FTR Credit Requirement Filing

Risk Management Committee

May 24, 2022

Background and Summary

FERC issued an order February 28 rejecting PJM's FTR Credit Requirement revisions including HSIM 97% Confidence Interval (CI) as unsupported by the record.

FERC found PJM proposed use of HSIM model at a 97% CI was not supported by the record.	▪ Lower aggregate collateral amounts to be collected ▪ PJM failed to demonstrate how the FTR Credit Requirement is calibrated to ensure Market Participants will be required to provide adequate collateral relative to risk of positions ▪ Lack of evidence that adequate margin will be in place for riskiest FTR counterparties ▪ Recent defaults in the FTR Markets
FERC had concerns regarding imposing use of HSIM model at a 99% CI.	▪ Unspecified transition to go from 97% CI to 99% CI ▪ Concern that some participants may unwind their portfolios

FERC cited concerns that the existing FTR Credit Requirement is no longer just and reasonable and instituted a 206 proceeding. FERC also recognized that PJM could propose revisions to its Tariff in a 205 filing.

PJM filed a **Request for Rehearing/ Alternative Clarification** on March 30.

Objectives of the Request

- Refute FERC's criticisms of PJM's Initial Margin filing
- Clarify that the February 28 FERC Order does not preclude PJM from submitting a second 205 filing with 97% CI

Outcome of Rehearing Request

- On May 2, PJM's request was denied by operation of law through FERC's no action.

PJM presented the cost benefit analysis of moving from 97% CI and 99% CI.

- Across the membership, the increase in cost of collateral **moving from 97% CI to 99% CI appears greater than the benefit**, given the expected reduction in default size.

- Conclusion **appears true for each sector** and in the aggregate across the membership.

Follow-up Items from April 14, 2022, Special MC

1. File on April 22, 2022, **requesting FERC to hold the 206 in abeyance** and a **205 targeted within 60 days**
2. Perform additional analysis on drivers of large reduction in collateral held at 97% CI (compared to status quo) to confirm these changes are in fact risk reducing prior to submitting a 205 to FERC at 97% CI
3. Review credit requirements from 2022/2023 Annual Auction
4. Develop plan on how to use additional tools and analysis to address the riskiest counterparties and portfolios
5. Share results with stakeholders and determine next steps

PJM Filed a Request for an Extension

PJM filed a **Request for Extension of Time to Respond** to the 206.

Objectives of the Request

Obtain additional time (60 days) to perform additional analysis and engage with stakeholders

Outcome of Request

FERC partially granted PJM's request (30 days). Response is now due May 31.

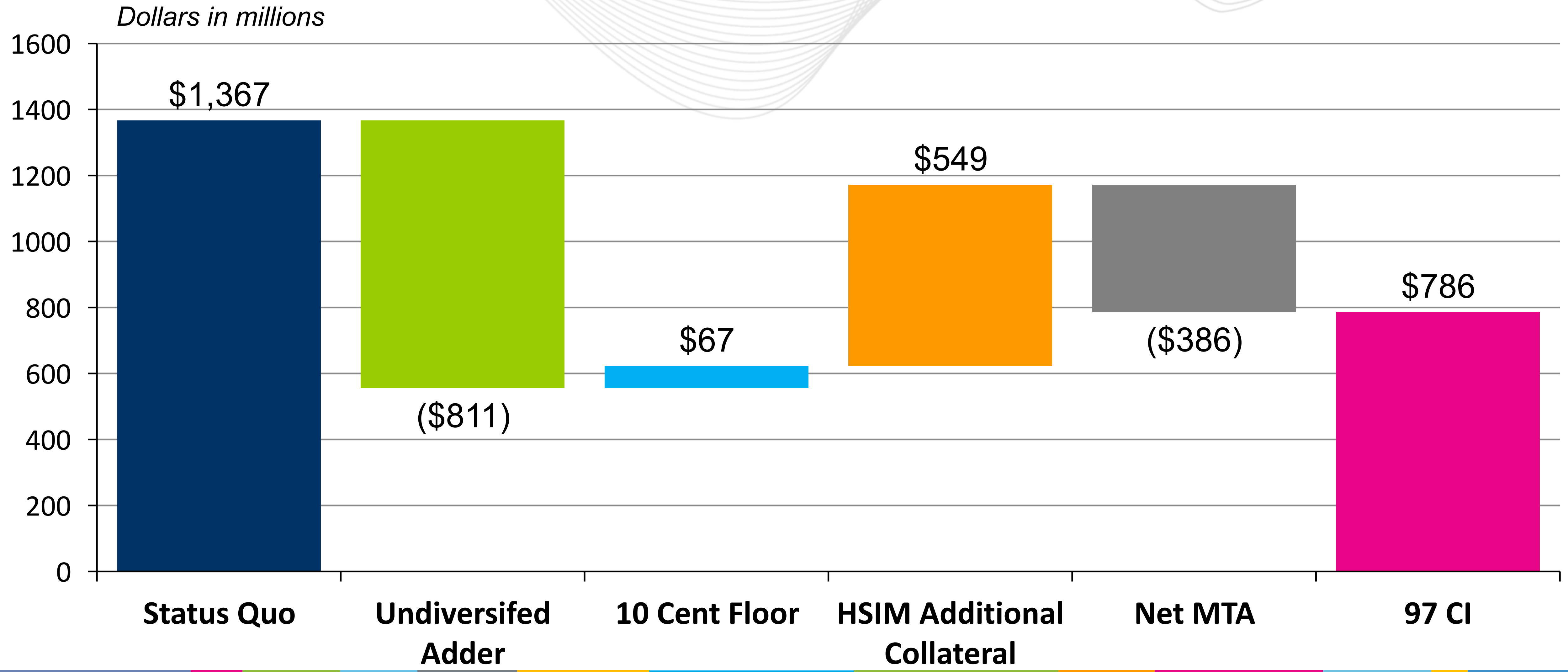
Analysis of April 2022 Data

Collateral Amounts as of April 2022

Dollars in millions	Status Quo	Collateral – 97% CI	$ Change Moving From Status Quo to 97% CI	% Change Moving From Status Quo to 97% CI
Electric Distributor	$18.8	$15.4	$(3.4)	(18)%
Generation Owner	$66.9	$95.6	$28.7	43%
Transmission Owner	$12.4	$26.2	$13.8	111%
Other Supplier ●	$1,269.1	$648.7	$(620.4)	(48)%
Load Serving Entity	$96.9	$49.3	$(47.6)	(49)%
Financial Trader	$786.1	$421.8	$(364.3)	(46)%
Other Supplier	$386.1	$177.6	$(208.5)	(54)%
Total	**$1,367.2**	**$785.9**	**$(581.3)**	**(43)%**

● Line of business based on participant self-identification in membership records.

Status Quo – HSIM 97% CI – April 2022 Collateral



Movements in Mark to Auction (MTA)

Observations – MTA Movements

The June MTA value is historically low because the June auction and the annual auction occur close to each other, the power system conditions are similar, and bidding behavior typically has small differences.

- Starting July through October, the MTA value gradually increased due to variance in the system condition and market participant bidding behavior.
- Increased MTA value starting in the November auction; this is a result of:
  - Fall EMS model update, different topologies
  - More available outage information; normally, outages are six months out, so by November, more information is available for future periods, which will change bidding behaviors.
- The decline in the first five months of the calendar year are historically correlated to the roll-off of positions in the balance of planning period.

Though there are differences in the underlying credit requirement calculations between Status Quo and HSIM 97% CI, there are two main drivers causing the FTR Credit Requirement variance.

Status Quo

Though the Undiversified Adder represents a large portion of the Status Quo credit requirement, backtesting supports this additional collateral is not improving the failure rate.

HSIM 97% CI

Though the net MTA positive variance reduces the overall credit requirement, it does not negatively impact the failure rate based on the backtesting.

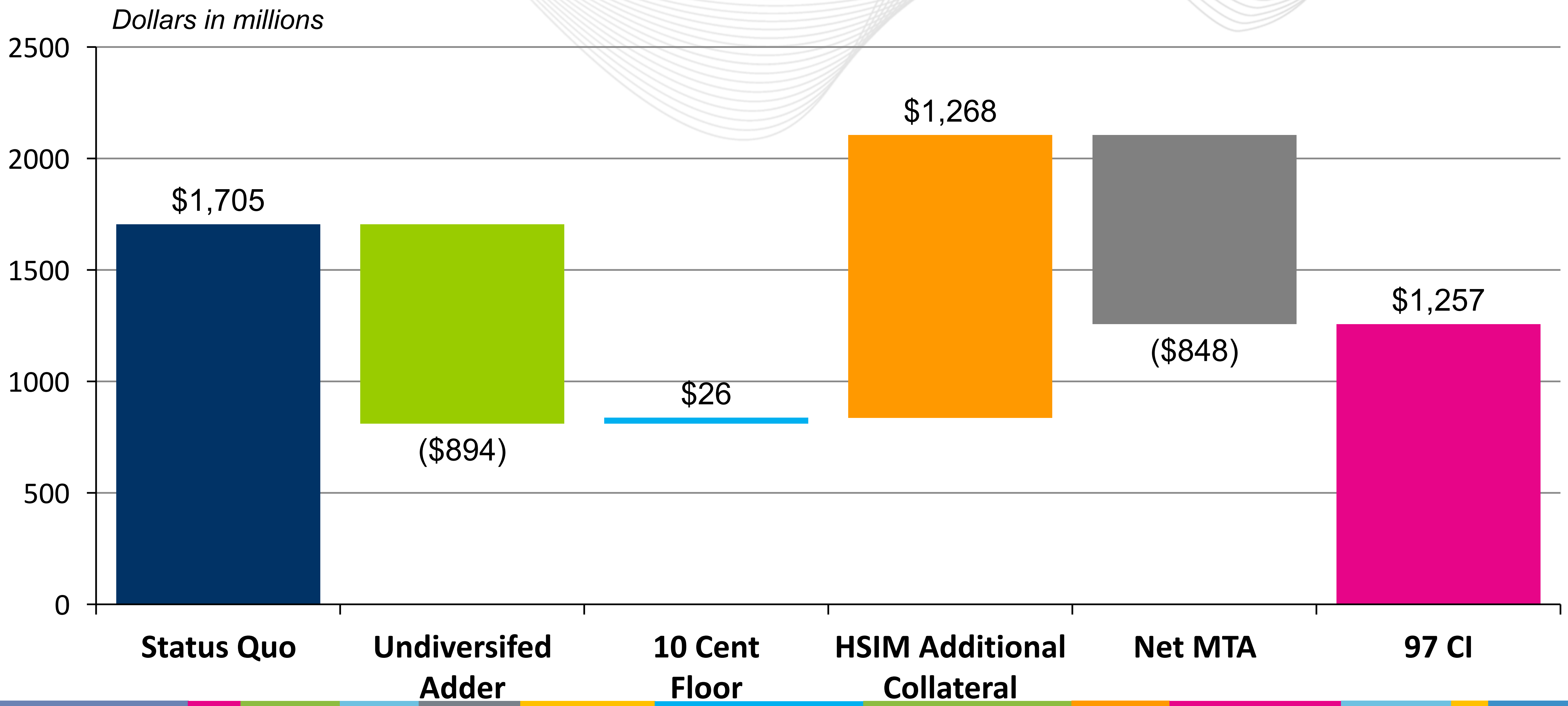
Analysis of February & March 2022 Auction Data

Collateral Amounts as of February 2022

Dollars in millions	Status Quo	Collateral – 97% CI	$ Change Moving From Status Quo to 97% CI	% Change Moving From Status Quo to 97% CI
Electric Distributor	$24.4	$32.1	$7.7	32%
Generation Owner	$119.4	$157.7	$38.3	32%
Transmission Owner	$31.3	$37.9	$6.6	21%
Other Supplier ●	$1,530.0	$1,028.9	$(501.1)	(33)%
Load Serving Entity	$96.8	$64.0	$(32.8)	(34)%
Financial Trader	$1,005.0	$650.4	$(354.6)	(35)%
Other Supplier	$428.2	$314.5	$(113.7)	(26)%
Total	**$1,705.1**	**$1,256.6**	**$(448.5)**	**(26)%**

● Line of business based on participant self-identification in membership records.

Status Quo – HSIM 97% CI – February 2022 Collateral

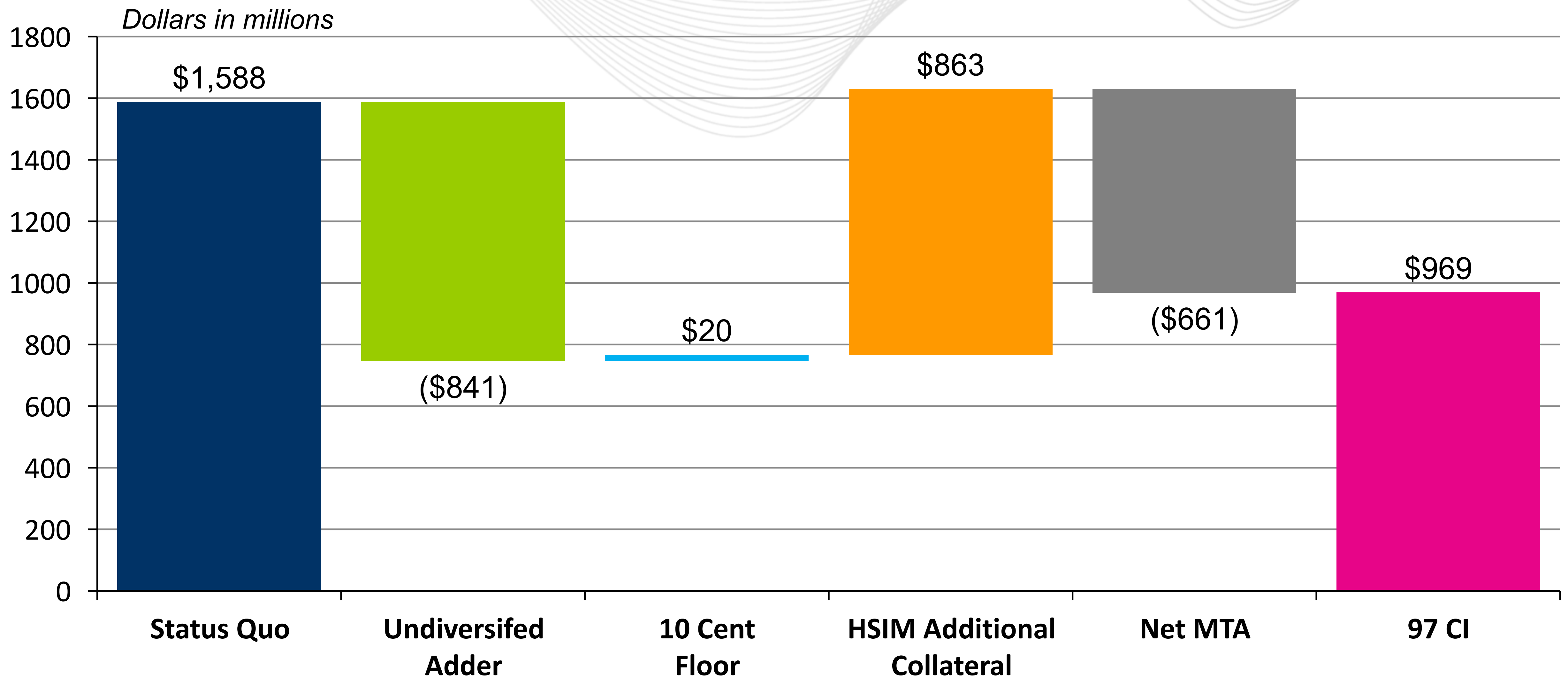


Collateral Amounts as of March 2022

Dollars in millions	Status Quo	Collateral – 97% CI	$ Change	% Change
			Moving From Status Quo to 97% CI	
Electric Distributor	$22.9	$19.4	$(3.5)	(15)%
Generation Owner	$105.5	$127.6	$22.1	21%
Transmission Owner	$27.1	$24.2	$(2.9)	(11)%
Other Supplier ●	$1,432.0	$797.3	$(634.7)	(44)%
Load Serving Entity	$96.5	$59.1	$(37.4)	(38)%
Financial Trader	$942.5	$532.5	$(410.0)	(44)%
Other Supplier	$393.0	$205.7	$(187.3)	(47)%
Total	**$1,587.5**	**$968.5**	**$(619.0)**	**(39)%**

● Line of business based on participant self-identification in membership records.

Status Quo – HSIM 97% CI – March 2022 Collateral



Results of Additional Backtesting

Backtesting Methodology

Backtesting performed provides validation of the HSIM model.

Forward market prices evaluated against auction date HSIM market prices to determine participant portfolio level gain or loss.

- Monthly FTR – Two months forward or settlement
- Long-Term FTR – Two long-term auctions, annual auction or settlement

Initial Margin calculated by HSIM, at a participant portfolio level, compared against back test gain or loss.

- Shortfall – Losses not covered by Initial Margin
- Failure Rate – Count of instances where losses were not covered by Initial Margin

Backtesting of February 2022 FTR Auction

Dollars in millions	Credit Requirement	Failure Rate[1]	Shortfall
97% CI	$1,256.6	3.6%	$2.3
Status Quo	$1,705.1	11.7%	$41.7

1. Failure Rate is based on instances of failure across the FTR portfolio.
   - 97% CI: 11 failures over 308 portfolios
   - Status Quo: 36 failures over 308 portfolios

Observations – February 2022 FTR Auction Backtesting

Referring back to the chart on slide 10, at Jan. 26, 2022, the MTA was approximately $850 million.

- As we move two periods forward, you can see there is significant movement in the negative direction because MTA dropped to $484 million on March 10, 2022.
- Slide 19 illustrates that **HSIM 97% CI failed approximately 3.6% of the time with a total shortfall of $2.3 million** as compared to the **Status Quo, which failed 11.7% of the time with a $41.7 million shortfall.**
- Even though there was a net positive MTA at the time of the auction, HSIM 97% CI resulted in a margin requirement sufficient to cover two periods forward, and the failure rate held as expected.

Backtesting of March 2022 Auction

Dollars in millions	Credit Requirement	Failure Rate[1]	Shortfall
97% CI	$968.5	3.0%	$0.6
Status Quo	$1,587.5	11.3%	$3.1

1. Failure Rate is based on instances of failure across the FTR portfolio.
   - 97% CI: 9 failures over 301 portfolios
   - Status Quo: 34 failures over 301 portfolios

Observations – March 2022 FTR Auction Backtesting

Backtesting was also completed at Feb. 22, 2022. The chart on slide 10 indicates the MTA declines to approximately $661 million.

- Slide 21 illustrates that **HSIM 97 failed approximately 3.0% of the time with a total shortfall of $0.6 million** as compared to the **Status Quo, which failed 11.3% of the time with a $3.1 million shortfall**.

- This backtesting proves that HSIM had sufficient margin to cover the large negative swings in the market, and the model is working as expected.

Analysis of 2022/2023 Annual Auction Data

Credit Requirements After the 2022/2023 Annual Auction

Dollars in millions	Status Quo	Collateral – 97% CI	$ Change Moving From Status Quo to 97% CI	% Change Moving From Status Quo to 97% CI
Electric Distributor	$23.6	$37.9	$14.3	61%
Generation Owner	$155.7	$163.8	$8.1	5%
Transmission Owner	$36.1	$113.7	$77.6	215%
Other Supplier ●	$1,495.1	$859.1	$(636.0)	(43)%
Load Serving Entity	$73.9	$51.1	$(22.8)	(31)%
Financial Trader	$989.8	$588.6	$(310.2)	(31)%
Other Supplier	$431.4	$219.4	$(212.0)	(49)%
Total	**$1,710.5**	**$1,174.5**	**$(536.0)**	**(31)%**

● Line of business based on participant self-identification in membership records.

There are two main drivers of the variances between both credit requirement calculations:

Status Quo

At May 2, 2022, the Undiversified Adder represented $658.2 million of the status quo credit requirement. **This increase has a disproportionate impact on the credit from Members in the Other Supplier sector and, specifically, financial traders because they hold a larger share of net counterflow portfolios.**

HSIM 97% CI

The credit requirement includes a net MTA positive variance of $494.7 million. This reduces the overall HSIM 97% CI credit requirement.

Additional Backtesting

PJM will continue to backtest HSIM 97% CI after implementation to ensure the failure rate is holding. PJM will share those results with stakeholders periodically at Risk Management Committee meetings.

Results of backtesting performed will provide insights that may be applied as future refinements of the HSIM.

PJM will move forward with a 205 filing in support of HSIM at 97% CI with the additional supporting documentation shared with stakeholders today.

205 Filing targeted for May 31, 2022.

Credit Enhancements

Other Credit Enhancements

In 2020, PJM instituted enhanced risk management tools to specifically assess counterparty risk.

- Implemented Know Your Customer reforms
- Tightened timelines for collateral calls payments
- Enhanced material adverse change language
- Required audited financials
- Implemented financial risks models
- Added unreasonable credit risk as a basis for collateral calls
- Ability to limit and suspend market participation

PJM will continue to enhance communication and transparency in the application of these tools with stakeholders.

Residual Risks

PJM needs to assess the following residual risks and mitigations to protect the integrity of the FTR Market. They include:

- Events that result in greater than 97% CI
- Liquidation period takes longer than two auction cycles and/or large positions cause markets to move significantly as a result of liquidation
- Future event that has not happened in the past, and therefore not covered by the HSIM analysis

Continue Stakeholder Discussion at the RMC

- Develop transparent guidance regarding use of Unreasonable Credit Risk based on market participant credit profile
- Consider term and tenor limit guidelines – Correlation to credit risk
- Develop analytical approach to quantify liquidity risk relative to position size
- Consider applying models to predict extreme events that haven't happened before
  - Provide education on available models
  - Solicit feedback on input model assumptions
- Review PJM simulated back cast results
- Develop transparent guidance regarding linkage of model analysis and Unreasonable Credit Risk
- Consider establishing a default fund

We need to move forward together on the analysis at a consistent pace because of the pending 206 proceeding and the magnitude of residual risks

Recommended Path Forward (Continued)

FERC Considerations and Updates

- PJM anticipates completing engagement with stakeholders by December 2022.
- PJM will provide periodic updates (every 60 days) to FERC on the status of efforts with stakeholders on development and use of credit tools and models.
- PJM will request that FERC hold 206 in abeyance until the completion of PJM's efforts.

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