



California ISO
Your Link to Power

CAISO Straw Proposal for CRR Credit Policy

**Shucheng Liu
Principal Market Developer**

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Topics

- Credit requirement for participating in CRR allocation and auction
- Credit requirement for holding CRR
- Long-Term CRR credit requirement
- Compliance measures
- Market monitoring and mitigation
- Examples of CRR credit requirement
- Next steps

Credit Requirement to Participate in CRR Allocation

- **CAISO will require no advance credit deposit to participate in CRR allocation**
- **However, holder of the CRRs allocated will be subject to credit requirements**

Credit Requirement to Participate in CRR Auction

- **Bidding for positively priced CRRs:**
 - Credit deposit sufficient to cover bids
 - No credit margin needed during auction
- **Bidding for negatively priced CRRs**
 - No credit requirement to participate
 - No payment to auction winners until credit requirements for holding the CRRs are in place
- **CRRs will be paid at the conclusion of the auction**

Credit Requirement to Hold CRR

- **Same credit requirement criteria apply to all CRR holders**

- **Overall credit requirement is assessed for the whole portfolio of CRRs of each holder**
 - An option to consider: assessing credit requirements for each individual CRR, i.e. no netting. (will discuss later)

Two Components of CRR Credit Requirement

- **CRR expected value**

- Credit coverage for the negative auction price of a CRR paid to the holder
- A deterministic value determined in the auction process

- **Credit margin**

- Credit coverage that recognizes the potentially volatile nature of the CRR
- A percentile value determined on the probability distribution of the value of the CRR

Short-Term CRR Credit Requirement

- **Credit requirement of a CRR with a term of 1 year or less**

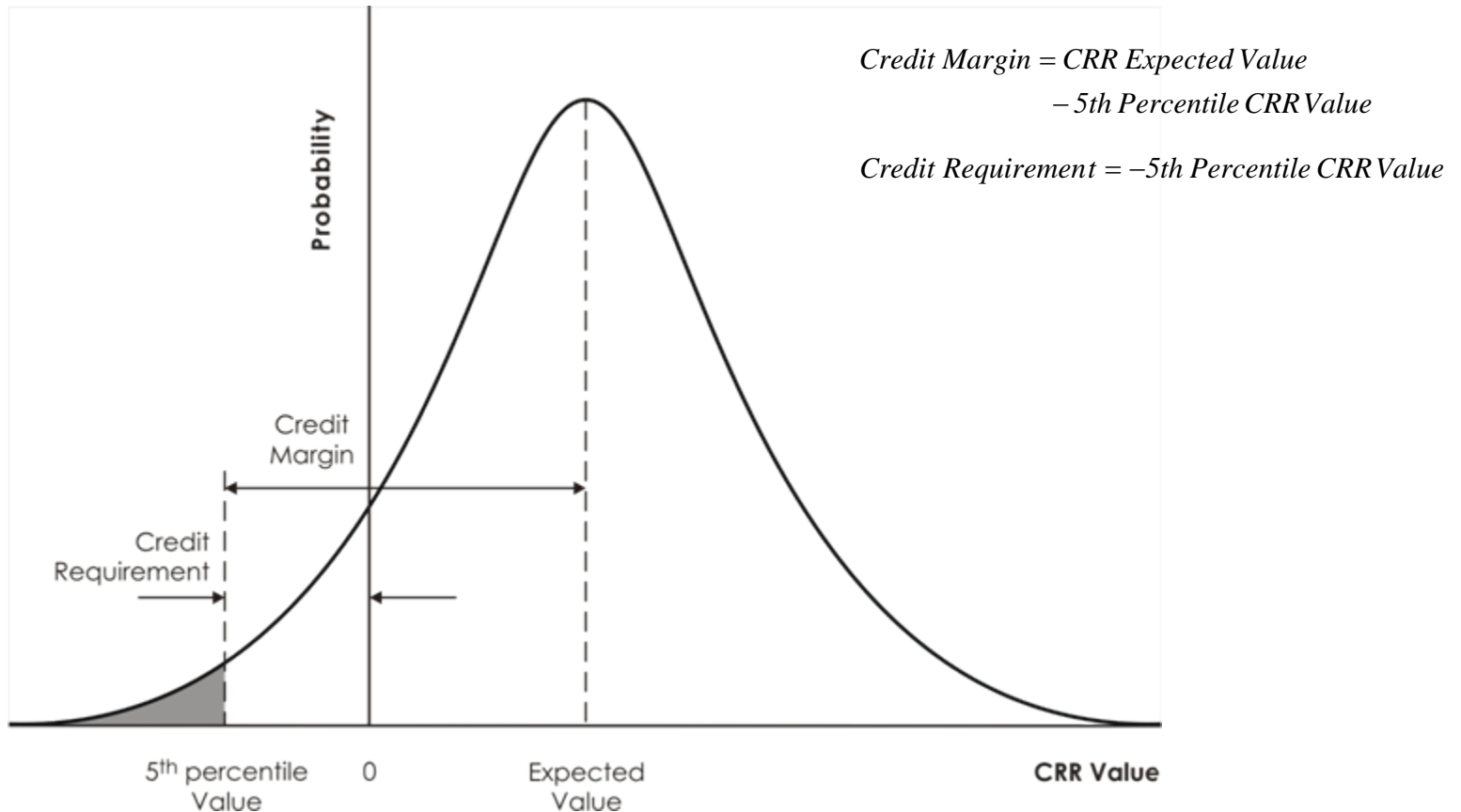
$$\textit{Credit Requirement} = -\textit{CRR Expected Value} + \textit{Credit Margin}$$

$$\textit{Credit Margin} = \textit{CRR Expected Value} - \textit{5th Percentile CRR Value}$$

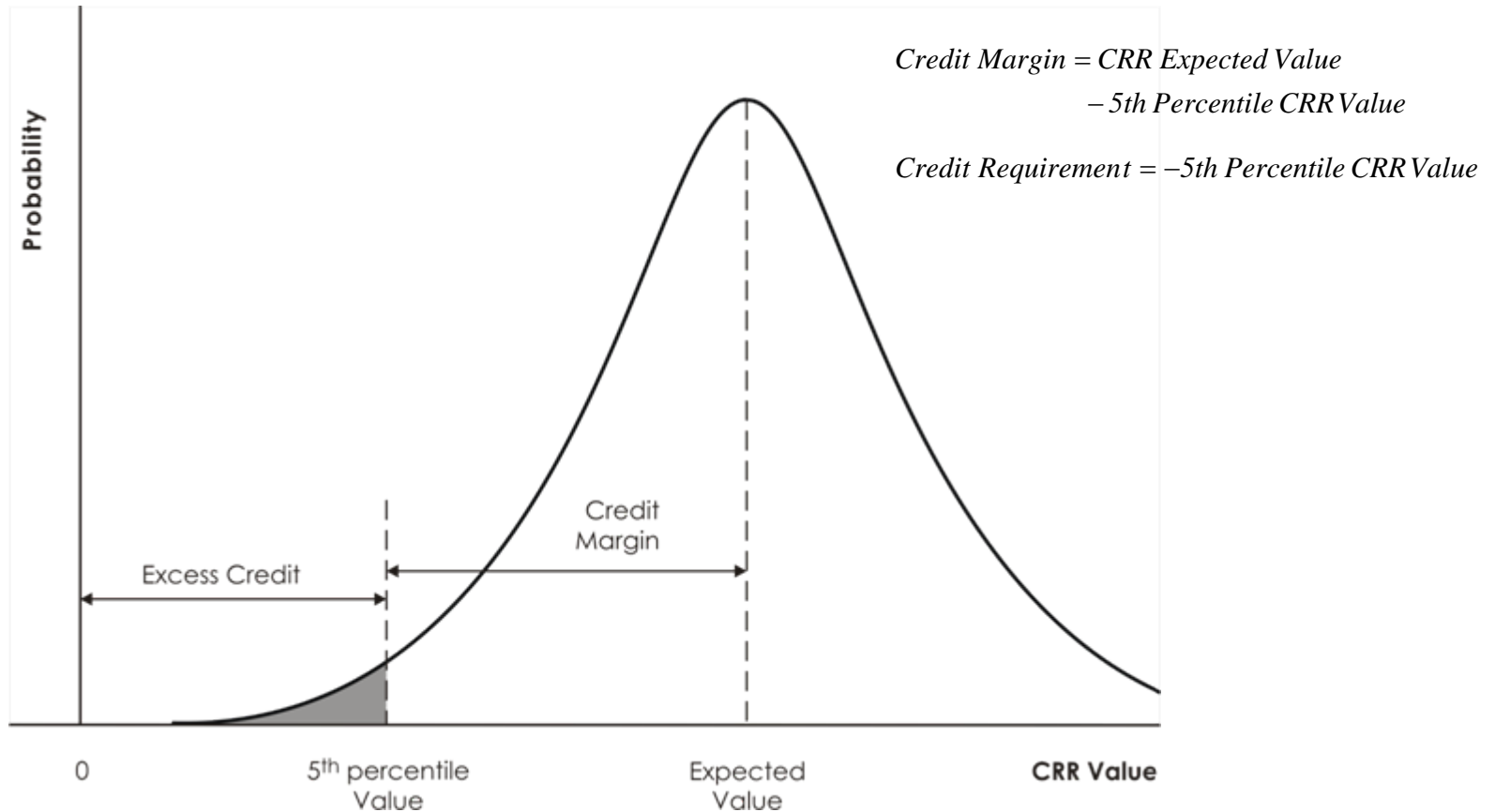
That is

$$\textit{Credit Requirement} = -\textit{5th Percentile CRR Value}$$

Short-Term CRR Credit Requirement – Low Positive Expected CRR Value



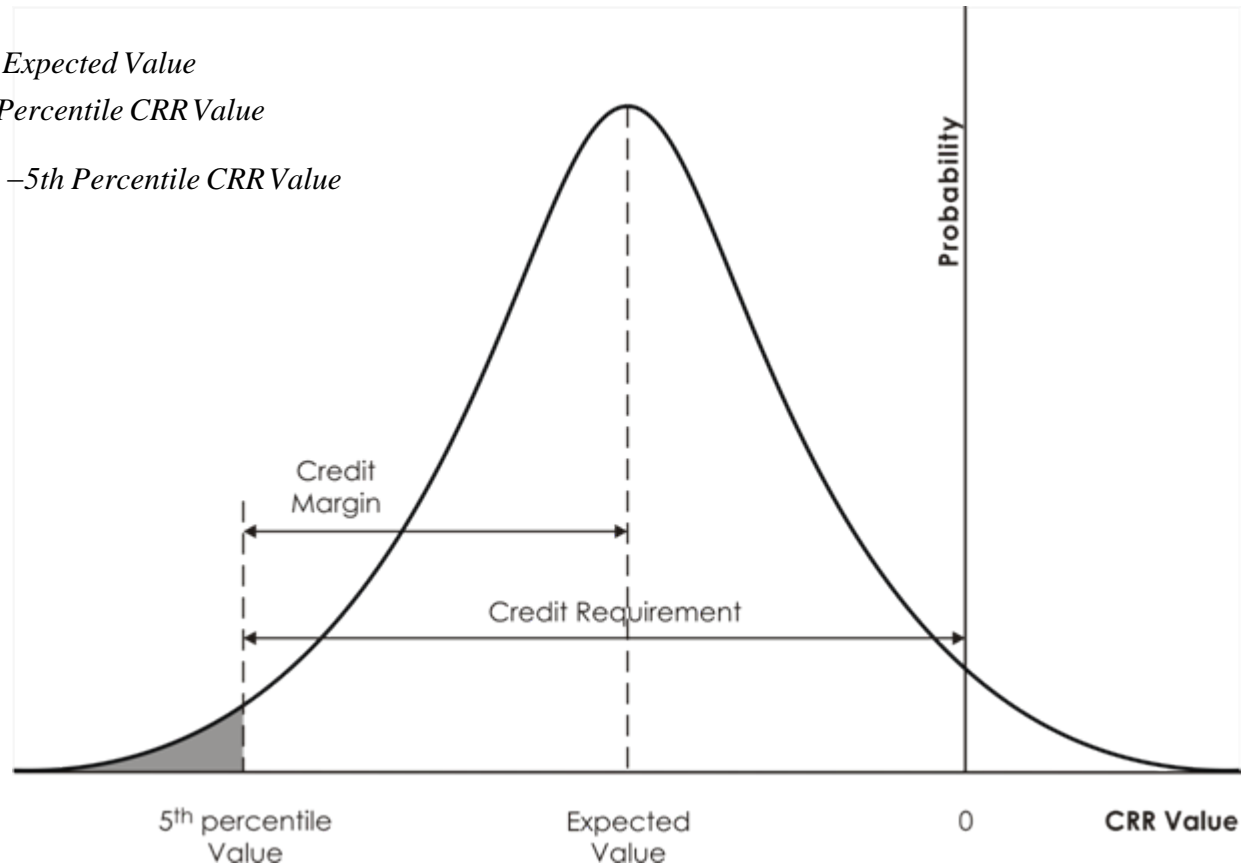
Short-Term CRR Credit Requirement – High Positive Expected CRR Value



Short-Term CRR Credit Requirement – Negative Expected CRR Value

*Credit Margin = CRR Expected Value
– 5th Percentile CRR Value*

Credit Requirement = –5th Percentile CRR Value



Factors to Consider in Deciding Short-Term CRR Credit Requirement

- **Options: also consider 2.5th and 1st percentile values**
- **Criteria: a balance between financial requirements and risk tolerance**
 - Too low requirements may increase financial risk
 - As CRRs are settled with other market charges, a payment default by the holder could create a shortfall that would affect all net creditors in the month of settlement.
 - Too high requirements may discourage participation and reduce liquidity and effectiveness of the CRR market

Calculation of Short-Term CRR Credit Requirements

- **Credit requirement for each CRR will be calculated**
- **Based on the CAISO LMP study data for the first year**
- **Actual historical LMP data will be used in the future**
- **Other ISO data will be used as references**

Short-Term CRR Credit Requirement – Examples

CRR	A	B	C	D	Portfolio
Statistics					
Expected Value	-6,807	-13,556	21,298	316	
1 Percentile	-8,281	-19,786	19,919	-290	
2.5 Percentile	-7,723	-16,385	20,050	-63	
5 Percentile	-7,235	-15,162	20,076	296	
Credit Margin (\$/MW-Year)					
1 Percentile	1,473	6,230	1,379	606	
2.5 Percentile	916	2,829	1,248	379	
5 Percentile	428	1,605	1,222	20	
Credit Requirement (\$/MW-Year)					
1 Percentile	8,281	19,786	-19,919	290	8,438
2.5 Percentile	7,723	16,385	-20,050	63	4,121
5 Percentile	7,235	15,162	-20,076	-296	2,025

Four Options Proposed for Determining Long-Term CRR Credit Requirement

Option 1:

$$n * (-1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin})$$

Option 2:

$$n * (-1 \text{ year CRR Expected Value}) + \sqrt{n} * (1 \text{ year Credit Margin})$$

Option 3:

$$-1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin}$$

Option 4:

$$n * (-1 \text{ year CRR Expected Value}) + 1 \text{ year Credit Margin}$$

Factors to Consider in Deciding Long-Term CRR Credit Requirement

- **Of the four options:**
 - Option 1 is the most conservative, and Option 3 is the least
 - The CAISO has preference toward Option 2 or 4
- **Criteria: a balance between financial requirements and risk tolerance**
 - Too low requirements may increase financial risk
 - Too high requirements may discourage participation and reduce liquidity and effectiveness of CRR market

Long-Term CRR Credit Requirement – Examples (\$/MW)

CRR	A	B	C	D	Portfolio
Statistics					
1-Year Expected Value	-6,807	-13,556	21,298	316	1,251
Option 1: $n * (-1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin})$					
1 Percentile	82,809	197,861	-199,194	2,901	84,377
2.5 Percentile	77,231	163,854	-200,501	626	41,209
5 Percentile	72,347	151,619	-200,761	-2,957	20,249
Option 2: $n * (-1 \text{ year CRR Expected Value}) + \sqrt{n} * (1 \text{ year Credit Margin})$					
1 Percentile	72,734	155,264	-208,624	-1,243	18,131
2.5 Percentile	70,970	144,510	-209,037	-1,963	4,480
5 Percentile	69,421	140,641	-209,119	-3,096	0
Option 3: $-1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin}$					
1 Percentile	8,281	19,786	-19,919	290	8,438
2.5 Percentile	7,723	16,385	-20,050	63	4,121
5 Percentile	7,235	15,162	-20,076	-296	2,025
Option 4: $n * (-1 \text{ year CRR Expected Value}) + 1 \text{ year Credit Margin}$					
1 Percentile	69,548	141,794	-211,605	-2,554	0
2.5 Percentile	68,990	138,393	-211,736	-2,781	0
5 Percentile	68,497	137,170	-211,762	-3,140	0

Long-Term CRR Credit Requirement Adjustment

- **Adjust no less than annually**
- **Account for change in remaining terms**
- **Reflect changes of CRR ownership**
- **Update expected value and credit margin based on actual market operation data**

Additional Credit Requirements for LT-CRRs Held by External LSEs

- **Maintain one year credit coverage for WAC prepayment**
 - One year of WAC commitment is added to the EAL
 - No need to post additional credit as long as ACL is greater than EAL including WAC prepayment
 - Entities would then prepay the WAC on a monthly basis
 - Consistent with FERC April 20 Order

Compliance Measures for Failure to Meet Credit Requirements

- **Terminate all CRR agreements with the default holder**
- **Retain all payments due to the CRRs and resell the CRRs in subsequent auctions**
- **Retain financial security sufficient to cover default**
- **Exclude the holder from future CRR allocation and auctions**
- **Prohibit the holder from subsequently acquiring CRRs**

Market Monitoring and Mitigation Measures

- **FERC and CAISO market rules prohibit Market Manipulation**
- **CAISO DMM will monitor unusual activities in CRR allocation and auction processes**
- **For misconduct, the CAISO will**
 - Require disclosure of affiliations
 - Explicitly warn participants
 - Refer to FERC

Short-Term CRR Credit Requirement without Credit Offset (i.e. no netting)

- Credit requirements assessed for each individual CRR in a portfolio separately

Credit Margin:

$$\textit{Credit Margin} = \textit{CRR Expected Value} - \textit{5th Percentile CRR Value}$$

Credit Requirement

$$\textit{Credit Requirement} = \max(0, -\textit{5th Percentile CRR Value})$$

Four Options for L-T CRR Credit Requirement without Credit Offset

Option 1:

$$n * \max(0, -1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin})$$

Option 2:

$$n * \max(0, -1 \text{ year CRR Expected Value}) + \sqrt{n} * (1 \text{ year Credit Margin})$$

Option 3:

$$\max(0, -1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin})$$

Option 4:

$$n * \max(0, -1 \text{ year CRR Expected Value}) + 1 \text{ year Credit Margin}$$

Short-Term CRR Credit Requirement without Offset – Examples

CRR	A	B	C	D	Portfolio
Statistics					
Expected Value	-6,807	-13,556	21,298	316	
1 Percentile	-8,281	-19,786	19,919	-290	
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5 Percentile	-7,235	-15,162	20,076	296	
Credit Margin					
1 Percentile	1,473	6,230	1,379	606	
2.5 Percentile	916	2,829	1,248	379	
5 Percentile	428	1,605	1,222	20	
Credit Requirement					
1 Percentile	8,281	19,786	0	290	28,357
2.5 Percentile	7,723	16,385	0	63	24,171
5 Percentile	7,235	15,162	0	0	22,397

LT-CRR Credit Requirement without Offset – Examples (\$/MW)

CRR	A	B	C	D	Portfolio
Statistics					
1-Year Expected Value	-6,807	-13,556	21,298	316	3,251
Option 1: $n * \max(0, -1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin})$					
1 Percentile	82,809	197,861	0	2,901	283,571
2.5 Percentile	77,231	163,854	0	626	241,710
5 Percentile	72,347	151,619	0	0	223,966
Option 2: $n * \max(0, -1 \text{ year CRR Expected Value}) + \sqrt{n} * (1 \text{ year Credit Margin})$					
1 Percentile	72,734	155,264	4,361	1,917	234,276
2.5 Percentile	70,970	144,510	3,948	1,197	220,625
5 Percentile	69,421	140,641	3,866	64	213,992
Option 3: $\max(0, -1 \text{ year CRR Expected Value} + 1 \text{ year Credit Margin})$					
1 Percentile	8,281	19,786	0	290	28,357
2.5 Percentile	7,723	16,385	0	63	24,171
5 Percentile	7,235	15,162	0	0	22,397
Option 4: $n * \max(0, -1 \text{ year CRR Expected Value}) + 1 \text{ year Credit Margin}$					
1 Percentile	69,548	141,794	1,379	606	213,327
2.5 Percentile	68,990	138,393	1,248	379	209,010
5 Percentile	68,497	137,170	1,222	20	206,909

ST-CRR Credit Requirement Comparison – With and without Credit Offset

CRR	A	B	C	D	Portfolio
Credit Margin (\$/MW-Year)					
1 Percentile	1,473	6,230	1,379	606	
2.5 Percentile	916	2,829	1,248	379	
5 Percentile	428	1,605	1,222	20	
Credit Requirement (\$/MW-Year, with Credit Offset)					
1 Percentile	8,281	19,786	-19,919	290	8,438
2.5 Percentile	7,723	16,385	-20,050	63	4,121
5 Percentile	7,235	15,162	-20,076	-296	2,025
Credit Requirement (\$/MW-Year, without Credit Offset)					
1 Percentile	8,281	19,786	0	290	28,357
2.5 Percentile	7,723	16,385	0	63	24,171
5 Percentile	7,235	15,162	0	0	22,397

LT-CRR Credit Requirement Comparison – With and without Credit Offset

(\$/MW)	With Credit Offset			Without Credit Offset		
CRR	C	D	Portfolio	C	D	Portfolio
Option 1						
1 Percentile	-199,194	2,901	84,377	0	2,901	283,571
2.5 Percentile	-200,501	626	41,209	0	626	241,710
5 Percentile	-200,761	-2,957	20,249	0	0	223,966
Option 2						
1 Percentile	-208,624	-1,243	18,131	4,361	1,917	234,276
2.5 Percentile	-209,037	-1,963	4,480	3,948	1,197	220,625
5 Percentile	-209,119	-3,096	0	3,866	64	213,992
Option 3						
1 Percentile	-19,919	290	8,438	0	290	28,357
2.5 Percentile	-20,050	63	4,121	0	63	24,171
5 Percentile	-20,076	-296	2,025	0	0	22,397
Option 4						
1 Percentile	-211,605	-2,554	0	1,379	606	213,327
2.5 Percentile	-211,736	-2,781	0	1,248	379	209,010
5 Percentile	-211,762	-3,140	0	1,222	20	206,909

Next Steps

- **Stakeholder written comments requested by May 11 (CRRComments@caiso.com)**
- **Second stakeholder conference call to discuss final policy proposal in mid May**
- **Presentation to the CAISO Board for decision in late May**
- **FERC filing in early June**