POTOMAC ECONOMICS

IMM Quarterly Report: Spring 2025

Presented to:

Markets Committee of the Board of Directors

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Potomac Economics

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Spring Summary

- The MISO markets performed competitively and mitigation was infrequent
- Energy prices rose 42 percent compared to last Spring as gas prices doubled, up from historically low values at Henry Hub last spring.
  - Peak load fell one percent and average load was the same as last year
- MISO experienced multiple episodes of severe weather – MISO declared two transmission emergencies that led to load shedding in the South:
  - In April, outages in SPP caused low voltage reliability risks that led to load shedding in both SPP and MISO
  - In May, transmission and multiple generator outages caused load shedding in Amite South
- Despite higher gas prices and the severe congestion in the South, day-ahead and real-time congestion rose just 2 and 4 percent, respectively
- Virtual trading quantities and profits were comparable to last spring
  - To address a modeling issue that enables virtual traders to extract inefficient rents, we recommend MISO suspend trading at the affected locations

Quarterly Summary

POTOMAC ECONOMICS

Spring		Value	Change[1] Prior Qtr.	Change[1] Prior Year
RT Energy Prices ($/MWh)		$35.29	*-13%*	*42%*
Fuel Prices ($/MMBtu)				
Natural Gas - Chicago		$3.12	*-17%*	*108%*
Natural Gas - Henry Hub		$3.54	*-9%*	*105%*
Western Coal		$0.81	*0%*	*4%*
Eastern Coal		$1.89	*4%*	*9%*
Load (GW)[2]				
Average Load		69.1	*-14%*	*0%*
Peak Load		97.3	*-11%*	*-1%*
% Scheduled DA (Peak Hour)		99.9%	99.7%	99.8%
Transmission Congestion ($M)				
Real-Time Congestion Value		$584.1	*7%*	*4%*
Day-Ahead Congestion Revenue		$378.1	*17%*	*2%*
Balancing Congestion Revenue[3]		-$28.2	$1.8	$8.4
Ancillary Service Prices ($/MWh)				
Regulation		$21.25	*20%*	*75%*
Spinning Reserves		$3.22	*27%*	*25%*
Supplemental Reserves		$0.87	*-6%*	*227%*
Short-Term Reserves		$0.35	*-50%*	*26%*

		Value	Change[1] Prior Qtr.	Change[1] Prior Year
FTR Funding (%)		100%	99%	93%
Wind Output (MW/hr)		13,416	*-2%*	*-2%*
Wind Curtailed (MW/hr)		719	*42%*	*-27%*
Guarantee Payments ($M)[4]				
Real-Time RSG		$3.8	*-44%*	*78%*
Day-Ahead RSG		$11.8	*-5%*	*60%*
Day-Ahead Margin Assurance		$13.4	*23%*	*-3%*
Real-Time Offer Rev. Sufficiency		$1.1	*67%*	*-2%*
Price Convergence[5]				
Market-wide DA Premium		-3.3%	4.0%	-6.3%
Virtual Trading				
Cleared Quantity (MW/hr)		24,449	*3%*	*-2%*
% Price Insensitive		52%	52%	43%
% Screened for Review		2%	2%	2%
Profitability ($/MW)		$0.6	$0.8	$0.6
Dispatch of Peaking Units (MW/hr)		849	1,040	1,611
Output Gap- Low Thresh. (MW/hr)		22	79	31

Key:
- Expected
- Monitor/Discuss
- Concern

Notes:
1. Values not in italics are the values for the past period rather than the change.
2. Comparisons adjusted for any change in membership.
3. Net real-time congestion collection, unadjusted for M2M settlements.
4. Includes effects of market power mitigation.
5. Values include allocation of RSG.

Quarterly Highlights: Spring 2025

April 2 Load Shed Event in MISO South (Slide 44)

- Weather-related challenges and voltage issues in MISO and SPP led to 27 MW of load shed in MISO South on April 2nd near the SPP seam
  - Severe storms lasting 4 days caused widespread transmission outages in MISO South that were compounded by major SPP planned outages
  - Two major line outages and multiple generation outages along the seam caused low-voltage grid issues that prompted MISO to declare varying levels of transmission emergencies
  - MISO directed load shedding in both MISO and SPP after a key line tripped
- Consistent with our recommendation, MISO attempted to price the load shed at the Value of Lost Load (VOLL), but it was unsuccessful
  - MISO identified process improvements going forward to reflect VOLL pricing for targeted load shed
- MISO's situational awareness and operator actions protected the grid:
  - MISO identified issues, coordinated with SPP, and took swift actions
  - SPP and MISO have agreed to work together to learn from this event

Quarterly Highlights: Spring 2025

May 25 Load Shed Event in MISO South (Slide 45)

- On May 25, forced transmission and generation outages impacted Amite South and MISO shed 600 MW of load in the Amite South Load Pocket
  - An impactful 500 kV forced transmission outage reduced power flows from the Southeast Texas load pocket into Amite South
  - Over 2 GW of generation was on planned outage, and an additional 4 GW of forced outages occurred, including a significant nuclear unit in the region
- MISO declared a transmission emergency and took a number of actions:
  - The emergency declaration provided access to emergency output ranges
  - MISO called for transmission line loading relief (TLR) that curtailed transactions between TVA and Southern Company
  - MISO implemented reconfiguration to mitigate the flows on the constraint
  - Flows reached critical levels and prompted load shedding by Entergy and Cleco in New Orleans and north of Lake Pontchartrain in Louisiana

Quarterly Highlights: Spring 2025

May 25 Load Shed Event in MISO South (Slide 45)

- This event was caused by an unlikely combination of planned and forced outages. MISO acted quickly but was impacted by a number of issues:
  - Although MISO had access to the emergency ranges on online units in the area, a number of resources did not follow dispatch into these ranges
  - MISO did not deploy LMRs in the area because MISO did not determine which LMRs were in locations that would help relieve the constraint
  - MISO committed a generator for VLR on May 25 that loaded the critical constraint – MISO decommitted the unit on May 24 and canceling the start on May 25 would likely have been advisable to help relieve the constraint
- To address future events, we recommend MISO:
  - Establish penalty provisions for generation non-performance in emergency ranges that mirror the proposed penalty provisions for LMRs
  - Develop local STR requirements for load pockets that would provide better incentives for resources in these areas
  - Improve LMR location information and process to call in advance of TSEs
  - Develop processes to decommit or cancel starts when it is the best option

Quarterly Highlights: Spring 2025

Inefficient Pricing on March 10 (Slide 46)

- The real-time dispatch sends dispatch instructions to generation to match the load every 5 minutes
  - MISO can adjust the real-time load in a dispatch "load offset" adjustment to account for unmodeled load or supply deviations and balance the system
  - The offset should *not* be used to prevent the market from pricing a shortage
- On March 10, over-forecasted wind and solar down-ramp caused the MISO dispatch to run out of rampable energy to meet the system needs
  - Selecting offsets that reflected the supply and demand situation would have resulted in system marginal prices of $3,500/MWh for 20 minutes
  - MISO used lower offsets that eliminated the shortage pricing, reducing prices by roughly $3,000/MWh, which had a $71 million market impact
- MISO agrees that the offsets selected on March 10 were not ideal
  - We are working with MISO to improve the offset procedures, including ensuring that offset decisions are not made based on pricing outcomes

Quarterly Highlights: Spring 2025

2025–2026 Planning Resource Auction Results (Slide 47)

- MISO cleared its first seasonal PRA under the RBDC in April
  - Auction clearing prices (ACP) averaged nearly $215 per MW-day for the year, with the lowest prices in the winter and highest in summer
- The summer price of $666 per MW-day accurately signals the tightening margin, compared to $20 per MW-day under a vertical demand curve.
  - 2.3 GW was procured above the minimum, which is valuable for reliability and lowers the clearing price
- Summer prices would have cleared at $472 per MW-day had 1.6 GW of resources deferred retirement to the fall – DOE ordered 1.2 GW to defer

Season	Capacity Procured	Offered Not Cleared	LOLE Target	Prices ($/MW-Day)		Excess Cleared	
				Rest of Market	MISO South	System	South
Summer 25	137,559	277	0.10	$666.50		1.017	1.008
Fall 25	132,516	4,260	0.01	$91.60	$74.09	1.023	1.002
Winter 25/26	131,000	3,262	0.01	$33.20		1.051	1.075
Spring 26	130,700	5,361	0.01	$69.88		1.012	0.997
PRA Year	132,944	3,290		$215.30	$210.92	1.026	1.021

Quarterly Highlights: Spring 2025

IMM Summer 2025 Assessment (Slide 20)

- We assessed the expected summer capacity margin based on the coincident peak summer forecast and the results of the 2025–26 PRA
  - Excluding typical outages and derates, MISO can expect a capacity margin of 18.9 percent, including more than 13 GW of emergency-only capacity
  - Including typical planned and forced outages and average non-firm imports in peak periods of 4.3 GW produces a capacity margin of 12.2 percent
  - Unusually hot conditions could raise peak demand by 7 GW and reduce supply by 7.6 GW and result in a capacity margin close to zero, although this scenario is very unlikely and additional imports would likely respond
- These levels are more than sufficient to satisfy MISO's reliability needs
- This is inconsistent with recent NERC Long-Term Reliability Assessment
  - We find this report inaccurate – it understates MISO's DR capacity, behind-the-meter generation, and firm capacity imports by more than 8 GW
  - It includes unrealistic potential near-term retirements of fossil resources
  - It does not properly recognize the size and value of MISO's import capability

Quarterly Highlights: Spring 2025

Virtual Trading Inefficiency (Slide 48)

- We have identified an aggregation modeling inefficiency that provided virtual traders with an opportunity to capture riskless rents from MISO
  - Under certain system conditions, virtual traders could capture profits at no risk based on modeling differences between day ahead and real time
  - The conditions materialized again in the spring quarter, and virtual traders once again seized the opportunity to profit from the modeling inefficiency
  - In total, the modeling issue has increased virtual profits by nearly $10 million in 2025
- We have recommended MISO address modeling differences at aggregated nodes to prevent this or suspend virtual trading at that the relevant locations in the meantime
  - MISO has implemented a near-term solution for this issue at this location, and we will be working with MISO as it evaluates long term solutions

Quarterly Summary of IMM Investigations

- We conducted multiple audits and investigations, including:
  - Nine units failing to follow dispatch instructions or economic curtailments
  - Five resources for inaccurate physical offer parameters
  - Five units for potential uneconomic production
  - Three units for potential physical withholding
- We recommended MISO sanction a unit for uneconomic production and are working on two more sanction recommendations
- We referred a market participant for a Duty of Candor Violation
- We continued to investigate past DR conduct
  - We referred the LMR to the right
  - MISO's DR filings will address our qualification, testing, gaming and penalty concerns

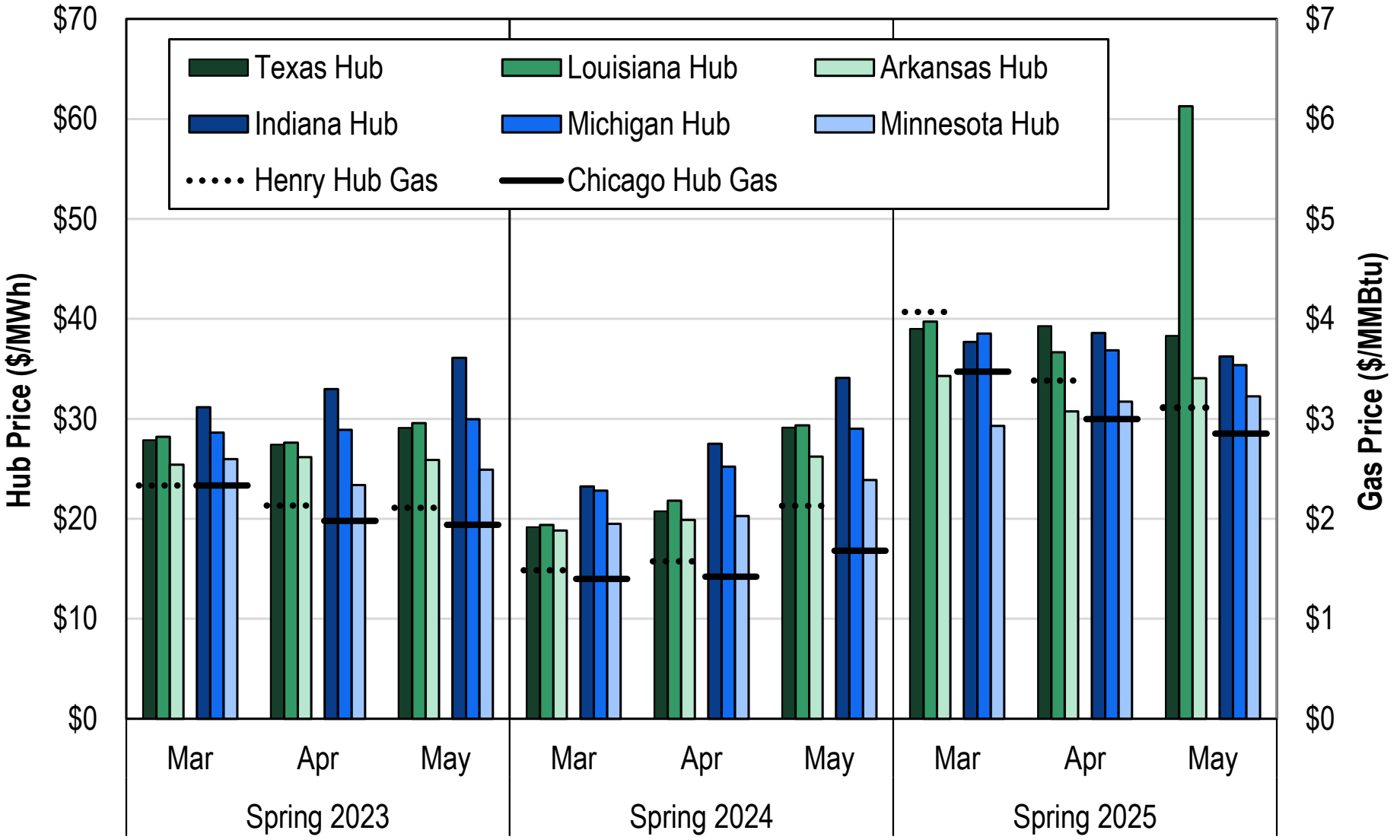
Submittals to External Entities and Other Issues

- During the Spring Quarter, we:
  - Responded to several FERC questions related to prior referrals and FERC investigations and responded to requests for information on market issues
  - Presented the IMM Winter Quarterly report to the MSC
  - We worked with MISO on recommended operational improvements, notably MISO's offset tool calculator
- We continued to investigate potential tariff violations in the market-to-market coordination of congestion between SPP, PJM and MISO
- We also continued to support MISO's filings to FERC. We:
  - Provided an affidavit in support of MISO's filing to improve Load Modifying Resource (LMR) and Emergency Resource accreditation reforms
  - Supported MISO's filing to eliminate cross-registration of LMRs as Emergency Demand Resources and Demand Response Resources
  - Supported MISO's filing to eliminate mock testing of demand resources and to improve the penalties for poor performance when LMRs are called upon

Quarterly Market Results: Spring 2025

Day-Ahead Average Monthly Hub Prices

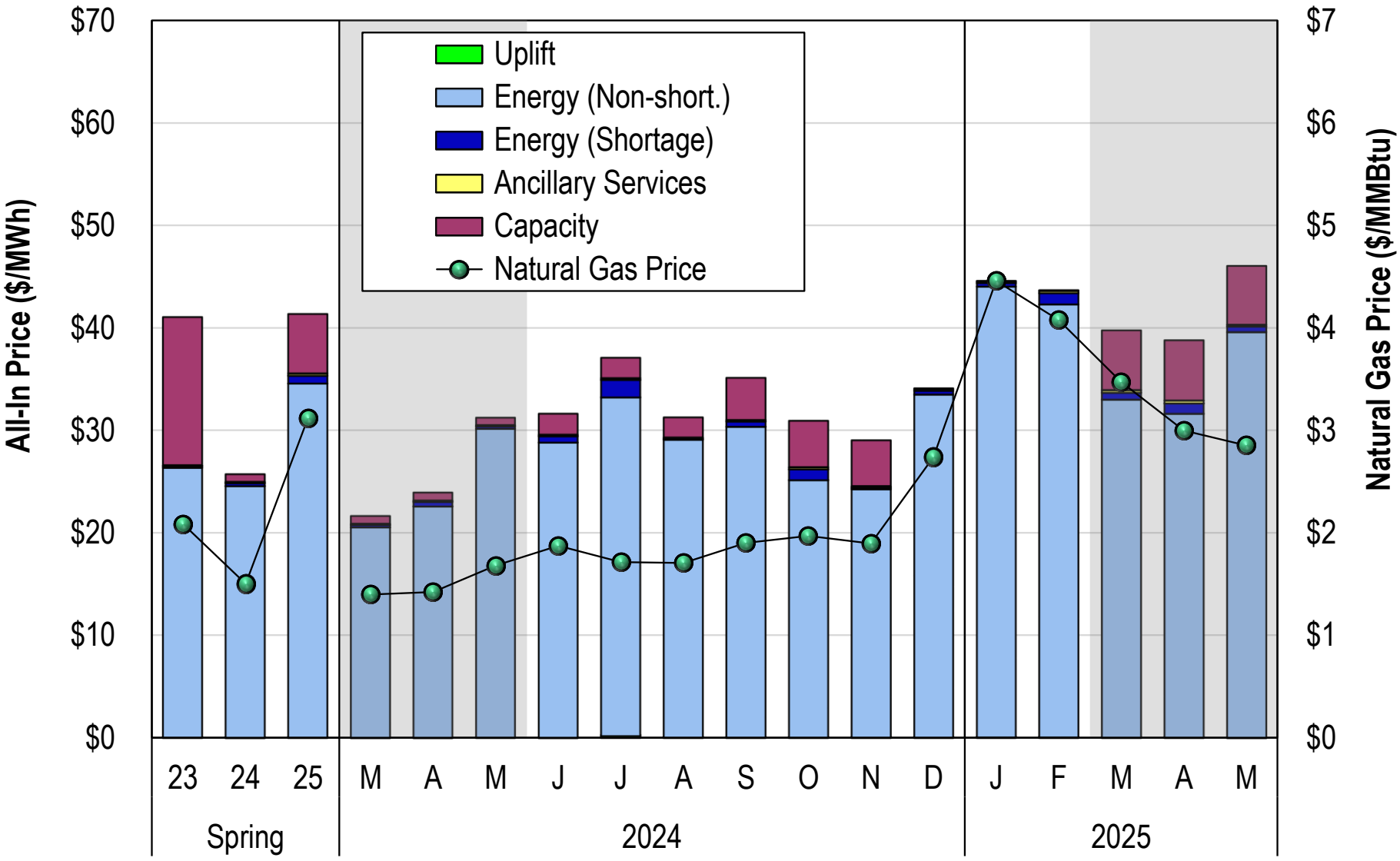
Spring 2023 – 2025



Note: Data available through May 28, 2025

All-In Price

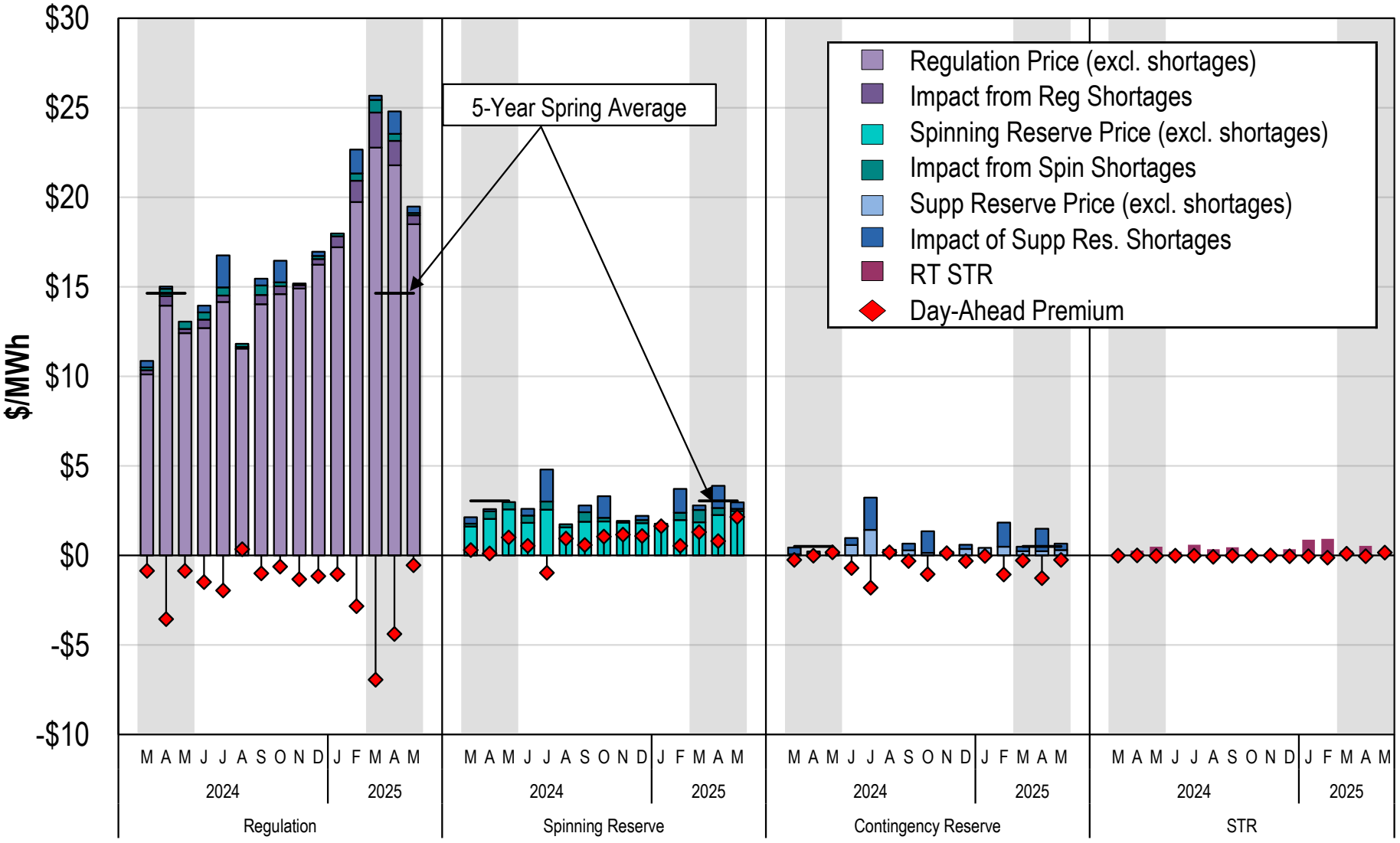
Spring 2023 – 2025



Note: Data available through May 27, 2025

Ancillary Services Prices

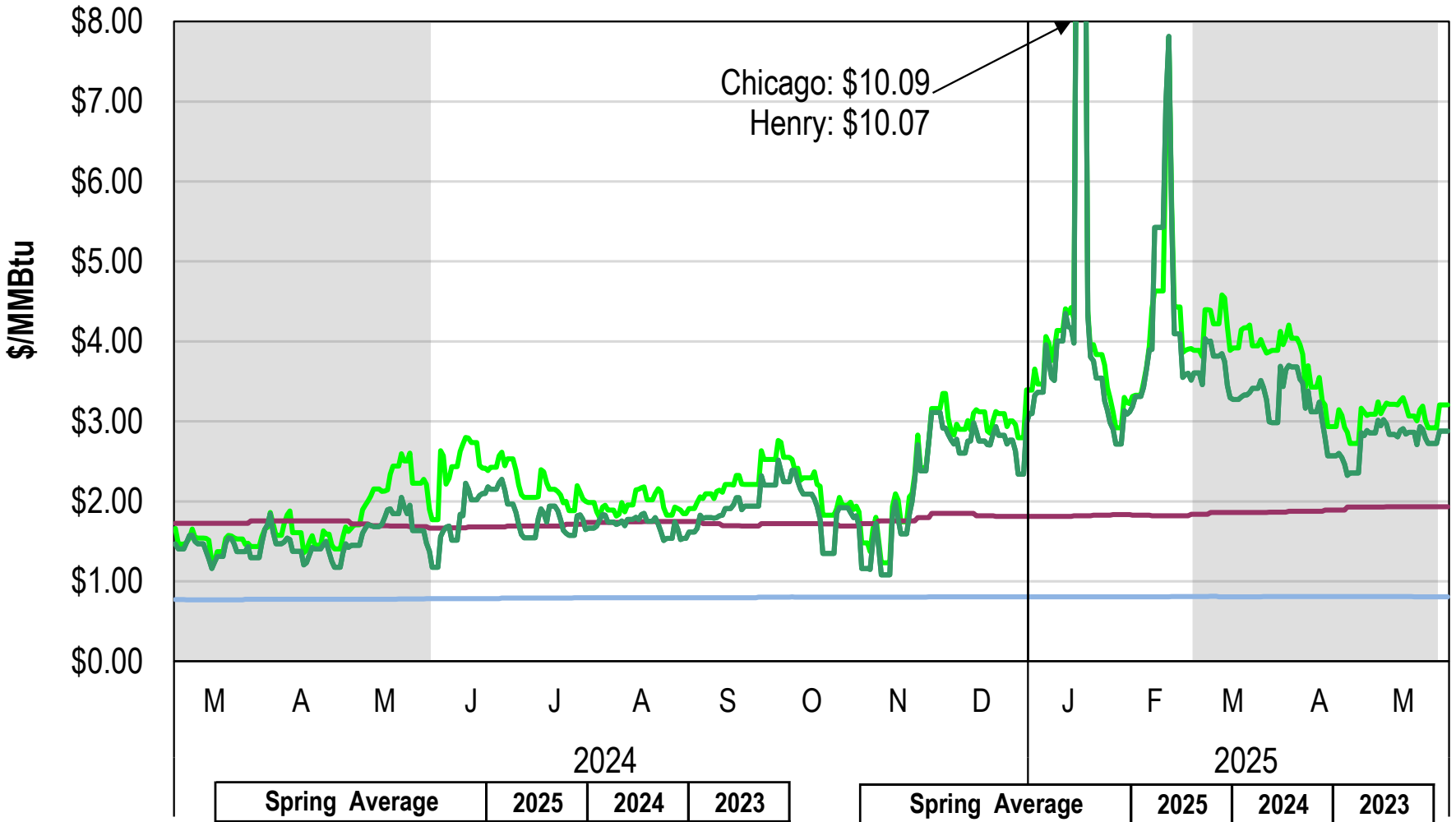
Spring 2023–2025



Note: Data available through May 23, 2025

MISO Fuel Prices

2023–2025



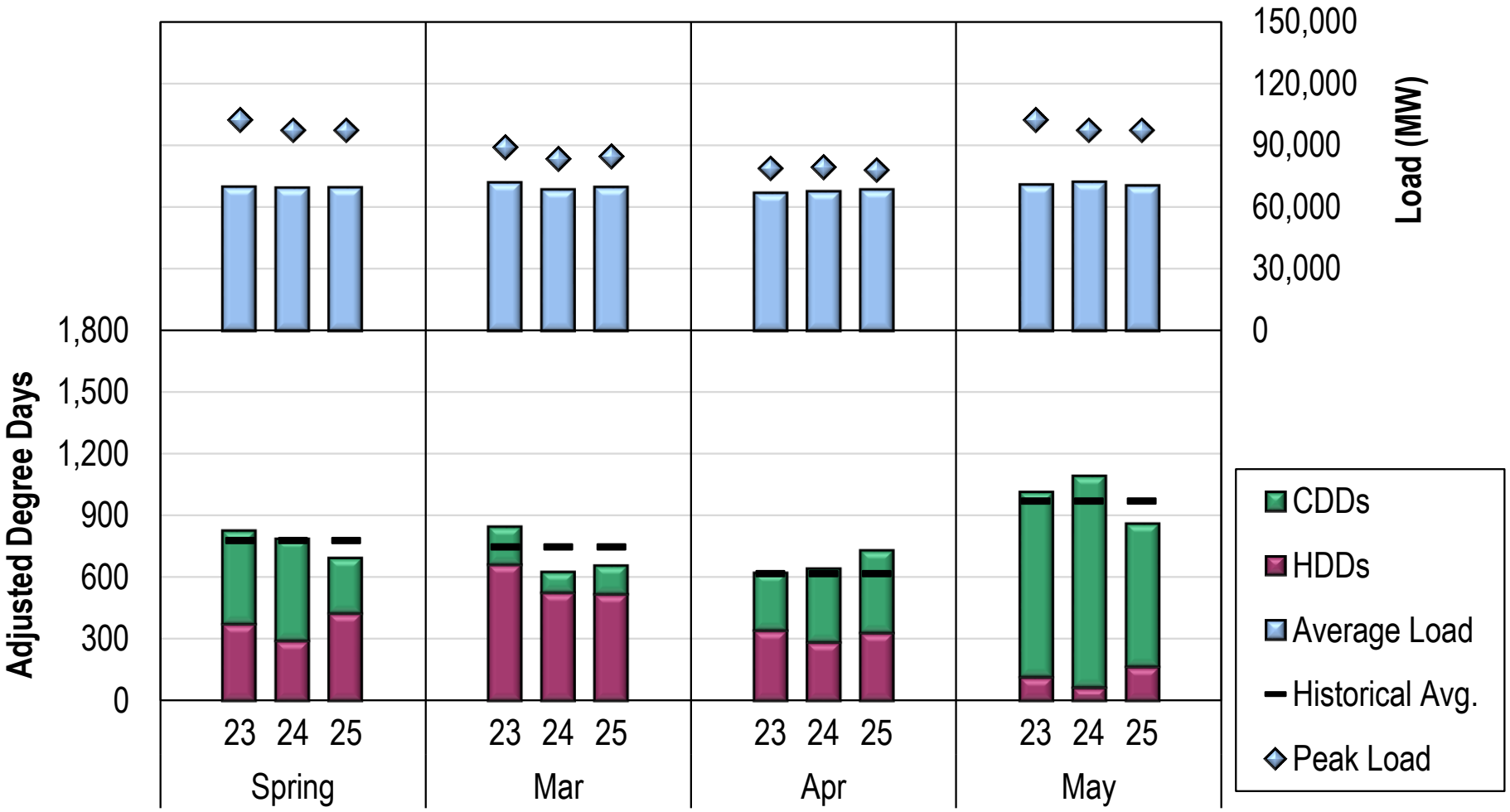
Spring Average	2025	2024	2023
Chicago NG	$3.12	$1.50	$2.08
Henry NG	$3.54	$1.73	$2.19

Spring Average	2025	2024	2023
IB Coal	$1.89	$1.73	$2.88
PRB Coal	$0.81	$0.77	$0.83

Note: Data available through May 28, 2025

Load and Weather Patterns

Spring 2023–2025



Notes: Midwest degree day calculations include four reprsentative cities: Indianapolis, Detroit,Milwaukee and Minneapolis. The South region includes Little Rock and New Orleans.

Note: Data available through May 27, 2025

Capacity, Energy and Price Setting Share

Spring 2024–2025

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Spring	Unforced Capacity				Energy Output		Price Setting			
	Total (MW)		Share (%)		Share (%)		SMP (%)		LMP (%)	
	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025
Nuclear	10,382	9,625	8%	8%	14%	15%	0%	0%	0%	0%
Coal	38,075	36,004	29%	28%	21%	26%	28%	24%	69%	64%
Natural Gas	64,038	62,148	49%	49%	38%	30%	72%	73%	86%	86%
Oil	1,416	1,348	1%	1%	0%	0%	0%	0%	0%	0%
Hydro	4,024	3,799	3%	3%	2%	2%	0%	0%	1%	1%
Wind*	7,499	5,959	6%	5%	20%	21%	0%	2%	77%	66%
Solar	3,540	7,020	3%	6%	2%	5%	0%	0%	20%	24%
Other	647	1,036	0%	1%	2%	0%	0%	0%	1%	2%
Total	**129,621**	**126,940**								

* The capacity factor for wind dropped from 23% in spring 2024 to 18% in spring 2025.

Note: Data available through May 23, 2025

IMM Summer Assessment

Summer 2025 Planning Reserve Margins

	Base Scenario	Alternative IMM Scenarios*			
		Realistic Scenario	Realistic <=2HR	High Temperature Cases	
				Realistic Scenario	Realistic <=2HR
Load					
Base Case	122,633	122,633	122,633	122,633	122,633
High Load Increase	-	-	-	7,338	7,338
Total Load (MW)	122,603	122,603	122,603	129,970	129,970
Generation					
Internal Generation Excluding Exports	134,812	134,812	134,812	134,812	134,812
BTM Generation	4,479	4,479	3,575	4,479	3,575
Unforced Outages and Derates**	(1,118)	(11,174)	(11,174)	(18,774)	(18,774)
Adjustment due to Transfer Limit	(5,635)	-	-	-	-
Total Generation (MW)	132,538	128,117	127,213	120,517	119,613
Imports and Demand Response* **					
Demand Response (ICAP)	9,655	7,241	3,052	7,241	3,052
Firm Capacity Imports	3,577	3,577	3,577	3,577	3,577
Margin (MW)	23,168	16,333	11,240	1,365	(3,728)
Margin (%)	**18.9%**	**13.3%**	**9.2%**	**1.1%**	**-2.9%**
Expected Capacity Uses and Additions					
Expected Forced Outages****	(6,965)	(5,769)	(5,769)	(5,769)	(5,769)
Non-Firm Net Imports in Emergencies	4,351	4,351	4,351	4,351	4,351
Expected Margin (MW)	20,554	14,914	9,822	(53)	(5,146)
Expected Margin (%)	**16.8%**	**12.2%**	**8.0%**	**0.0%**	**-4.0%**

* Assumes 75% response from DR.

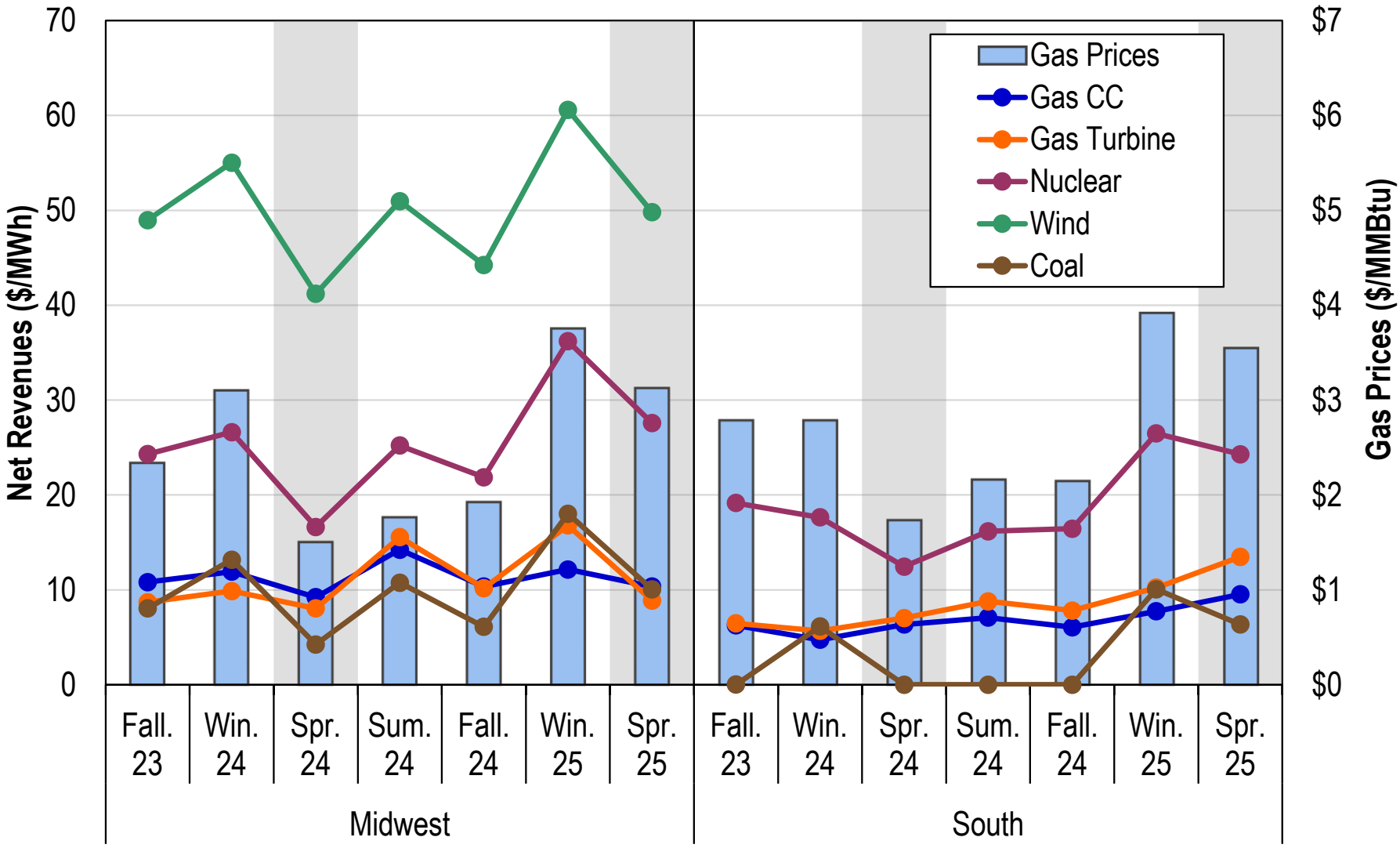
** Base scenario shows approved planned outages for summer 2025. Realistic cases use historical averages during peak summer hours. High temp. cases are based upon MISO's 2025 Summer Readiness.

*** Cleared amounts for the Summer Season of the 2025/2026 planning year.

**** Base scenario assumes 5% forced outage rate for internal and BTM generation. Alternative cases use historical average forced outages/derates during peak summer hours.

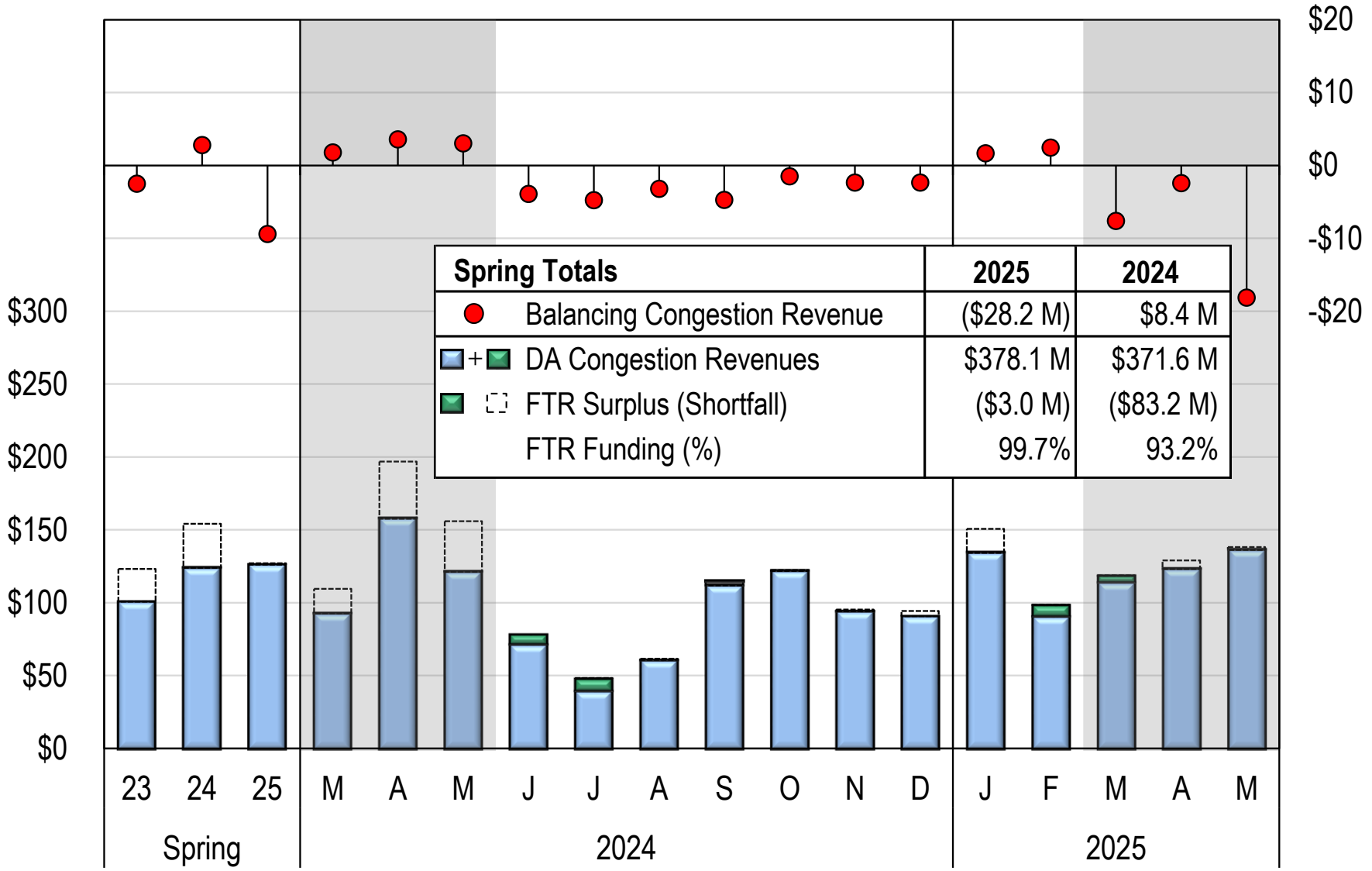
Net Revenues by Technology

2023-2025



Note: Data available through May 27, 2025

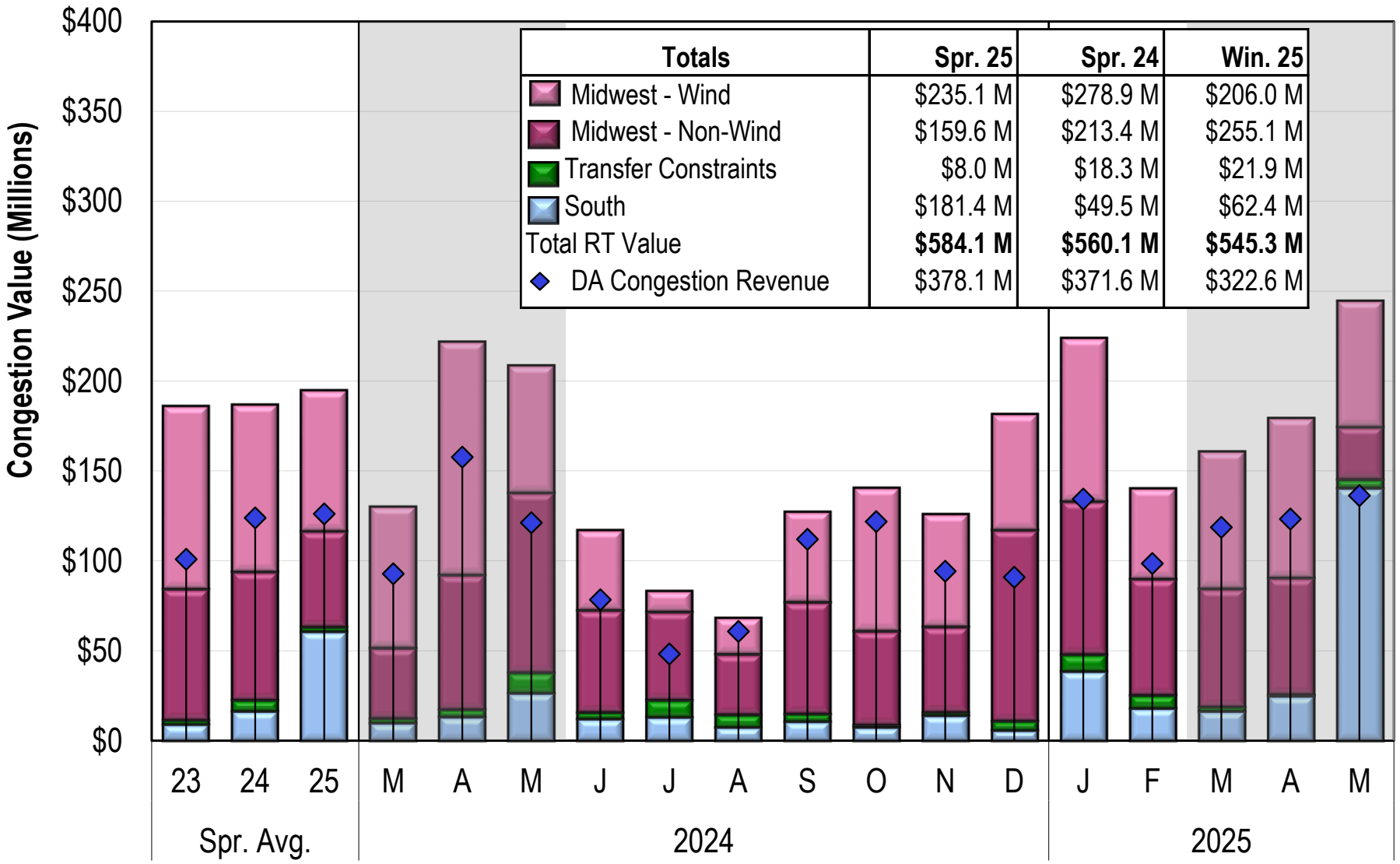
Day-Ahead and Balancing Congestion and FTR Funding



Note: Data available through May 28, 2025

Value of Real-Time Congestion

Spring 2023-2025



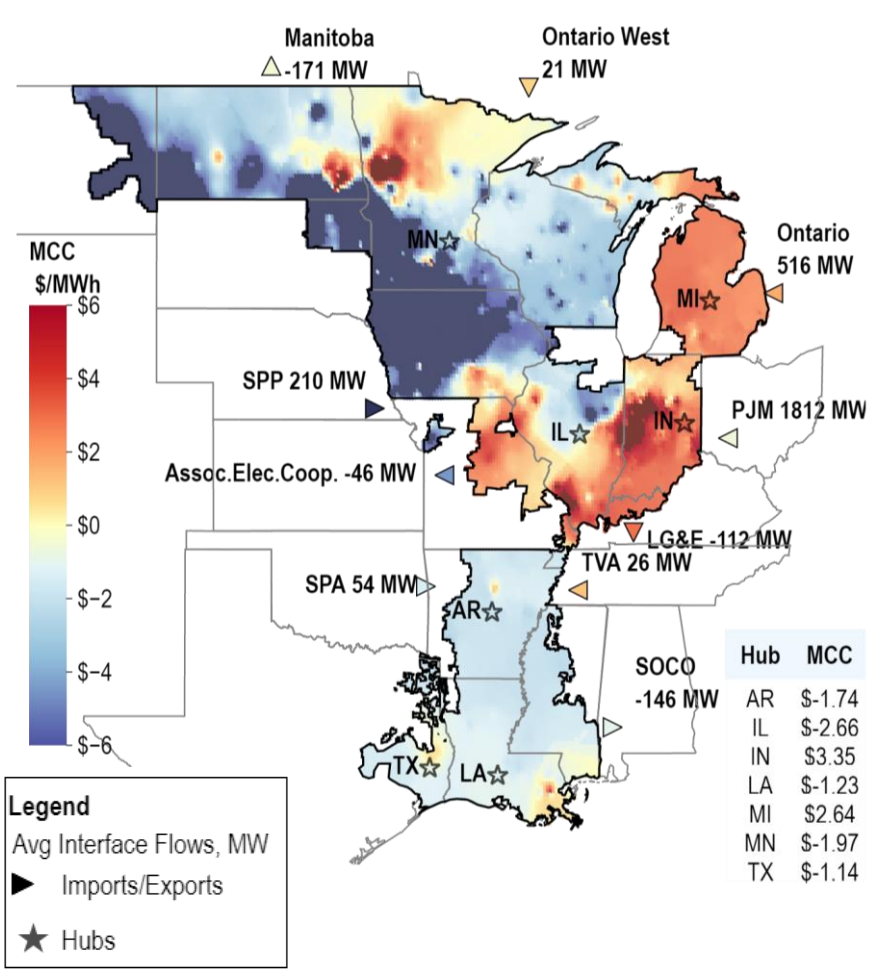
Totals	Spr. 25	Spr. 24	Win. 25
Midwest - Wind	$235.1 M	$278.9 M	$206.0 M
Midwest - Non-Wind	$159.6 M	$213.4 M	$255.1 M
Transfer Constraints	$8.0 M	$18.3 M	$21.9 M
South	$181.4 M	$49.5 M	$62.4 M
Total RT Value	**$584.1 M**	**$560.1 M**	**$545.3 M**
DA Congestion Revenue	$378.1 M	$371.6 M	$322.6 M

Note: Data available through May 27, 2025

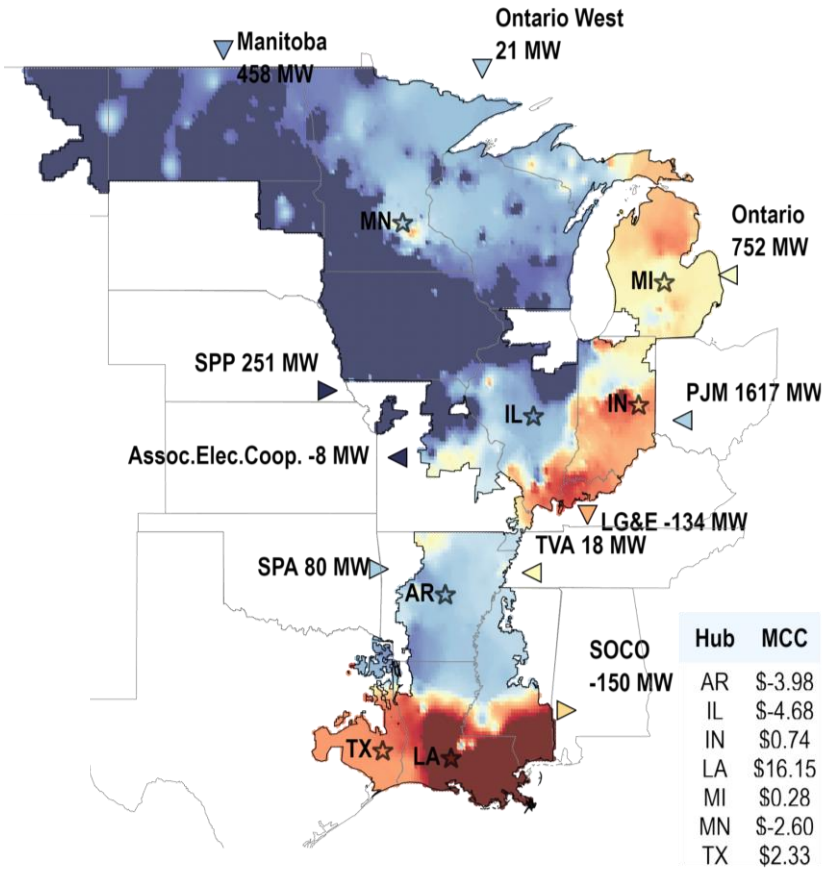
Average Real-Time Congestion Components

Spring 2024 – 2025

Spring 2024



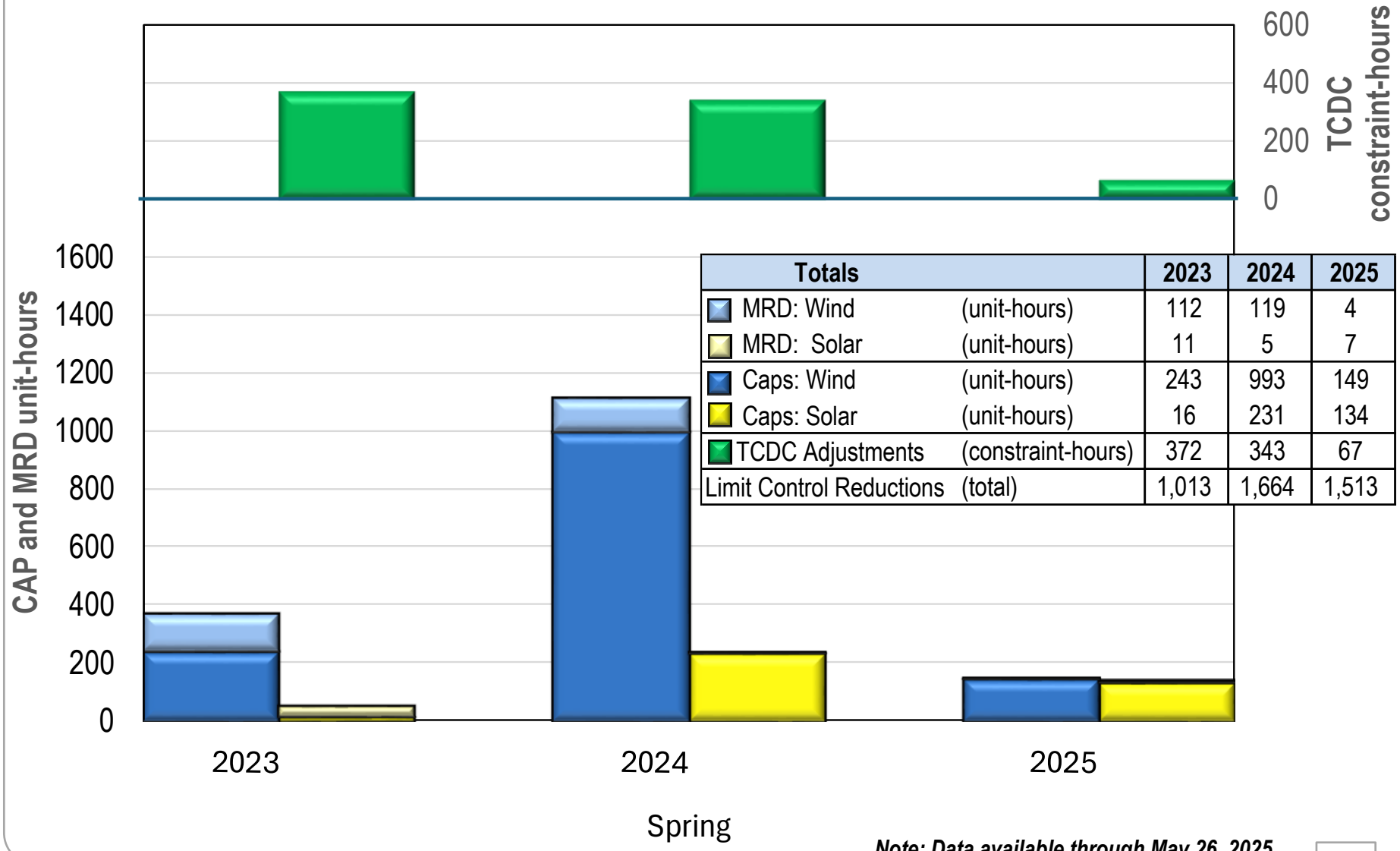
Spring 2025



Note: Data available through May 27, 2025

MISO Operator Actions for Congestion Management

Spring 2023 – 2025



Totals		2023	2024	2025
MRD: Wind	(unit-hours)	112	119	4
MRD: Solar	(unit-hours)	11	5	7
Caps: Wind	(unit-hours)	243	993	149
Caps: Solar	(unit-hours)	16	231	134
TCDC Adjustments	(constraint-hours)	372	343	67
Limit Control Reductions	(total)	1,013	1,664	1,513

Note: Data available through May 26, 2025

Benefits of Ambient-Adjusted and Emergency Ratings

Spring 2024–2025

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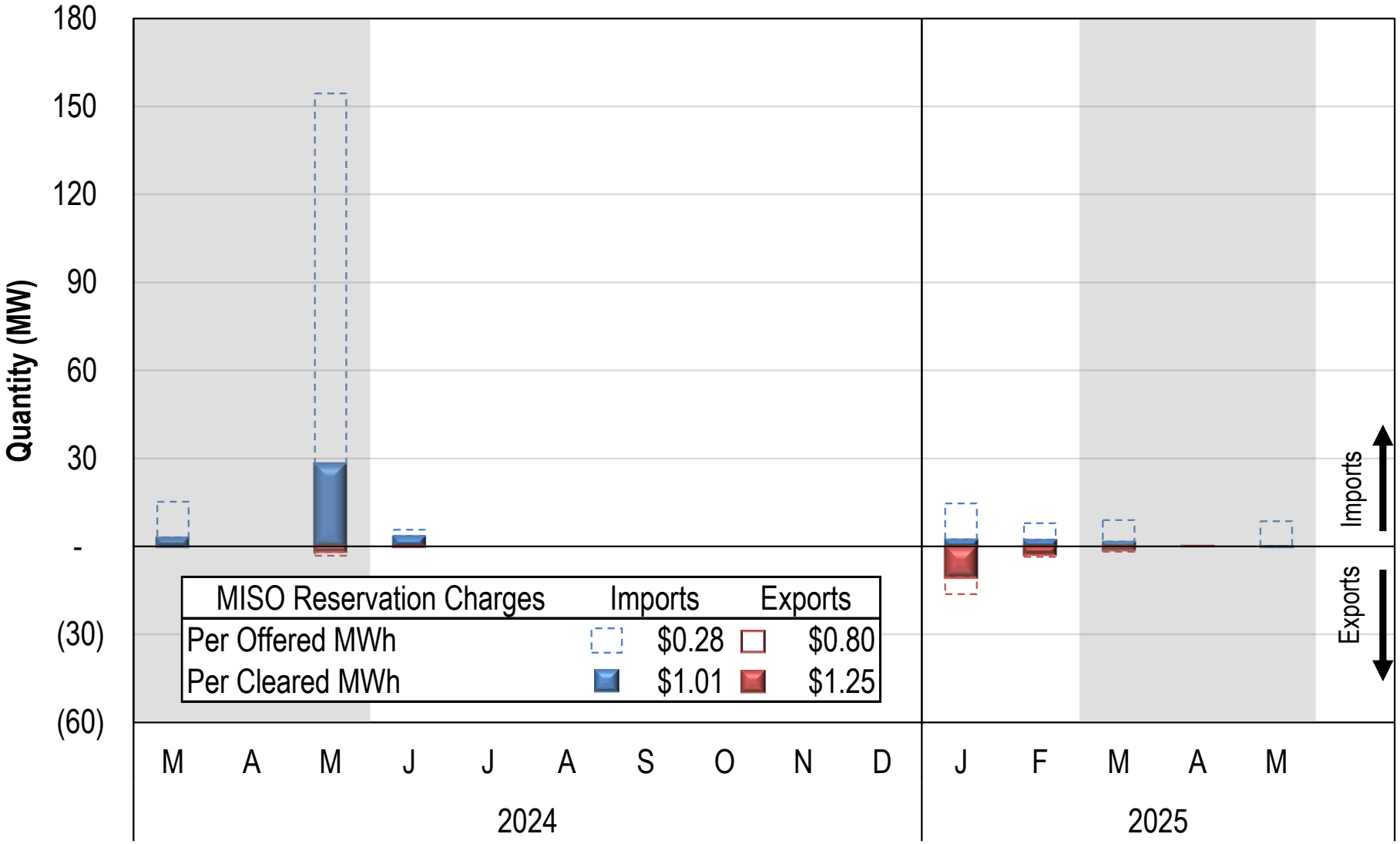
Spring		Savings ($ Millions)			# of Facilites for 2/3 of Savings	Share of Congestion
		Ambient Adj. Ratings	Emergency Ratings	Total		
2024	**Midwest**	$35.0	$24.42	$59.4	14	11.3%
	South	$0.6	$1.81	$2.4	2	4.5%
	Total	**$35.6**	**$26.2**	**$61.8**	**16**	**10.7%**
2025	**Midwest**	$24.2	$16.99	$41.1	8	10.6%
	South	$1.8	$7.63	$9.5	2	5.6%
	Total	**$26.0**	**$24.6**	**$50.6**	**10**	**9.0%**

Note: Data available through May 27, 2025

Coordinated Transaction Scheduling (CTS)

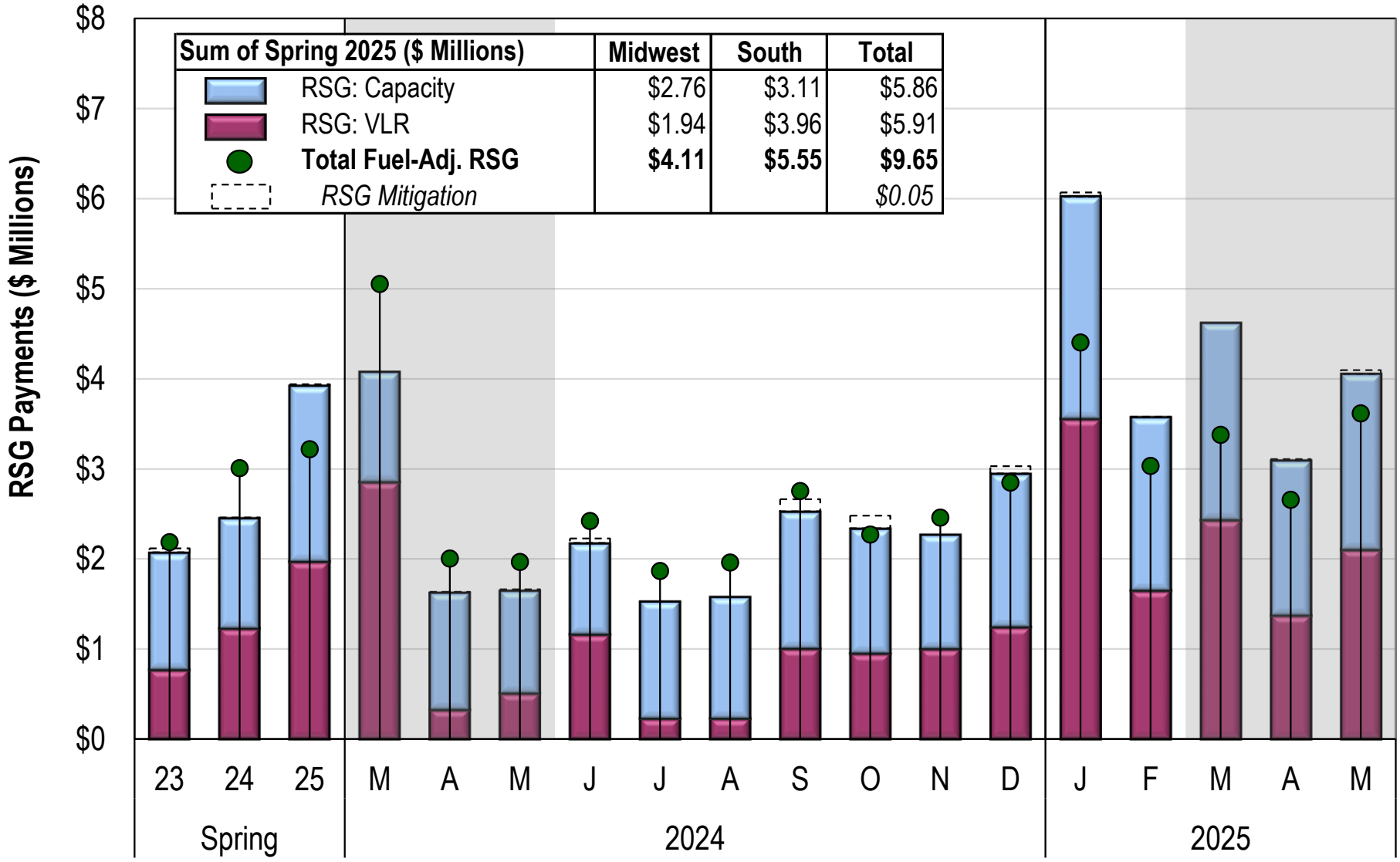
Spring 2024–2025



Note: Data available through May 27, 2025

Day-Ahead RSG Payments

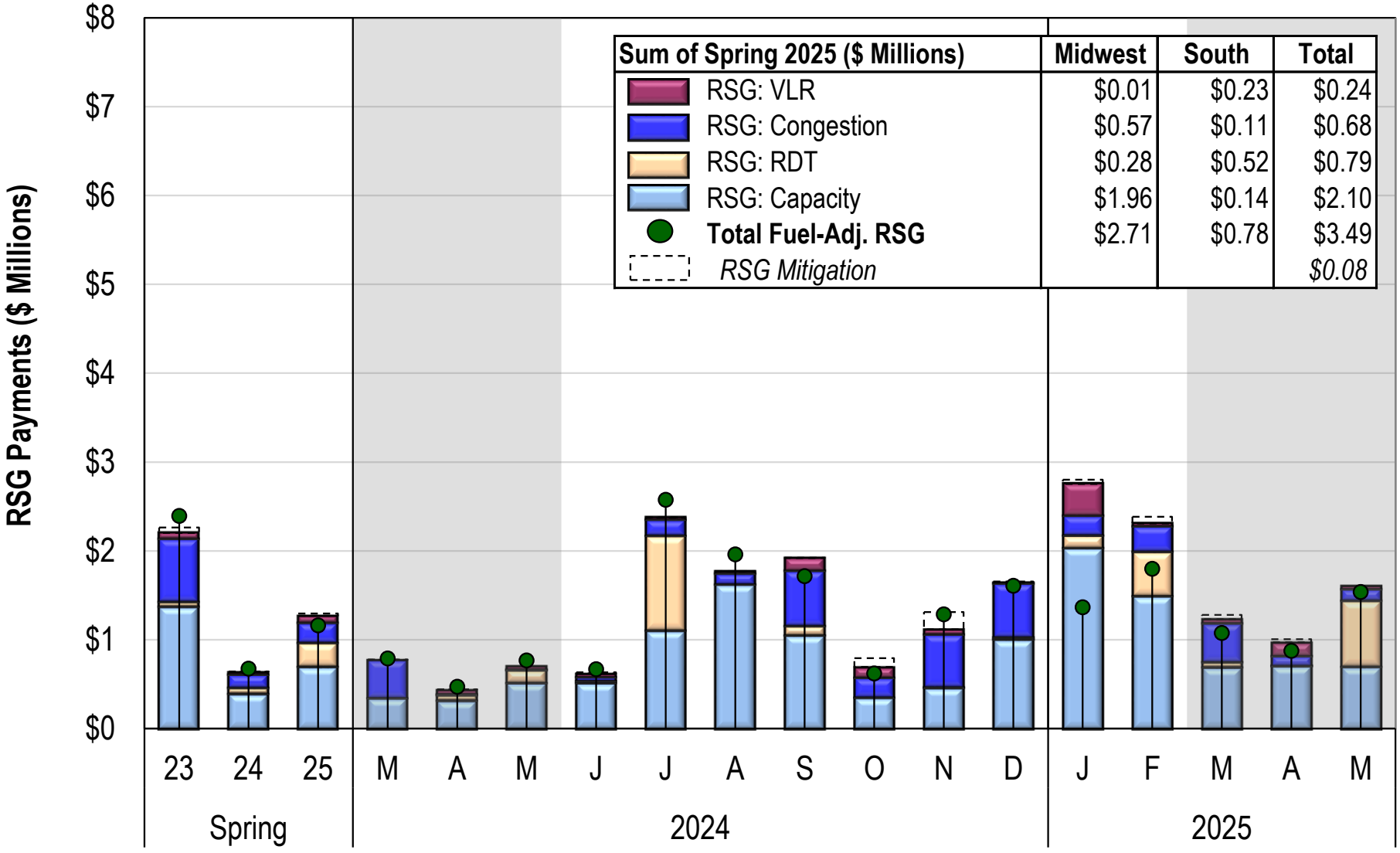
Spring 2023–2025



Note: Data available through May 27, 2025

Real-Time RSG Payments

Spring 2024–2025

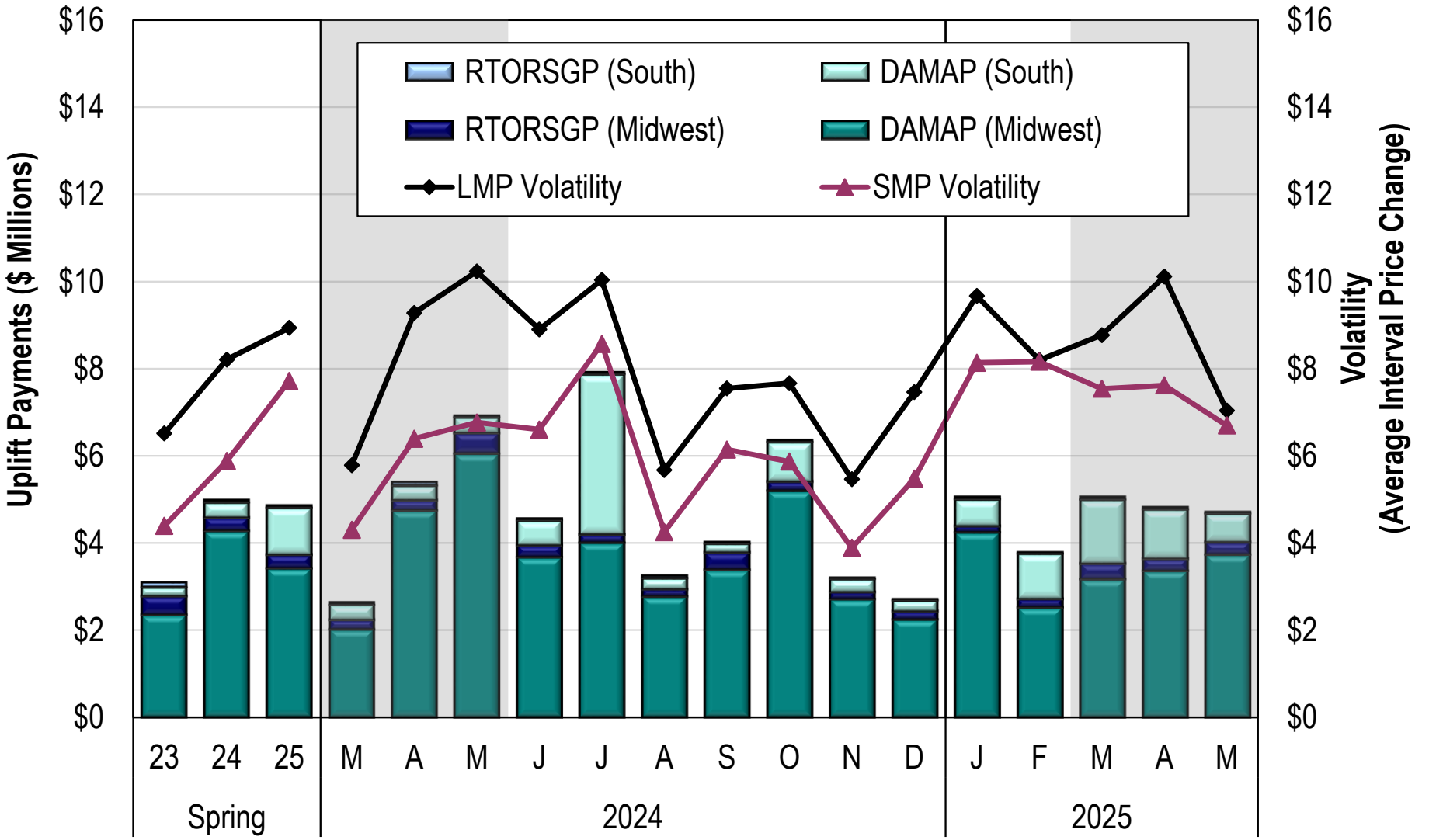


Sum of Spring 2025 ($ Millions)	Midwest	South	Total
RSG: VLR	$0.01	$0.23	$0.24
RSG: Congestion	$0.57	$0.11	$0.68
RSG: RDT	$0.28	$0.52	$0.79
RSG: Capacity	$1.96	$0.14	$2.10
Total Fuel-Adj. RSG	$2.71	$0.78	$3.49
RSG Mitigation			*$0.08*

Note: Data available through May 27, 2025

Price Volatility Make Whole Payments

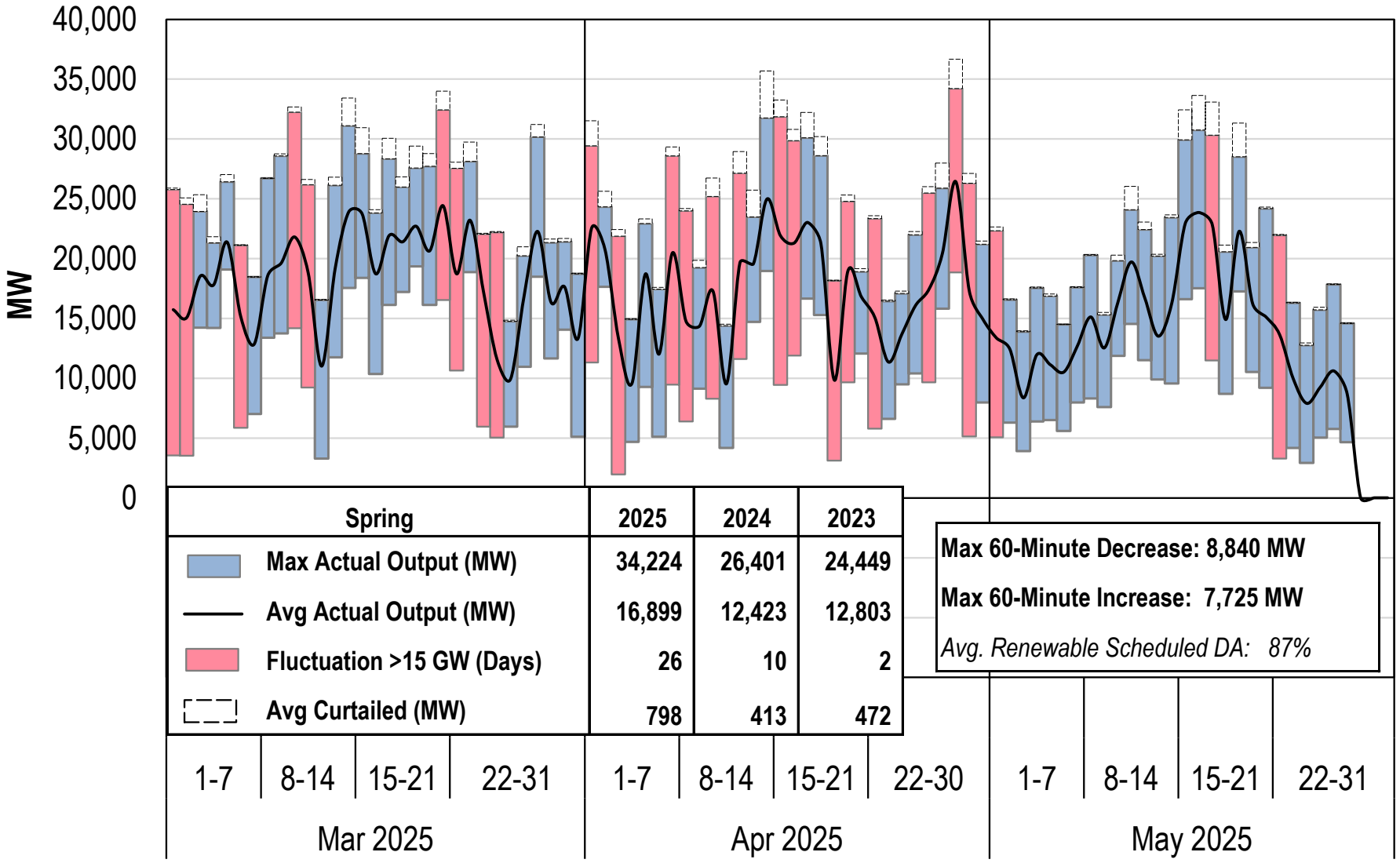
Spring 2023–2025



Note: Data available through May 22, 2025

Wind and Solar Output in Real Time

Daily Range and Average



Spring	2025	2024	2023
Max Actual Output (MW)	34,224	26,401	24,449
Avg Actual Output (MW)	16,899	12,423	12,803
Fluctuation >15 GW (Days)	26	10	2
Avg Curtailed (MW)	798	413	472

Max 60-Minute Decrease: 8,840 MW

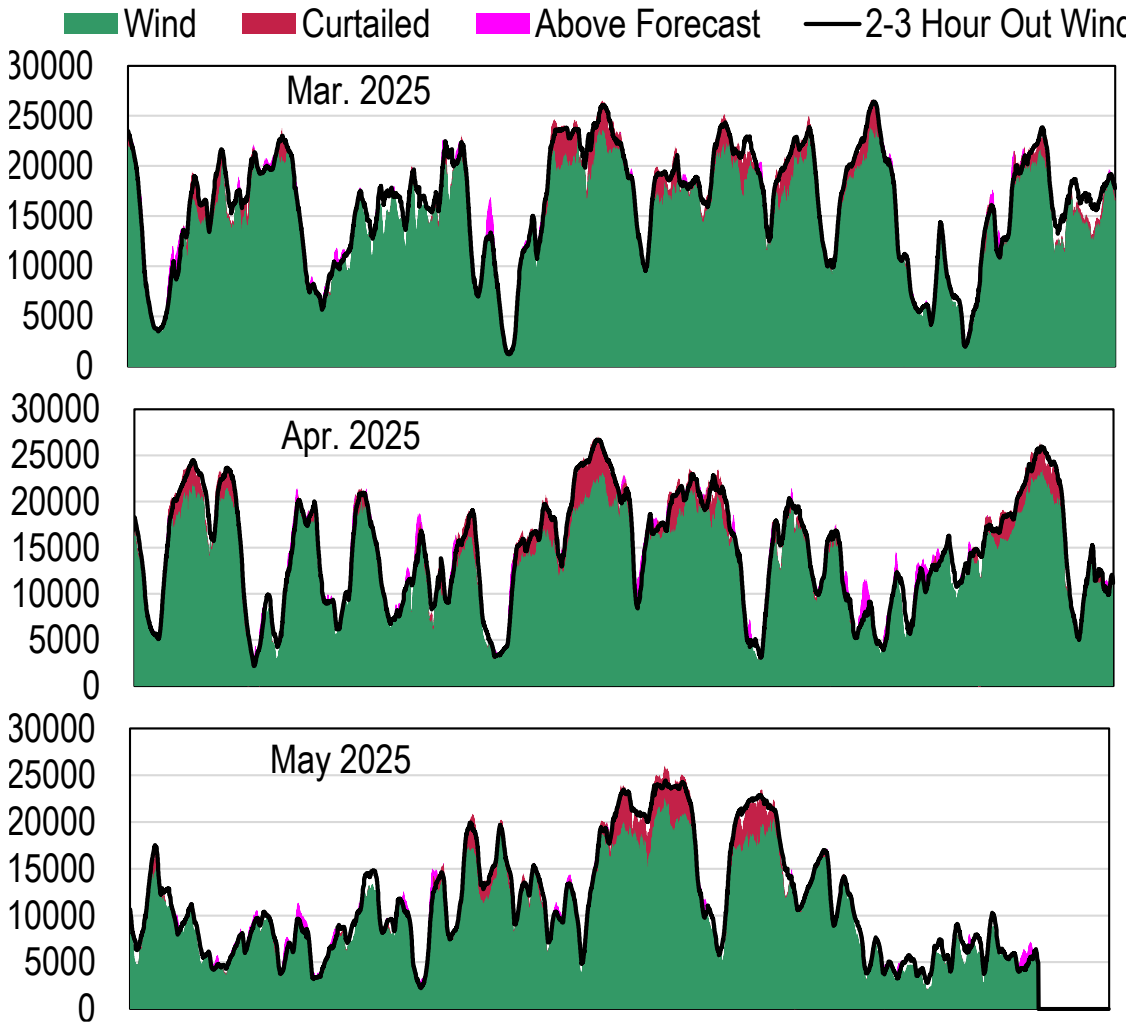
Max 60-Minute Increase: 7,725 MW

Avg. Renewable Scheduled DA: 87%

Note: Data available through May 27, 2025

Wind Forecast and Actual Output

Spring 2025



Spring 2025	
Real-Time Wind (MW)	13,416
Day-Ahead Wind (MW)	11,861
Avg Curtailments (MW)	719
Forecast Errors (%)	1.4%
Absolute Errors (%)	7.6%

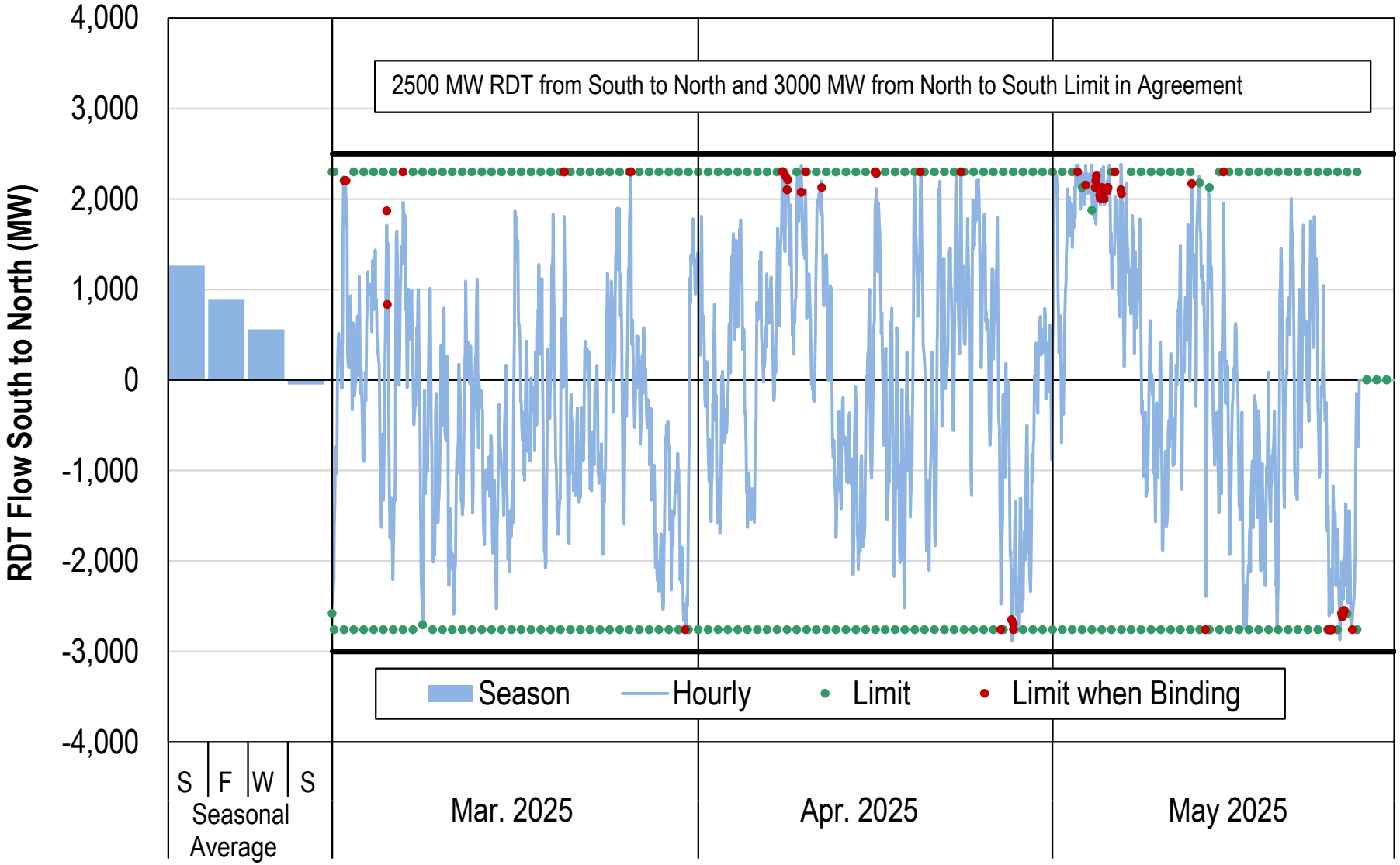
Spring 2024	
Real-Time Wind (MW)	13,631
Day-Ahead Wind (MW)	12,214
Avg Curtailments (MW)	985
Forecast Errors (%)	-0.7%
Absolute Errors (%)	7.7%

Windter 2025	
Real-Time Wind (MW)	13,625
Day-Ahead Wind (MW)	11,712
Avg Curtailments (MW)	508
Forecast Errors (%)	2.1%
Absolute Errors (%)	9.1%

Note: Data available through May 27, 2025

Real-Time Hourly Inter-Regional Flows

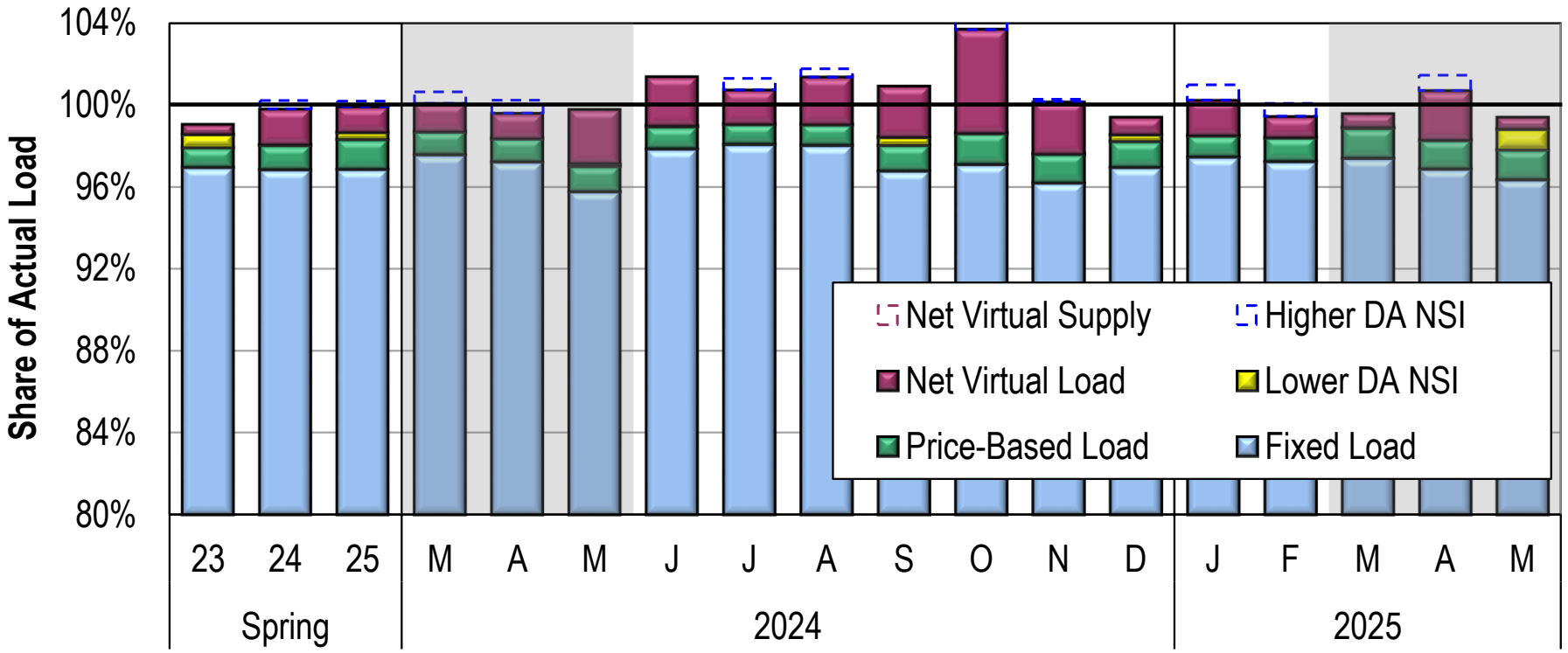
Spring 2025



Note: Data available through May 27, 2025

Day-Ahead Peak Hour Load Scheduling

Spring 2023–2025



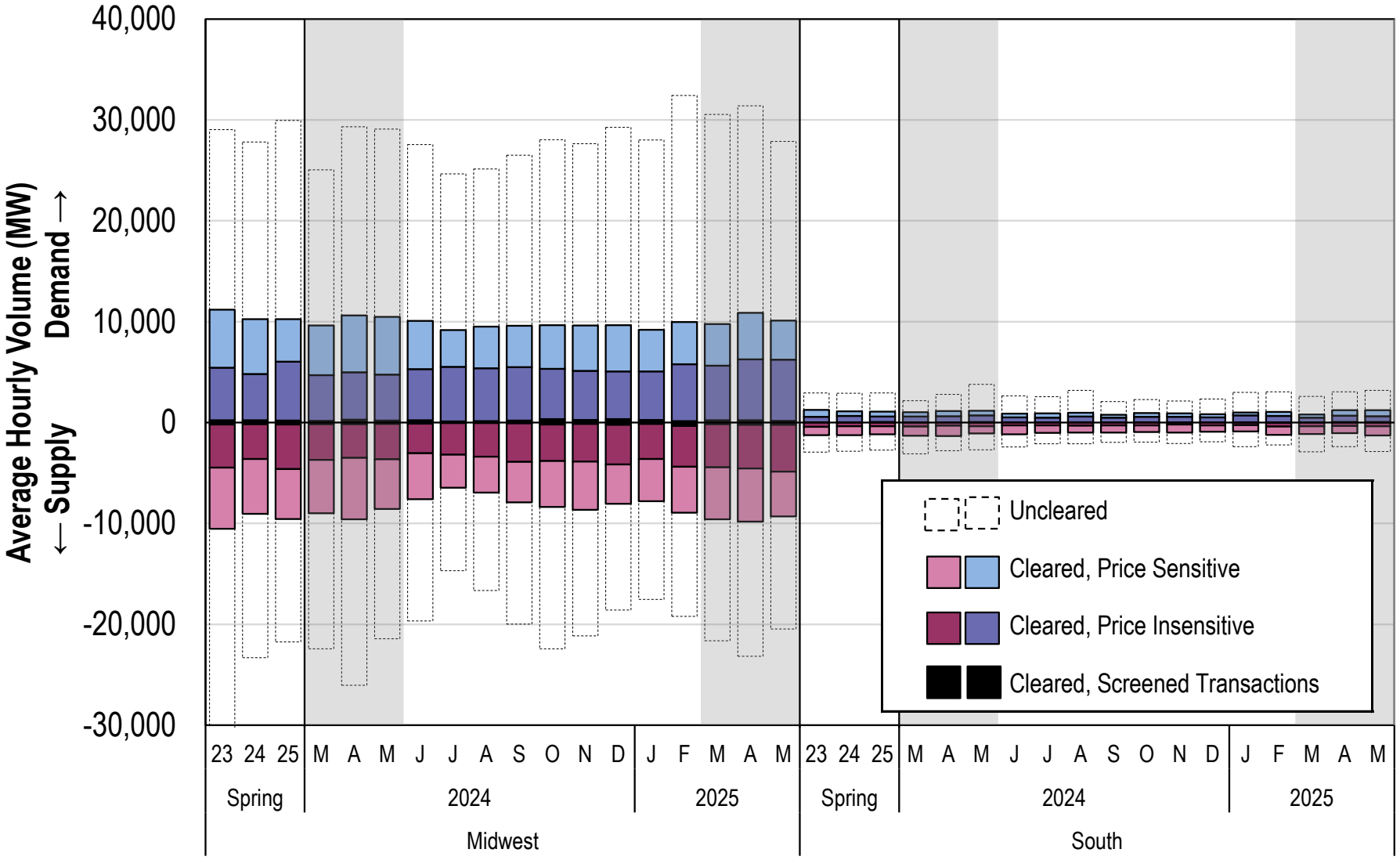
Share of Actual Load (%)

All Hours	99.3	99.8	99.0	99.1	99.3	101.0	101.4	102.0	101.9	100.7	100.4	99.2	99.5	100.2	99.1	98.1	99.8	99.1
Peak Hours Midwest	98.8	100.2	99.5	100.9	99.4	100.3	102.6	101.3	101.9	101.7	105.1	100.5	99.6	100.1	100.0	99.1	100.1	99.2
Peak Hours South	101.3	100.2	102.4	100.8	99.1	100.8	100.7	99.9	100.6	100.2	103.1	100.5	100.7	100.5	102.5	102.5	103.1	101.6

Note: Data available through May 27, 2025

Virtual Load and Supply

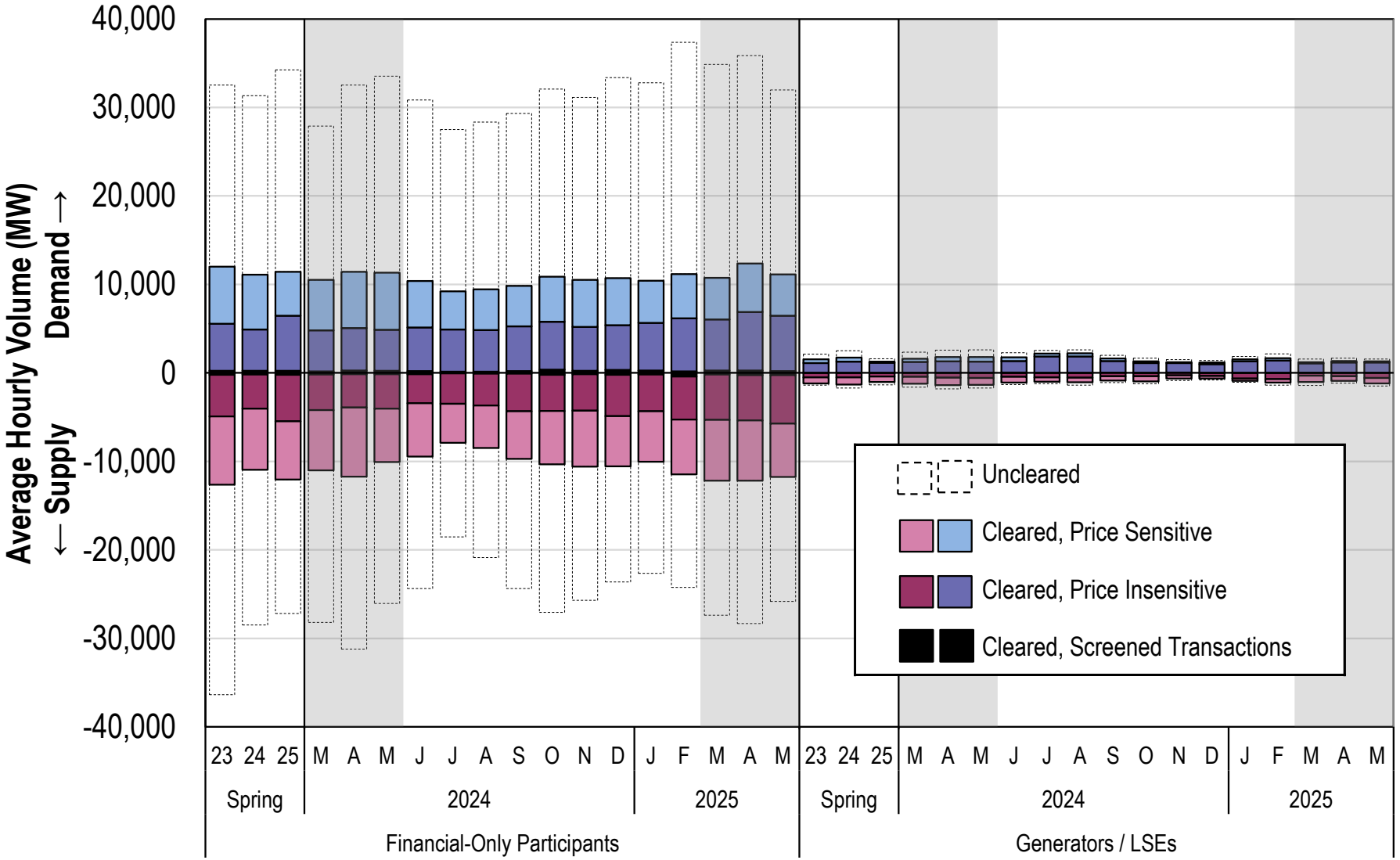
Spring 2023–2025



Note: Data available through May 27, 2025

Virtual Load and Supply by Participant Type

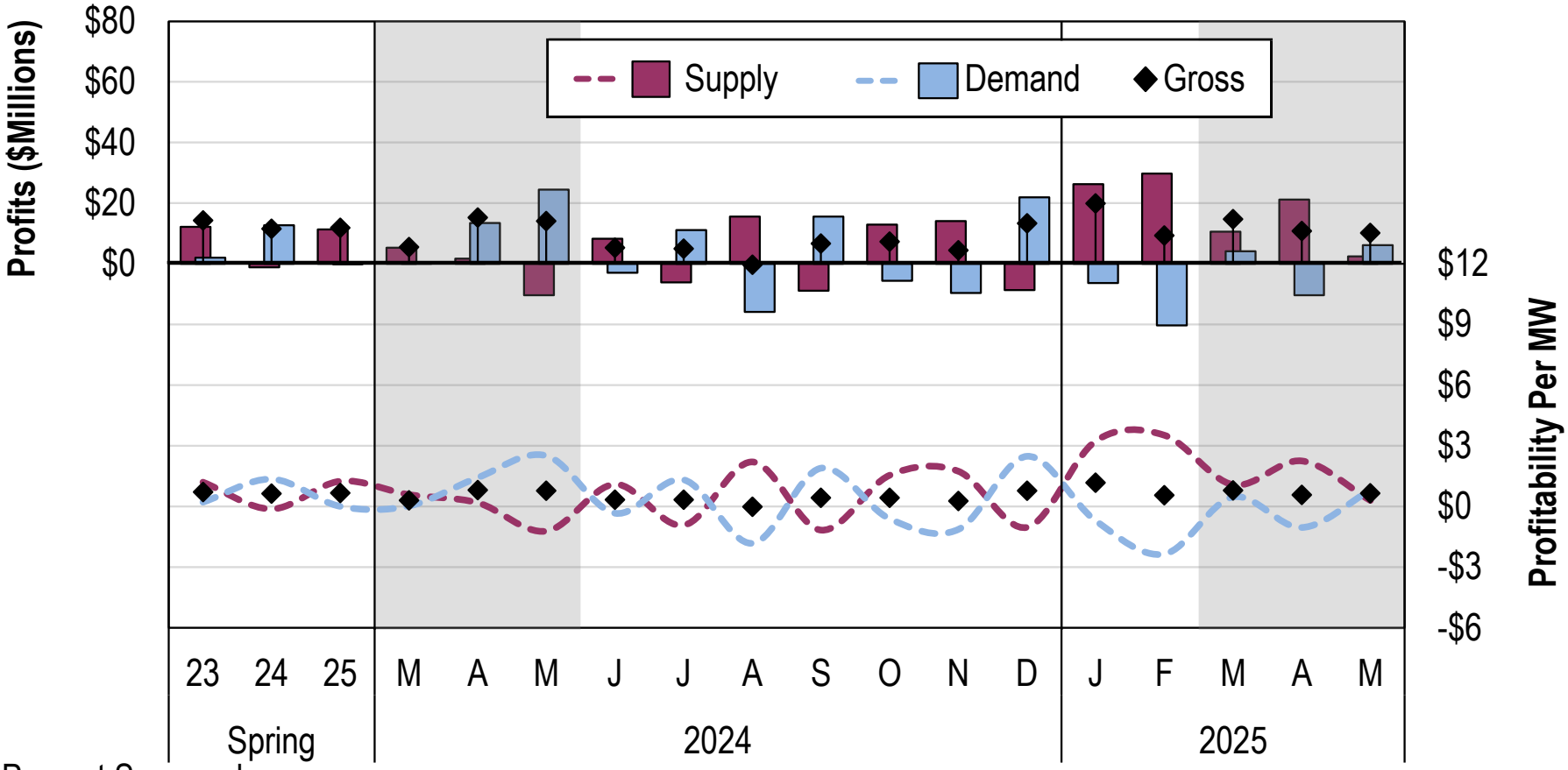
Spring 2023–2025



Note: Data available through May 27, 2025

Virtual Profitability

Spring 2023–2025



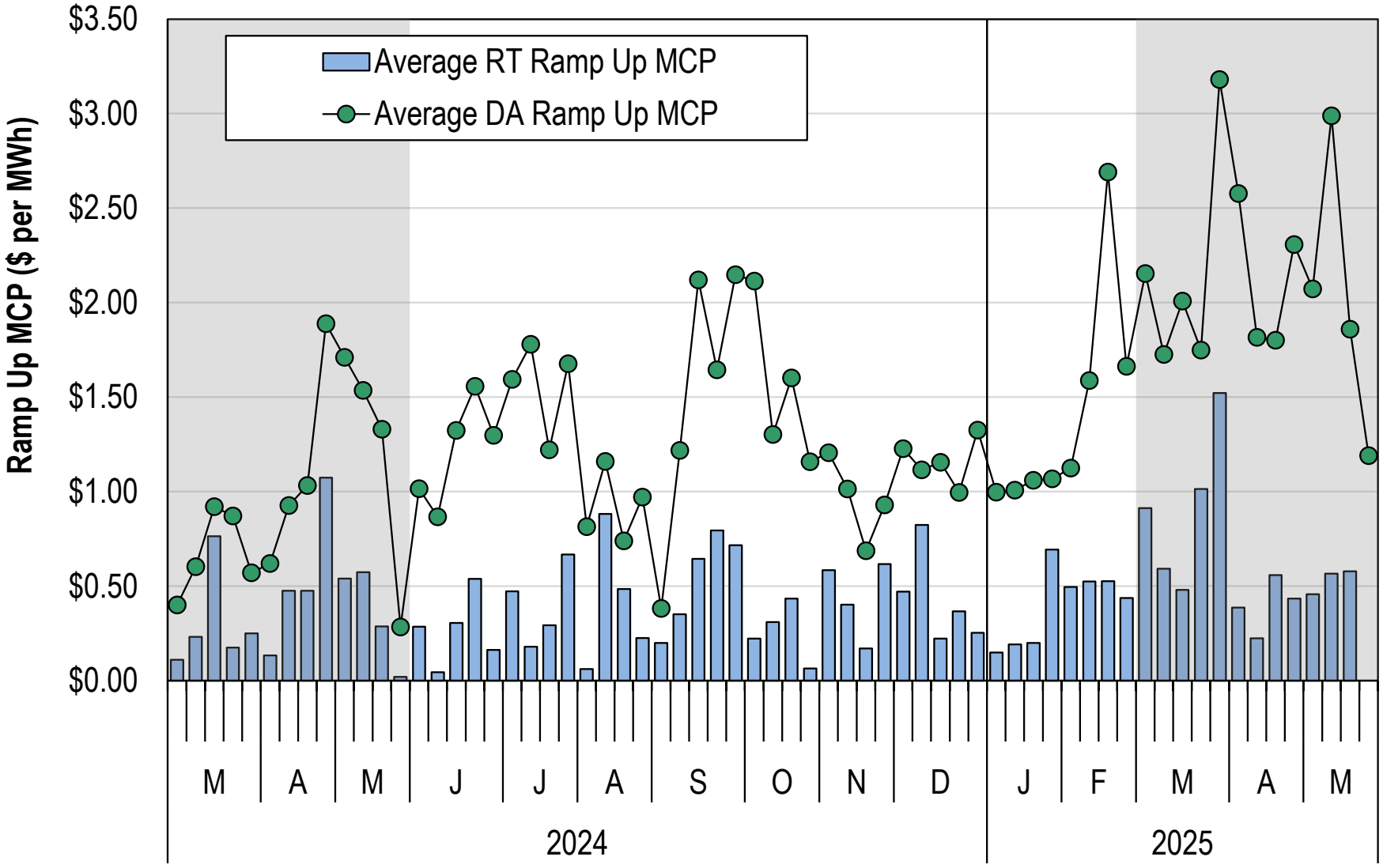
Percent Screened

Supply	1.5	1.4	1.8	1.6	1.3	1.5	1.5	0.7	0.8	0.9	1.9	1.5	2.0	1.7	3.6	1.4	1.9	2.0
Demand	2.0	2.0	2.2	1.6	2.3	2.0	2.2	1.2	1.5	1.9	3.3	2.4	3.1	2.5	1.5	2.3	2.3	1.9
Total	1.7	1.7	2.0	1.6	1.8	1.8	1.9	1.0	1.2	1.4	2.6	1.9	2.6	2.1	2.5	1.9	2.1	1.9

Note: Data available through May 27, 2025

Day-Ahead and Real-Time Ramp Up Price

Spring 2023–2025

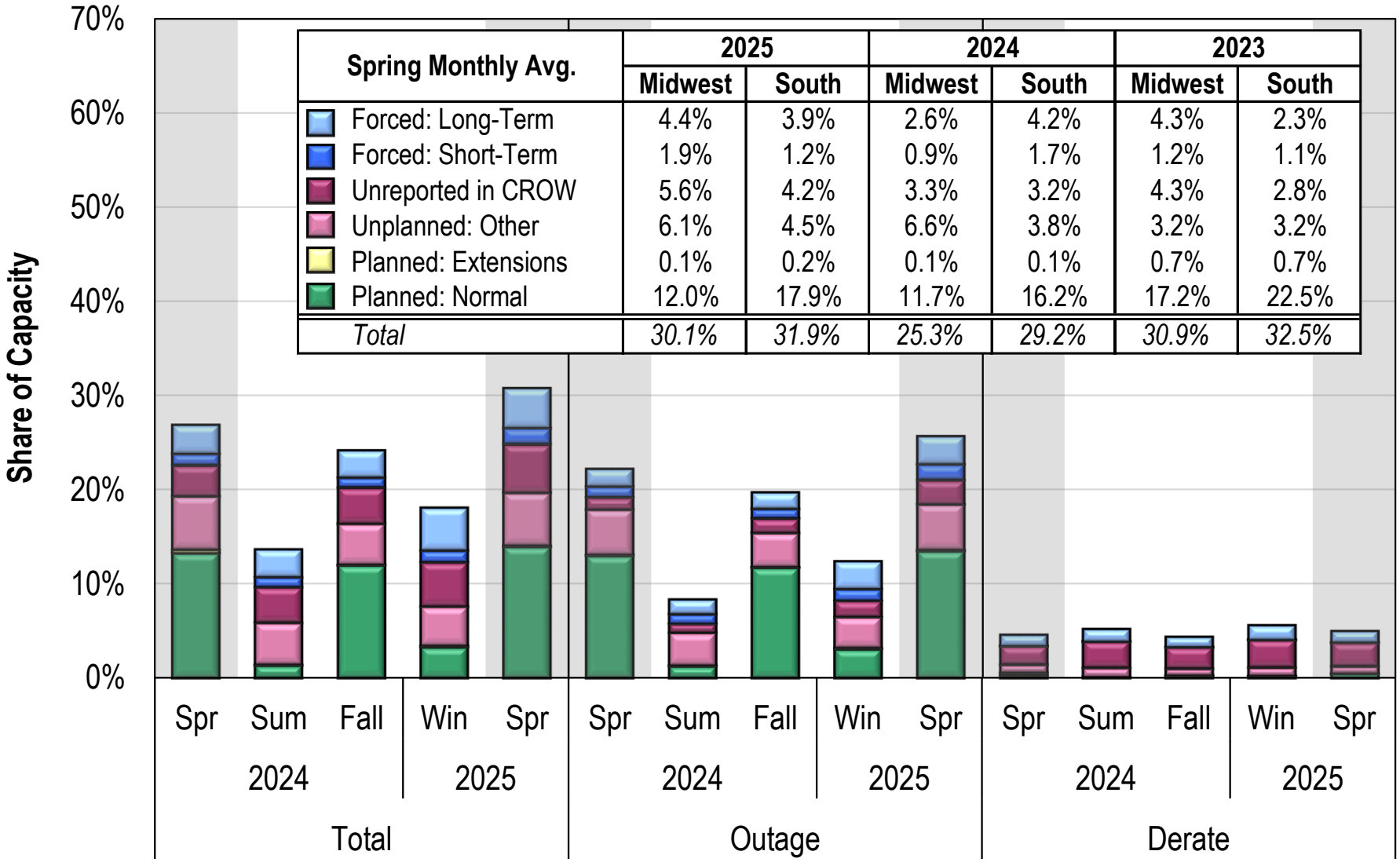


Note: Data available through May 27, 2025

Generation Outages and Deratings

Spring 2023–2025

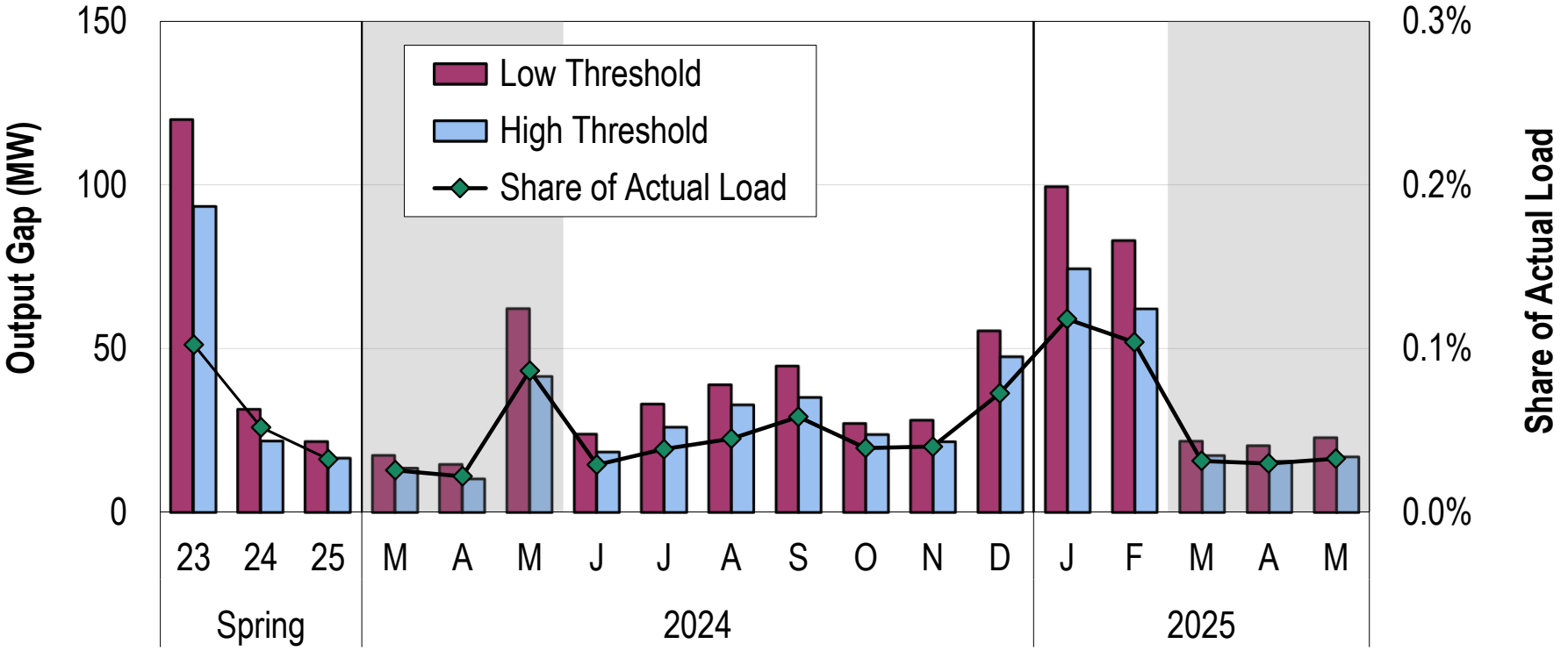
Spring Monthly Avg.	2025		2024		2023	
	Midwest	South	Midwest	South	Midwest	South
Forced: Long-Term	4.4%	3.9%	2.6%	4.2%	4.3%	2.3%
Forced: Short-Term	1.9%	1.2%	0.9%	1.7%	1.2%	1.1%
Unreported in CROW	5.6%	4.2%	3.3%	3.2%	4.3%	2.8%
Unplanned: Other	6.1%	4.5%	6.6%	3.8%	3.2%	3.2%
Planned: Extensions	0.1%	0.2%	0.1%	0.1%	0.7%	0.7%
Planned: Normal	12.0%	17.9%	11.7%	16.2%	17.2%	22.5%
Total	*30.1%*	*31.9%*	*25.3%*	*29.2%*	*30.9%*	*32.5%*



Note: Data available through May 27, 2025

Monthly Output Gap

Spring 2023–2025



Low Threshold Results by Unit Status (MW)

Offline	112	23	14	8	6	56	18	25	31	37	22	24	49	71	62	13	13	15
Online	8	8	8	10	9	6	6	8	7	8	6	4	7	28	21	9	8	7

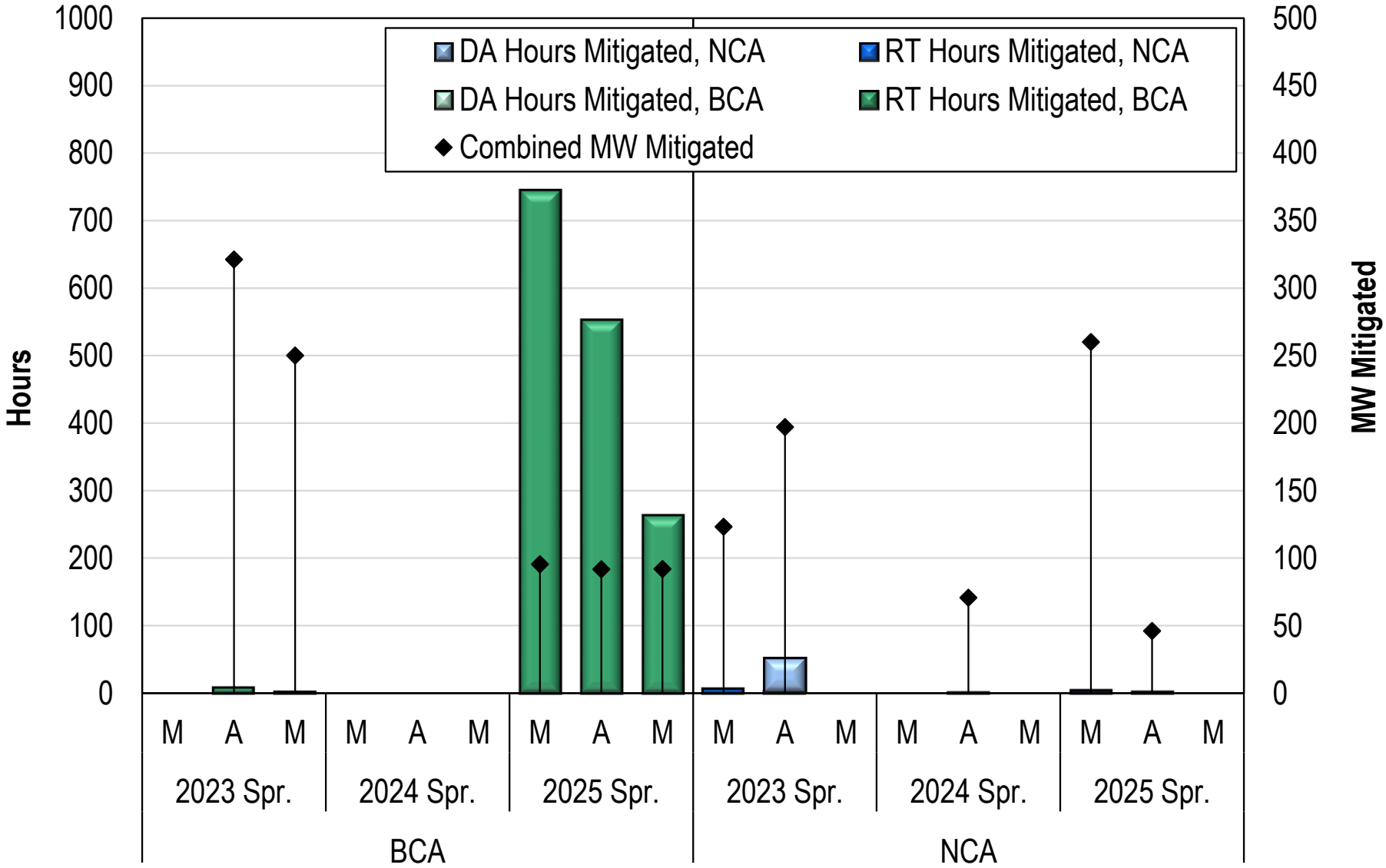
High Threshold Results by Unit Status (MW)

Offline	88	16	12	6	4	38	14	22	29	31	20	19	44	66	56	12	11	12
Online	5	6	5	7	6	4	5	4	4	4	4	3	3	9	6	5	4	5

Note: Data available through May 27, 2025

Day-Ahead And Real-Time Energy Mitigation

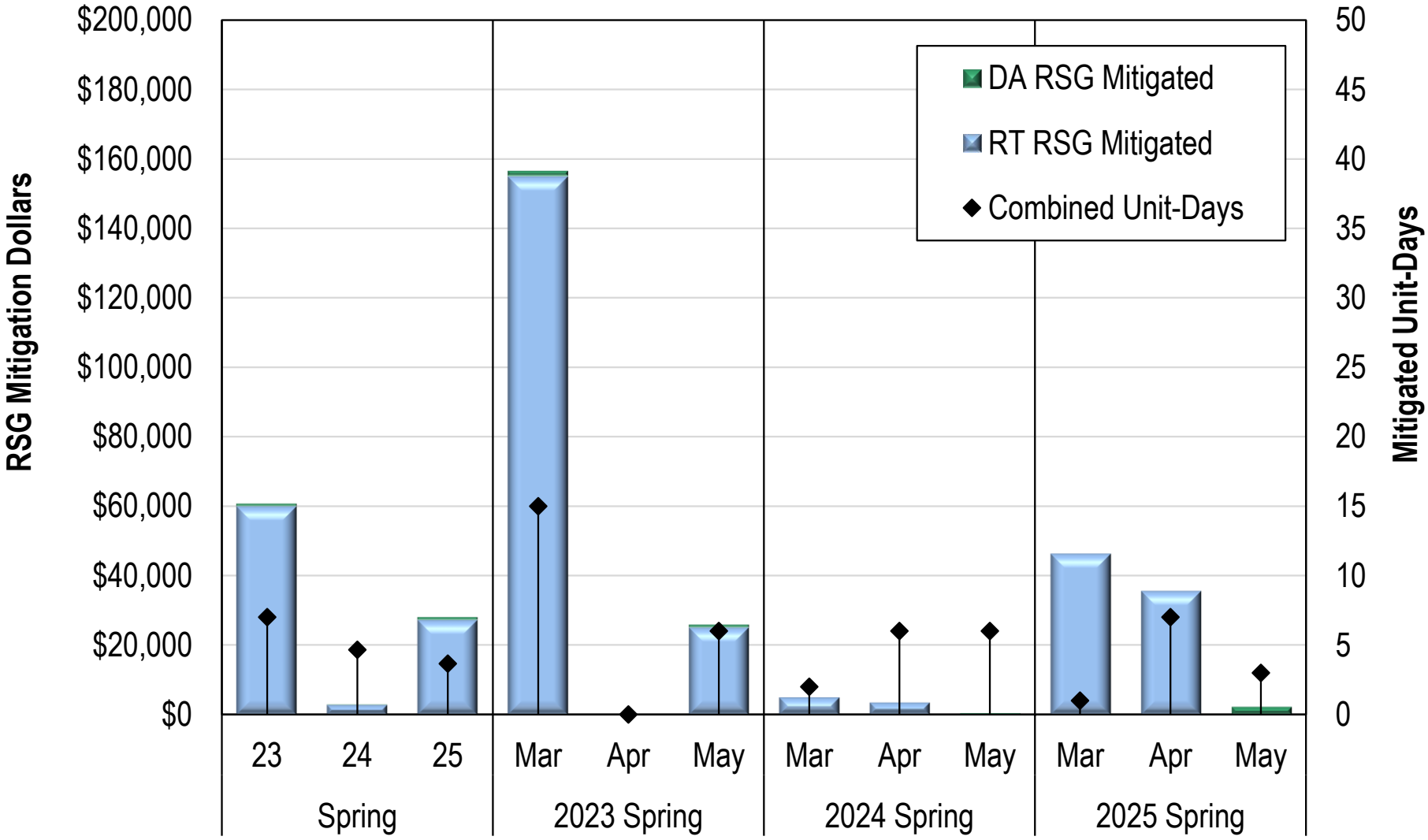
Spring 2023 - 2025



Note: Data available through May 27, 2025

Day-Ahead and Real-Time RSG Mitigation

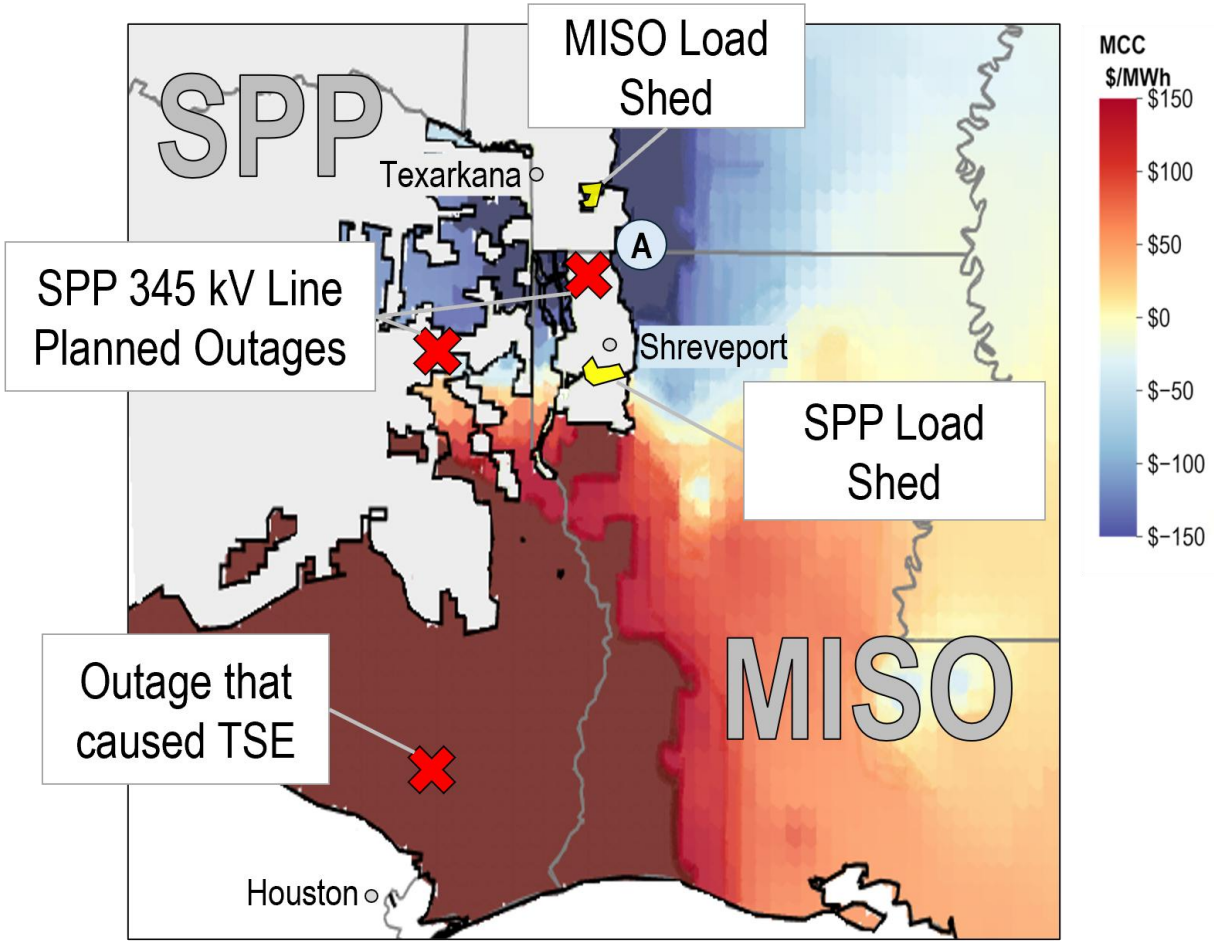
Spring 2023 - 2025



Note: Data available through May 27, 2025

Other Key Market Events

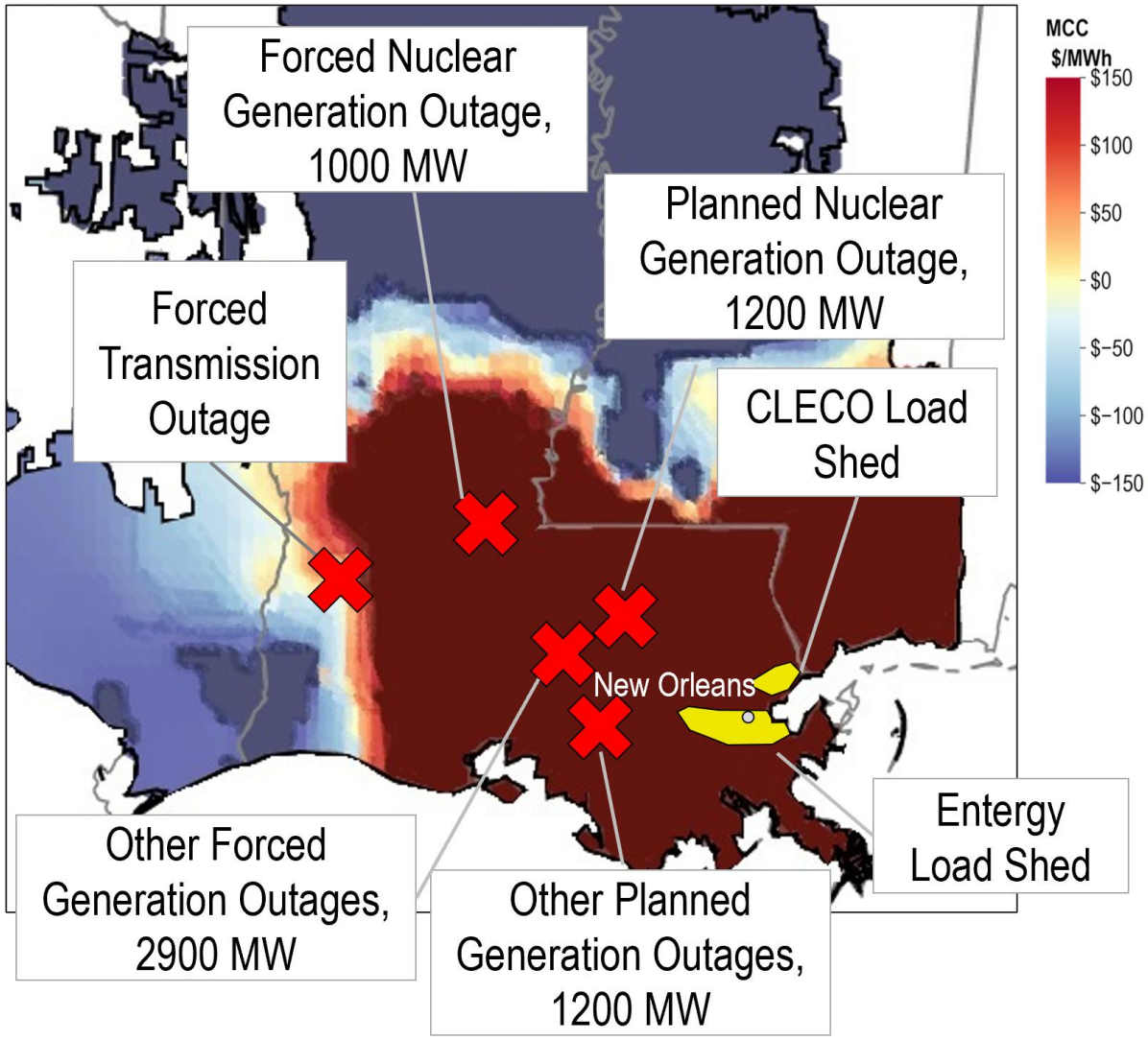
April 2 Load Shed Event in MISO and SPP



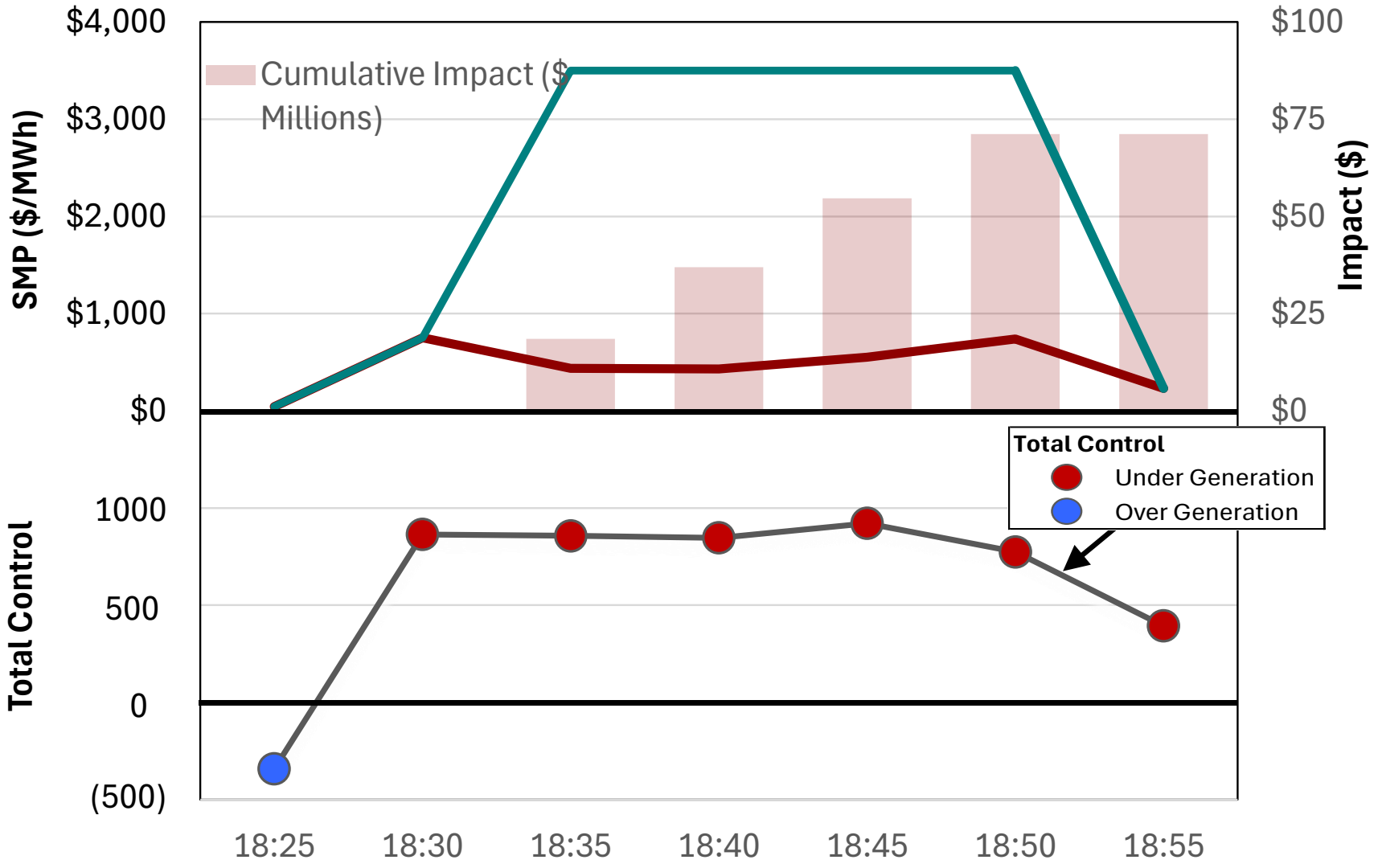
Violated Transmission Constraint

Ⓐ Harvey Couch - Lewisville

May 25 Load Shed Event in MISO

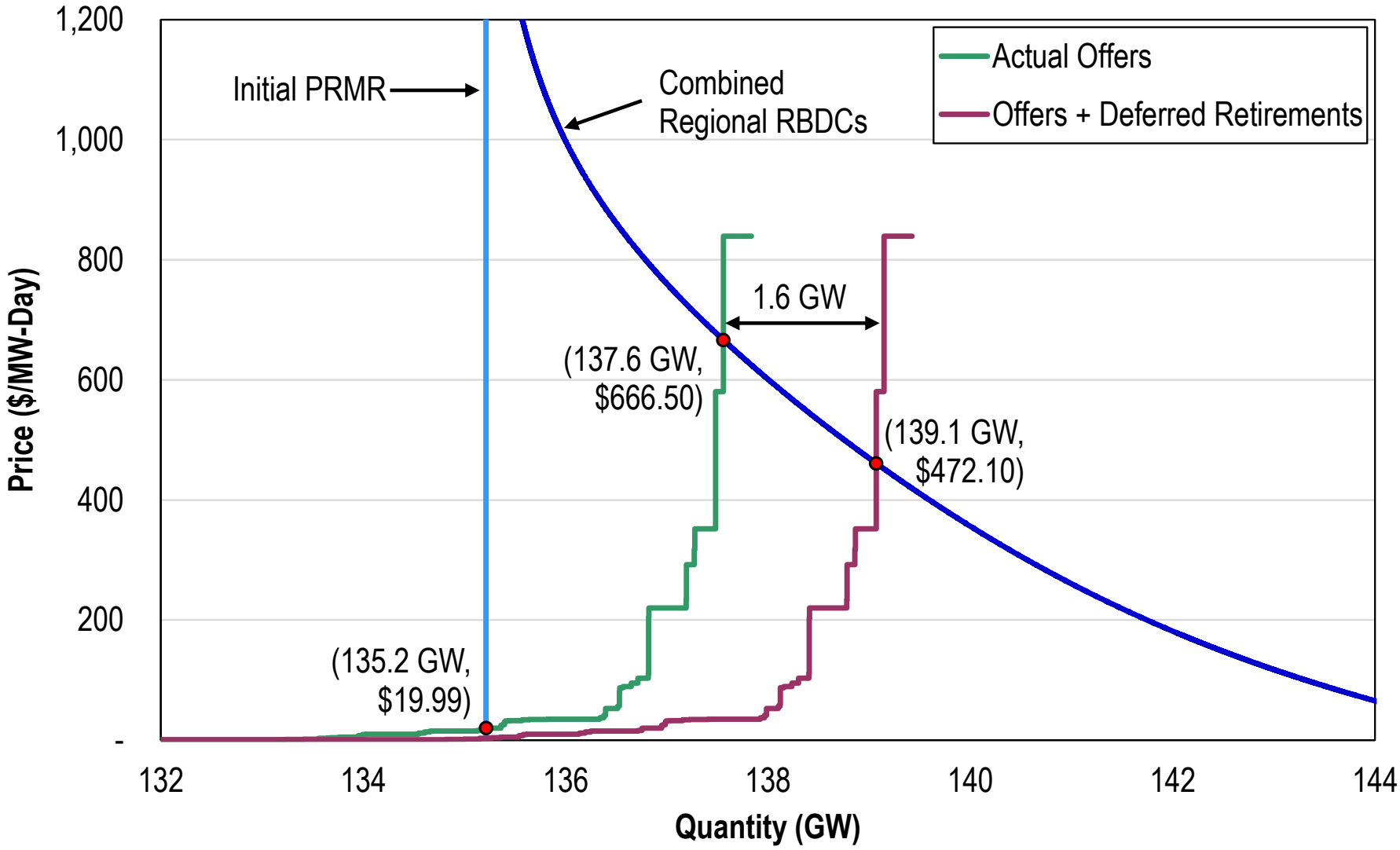


Load Adjustments and Price Impacts



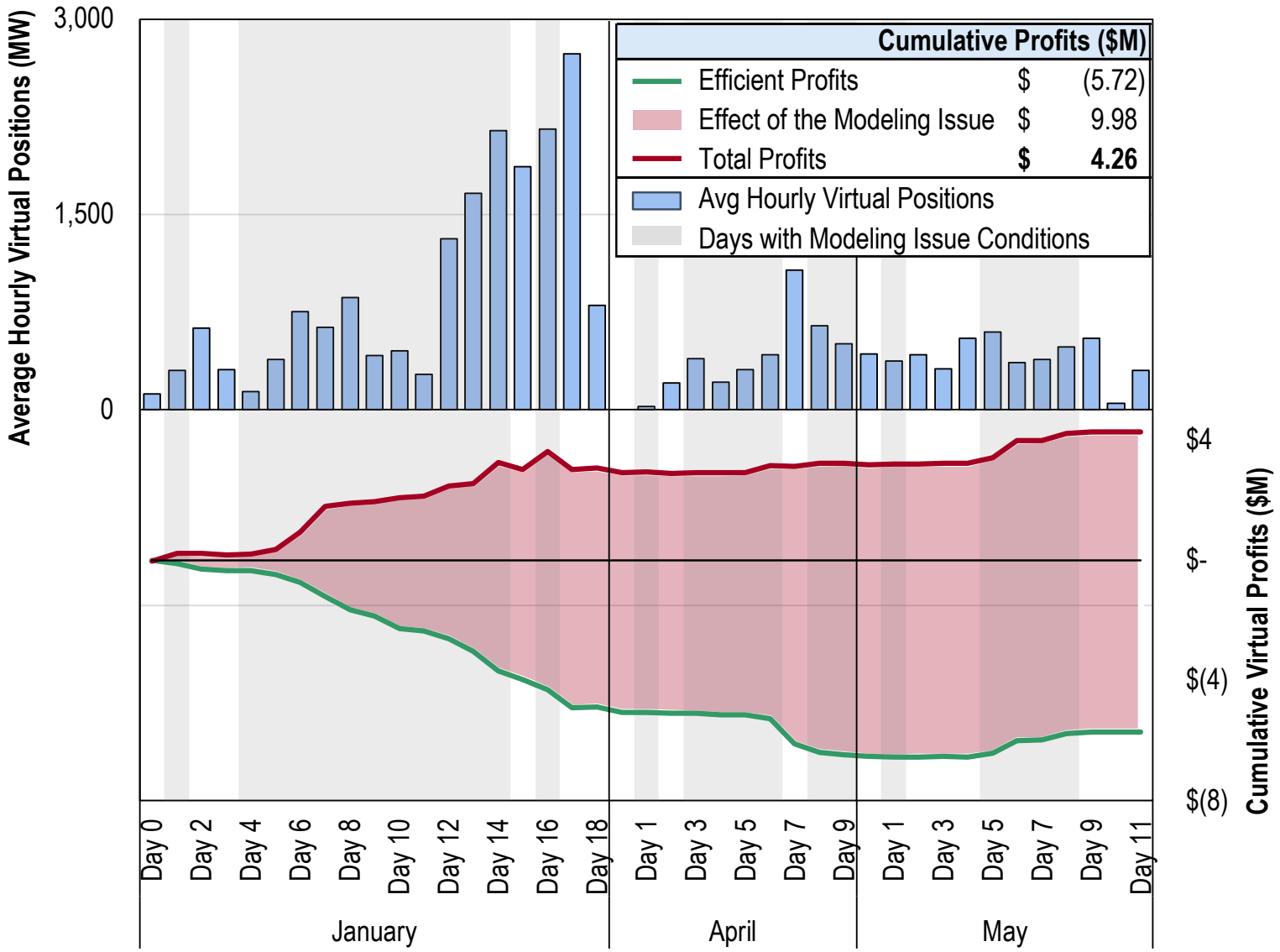
2025–26 Planning Resource Auction

Summer 2025 Clearing versus Alternative



Virtual Trading around Modeling Inconsistency

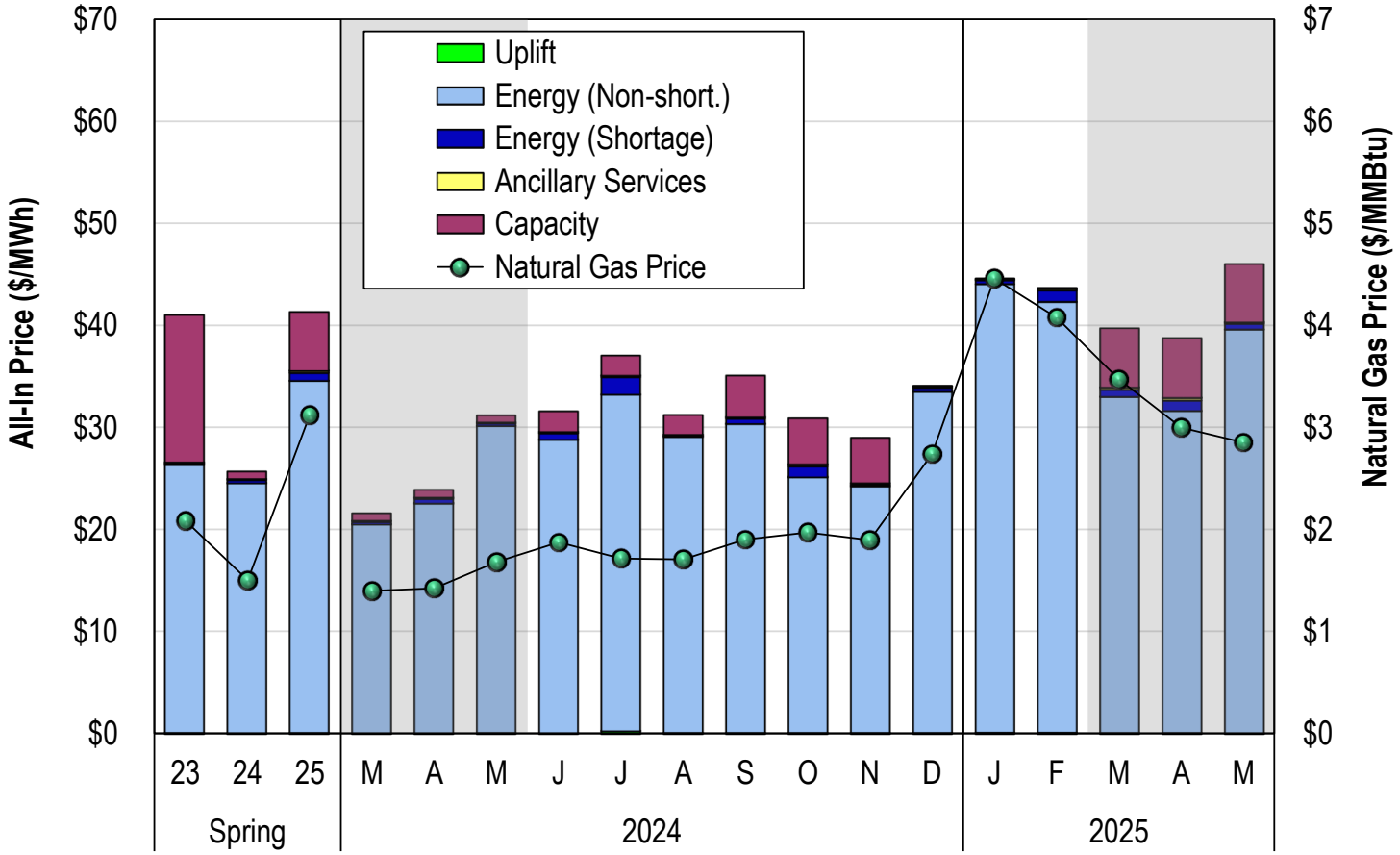
Hourly Virtual Positions and Cumulative Revenues



Slides Reproduced for the Board of Directors

All-In Price
Spring 2023 – 2025

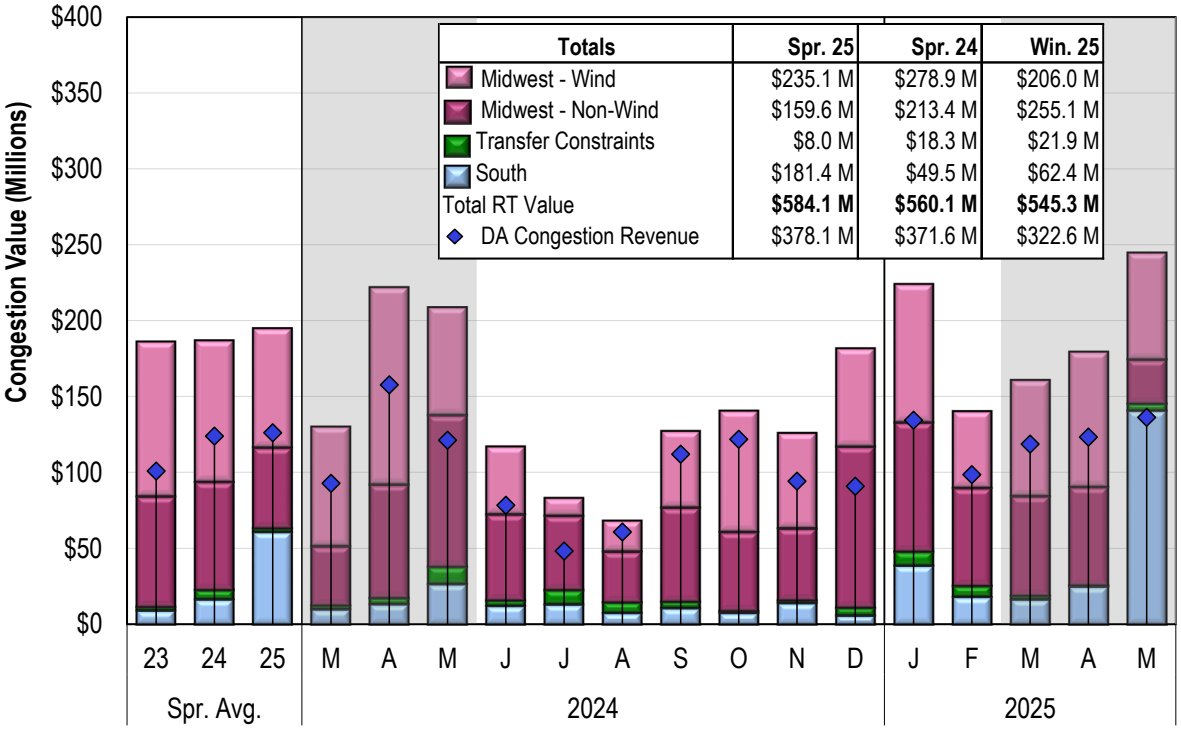
- Energy prices rose 42 percent compared to last Spring
  - Gas prices doubled, up from historically low values at Henry Hub last spring
  - Peak load fell one percent and average load was the same as last year



Note: Data available through May 27, 2025

Value of Real-Time Congestion

- Despite higher gas prices and the severe congestion in the South, day-ahead and real-time congestion rose just 2 and 4 percent, respectively
  - Congestion in the South was 267 percent higher than last spring
  - MISO experienced multiple episodes of severe weather – MISO declared two transmission emergencies that led to load shedding in the South



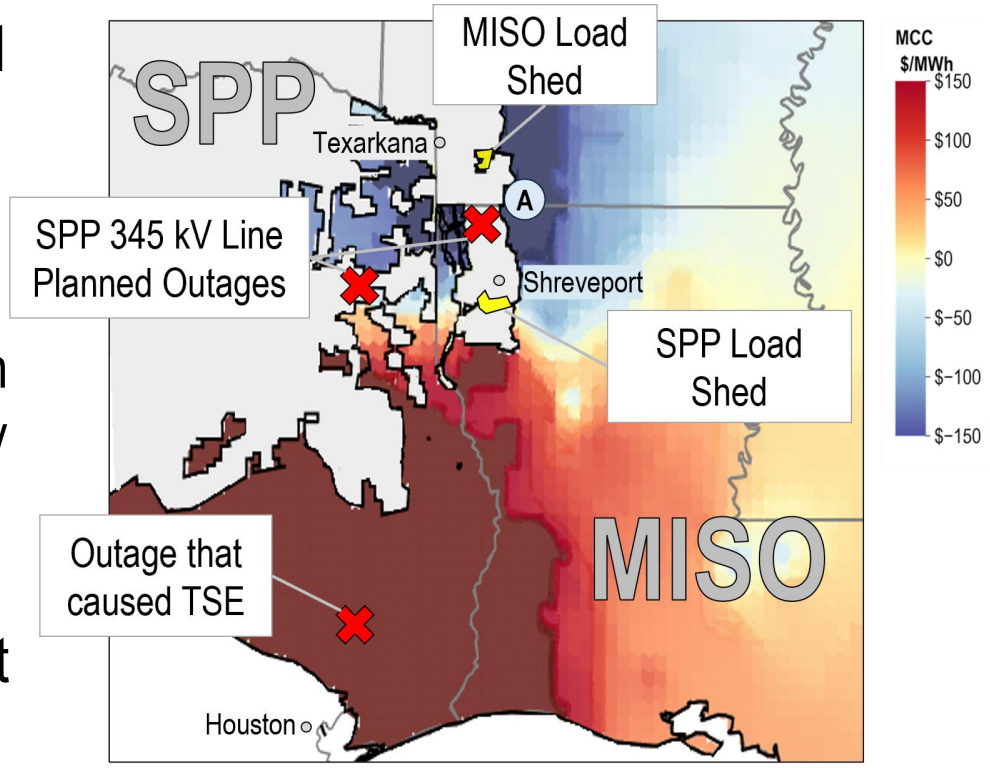
Totals	Spr. 25	Spr. 24	Win. 25
Midwest - Wind	$235.1 M	$278.9 M	$206.0 M
Midwest - Non-Wind	$159.6 M	$213.4 M	$255.1 M
Transfer Constraints	$8.0 M	$18.3 M	$21.9 M
South	$181.4 M	$49.5 M	$62.4 M
Total RT Value	**$584.1 M**	**$560.1 M**	**$545.3 M**
DA Congestion Revenue	$378.1 M	$371.6 M	$322.6 M

- From May 21-26, MISO incurred over $105 million of congestion in the South
  - More than half was on May 25 when outages reduced flows into the Amite South load pocket and led to an emergency and load shedding

Note: Data available through May 27, 2025

April 2 Load Shed Event in MISO and SPP

- Weather-related challenges and voltage issues in MISO and SPP led to 27 MW of load shed in MISO South on April 2nd near the SPP seam
  - Severe storms lasting 4 days caused widespread transmission outages in MISO South that were compounded by major SPP planned outages
- MISO unsuccessfully attempted to price the load shed at VOLL
- MISO's situational awareness was key for MISO and SPP
  - MISO directed load shedding in both MISO and SPP after a key line tripped
- SPP and MISO are working together to learn from this event

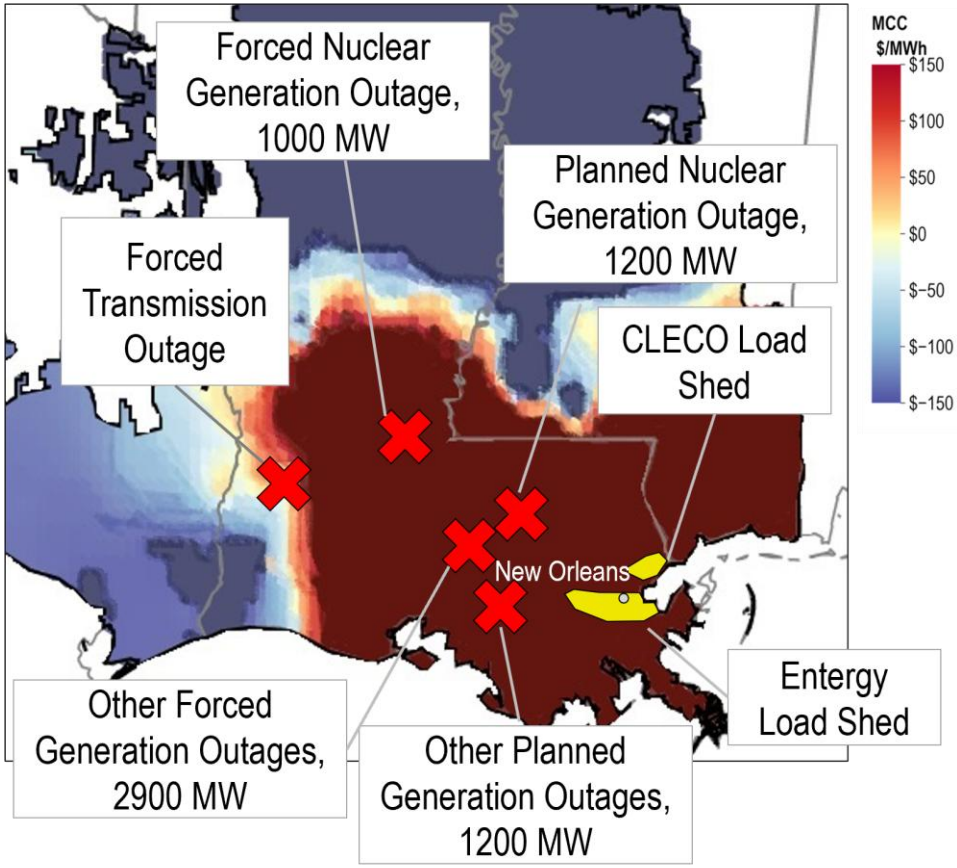


Violated Transmission Constraint

Ⓐ Harvey Couch - Lewisville

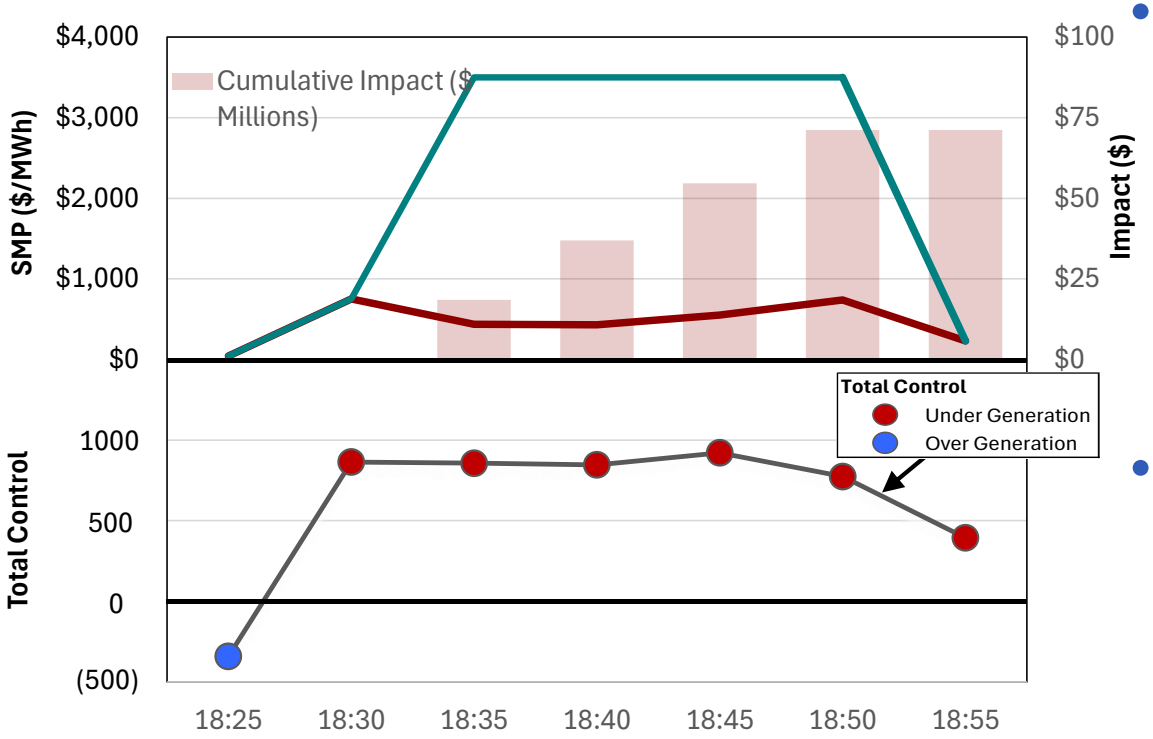
May 25 Load Shed Event in MISO

- Forced transmission and generation outages impacted Amite South and MISO shed 600 MW of load in the Amite South Load Pocket
  - This event was caused by an unlikely combination of outages
- MISO faced some issues:
  - Some generators did not follow dispatch into emerg. ranges
  - LMRs were not deployed due to limited location information
  - A unit was committed that was likely advisable to decommit
- We recommend MISO develop:
  - Penalty provisions for non-performance in emerg. ranges
  - Local STR for load pockets
  - Process to decommit resources



Load Adjustments and Price Impacts

- MISO can adjust the real-time load in the dispatch with a "load offset" to account for unmodeled deviations and balance the system
- On March 10, over-forecasted wind and solar down-ramp caused the MISO dispatch to run out of rampable energy to meet the system needs



- MISO used lower offsets than were warranted that:
  - Eliminated efficient $3500 per MWh shortage pricing
  - Caused a $71 million market impact
- Prices should not influence the offset selection
  - MISO agrees and is working with us to improve the offset procedures

Quarterly Highlights: Spring 2025

2025–2026 Planning Resource Auction Results

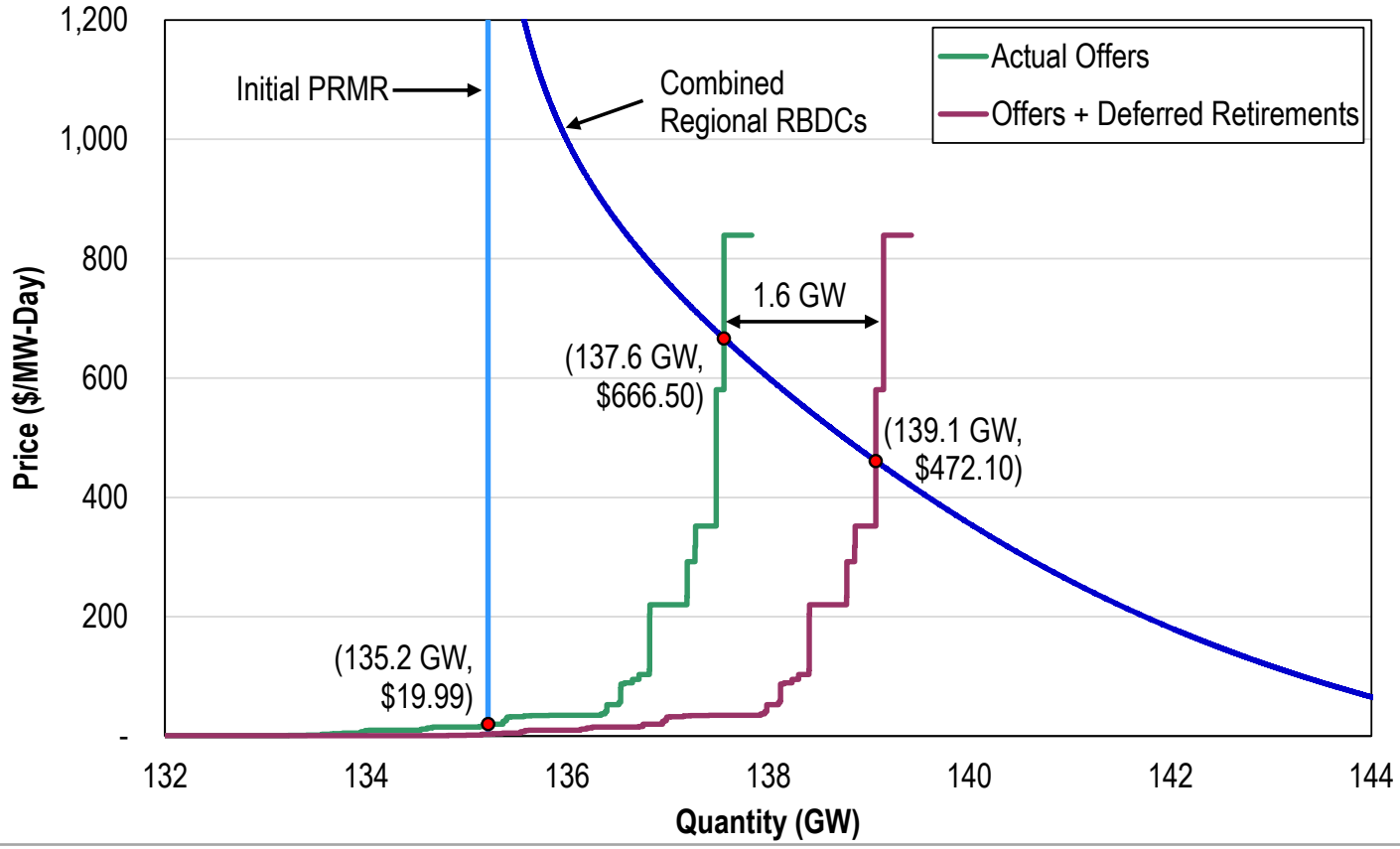
- MISO cleared its first seasonal PRA under the RBDC in April
  - Auction clearing prices (ACP) averaged nearly $215 per MW-day for the year, with the lowest prices in the winter and highest in summer
- The summer price of $666 per MW-day accurately signals the tightening margin, compared to $20 per MW-day under a vertical demand curve

Season	Capacity Procured	Offered Not Cleared	LOLE Target	Prices ($/MW-Day)		Excess Cleared	
				Rest of Market	MISO South	System	South
Summer 25	137,559	277	0.10	$666.50		1.017	1.008
Fall 25	132,516	4,260	0.01	$91.60	$74.09	1.023	1.002
Winter 25/26	131,000	3,262	0.01	$33.20		1.051	1.075
Spring 26	130,700	5,361	0.01	$69.88		1.012	0.997
PRA Year	132,944	3,290		$215.30	$210.92	1.026	1.021

2025–26 Planning Resource Auction

Summer Season

- 2.3 GW (1.7% surplus) was procured above the minimum in the summer, which is valuable for reliability and lowered the clearing price
- Deferral of the 1.6 GW of retirements to the fall would have lowered prices to $472/MW-day – DOE has ordered 1.2 GW to defer to the fall



IMM Summer Assessment

Summer 2025 Planning Reserve Margins

	Base Scenario	Alternative IMM Scenarios*			
		Realistic Scenario	Realistic <=2HR	High Temperature Cases: Realistic Scenario	High Temperature Cases: Realistic <=2HR
Load					
Base Case	122,633	122,633	122,633	122,633	122,633
High Load Increase	-	-	-	7,338	7,338
Total Load (MW)	122,603	122,603	122,603	129,970	129,970
Generation					
Internal Generation Excluding Exports	134,812	134,812	134,812	134,812	134,812
BTM Generation	4,479	4,479	3,575	4,479	3,575
Unforced Outages and Derates**	(1,118)	(11,174)	(11,174)	(18,774)	(18,774)
Adjustment due to Transfer Limit	(5,635)	-	-	-	-
Total Generation (MW)	132,538	128,117	127,213	120,517	119,613
Imports and Demand Response* **					
Demand Response (ICAP)	9,655	7,241	3,052	7,241	3,052
Firm Capacity Imports	3,577	3,577	3,577	3,577	3,577
Margin (MW)	23,168	16,333	11,240	1,365	(3,728)
Margin (%)	**18.9%**	**13.3%**	**9.2%**	**1.1%**	**-2.9%**
Expected Capacity Uses and Additions					
Expected Forced Outages****	(6,965)	(5,769)	(5,769)	(5,769)	(5,769)
Non-Firm Net Imports in Emergencies	4,351	4,351	4,351	4,351	4,351
Expected Margin (MW)	20,554	14,914	9,822	(53)	(5,146)
Expected Margin (%)	**16.8%**	**12.2%**	**8.0%**	**0.0%**	**-4.0%**

* Assumes 75% response from DR.

** Base scenario shows approved planned outages for summer 2025. Realistic cases use historical averages during peak summer hours. High temp. cases are based upon MISO's 2025 Summer Readiness.

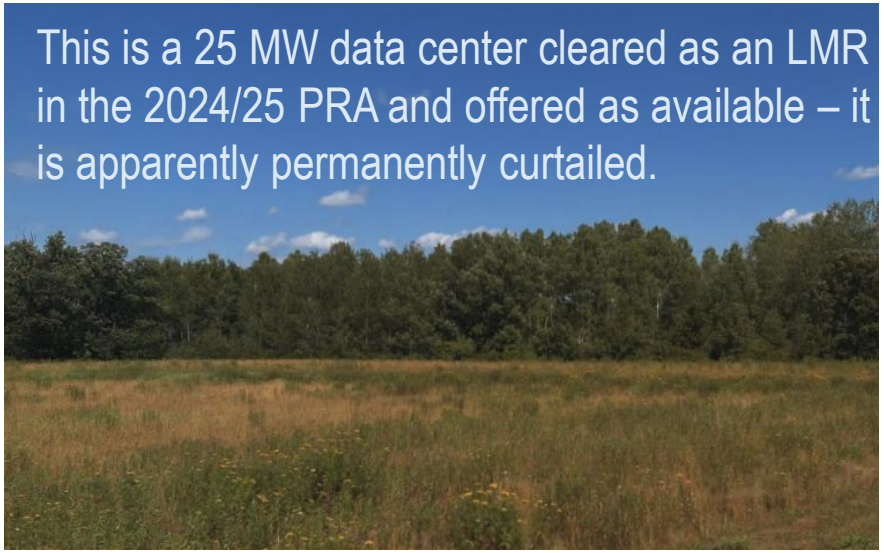
*** Cleared amounts for the Summer Season of the 2025/2026 planning year.

**** Base scenario assumes 5% forced outage rate for internal and BTM generation. Alternative cases use historical average forced outages/derates during peak summer hours.

- Including typical planned and forced outages and imports produces a capacity margin of 12.2%
- Hot temps could drop the margin to zero, but not likely and imports would respond
- MISO is more than sufficient to satisfy its reliability needs
- NERC Long Term Reliability findings are not accurate
  - Understates MISO's capacity by > 8 GW
  - Unrealistic potential near-term fossil retirements
  - Does not recognize the size and value of MISO's import capability

Quarterly Summary of IMM Investigations

- We conducted multiple audits and investigations, including:
  - Nine units failing to follow dispatch instructions or economic curtailments
  - Five resources for inaccurate physical offer parameters
  - Five units for potential uneconomic production
  - Three units for potential physical withholding
- We recommended MISO sanction a unit for uneconomic production and are working on two more sanction recommendations
- We referred a market participant for a Duty of Candor Violation
- We continued to investigate past DR conduct
  - We referred the LMR to the right
  - MISO's DR filings will address our qualification, testing, gaming and penalty concerns



Submittals to External Entities and Other Issues

- During the Spring Quarter, we:
  - Responded to several FERC questions related to prior referrals and FERC investigations and responded to requests for information on market issues
  - Presented the IMM Winter Quarterly report to the MSC
  - Worked with MISO on recommended operational improvements, notably MISO's offset tool calculator
- We continued to investigate potential tariff violations in the market-to-market coordination of congestion between SPP, PJM and MISO
- We also continued to support MISO's filings to FERC. We:
  - Provided an affidavit in support of MISO's filing to improve Load Modifying Resource (LMR) and Emergency Resource accreditation reforms
  - Supported MISO's filing to eliminate cross-registration of LMRs as Emergency Demand Resources and Demand Response Resources
  - Supported MISO's filing to eliminate mock testing of demand resources and to improve the penalties for poor performance when LMRs are called upon

List of Acronyms

- AAR Ambient-Adjusted Ratings
- AMP Automated Mitigation Procedures
- BCA Broad Constrained Area
- CDD Cooling Degree Days
- CMC Constraint Management Charge
- CTS Coordinated Transaction Scheduling
- DAMAP Day-Ahead Margin Assurance Payment
- DDC Day-Ahead Deviation & Headroom Charge
- DIR Dispatchable Intermittent Resource
- HDD Heating Degree Days
- ELMP Extended Locational Marginal Price
- JCM Joint and Common Market Initiative
- JOA Joint Operating Agreement
- LAC Look-Ahead Commitment
- LSE Load-Serving Entities
- M2M Market-to-Market
- MSC MISO Market Subcommittee
- NCA Narrow Constrained Area
- ORDC Operating Reserve Demand Curve
- PITT Pseudo-Tie Issues Task Team
- PRA Planning Resource Auction
- PVMWP Price Volatility Make Whole Payment
- RAC Resource Adequacy Construct
- RDT Regional Directional Transfer
- RSG Revenue Sufficiency Guarantee
- RTORSGP Real-Time Offer Revenue Sufficiency Guarantee Payment
- SMP System Marginal Price
- SOM State of the Market
- STE Short-Term Emergency
- STR Short-Term Reserves
- TLR Transmission Loading Relief
- TCDC Transmission Constraint Demand Curve
- UD Uninstructed Deviation
- VLR Voltage and Local Reliability
- WUMS Wisconsin Upper Michigan System