

# Forward Reserve Market (FRM) Offer Cap Update and Offer Publication



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*Proposal to address Forward Reserve Market  
(FRM) market power concerns*

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**Proposed Effective Date: March 2024**

- In response to concerns expressed by the IMM over the potential exercise of market power in the FRM, ISO is proposing two updates to the FRM rules:
  - Update the Forward Reserve Offer Cap (“offer cap”) to \$6,300/MW-month
  - Delay publication of forward reserve auction offer data for 12 months, rather than the current four month delay
- ISO will seek a vote on the proposed Tariff revisions at the December 2023 Markets Committee (MC) meeting and January 2024 Participants Committee (PC) meeting
- The proposed effective date of March 2024 will allow these changes to take effect by the Summer 2024 forward reserve auction

# Background

## *Purpose of the Forward Reserve Offer Cap*

- ISO administers two forward reserve auctions each year:
  - A summer auction for June–September
  - A winter auction for October–May
- The offer cap defines the maximum price at which suppliers may offer into a forward reserve auction and is the maximum auction clearing price
  - The FRM uses a single offer cap applicable to summer and winter auctions, all locations, and both forward reserve products (Thirty Minute Operating Reserve (TMOR) and Ten-Minute Non-Spinning Reserve (TMNSR))
- FRM rules do not provide for ex-ante review of supply offers or mitigation of uncompetitive offers
  - The offer cap helps limit the potential exercise of seller-side market power
- The offer cap aims to reflect the upper end of the estimated costs for a representative, installed unit to provide forward reserves



# Background

## *The IMM expressed concern about market power in Spring 2023 QMR*

- The IMM observed that “[c]learing prices for TMNSR in the two most-recent auctions [were] more than three times the highest clearing price observed for that reserve product during summer auctions between 2017 and 2021”
- The IMM reviewed the results of the summer 2023 forward reserve auction and could not conclude that prices were the result of competitive offers
- The IMM recommended that ISO review and update the forward reserve supply offer cap
- The IMM also recommended that ISO cease or delay publication of auction offer data for several auction cycles



# I. UPDATED FORWARD RESERVE OFFER CAP

*Approach taken to derive updated offer cap*



## To derive the proposed cap, ISO followed – with some updates – the method used to derive the current offer cap

- The objective of estimating an updated offer cap – established in the 2016 analysis – remains valid now:
  - To estimate a **reasonable upper bound** of a competitive supplier's **direct costs and opportunity costs** to meet a forward reserve obligation with a **representative, installed unit**
- ISO used, where relevant, newer models and updated assumptions, as well as current market data
- This section explains key elements of the analysis carried out to derive an updated offer cap
  - The memorandum [Summary of Analysis for Calculating an Updated Forward Reserve Offer Cap](#) posted for this agenda topic provides additional detail

# Components of Updated Offer Cap

Table 1 in memo “Summary of Analysis for Calculating an Updated Forward Reserve Offer Cap”

Updated Offer Cap ( \$/MW-Month)			
Item Number	Item Description	Item Value	Item Units
<b>1</b>	<b>Foregone Revenue</b>		
1.1	Number of Reserve Shortage Hours	4.8	hours/year
1.2	Reserve Shortage Hour Reserve Revenue	1,706	\$/MW-month
1.2(a)	<i>Minimum Total Reserve Req. Shortage Revenue</i>	1,200	\$/MW-month
1.2(b)	<i>Ten-Minute Reserve Req. Shortage Revenue</i>	506	\$/MW-month
1.3	Energy and Reserve Market Revenue	3,023	\$/MW-month
<b>Item 1 Subtotal</b>	<b>Foregone Revenue Subtotal</b>	<b>4,729</b>	<b>\$/MW-month</b>
<b>2</b>	<b>Penalties</b>		
2.1	Failure to Reserve (Item 1 Subtotal*5.72%)	270	\$/MW-month
2.2	Failure to Activate (Item 1 Subtotal*9.71%)	459	\$/MW-month
<b>Item 2 Subtotal</b>	<b>Penalty Subtotal</b>	<b>729</b>	<b>\$/MW-month</b>
<b>3</b>	<b>Supplier Risk Premium</b> ([Item 1 subtotal + Item 2 subtotal]*15%)	<b>819</b>	\$/MW-month
			\$/MW-month
<b>4</b>	<b>Total Offer Cap (Item 1 + Item 2 + Item 3)</b>	<b>6,277</b>	\$/MW-month
<b>Item 4 Rounded</b>	<b>Updated Forward Reserve Offer Cap</b>	<b>6,300</b>	<b>\$/MW-month</b>

# Operationalizing the Objective

## *How ISO worked toward objective in deriving updated offer cap*

- Estimating reasonable upper-bounds
  - Considered seasonal differences in expected costs
- Direct costs and opportunity cost components
  - Included:
    - Foregone reserve shortage hour reserve revenue
    - Foregone energy and reserve market revenue (non-shortage hours)
    - Forward reserve penalties
    - Supplier risk premium
- Representative, installed unit criteria
  - Considered current FRM participation and characteristics of a unit representing the upper-end of opportunity costs
    - Identified relatively-efficient natural gas units, with approximate heat rate of 9,575 BTU/kWh and other generalized operating parameters necessary to simulate hypothetical dispatch

# Item 1 – Foregone Revenue

- Estimated energy and real-time operating reserve market revenue foregone as a result of fulfilling forward reserve obligations
- Two components:
  - Reserve Shortage Hour Reserve Revenue (Item 1.2)
  - Energy and Reserve Market Revenue (Item 1.3)



## Item 1.2 – Reserve Shortage Hour Reserve Revenue

- Reserve revenue earned during hours of operating reserve shortage
- Hours of operating reserve shortage are identified as Item 1.1
- The estimate of hours of operating reserve shortage incorporates two types of operating reserve shortage:
  - Peak load reserve shortage
  - Transient reserve shortage
- Reserve Shortage Hour Reserve Revenue includes revenue from each reserve product:
  - TMOR (Thirty-Minute Operating Reserve)
  - TMNSR (Ten-Minute Non-Spinning Reserve)



# Item 1.1 – Number of Reserve Shortage Hours

- We estimate monthly operating reserve shortage hours by:
  - Estimating the annual numbers of peak load reserve shortage hours and transient reserve shortage hours
  - Allocating annual estimates of reserve shortage hours to summer using a seasonal allocation factor



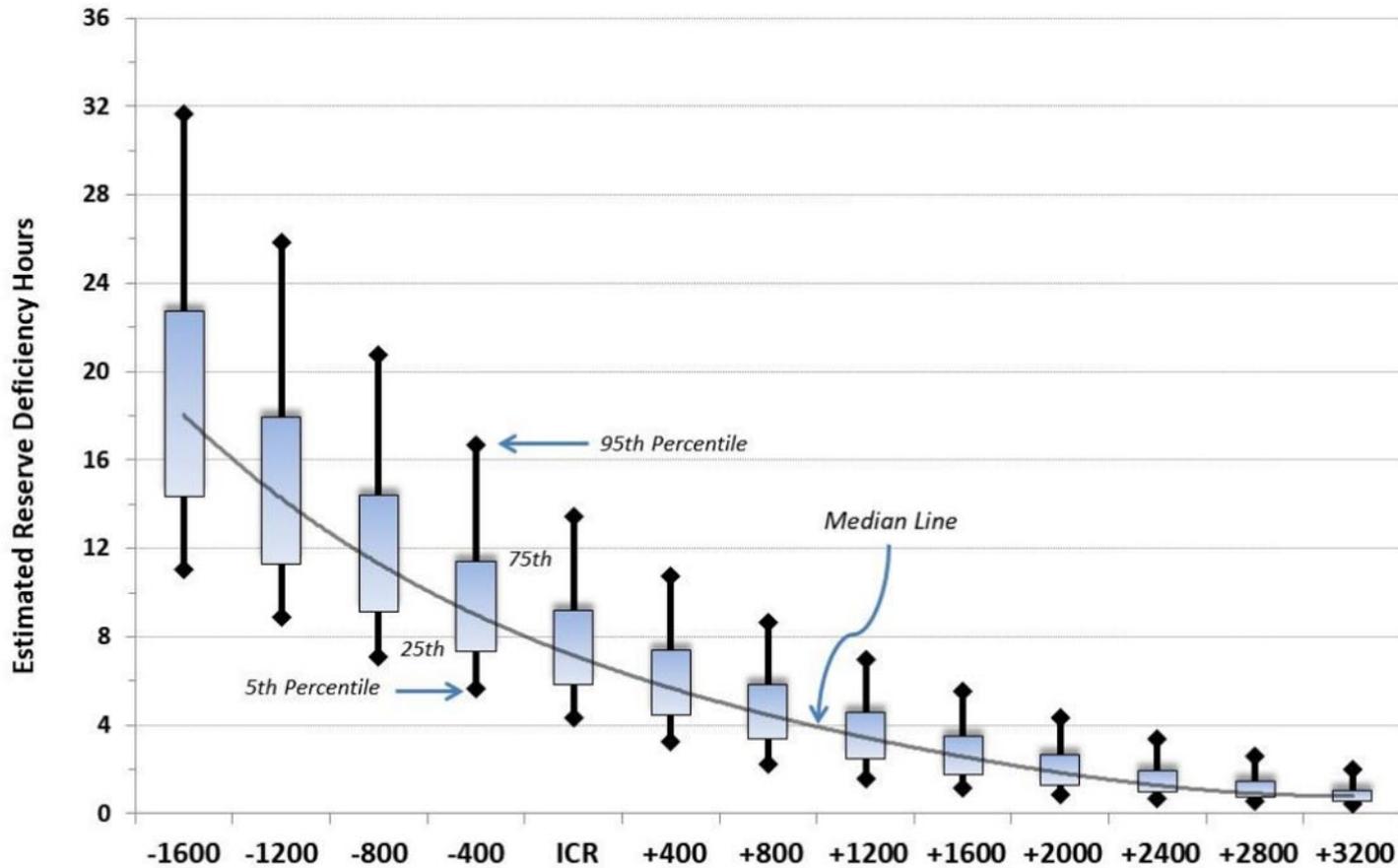
# Peak Load Reserve Shortage Hours

- GE MARS-estimated hours of system-wide operating reserve shortage
- 95<sup>th</sup> percentile of estimated annual hours of system operating reserve deficiency at the average, actual level of capacity over CCP 2021/22 through CCP 2024/25



# ISO Studies of Operating Reserve Deficiency Hours

*Studies conducted in conjunction with the representative net-ICR development process*



# Peak Load Reserve Shortage Hours (Continued)

Table 2 in memo "Summary of Analysis for Calculating an Updated Forward Reserve Offer Cap"

Capacity Commitment Period (CCP)	Actual level of capacity relative to Net ICR (CSO MW – Net ICR MW)	Estimated 95th Percentile of Operating Reserve Shortage Hours at Net ICR+1600MW	Estimated 95th Percentile of Operating Reserve Shortage Hours at Net ICR+2000MW
2021-2022	1796.99	7.8	6.7
2022-2023	1838.53	6.3	5.1
2023-2024	1648.65	8.3	5.8
2024-2025	1557.14	5.5	4.3
Average	1710.33	7.0	5.5

# Transient Reserve Shortage Hours

- Duration of reserve shortage resulting from operational risks (e.g., under-commitment due to load forecast error or loss of critical transmission elements)
- Added to peak load reserve shortage hours because transient reserve shortage hours (operational) not obtained from GE MARS (designed for planning studies)
- 95<sup>th</sup> percentile of transient reserve shortage hours occurring annually during the period 5/1/2015 to 12/31/2022

# Seasonal Allocation of Reserve Shortage Hours

- The seasonal allocation factor determines the proportion of total annual reserve shortage hours (peak load and transient) occurring during the summer period
- It is the ratio of:
  - (i) total number of Minimum Total Reserve Requirement and Ten-Minute Reserve Requirement Reserve-Constraint Penalty Factor (RCPF) activation events in summer months
  - to
  - (ii) the total number of Minimum Total Reserve Requirement and Ten-Minute Reserve Requirement RCPF activation events in all months
- Uses data for the period 5/1/2015 to 12/31/2022

## Item 1.2(a) – Minimum Total Reserve Requirement Shortage Revenue

- Number of estimated Minimum Total Reserve Requirement shortage hours multiplied by the RCPF of \$1,000/MWh
- Estimate of Minimum Total Reserve Requirement shortage hours uses historical relative frequency of Minimum Total Reserve Requirement RCPF activations in summer months
- Historical relative frequency of Minimum Total Reserve Requirement RCPF activations is the ratio of:
  - (i) the number of five-minute intervals including a Minimum Total Reserve Requirement RCPF activation
  - to
  - (ii) total number of five-minute intervals of reserve shortage
- Uses data for summer months from 6/1/2018 to 5/31/2023

## Item 1.2(b) – Ten-Minute Reserve Requirement Shortage Revenue

- Number of estimated Ten-Minute Reserve Requirement shortage hours multiplied by the RCPF of \$1,500/MWh
- Estimate of Ten-Minute Reserve Requirement shortage hours uses historical relative frequency of Ten-Minute Reserve Requirement RCPF activations in summer months
- Historical relative frequency of Ten-Minute Reserve Requirement RCPF activations is the ratio of:
  - (i) the number of five-minute intervals including a Ten-Minute Reserve Requirement RCPF activation
  - to
  - (ii) total number of five-minute intervals of reserve shortage
- Uses data for summer months from 6/1/2018 to 5/31/2023

# Item 1.3 – Energy and Reserve Market Revenue

- Energy and operating reserve revenue estimated for the representative asset
  - Excludes hours of operating reserve shortage (avoids double-counting)
- Difference between:
  - (i) revenues assuming the asset is assigned forward reserve megawatts
  - and
  - (ii) revenues assuming it is not assigned forward reserve megawatts
- Uses dispatch model created in 2020 for ISO-NE's FCA 16 parameters update, with updated asset parameters and prices
- Uses prices from 6/1/2018 through 5/31/2023 as hourly input values

## Item 2 - Penalties

- Accounts for costs associated with penalties arising from failure to meet forward reserve obligations
- Two components:
  - Failure to Reserve Penalties (Item 2.1)
  - Failure to Activate Penalties (Item 2.2)



## Item 2.1 – Failure to Reserve Penalty

- Product of the average monthly failure to reserve penalty rate and the monthly foregone revenue
- The monthly failure to reserve penalty rate is the ratio of:
  - (i) historical monthly failure to reserve penalties incurred 6/1/2018 through 5/31/2023
  - to
  - (ii) historical monthly base forward reserve revenue
- Uses average because failure to reserve occurs more frequently than failure to activate, occurs for a wider array of reasons, and features higher variability; average best captures likely penalties

## Item 2.2 – Failure to Activate Penalty

- Product of the 95<sup>th</sup> percentile monthly failure to activate penalty rate and the monthly foregone revenue
- The monthly failure to activate penalty rate is the ratio of:
  - (i) historical monthly failure to activate penalties incurred 6/1/2018 through 5/31/2023
  - to
  - (ii) historical monthly base forward reserve revenue
- Uses 95<sup>th</sup> percentile because failure to active occurs relatively rarely; 95th percentile captures a reasonable upper end of the range of likely penalties

## Item 3 – Supplier Risk Premium

- Risk premium to account for uncertainty in estimates of other cap components
- Proposal maintains 15% value used for the current offer cap



# Comparison to IMM QMR Recommendation

*Differs primarily because of representative unit choice*

- IMM 2023 Spring QMR recommended an offer cap of \$6,600/MW-month
- The proposed offer cap value differs as a result of:
  - Some differences in assumed representative asset parameters
    - The updated cap is based on a slightly less-efficient natural gas unit (with lower opportunity costs)
  - Difference in approach to determining failure to reserve rate
    - IMM used a 33% failure to reserve penalty rate; the updated cap is based on historical failure to reserve penalties

## II. FORWARD RESERVE OFFER PUBLICATION

*Proposal to delay forward reserve offer publication*



# Delay Offer Data Publication by One Year

- Offers will not be published until the first day of the twelfth month following the month during which the supply offers were in effect
  - Currently, offer publication is delayed until the first day of the fourth month following the offer effective month
- The month during which the supply offers were in effect = the first month of the procurement period
- For example:
  - Offers made in April 2024 summer auction for June 1, 2024 – September 30, 2024 procurement period are “in effect” June 1, 2024
  - First day of the twelfth month following June 1, 2024 is June 1, 2025

# PROPOSED TARIFF CHANGES



# Summary of Proposed Tariff Changes

Tariff Section	Description of Change	Reason for Change
I.2.2	Modify definition of Forward Reserve Offer Cap to “is \$6,300/megawatt-month.”	Reduce offer cap
III.9.3	Add text stating that publication of Forward Reserve Auction Offers will be delayed until first day of twelfth month following the month offers are in effect	Delay offer publication

# SUMMARY AND NEXT STEPS



# Summary

- ISO proposes to update the Forward Reserve Offer Cap to \$6,300/MW-month
- ISO proposes to delay Forward Reserve offer publication data for 12 months after the date the offer is in effect
- ISO proposes an effective date of March 2024, to implement changes for the Summer 2024 Forward Reserve Auction



# Stakeholder Schedule

Stakeholder Committee and Date	Scheduled Project Milestone
<b>Markets Committee</b> <b>October 11-12, 2023</b>	Introduce offer cap proposal, offer publication delay proposal, and tariff language
<b>Markets Committee</b> <b>November 7-8, 2023</b>	Address follow-up questions, review any revised Tariff language from prior meeting, and discuss proposed amendments
<b>Markets Committee</b> <b>December 12-13, 2023</b>	Vote on proposal and any proposed amendments
<b>Participants Committee</b> <b>January 4, 2024</b>	Vote on proposal and any proposed amendments

# Questions

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# Acronyms Used in this Presentation

- FRM = Forward Reserve Market
- FRA = Forward Reserve Auction
- TMOR = Thirty-Minute Operating Reserve
- TMNSR = Ten-Minute Non-spinning Reserve
- RCPF = Reserve Constraint Penalty Factor
- FCM = Forward Capacity Market
- CCP = Capacity Commitment Period
- ORTP = Offer Review Trigger Price
- CONE = Cost of New Entry
- IMM = Internal Market Monitor
- QMR = Quarterly Markets Report

# APPENDIX

*Proposal to address Forward Reserve Market (FRM) market power concerns*



# Updated and Currently-Effective Cap Components

Revision  
One: Item  
Number 1.1  
(2016 Value)  
changed to  
12.81

Updated Cap			Current Cap	
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