

IMM Commentary on 2026 AS Methodology

Presented to:

TAC

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Summary of IMM Commentary

Primary arguments

- ERCOT's proposed AS Methodology employs several factors that inflate the target procurement levels beyond a sensible reliability level
 - Two gigawatts of the proposed procurement provides zero reliability improvement.
 - Key factors are the “Watch” criteria, 6hr load forecast error, and 4hr ESR duration.
 - We propose a compromise that would procure 2,840 MW of ECRS and Non-Spin bringing total AS procurement to just over 6 GW.
- It is misaligned with reliability outcomes
 - ERCOT's operational objective is to avoid Watch conditions instead of reliability outcomes such as preventing firm load shed.
 - The input parameters for individual AS products are not based on the risks they are designed to manage.
- It will undermine performance in the energy-only market
 - ERCOT's proposal will procure excessive volumes of AS capacity.
 - Excess AS capacity will inefficiently reduce scarcity and prices in the market.
 - Undermining effective shortage pricing will inhibit efficient signals for new investment.

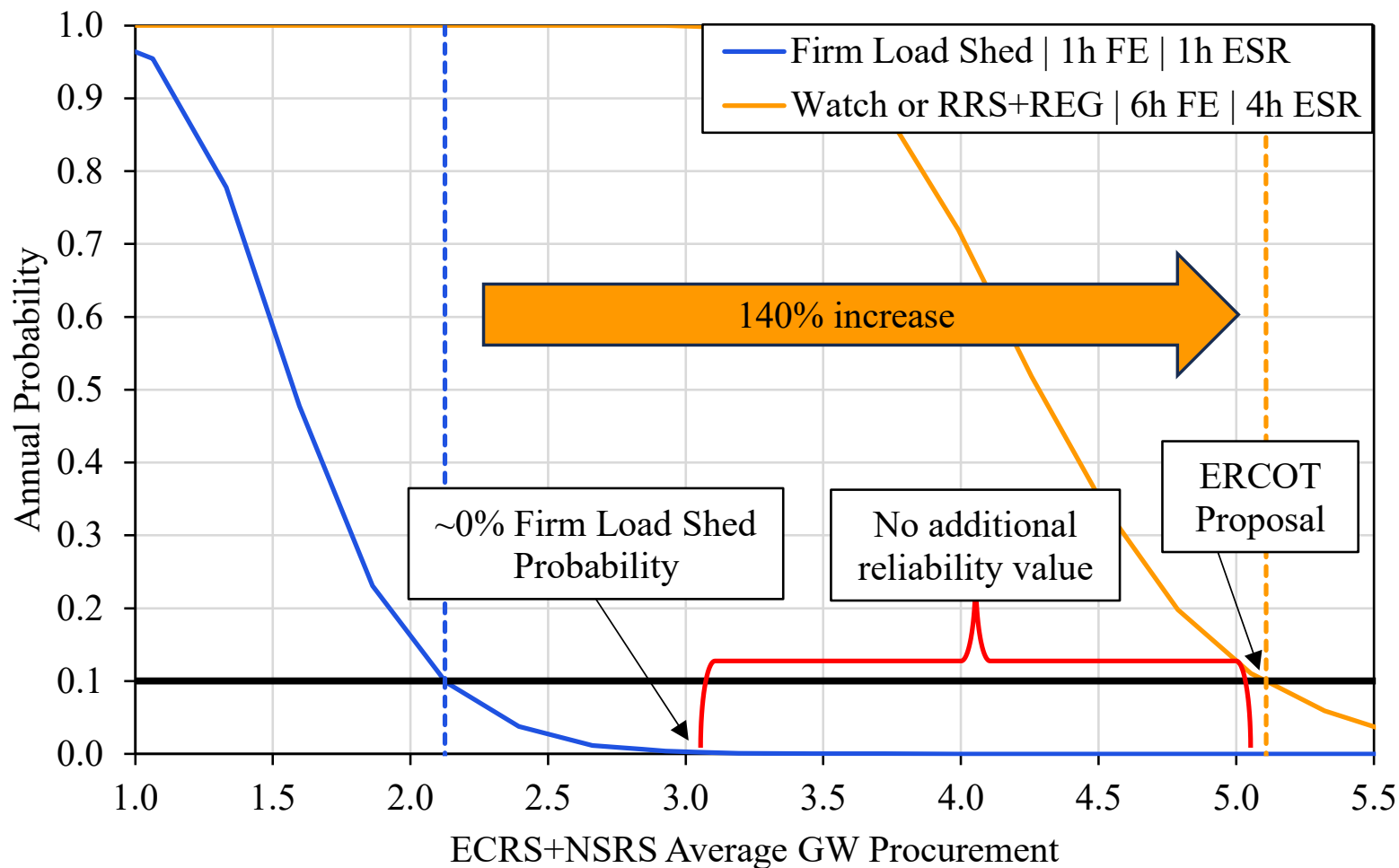
Summary of IMM Commentary

Overview and context

- The IMM developed a stochastic risk model to evaluate the need for ECRS and NSRS capacity as part of the PUC's AS Study from 2023-2024.
- ERCOT has adopted many fundamental aspects of the IMM's proposed stochastic risk model, but the IMM disagrees with parameter assumptions included in ERCOT's proposal.
- In particular, the IMM has evaluated the impact of several key parameter settings:
 - Net Load Forecast Error Time Horizon (adds 1.2 GW)
 - Convergence Criteria (i.e., firm load shed vs. Watch) (adds 1.0 GW)
 - ESR Duration Requirement (adds 624 MW)
- ERCOT has also proposed a new parameter for discounting reserves – 25% credit for daytime hours and 60% credit overnight.
 - This is done to adjust for the use of average headroom figures.
 - Somewhat clouds the analysis ... an approach that accounted for all observed headroom values would be more straight-forward.

Overall Impact of ERCOT Proposal

ERCOT proposal excessively procures AS for no additional reliability value



Note this set of values differs from the previously submitted memo due to calibrating the IMM calculation of ERCOT base case to the preliminary quantities provided by ERCOT for that case.

Parameter Settings: Summary Table

#	Scenario name	Convergence Criteria (MW)	Forecast Error Time Horizon (Hours Ahead)	ESR Duration	Annual Probability	ECRS + NSRS Plan (MW)	Absolute Increase from IMM Base Case (MW)	Relative Increase from IMM Base Case (%)
0	IMM Base Case	1500	1	1	1/10	2,126		
1.1	"Watch" Criteria	3000	1	1	1/10	3,047	922	43.4%
1.2	Max of Firm Load Shed or Reg + RRS	MAX(1500, RRS+REG)	1	1	1/10	3,180	1,054	49.6%
1.3	Max of "Watch" or Reg + RRS	MAX(3000, RRS+REG)	1	1	1/10	3,189	1,063	50.0%
2.1	6 HA Forecast Error	1500	6	1	1/10	3,338	1,212	57.0%
2.2	3 HA Forecast Error	1500	3	1	1/10	2,842	716	33.7%
3	4 hr. ESR Duration	1500	1	4	1/10	2,750	624	29.4%
4	ERCOT Base Case	MAX(3000, RRS+REG)	6	4	1/10	5,108	2,983	140.3%

Note this set of values differs from the previously submitted memo due to calibrating the IMM calculation of ERCOT base case to the preliminary quantities provided by ERCOT for that case.

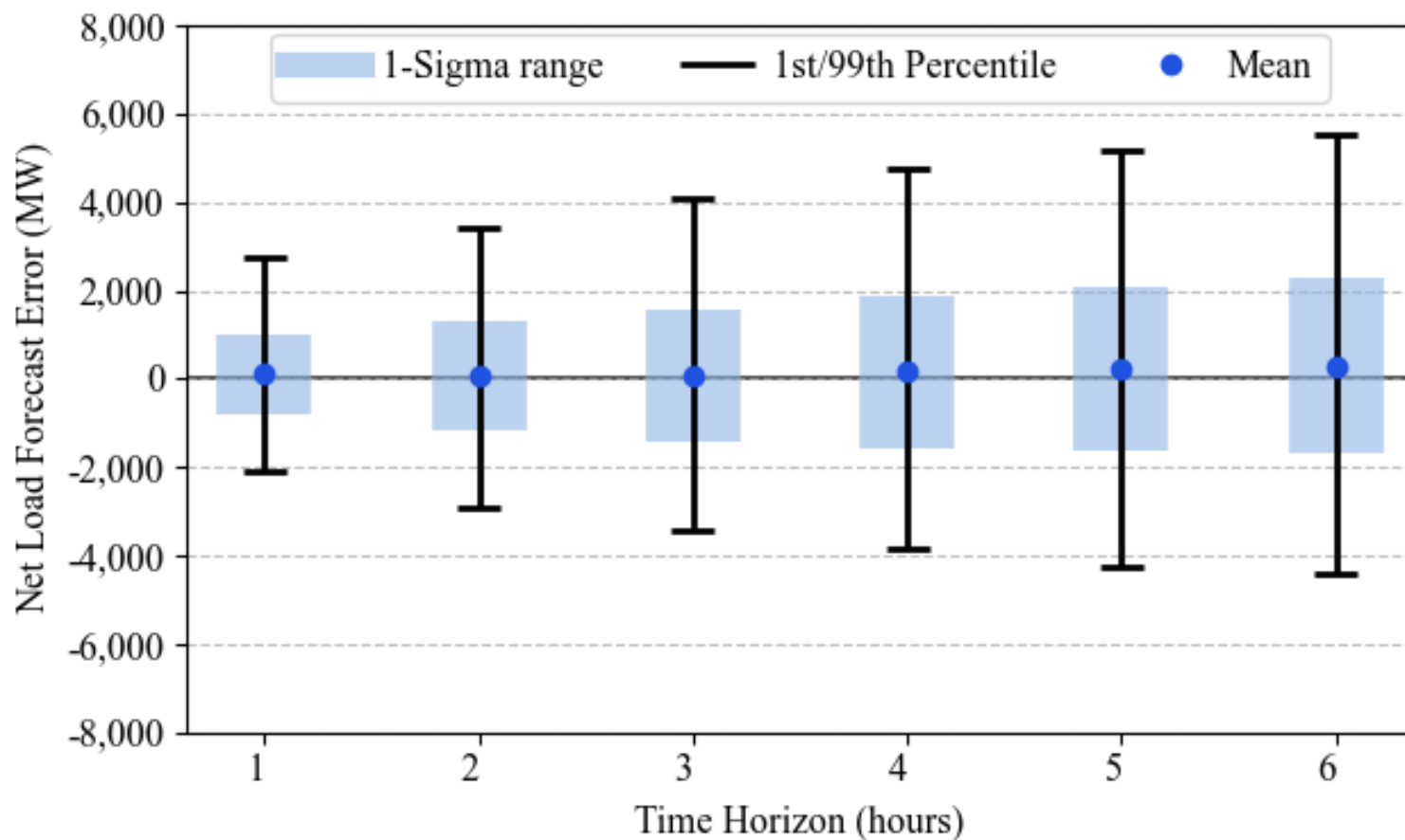
Parameter Settings: Forecast Error Time Horizon

A 6-hour ahead time horizon is unreasonably conservative

- Uncertainty from net load forecast error is a significant driver of the total risk perceived by the probabilistic framework, making the time horizon setting extremely influential.
- Compared to the IMM's preferred 1-hour time horizon, ERCOT's proposed 6-hour time horizon would increase AS procurements by ~57%.
 - Compared to other parameter settings, the forecast error time horizon influences AS procurement outcomes the most.
- A 1-hour time horizon is justified because much of the uncommitted capacity available during tight reserve intervals can be reached within 1 hour.
- The IMM considers the 6-hour time horizon to be unreasonable because it:
 - Ignores market response within 6 hours of a contingency event
 - Is primarily proposed to reduce the need to issue RUCs, a problem manifested by "Conservative Operations" after Winter Storm Uri
 - Ultimately leads to more RUC upon implementation of RTC and sloped ASDCs
 - Leads to higher AS procurement solely to satisfy goals associated with "Conservative Operations"

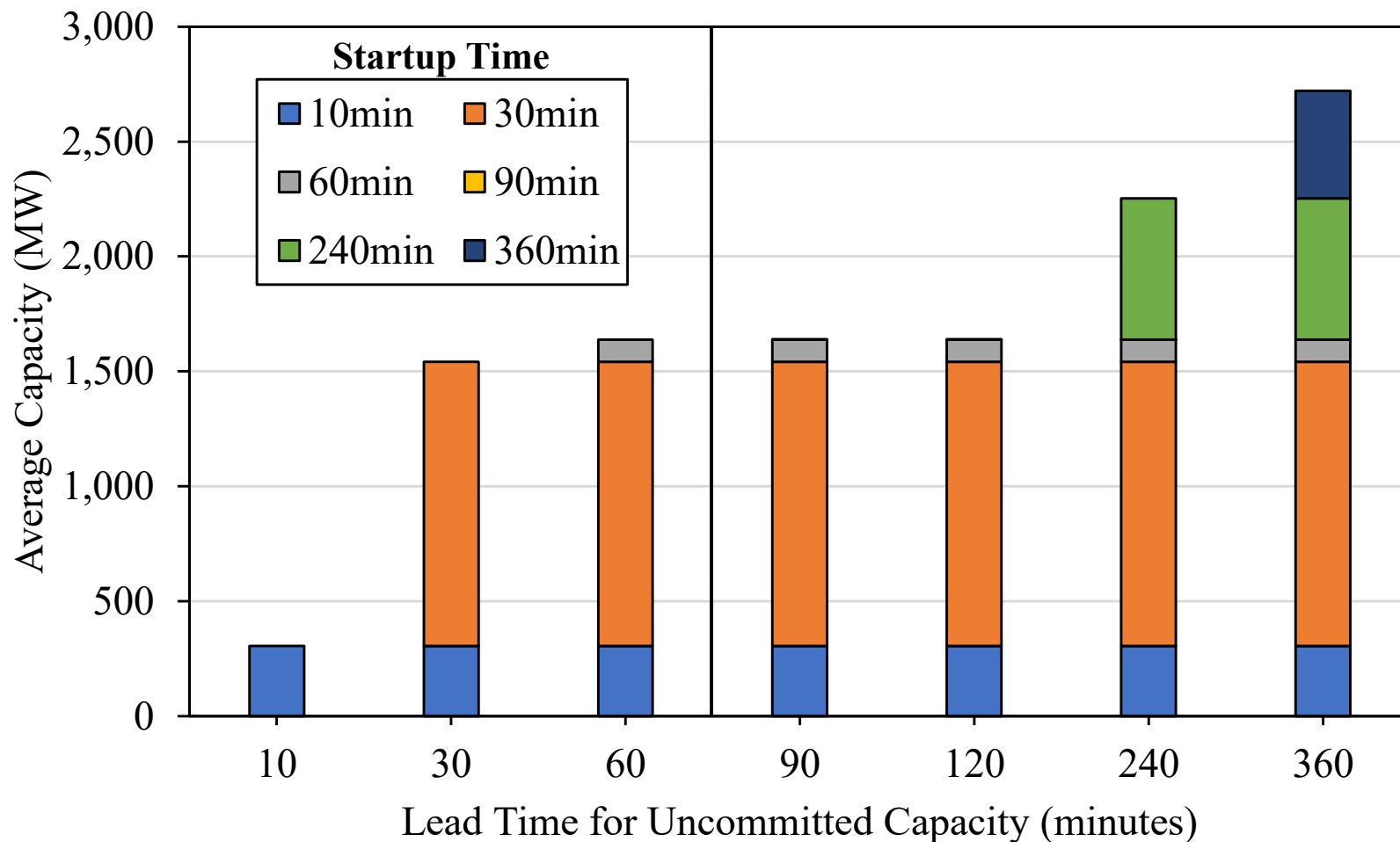
Parameter Settings: Forecast Error Time Horizon

6 hour ahead forecast error approximately twice as large as 1 hour ahead



Parameter Settings: Forecast Error Time Horizon

Significant uncommitted capacity available within 1 hour when PRC < 5GW



Parameter Settings: Convergence Criteria

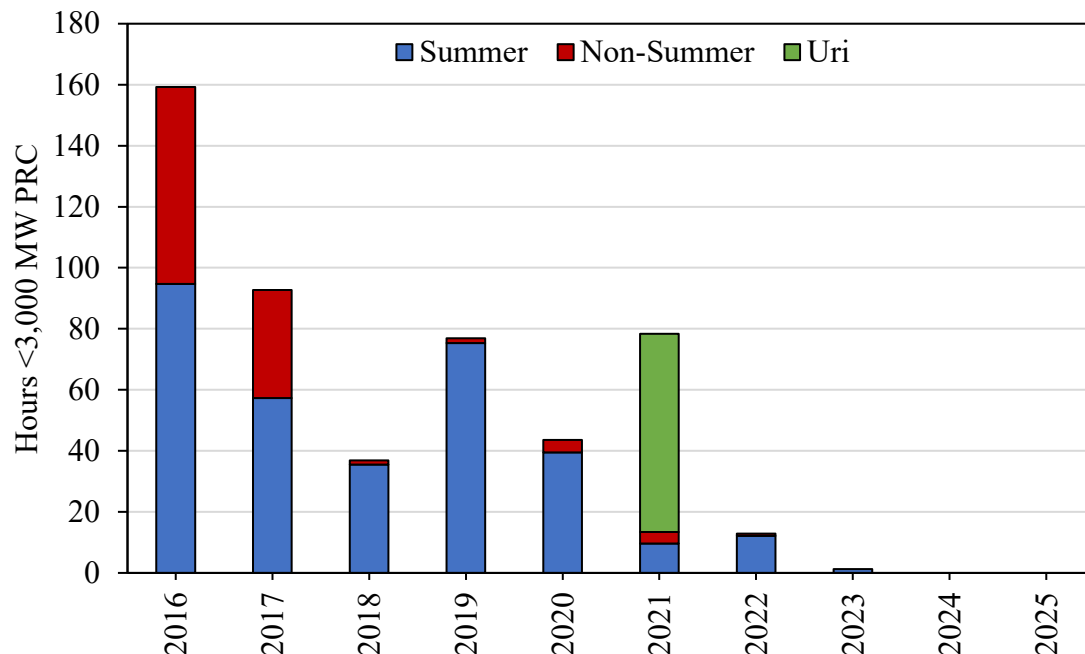
Avoiding a “Watch” is overly conservative and arbitrary

- Compared to the IMM’s proposed firm load shed threshold, IMM modeled results indicate ERCOT’s proposed “Watch” threshold would increase AS procurements by 40%-50%.
- Firm Load Shed threshold – 1,500 MW – justifications:
 - Commonly understood and utilized reliability planning standard
 - Clear definition and alignment within ERCOT Protocols – EEA Level 3 at 1,500 MW PRC
- Avoiding a “Watch” – $\text{Max}(\text{REG} + \text{RRS}, 3,000 \text{ MW})$ – is overly conservative
 - No clear definition of “Watch” – loosely tied to 3,000 MW PRC
 - REG+RRS constraint is even more conservative
 - It implies a 1/10 standard short on REG and RRS
 - This setting will overwhelm any threshold below 3,000 MW due the quantity of REG+RRS typically procured
 - Using minimum requirements for the REG+RRS component could be a reasonable compromise (e.g., largest single contingency)

Parameter Settings: Convergence Criteria

“Watch” or Reg/RRS criteria are overly conservative compared to pre-Uri

- Prior to Winter Storm Uri, intervals with PRC below 3 GW were more common.



- RRS + REG procurement is greater than 3 GW during most hours.

Volume of RRS + REGUP June 2023 to December 2024

Min MW	2,403
Max MW	3,889
Mean MW	3,149
Hours >3,000 MW	67%

Parameter Settings: ESR Duration

ESRs primarily needed during the first hour of contingency events

- The duration requirement for ESR reserves has less influence on AS procurement outcomes, but remains significant.
 - Compared to a 1-hour ESR duration requirement, ERCOT's 4-hour requirement proposal increases AS procurement by ~29%.
- Similar to the justification for a 1-hour forecast error time horizon, the duration requirement for ESRs should be similar.
 - During tight reserve intervals when PRC is below 5 GW, most uncommitted capacity is available within 1-hour.
 - ESRs are primarily needed during the first hour of a contingency event prior to when uncommitted capacity will be converted into energy.
- The IMM has previously provided commentary on this perspective in other forums, such as during the stakeholder proceedings associated with NPRR 1282.

Parameter Settings: Reserve Discounts (Risk Credits)

Probabilistic method inherently meant to consider ALL risks and reserves

- The approach used by ERCOT relies on average headroom values, which are discounted to reflect likely actual values v. the averages.
- A stochastic or probabilistic method is inherently designed to consider all observed risks. Averaging headroom eliminates a key benefit of using a probabilistic method in determining target reserve levels.
- We understand why the risk credit values of 25% and 60% are applied, but argue that the underlying reason for this diminishes the value of using a probabilistic model.
- On the surface it appears this modeling approach decreases the implied procurement target, however the direction it is not entirely clear.

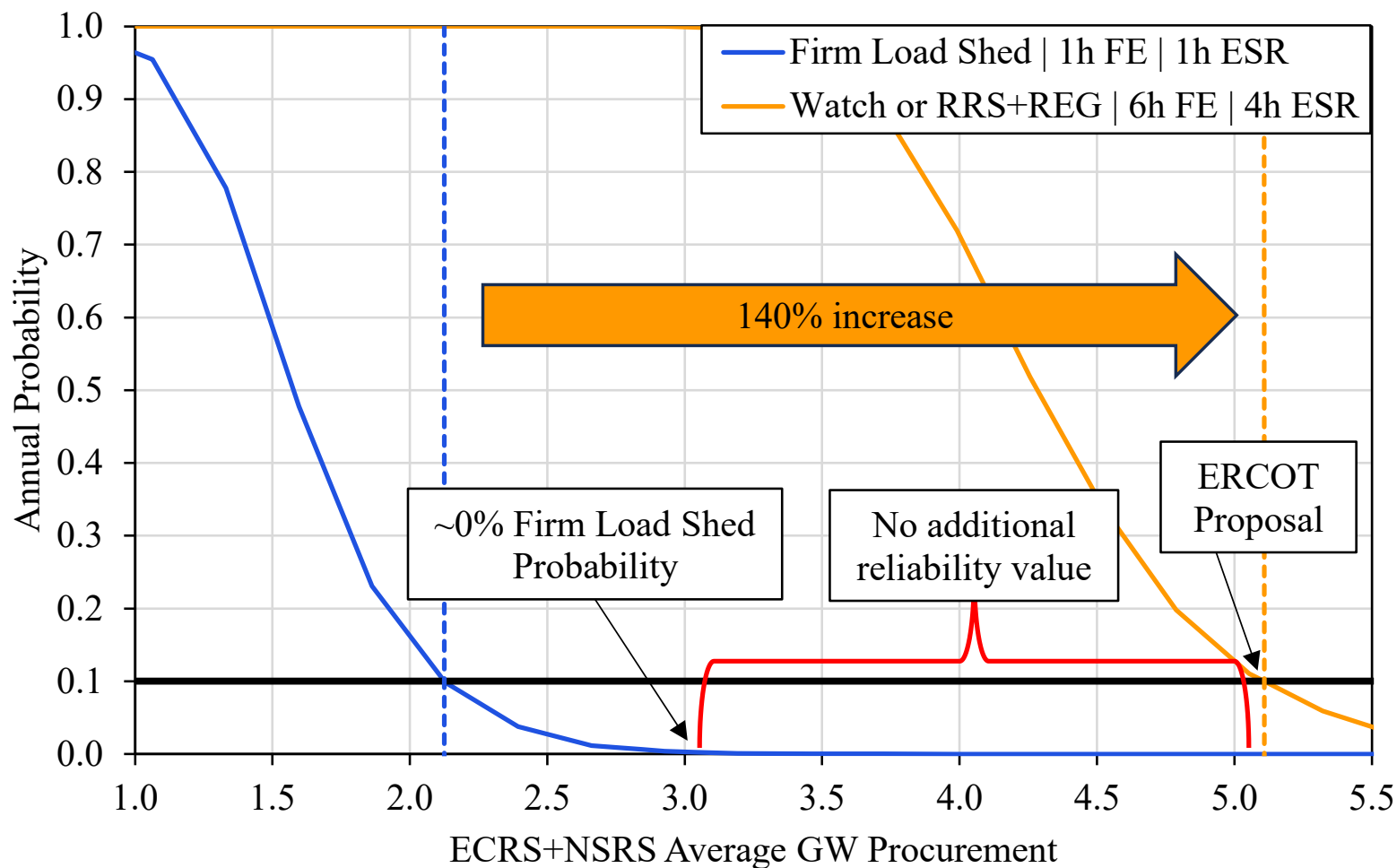
Overall Impact of ERCOT Proposal

ERCOT proposal excessively procures AS for no additional reliability value

- To summarize the overall impact, ERCOT's proposed parameter settings would lead to significant over-procurement of AS capacity.
 - Compared to the IMM's proposed assumptions, ERCOT's proposal represents a 140% increase to ECRS+NSRS procurement.
 - In terms of avoiding firm load shed, ERCOT's proposal would procure significant excess AS capacity (~2 GW) that provides no additional reliability value.
 - The IMM's modeled AS procurements do not apply reserve discounts, implying that ERCOT's proposed discounts would extend excess procurement further.
- The following slide visually highlights the difference between the IMM assumptions and ERCOT assumptions in terms of AS procurement volume outcomes.

Overall Impact of ERCOT Proposal

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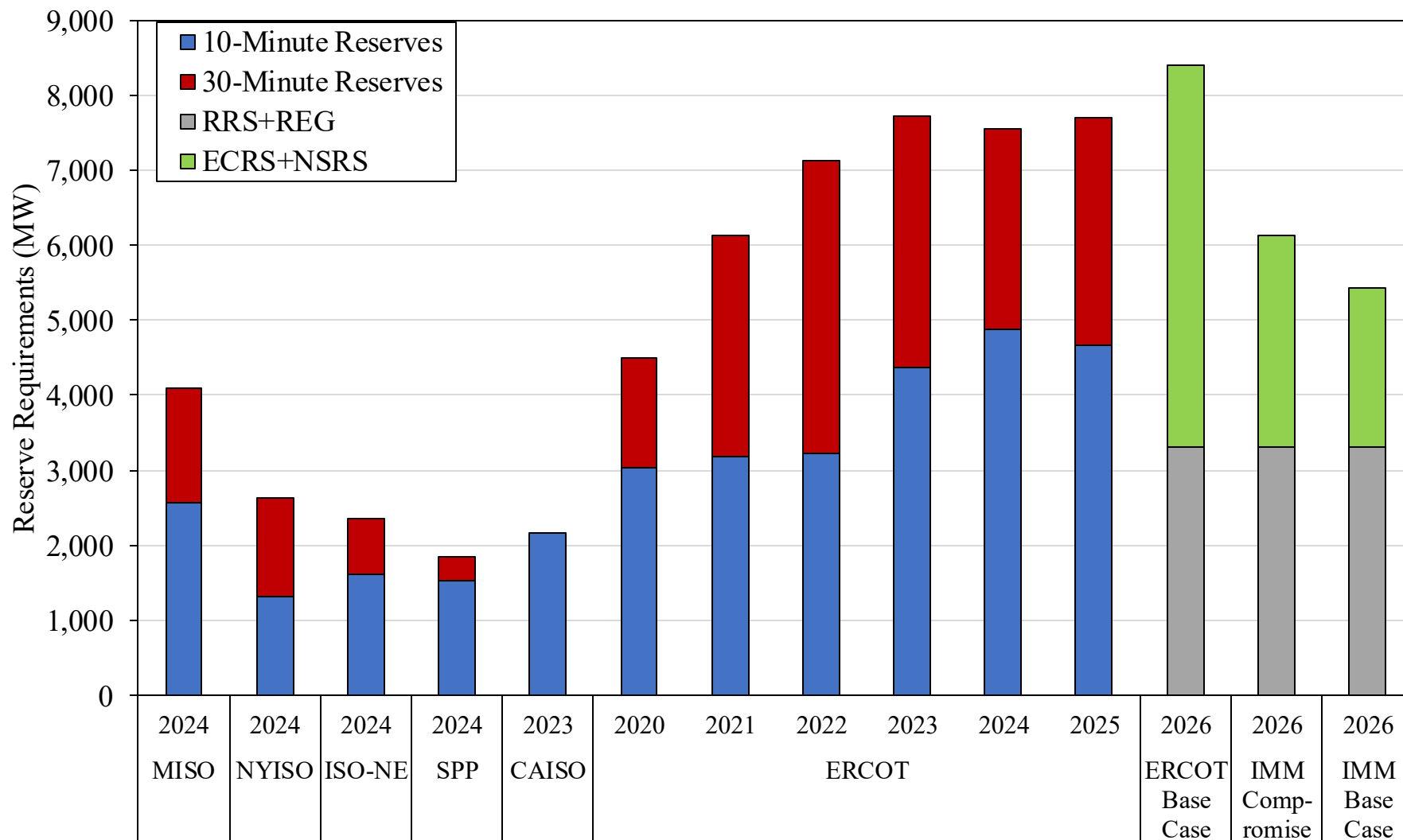
Overall Impact of ERCOT Proposal

Excess AS capacity will undermine the performance of energy-only market

- Excess AS capacity would have significant negative cost and efficiency implications in the forms of additional uplift and undermining performance of the energy-only market.
 - Over-procuring AS capacity leads to higher costs uplifted to consumers.
 - Higher AS volume leads brings more non-price setting capacity online which suppresses energy prices.
 - Inefficiently reducing scarcity undermines self-commitment incentives in the energy-only market.
 - Ultimately leads to more RUC upon implementation of RTC and sloped ASDCs
- ERCOT currently procures more operating reserves than other ISOs; the 2026 proposal would increase that margin even further.
 - ERCOT's procurement volumes of operating reserves have increased by more than 70% between 2020 and 2025.

ISO Operating Reserve Comparison

IMM Base Case seeks to reduce excessive ECRS+NSRS capacity



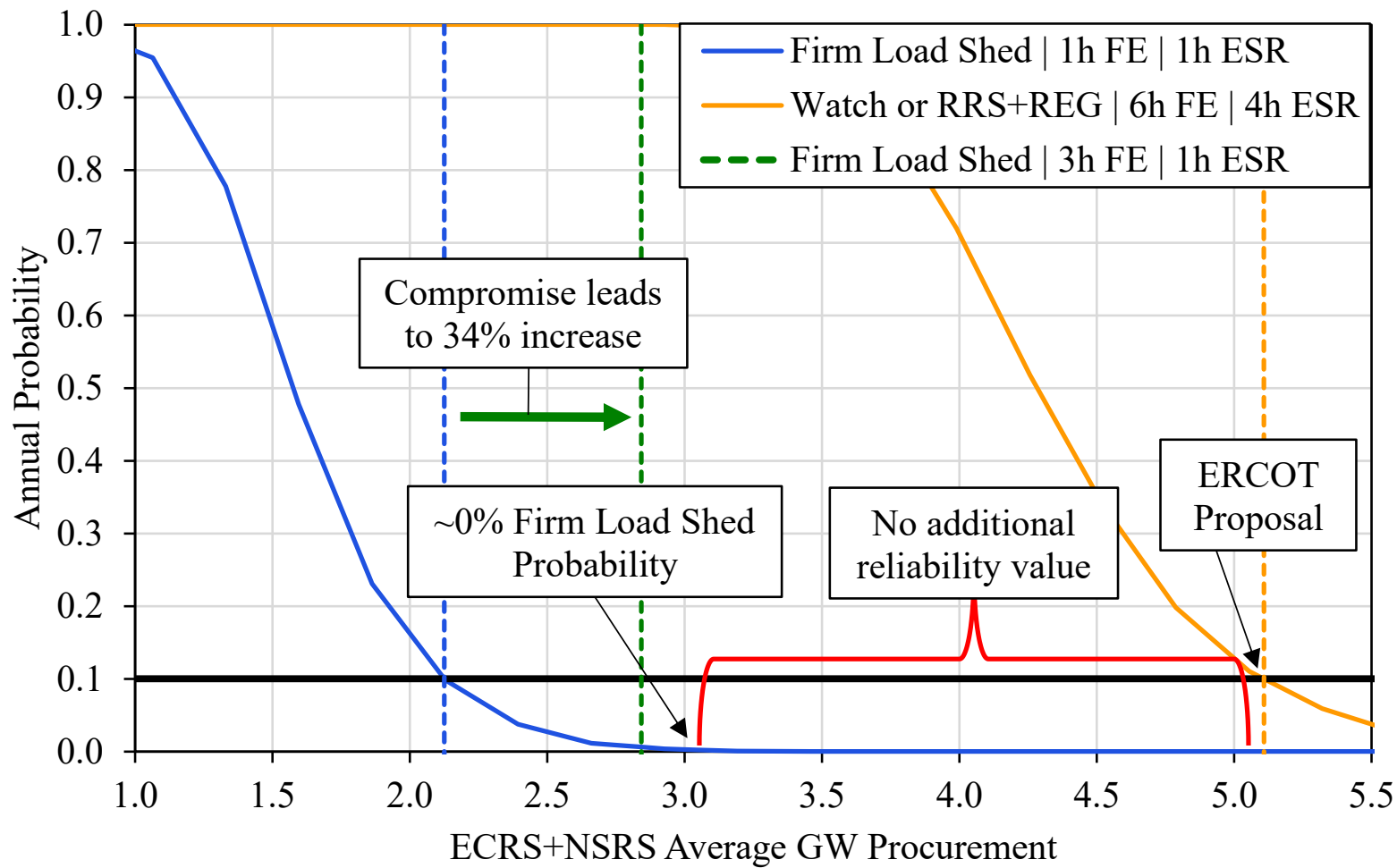
Recommended Compromise Proposal

3-hour time horizon eliminates excess capacity while maintaining reliability

- As a compromise, the IMM recommends using a 3-hour forecast error time horizon
 - Relative to the IMM Base Case proposal, a 3-hour time horizon would require approximately 34% more AS capacity
- Using a 3-hour forecast error time horizon is supported by several justifications:
 - The compromise is closer to the IMM's preferred 1-hour time horizon – a reasonable timeframe for uncommitted capacity to respond to contingency events
 - Maintains a near 0% probability of entering firm load shed
 - Significantly reduces excess procurement associated with ERCOT's proposal
 - ERCOT has legacy operational experience using a 3-hour time horizon for NSRS from 2016-2022
 - No issues related to insufficient NSRS procurement during this timeframe
 - Longer Winter events, such as Winter Storm Uri, are not contingency events that NSRS is expected to cover

Recommended Compromise Proposal

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3 HA Forecast Error and 4 hr. ESR and Max of "Watch" or Reg + RRS	MAX(3000, RRS+REG)	3	4	1/10	4,565	2,439	114.8%
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Conservative Operations

“Conservative Operations” drives over-procurement of AS

- Broader conflict with “Conservative Operations” at the heart of the IMM’s perspective on the proposed AS Methodology.
 - Leads to over-procurement of AS capacity
 - Inefficiently reduces scarcity
 - Ultimately results in higher uplift costs to the market and consumers
 - Undermines self-commitment in the energy market
 - Doesn’t meaningfully support maintaining resource adequacy via investment in new generation resources
- The IMM acknowledges the will of the PUC to maintain a more conservative posture following Winter Storm Uri. At the same time, we remain concerned about the nuances of how “Conservative Operations” is achieved and the negative impacts related decisions can have on the market.