR prices remain largely in the low and tight price range?



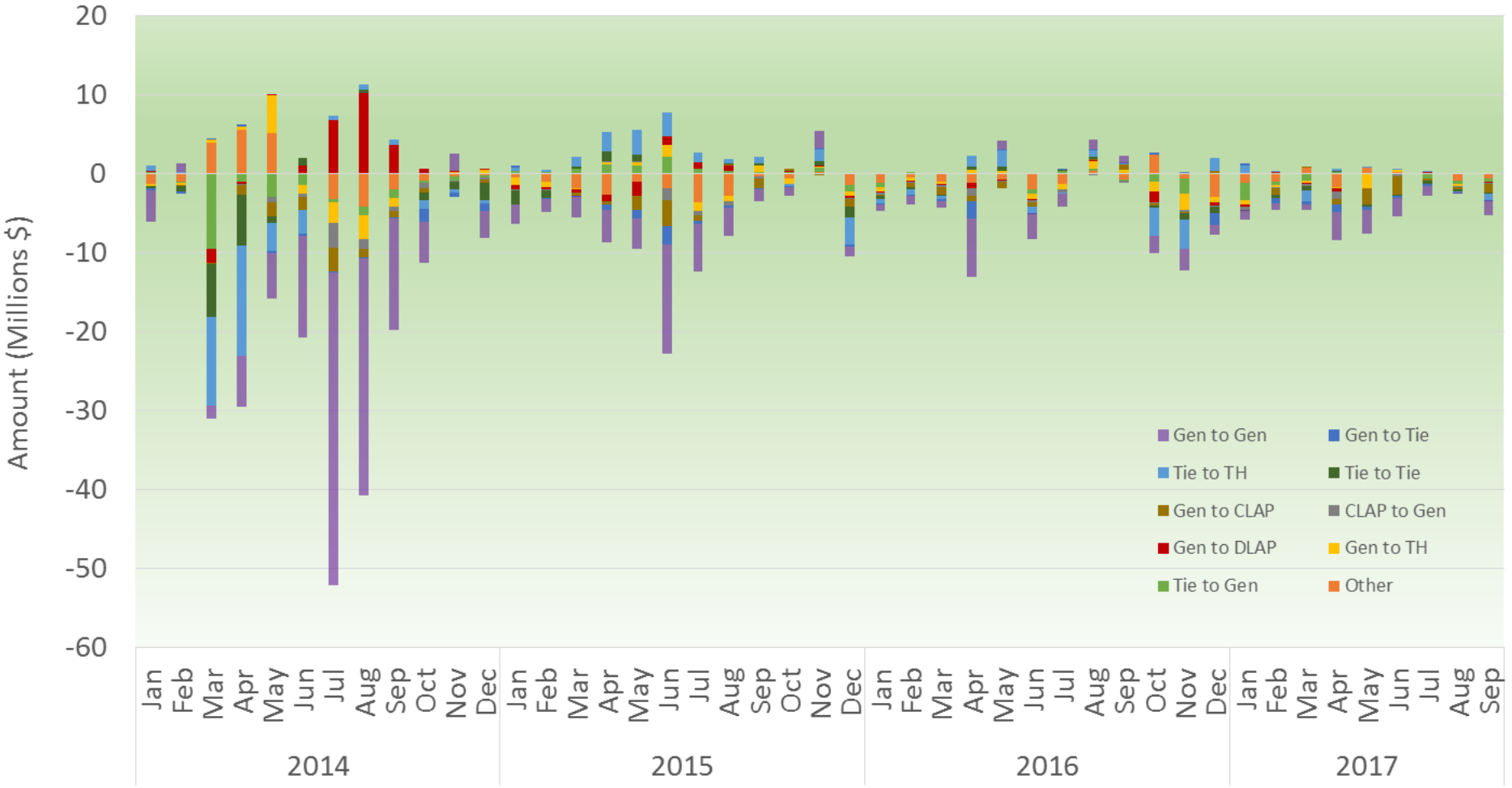


Negative CRR payments have been systemic in both annual and monthly auctions and also in both time of use



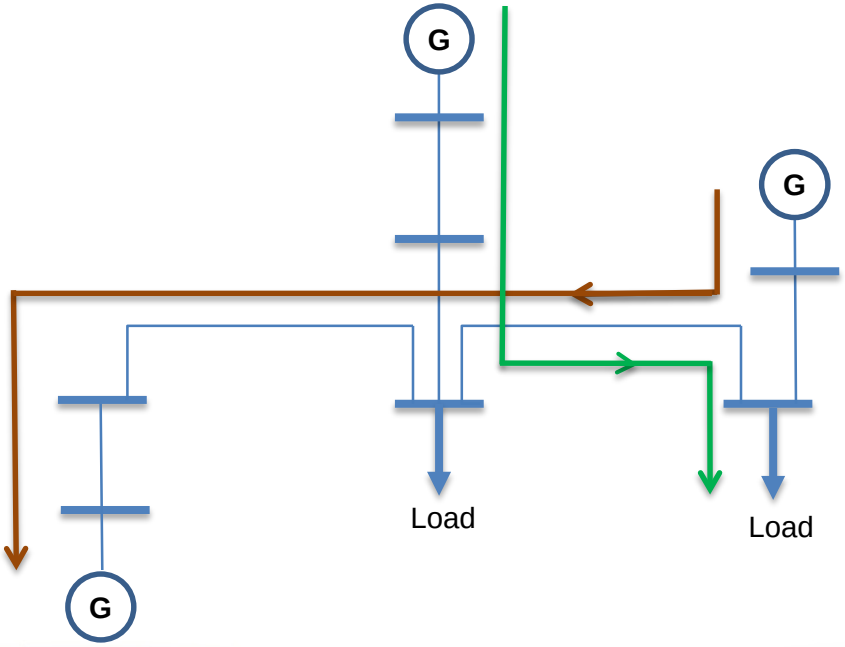
Net CRR payments= Auction revenues less CRR payouts.
Estimates from the point of view of ISO: Negative CRR payment means ISO pays to CRR holders

Over 80 percent of net CRR payments are accrued on CRRs going from supply to supply locations



What is the value added of CRRs from supply to supply cleared in CRR auctions?

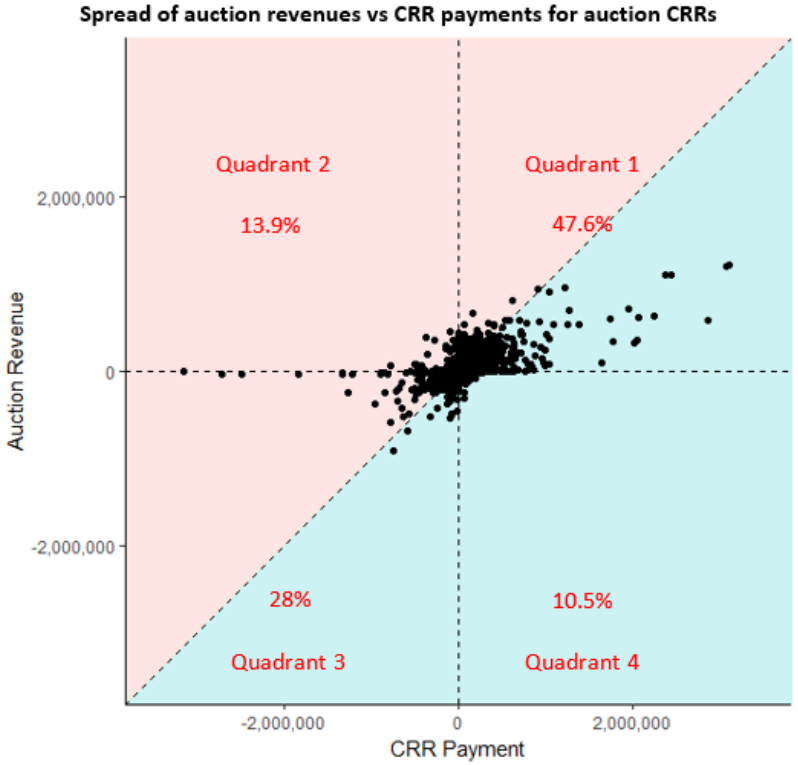
- CRR auction awards of over 40,000MW in a given month can only be supported with large volumes of auctioned CRRs providing counter-flows to each other.



Although these supply-to-supply CRRs may create counter-flows to enable CRRs associated with hedging goals, what is the value as a hedge of supply-to-supply CRRs?

CRR acquired through auctions are not risk free

17 percent of CRRs had CRR payments to be less than auction revenues.



17% seems to be low, what is a more reasonable share of CRRs expected to have losses to claim an efficient auction? Is it 50/50?

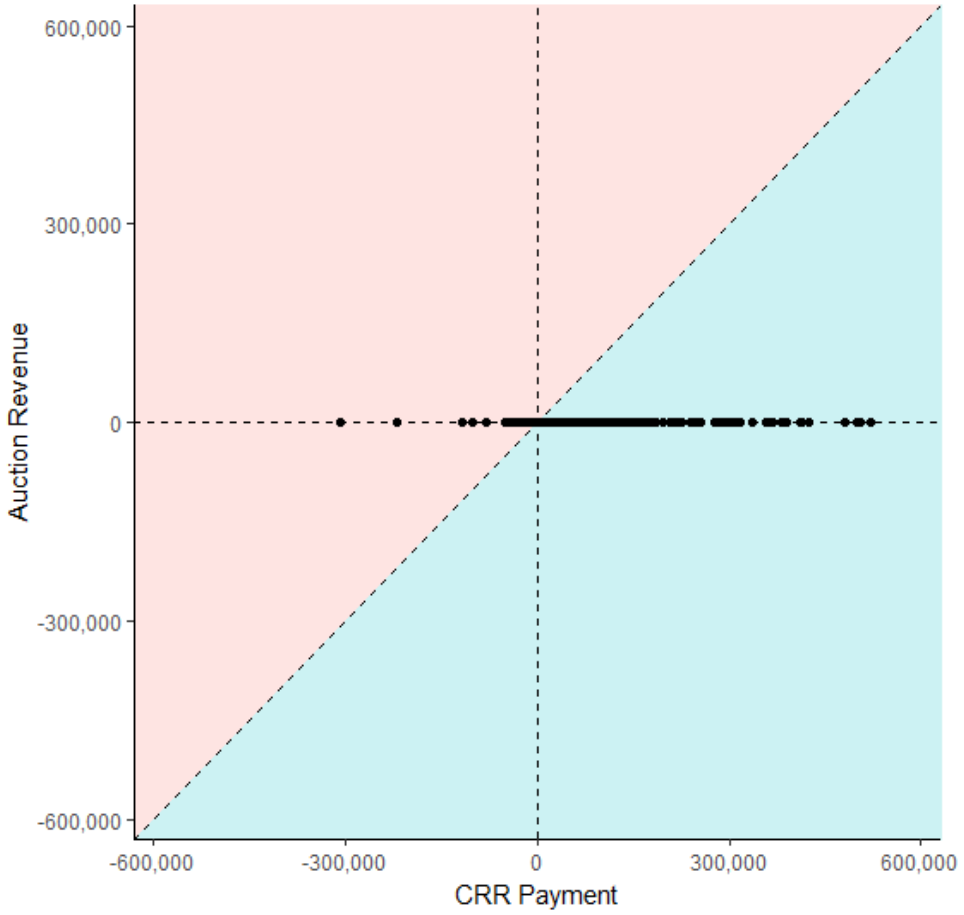
DO profits and losses need to be randomly distributed around $0?

What is the value added by zero-price CRRs cleared in the auctions?

What is the value added by CRRs going between points electrically close to each other?

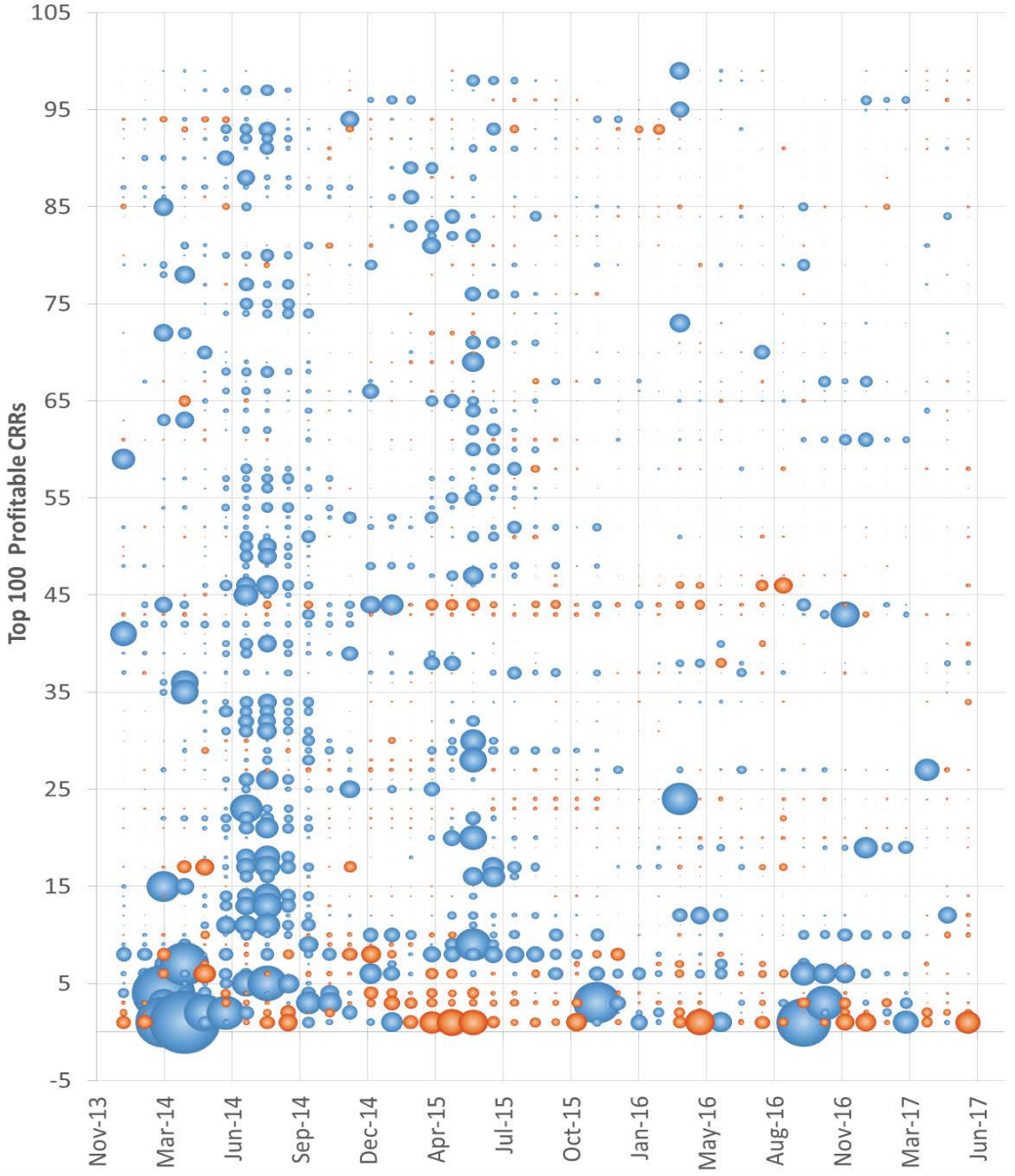
Enforcement of nodal constraints in CRR auctions has reduced the clearing of these CRRs

Is this signaling a need for a floor on cleared CRRs to be awarded?

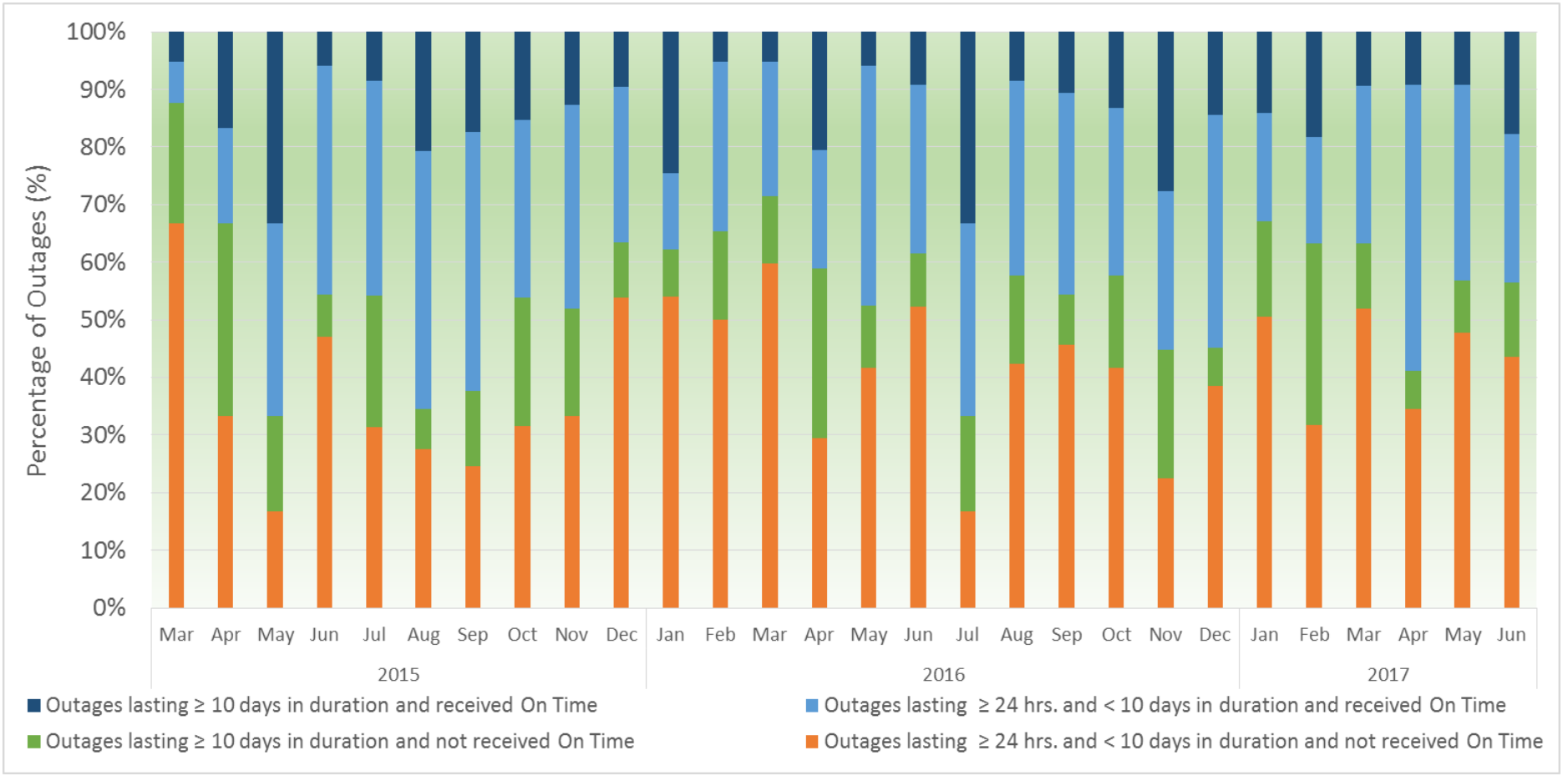


Are there CRRs consistently and persistently profitable over time?

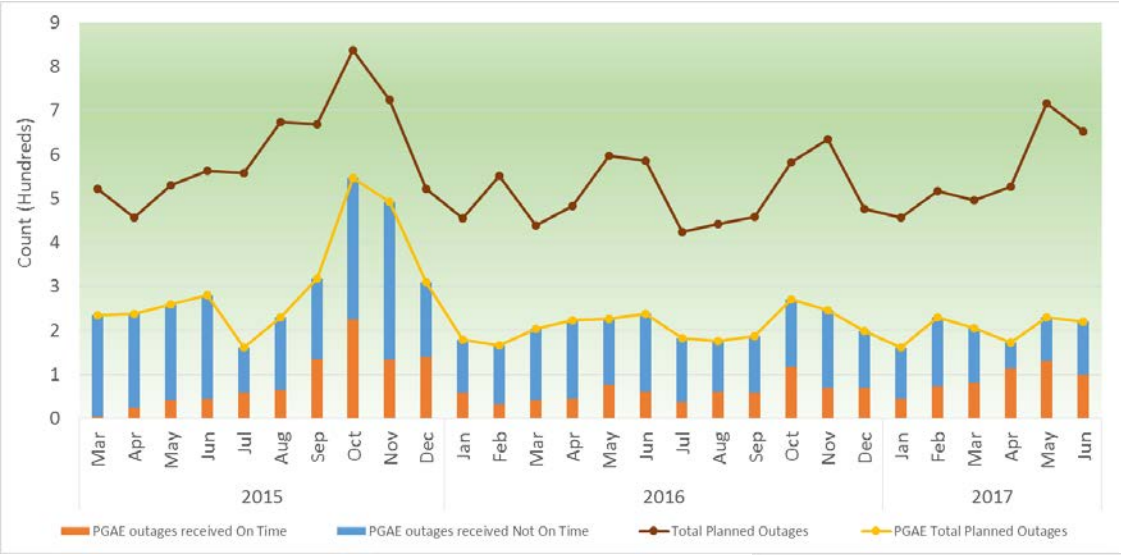
Are the CRR auction outcomes too predictable?

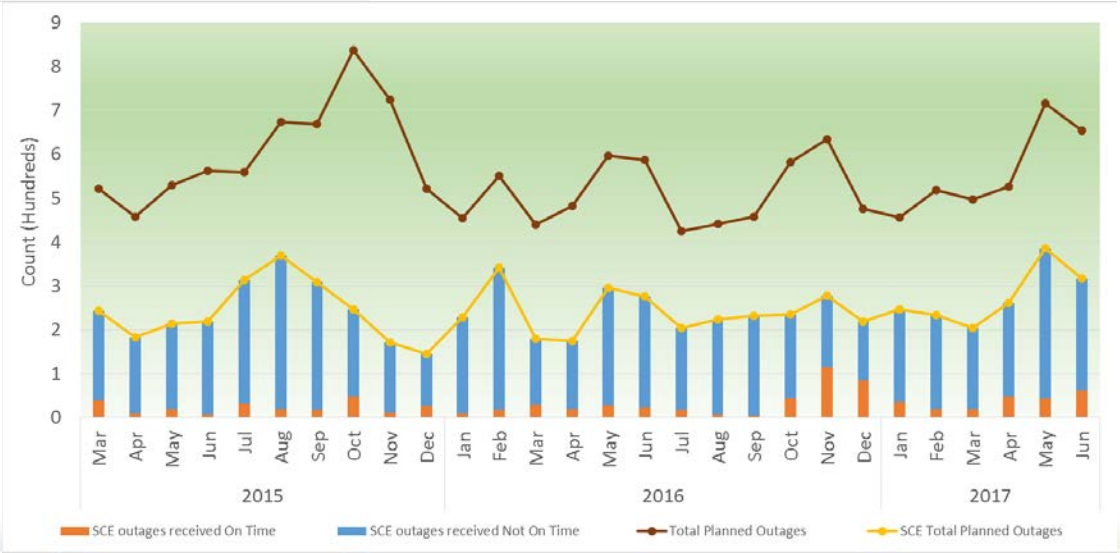


57 percent of significant outages were not received in time to be modelled in the CRR auctions

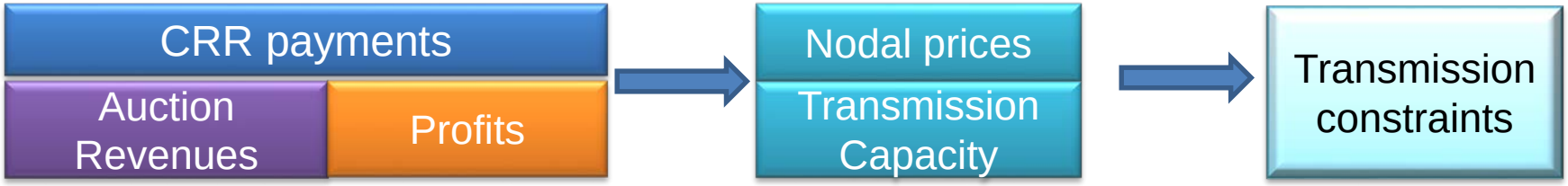


Late submission of outages are equally observed in both PG&E and SCE areas

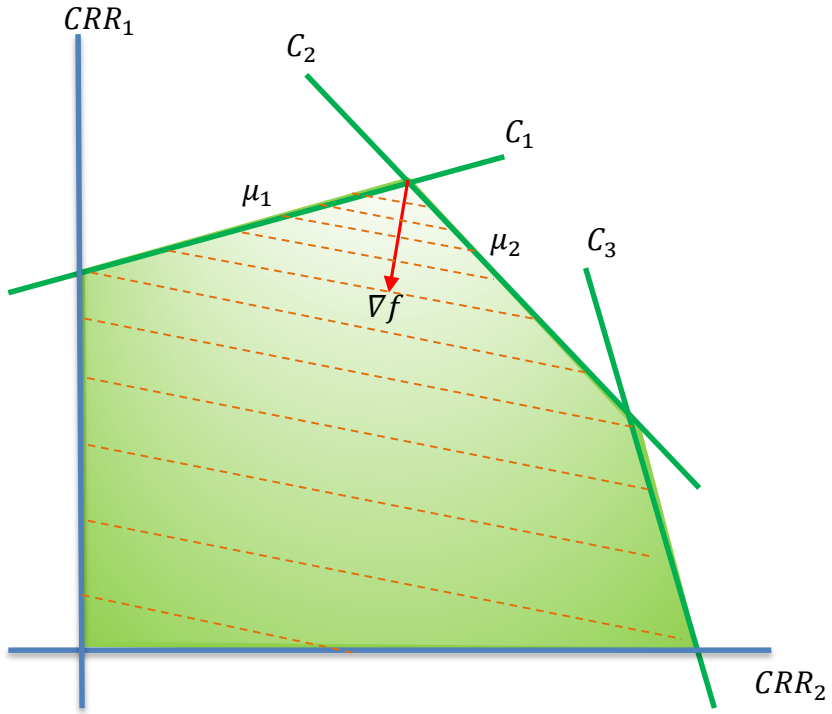




Fundamental variables of CRR profits



Congestion Rents and Auction Revenues have same fundamental variables



Auction revenues are derived from the basis of the solution:
Capacity released and constraint prices

$$AR = \sum C_i \, \mu_i$$

CRR payments are derived from congestion rents, which are derived from the basis of the DAM solution:
Capacity released and constraint prices

$$CR = \sum C_j \, \mu_j$$

CRR profits is a misalignment between CRR payments and Auction revenues

CRR profits are no more than a misalignment of both transmission capacity released and constraint prices between CRR auctions and DAM

Given a sample period of detailed analysis, misalignment between CRR auctions and the DAM is a meaningful contributor to large net CRR payment (CRR profits)

- Missed/late outages
- Late enforcement of constraints
- Process gaps in the markets set-up
- Limitations inherent to timing and modelling

January 2017 show case for misalignment between markets

CRRs from annual auction January 2017

Constraints	Total CRR Payment	Total CRR Auction Revenue	Net CRR Payment
23040_CROSSTRIP	-$3,963,393.0	$0.0	-$3,963,393.0
OMS 4622069 TL50003	-$932,224.1	$0.0	-$932,224.1
24086_LUGO _500_26105_VICTORVL_500_BR_1_1	-$383,394.1	$142,491.5	-$240,902.6
OMS 4583153_PATH15_S-N	-$155,226.2	$0.0	-$155,226.2

CRRs from monthly auction January 2017

Constraints	Total CRR Payment	Total CRR Auction Revenue	Net CRR Payment
23040_CROSSTRIP	-$1,769,340.9	$0.0	-$1,769,340.9
OMS 4622069 TL50003	-$312,298.1	$0.0	-$312,298.1
OMS 4583153_PATH15_S-N	-$121,071.5	$0.0	-$121,071.5
24086_LUGO _500_26105_VICTORVL_500_BR_1_1	-$310,756.4	$197,327.1	-$113,429.3

Alignment between CRR auctions and day-ahead market

Constraint	Constraint Type	TOU	Payment to Annual CRR	Payments to monthly CRR	DAM limit	Annual CRR Limit	Monthly CRR Limit	Annual CRR Status	Monthly CRR Status	Reason
23040_CROSSTRIP	NOMOGRAM	ON	-$3,297,367.0	-$1,594,164.9	433.8	Unbounded	Unbounded	Not Enforced	Not Enforced	Late Enforcement
OMS 4622069 TL50003	NOMOGRAM	OFF	-$932,224.1	-$312,298.1	450.0	Unbounded	Unbounded	Not Enforced	Not Enforced	Late/Missed Outage
23040_CROSSTRIP	NOMOGRAM	OFF	-$666,026.0	-$175,176.0	435.0	Unbounded	Unbounded	Not Enforced	Not Enforced	Late Enforcement
OMS 4583153_PATH15_S-N	NOMOGRAM	ON	-$155,226.2	-$121,071.5	1250.0	Unbounded	Unbounded	Not Enforced	Not Enforced	Late/Missed Outage

Crosstrip constraint was not enforced in the annual and monthly auctions but started to be enforced in the day-ahead market in late Dec 2017, therefore

- transmission capacity released in the CRR auctions was not limited,
- transmission constraint was not priced in the CRR auction

How far can we go to have a workable alignment/convergence between CRR auctions and DAM market?

- What do we do for outages in auctions cleared far in advance of the energy market?
- Even if we know the outages, how do we accurately model their effects in the auctions?
- What is the safety net when things happens in the DAM market…because things will happen?

The ISO market structure already has a platform for bilateral trades for participants

Participants can engage on bilateral trades for CRRs on their own terms

This platform provides the means for participants to find each other

Why has there been only a couple of transactions for CRRs since the inception of the platform? Why isn't the bilateral trade directly between two parties attractive?

What is it missing to have a robust and active bilateral trade system?