FTR Credit Requirements
Mark-to-Auction (MTA)

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Credit
Markets & Reliability Committee
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FTR Mark-to-Auction

- Market value decline can be an indicator of increasing FTR risk
  - Currently, there is no provision which provides for a collateral call when an FTR portfolio is deteriorating in value
- Mark-to-Auction measures FTR market value changes
  - Difference between purchase price and most recent market price
- The Credit Subcommittee is proposing a new a Mark-to-Auction component for FTR credit requirements
  - Many proposals were considered, and nine eventually polled
  - One proposal received 82% support
  - Eight proposals received between 12% and 42% support
    - Three were withdrawn with no objection

Summary of Poll Results

Package	Application	Threshold	Support	Do Not Support	Abstain	% Support
A - "Higher of"	Monthly	None	22	149	6	13%
D1 - "Higher of"	Portfolio	None	27	146	4	16%
D1' - "Higher of"	Portfolio	$100k	19	142	16	12%
G1 - Additive *PJM Proposal*	Portfolio	None	132	29	16	82%
G2 - Additive	Portfolio	$100k	51	116	10	31%
H - Higher of Existing and (MTA plus MTA Adder)	Portfolio	None	51	111	15	31%
H' - Higher of Existing and (MTA plus MTA Adder)	Portfolio	$100k	35	127	15	22%
I - Higher of Package G1 and Package H	Portfolio	None	71	97	9	42%
I' - Higher of Package G2 and Package H'	Portfolio	$100k	29	138	10	17%

All packages propose intra-auction collateral calls

*Grayed out Packages (A, D1, D1') were withdrawn by the proposing party

FTR Credit Calculation - Current

- The current FTR Credit Requirement has two main components
  - Path-specific component
    - Cleared price minus adjusted historical reference value (includes adjustments for RTEP upgrades)
    - Undiversified (counterflow) adder (if any)
  - 10¢ Per-MWh Minimum
- Both are calculated monthly
- Each month, the higher is taken and ARR credits applied as applicable
- The FTR Credit Requirement is the sum of all positive months

FTR Credit Calculation - Proposed

- Proposed new FTR Credit Requirement would incorporate a third component
  1. Path-specific component – including:
     - Cleared price minus adjusted historical reference value (includes adjustments for RTEP upgrades)
     - Undiversified adder (if any)
  2. 10¢ Per-MWh minimum
  3. Mark to Auction - NEW
     - Cleared FTR portfolio marked against most recent auction prices
     - Individual proposals differ in the method of applying the MTA

Design Components

- Five main design components were considered
  - Three components are the same for all six remaining packages
    - Portfolio application of MTA
    - Intra-auction collateral calls if needed
    - Freeze on transactions for failure to post collateral one time
      - Default after second time
  - Two components differ among the packages
    - Method of application on existing requirements
    - Consideration of an intra-auction threshold for collateral calls

Portfolio Application

- Portfolio application of Mark-to-Auction
  - The MTA is calculated on a monthly basis using the most recent auction clearing prices
  - Then it is calculated for the whole portfolio, summed across all months
  - ARR credits available to offset MTA credit requirements

Intra-Auction Collateral Calls

- All packages propose an intra-auction collateral call component
  - The intra-auction collateral calls will be implemented the same as the undiversified collateral calls work today
    - Collateral call for shortfall is issued during the auction clearing process
    - Must be satisfied by 4 pm the next business day
      - If not cured in time, all of the member's bids are removed and the case is re-executed
- Some packages propose a $100k threshold for the intra-auction collateral calls
  - Threshold is applied intra-auction only
  - Collateral calls issued post-auction for any shortfall, but positions would not be removed

Freeze Remedy

- When a Market Participant does not cure an MTA collateral call:
  - All credit-screened market activity (i.e. virtuals, imports/exports, RPM), except for FTR Sells, will be frozen
  - Participant declared in default after second consecutive auction
    - "Consecutive auctions" must include some overlapping periods
      - e.g. two LTFTR auctions, two BOPP auctions, annual plus one LTFTR auction, annual plus one BOPP auction
      - LTFTR and BOPP auctions do not overlap
    - Four rounds of a single Annual Auction count as a single "auction clearing" for default declaration purposes

Application with Existing Requirements

- Proposed options for applying MTA[1] to current requirement[2]:
  - Additive (G1/G2)
    - Add positive MTA credit requirement to current requirement (Negative MTA is ignored; MTA cannot reduce current requirement)
  - "Higher of" (H/H')
    - Use the higher of the current requirement and the MTA + "MTA Adder", where the "MTA Adder" is:
      - 20% of MTA for FTRs awarded in BOPP or Annual
      - 50% MTA loss for LTFTRs (reduces to 20% when they become current-year)
  - Combination of both "Higher of" and Additive (I/I')

[1] For this discussion, adding and comparing MTA refer to values that have moved against the participant

[2] Current requirement is higher of path-specific and per-MWh minimum requirements

Impacts

Mark to Auction Proposals

	Package G1	Package G2	Package H	Package H'	Package I	Package I'
Integration with existing requirements	Additive		Higher of Existing and MTA plus MTA Adder: • 20% of MTA for FTRs awarded in BOPP or Annual • 50% MTA loss for Long-Term FTRs[2]		Higher of Current plus MTA and MTA plus MTA Adder: • 20% of MTA for FTRs awarded in BOPP or Annual • 50% MTA loss for Long-Term FTRs[2]	
Intra-Auction or Post-Auction	Intra-Auction	Intra-Auction with $100k Threshold[1]	Intra-Auction	Intra-Auction with $100k Threshold[1]	Intra-Auction	Intra-Auction with $100k Threshold[1]
Increase of Requirements for Members – excluding GreenHat (as of JUL 2018 Auction)	$33M (3.5%)		$3M (0.3%)		$33M (3.5%)	
Percentage of Accounts Impacted	25%		4%		25%	
Total GreenHat Requirement (Including $90M volumetric requirement)	$207M		$162M		$207M	
Support in Credit Subcommittee Poll	82%	31%	31%	22%	42%	17%

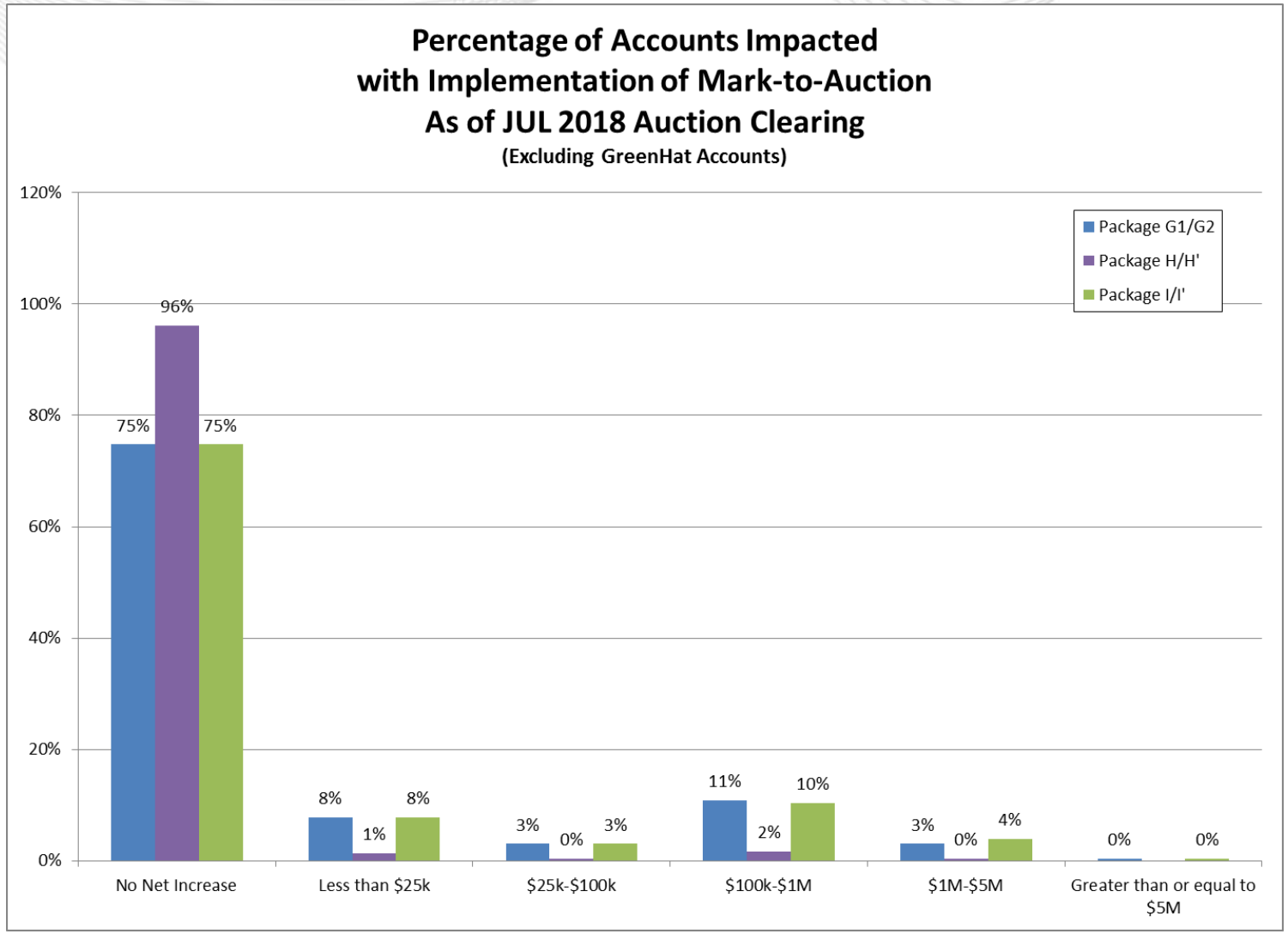
[1]Threshold only to be applied Intra-Auction, collateral calls for an amount under the threshold will be issued Post-Auction
[2]LT adder would be for LT FTRs until they become the annual auction period

Member Impacts

Package G1/G2
- 75% of accounts would have no net increase
- Remaining 25% would have a total increase of ~$33M

Package H/H’
- 96% of accounts would have no net increase
- Remaining 4% would have a total increase of ~$3M

Package I/I’
- 75% of accounts would have no net increase
- Remaining 25% would have a total increase of ~$33M



Intra-Auction Impact - Historical Analysis

- Increased credit requirements from marking an existing portfolio to new auction clearing prices can cause credit requirement increases and associated collateral calls during auction clearing
  - Just like the current “undiversified adder” collateral calls
- PJM back-tested the proposed mark-to-auction requirements against seven auctions from 18/19 Annual Round 1 through JUL 2018 to see the possible impact on auction clearing
  - This period incorporated auctions undertaken since FTR Credit Requirements were changed on April 1, 2018

Intra-Auction Analysis

Package G1/G2 and Package I/I'

Number of Members who would have an Intra-Auction Collateral Call

	18/19 AnnRd1	17/18 May & 18/19 AnnRd2	18/19 AnnRd3	18/19 AnnRd4	18/19 June	19/22 LT Rd1	18/19 July	Total
Total	6	8	9	7	9	1	3	43
>1MM			1		2	1		4
500K-1MM	1	2	2	1	1			7
100K - 500K	4	4	1	1	4		2	16
25K-100K	1		2	4	1		1	9
<25K		2	3	1	1			7

For all seven auctions, there would have been 43 intra-auction collateral calls

37% would have been for less than $100k

Package H/H'

Number of Members who would have an Intra-Auction Collateral Call

	18/19 AnnRd1	17/18 May & 18/19 AnnRd2	18/19 AnnRd3	18/19 AnnRd4	18/19 June	19/22 LT Rd1	18/19 July	Total
Total	4	8	5	1	10	2	2	32
>1MM			1		1	1		3
500K-1MM		2			2			4
100K - 500K	3	4	1		4		1	13
25K-100K	1		1		1		1	4
<25K		2	2	1	2	1		8

For all seven auctions, there would have been 32 intra-auction collateral calls

38% would have been for less than $100k

Next Steps

- Stakeholder Timeline

– Credit Subcommittee	Poll Poll Results	October 23-30, 2018 October 31, 2018
– Market Implementation Committee	First Read Endorsement	November 7, 2018 December 12, 2018
– Markets and Reliability Committee	First Read Endorsement	December 6, 2018 December 20, 2018
– Members Committee	Endorsement	January 24, 2019
– FERC Filing		January 31, 2019

- Target Effective Date — April 1, 2019

Appendix

MTA Credit Calculation by FTR

- The MTA is initially calculated on a monthly basis for each FTR path as the original purchase price minus the most recent auction clearing price
- The original purchase price is prorated by monthly class hours
- The most recent auction clearing prices are applied
  - Long Term Auction prices are pro-rated on a monthly class hour basis for the applicable year(s)
  - Annual Auction prices are pro-rated on a monthly class hour basis for the applicable year
  - Balance of Planning Period (BOPP) Auction prices are applied monthly if monthly value exists (i.e. JUL); Overlapping periods in an individual auction (i.e. SEP and Q2), subtract the known price of the sub-period from the larger period's price, and prorate the remaining price among the remaining months in that period; Quarterly periods are prorated by monthly class hours
- "Sell" and options logic are implemented the same as the path specific credit requirements are calculated currently
- The MTA Credit is then summed over all the months, with negative months netting with positive months

Path Specific Example for BOPP

- A 1-MW, 24H, “Buy” Obligation FTR clears at $50 in the 16/19 Long Term Auction Round 3 for 18/19 Planning Year (i.e. YR3) and the results from the JUL 2018 Auction are as follows:

Period	Clearing Price
JUL	-$4
AUG	-$7
SEP	-$5
Q2-SEP	-$10
Q3	$15
Q4	-$6

Path Specific Example for BOPP

The individual monthly MTA credit values for this path would be as follows:

	Equation	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Period Type		JUL	AUG	SEP	Q2-SEP			Q3			Q4	
Class Hours (A)		744	744	720	744	721	744	744	672	743	720	744
Proration Factor for Original Purchase Price (B)	(A)/8760	744/8760	744/8760	720/8760	744/8760	721/8760	744/8760	744/8760	672/8760	743/8760	720/8760	744/8760
Prorated Original Purchase Price (C)	(B*50)	$4.25	$4.25	$4.11	$4.25	$4.12	$4.25	$4.25	$3.84	$4.24	$4.11	$4.25
Proration Factor for Most Recent Auction Clearing Price (D)	(A)/sum of class hours in period type	744/744	744/744	720/720	744/1465	721/1465	744/2160	744/2160	672/2160	743/2207	720/2207	744/2207
Most Recent Auction Clearing Price (E)		-$4	-$7	-$5	-$10	-$10	$15	$15	$15	-$6	-$6	-$6
Prorated Most Recent Auction Clearing Price (F)	(D*E)	-$4.00	-$7.00	-$5.00	-$5.08	-$4.92	$5.17	$5.17	$4.67	-$2.02	-$1.96	-$2.02
Mark to Auction Credit	(C-F)	$8.25	$11.25	$9.11	$9.33	$9.04	-$0.92	-$0.92	-$0.83	$6.26	$6.07	$6.27

- The months with positive MTA credit represent that the most recent mark is moving against the portfolio, and thus has a positive credit requirement
- If this was the only FTR in a portfolio, the portfolio approach would sum all the months for a total of $62.98 (note: positive values net with negative values).

Example 1: Application of each of the Packages

Assuming a portfolio consisted of positions for the current planning year (18/19) and one long term (19/20), and the monthly values for the current credit requirement and the MTA credit are as shown in the table to the right:

- Package A would have a credit requirement equal to the sum of column (C) = $14,125
- Package D1/D1' would have a credit requirement equal to the higher of [(A) and (B)] = $13,950
- Package G1/G2 would have a credit requirement equal to [(A)+(B)] = $19,850
- Package H/H' would have a credit requirement equal to higher of [(A) and (B)+0.2*(D)+0.5*(E)]= higher of [$13,950 and $7,103]=$13,950
- Package I/I' would be the max of Package G1/G2 and Package H/H' = $19,850

NOTE: Under all packages, if (B) was negative (i.e. a positive mark) then it would not be used to reduce credit requirements.

	Month	Year	Current Credit Requirement	MTA Credit	Monthly "Higher of"
Annual	JUL	2018	800	-100	800
	AUG	2018	850	300	850
	SEP	2018	700	200	700
	OCT	2018	650	450	650
	NOV	2018	650	500	650
	DEC	2018	675	700	700
	JAN	2019	700	750	750
	FEB	2019	625	700	700
	MAR	2019	725	750	750
	APR	2019	800	775	800
	MAY	2019	850	800	850
Long Term	JUN	2019	500	100	500
	JUL	2019	650	50	650
	AUG	2019	550	25	550
	SEP	2019	450	-25	450
	OCT	2019	475	-25	475
	NOV	2019	450	-50	450
	DEC	2019	500	-75	500
	JAN	2020	575	-25	575
	FEB	2020	400	-50	400
	MAR	2020	450	50	450
	APR	2020	475	50	475
	MAY	2020	450	50	450
Portfolio Total			13,950	5,900	14,125
			(A)	(B)	(C)

Additional Calculations for Package H/H':

The Annual MTA is the sum of MTA from JUL 2018 through May 2019. It is equal to $5,825 (D)

The Long Term MTA is the sum of MTA from JUN 2019 through MAY 2020. It is equal to $75 (E)

Example 2: Application of each of the Packages

Assuming a portfolio consisted of positions for the current planning year (18/19) and one long term (19/20), and the monthly values for the current credit requirement and the MTA credit are as shown in the table to the right:

- Package A would have a credit requirement equal to the sum of column (C) = $21,838
- Package D1/D1' would have a credit requirement equal to the higher of [(A) and (B)] = $14,750
- Package G1/G2 would have a credit requirement equal to [(A)+(B)] = $28,700
- Package H/H' would have a credit requirement equal to higher of [(A) and (B)+0.2*(D)+0.5*(E)]= higher of [$13,950 and $17,756]=$ 17,756
- Package I/I' would be the max of Package G1/G2 and Package H/H' = $28,700

NOTE: Under all packages, if (B) was negative (i.e. a positive mark) then it would not be used to reduce credit requirements.

	Month	Year	Current Credit Requirement	MTA Credit	Monthly "Higher of"
Annual	JUL	2018	800	(250)	800
	AUG	2018	850	750	850
	SEP	2018	700	500	700
	OCT	2018	650	1,125	1,125
	NOV	2018	650	1,250	1,250
	DEC	2018	675	1,750	1,750
	JAN	2019	700	1,875	1,875
	FEB	2019	625	1,750	1,750
	MAR	2019	725	1,875	1,875
	APR	2019	800	1,938	1,938
	MAY	2019	850	2,000	2,000
LongTerm	JUN	2019	500	250	500
	JUL	2019	650	125	650
	AUG	2019	550	63	550
	SEP	2019	450	(63)	450
	OCT	2019	475	(63)	475
	NOV	2019	450	(125)	450
	DEC	2019	500	(187)	500
	JAN	2020	575	(63)	575
	FEB	2020	400	(125)	400
	MAR	2020	450	125	450
	APR	2020	475	125	475
	MAY	2020	450	125	450
Portfolio Total			13,950	14,750	21,838
			(A)	(B)	(C)

Additional Calculations for Package H/H':

The Annual MTA is the sum of MTA from JUL 2018 through May 2019. It is equal to $14,563 (D)

The Long Term MTA is the sum of MTA from JUN 2019 through MAY 2020. It is equal to $187 (E)