



# Peak Market Activity Proposal

Risk Management Committee

Yong Hu, Manager - Trade Risk & Analytics

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1. Selected Back-tested Solutions

2. Proposed Solution

3. Key Takeaways

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	RMSE Under	RMSE Over	RMSE Total	Failure Rate	Expected Shortfall	Collateral Reduction
Status Quo	1,685,799	11,759,081	11,879,306	7.6%	(116,767)	
Option 1: 3-Month Reset	1,772,402	11,222,516	11,361,614	7.8%	(128,251)	-4.2%
Option 2: Rolling 3-week Invoice	1,910,641	9,754,472	9,939,832	11.5%	(169,088)	-17.8%
Option 3: Rolling 4-week Invoice	1,567,750	10,480,514	10,597,123	6.4%	(95,547)	-6.5%
Option 4: Rolling 4-week Invoice + Minimum Transfer Amount <sup>[1]</sup>	1,543,174	10,516,319	10,629,045	4.9%	(90,462)	-6.1%

- *RMSE Under* is the PMA under collection measured by Root Mean Square Error<sup>[2]</sup>
  - Option 1 & 2 are worse than the Status Quo.
- *RMSE Over* is the PMA over collection measured by Root Mean Square Error
  - All options alleviate PMA over collection.
- *RMSE Total* is the PMA for both under and over collection measured by Root Mean Square Error
  - All options alleviate PMA over collection.
- *Failure Rate* is the percentage of failure over Total Samples<sup>[3]</sup>. A failure is recorded every time *the collateral requirement - target period<sup>[4]</sup> invoices < - Minimum Exposure<sup>[5]</sup>*.
  - Option 1 & 2 have higher failure rate than the Status Quo.
  - Option 3 & 4 have lower failure rate than the status quo, with Option 4 failure rate reduction almost by half.
- Expected Shortfall is the average shortfall over all samples.
  - Option 1 & 2 have higher expected shortfall than the Status Quo.
  - Option 3 & 4 have lower shortfall than the Status Quo.
- Collateral Reduction measures how much collateral can be reduced comparing to the Status Quo.
  - All options have collateral reduction.

[1] Minimum Transfer Amount: the minimum amount that will be transferred for any PMA call or return.

[2] Root Mean Square Error measures the differences between collateral requirements and the target period invoices.

[3] Total Samples are weekly from Q1-2020 to Q2-2023, for all members with 2022 PMA > \$1,000.

[4] Target Period: week -1 to week+1 (last week, current week, and next week).

[5] Minimum Exposure: the minimum threshold a PMA call is made. No PMA call is made if the PMA deficiency is below this threshold.

## Proposed (Option 4): Rolling 4-week Invoices + Minimum Transfer Amount

- There is a PMA collateral shortfall if current 4-week PMA requirement is greater than collateral held last week.
  - If PMA shortfall is greater than the *Minimum Exposure*, a PMA call is made, which equals to  $n * \text{Minimum Transfer Amount}$ , where the integer  $n$  is optimized to bring the collateral to just at or above the current 4-week PMA requirement.
  - Otherwise, no PMA call is necessary.
- There is a PMA surplus if current 4-week PMA requirement is less than collateral held last week.
  - If the surplus is greater than *Minimum Transfer Amount*, then collateral is returned, which equals to  $n * \text{Minimum Transfer Amount}$ , where the integer  $n$  is optimized to bring the collateral to just at or above the current 4-week PMA requirement.
  - Otherwise, no collateral is returned.
- *Minimum Exposure* is the maximum of a) 3,000, and b) 1% of the greatest amount invoiced in any rolling one, two or three week period in the prior 52 weeks, capped at \$100,000.
- *Minimum Transfer Amount* is the maximum of a) \$20,000, and b) 5% of the greatest amount invoiced in any rolling one, two or three week period in the prior 52 weeks, capped at \$1,000,000.

	Rolling 4-week	Shortfall / (Over Collection)	Integer Multiple for Returnable	Returned Amount	Integer Multiple for Callable	Called Amount	Collateral Requirement	Over / (Under Collection)
<b>week 0</b>							<b>12,150,000</b>	
<b>week 1</b>	<b>12,200,000</b>	50,000	0	0	0	0	<b>12,150,000</b>	(50,000)
<b>week 2</b>	<b>12,300,000</b>	150,000	0	0	1	1,000,000	<b>13,150,000</b>	850,000
<b>week 3</b>	<b>13,000,000</b>	(150,000)	0	0	0	0	<b>13,150,000</b>	150,000
<b>week 4</b>	<b>11,000,000</b>	(2,150,000)	(2)	(2,000,000)	0	0	<b>11,150,000</b>	150,000

Minimum Exposure \$100,000; Minimum Transfer Amount \$1,000,000.

Shortfall = current week Option 3 PMA requirement less previous week Option 4 PMA amount.

Week 1: Shortfall \$50,000. No action, as the amount is less than Minimum Exposure.

Week 2: Shortfall \$150,000. PJM calls for \$1,000,000. New collateral held is now \$13,150,000.

Week 3: No action, as the collateral held is \$150,000 more than the required amount.

Week 4: The collateral held is \$2,150,000 over the required. \$2,000,000 is returned.

The expectation is that under this proposed solution, Option 4, a member's collateral requirement deficit would remain under their Minimum Exposure, while excess collateral requirement would remain under the Minimum Transfer Amount.

- PMA using rolling 4-week invoices provides extra week of cover during stressed period.
- Minimum Exposure sets up a threshold, below which small PMA deficiencies are allowed.
- Minimum Transfer Amount reduces frequent PMA calls or returns, and provides extra cushion.
  
- Back-test results show the proposed solution is better than Current PMA calculation
  - Reduced RMSE
  - Reduced failure rate
  - Reduced expected shortfall
  - Reduced total collateral requirement
  - Shorter period of holding high collateral after peak