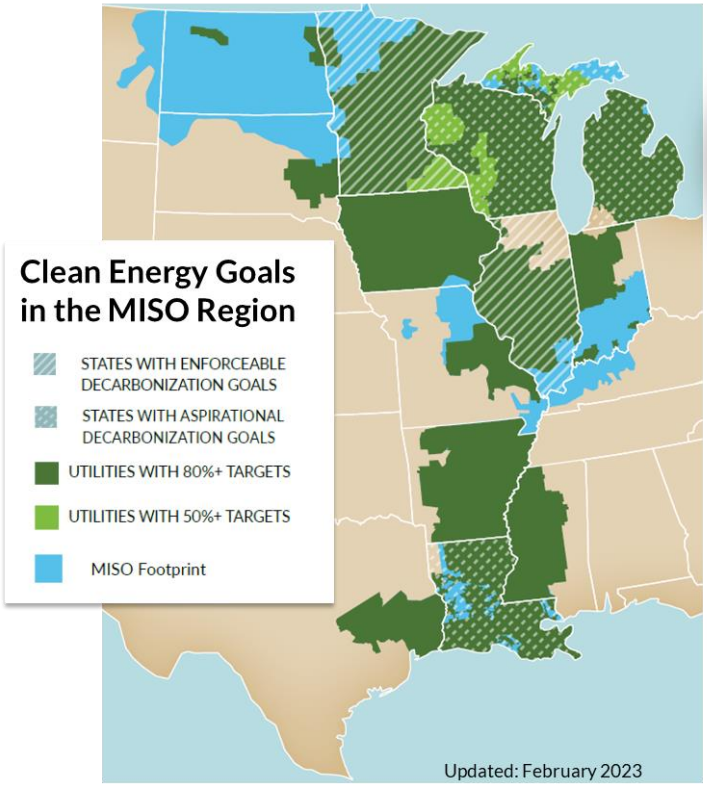
Planning Resource Auction

Results for Planning Year 2023-24

May 19, 2023

Seasonal resource adequacy construct sets the stage for several other key initiatives necessary to ensure a sustainable response to the Reliability Imperative

- The changing resource fleet driven by aggressive member decarbonization strategies continues to dramatically shift the reliability risk profile in our region.
- Coordinated reform of Resource Adequacy, Market Design and Transmission evolution is necessary to ensure continued reliability.
- Implementation of the seasonal construct is one step in the overall work needed to meet the Reliability Imperative.



21 utilities have energy goals greater than 80%

3 states have 100% clean energy goals

2 states with 100% clean energy law

Market response to high prices from the 2022 auction helps mitigate Resource Adequacy risk for Planning Year 2023-24

- MISO's seasonal PRA improves reliability planning by identifying requirements, resource accreditation and risks for individual seasons.
- MISO is projected to have adequate capacity to meet resource adequacy requirements for PY 2023-24 at the regional, sub-regional & zonal levels.
  - Auction Clearing Prices are flat across the region:

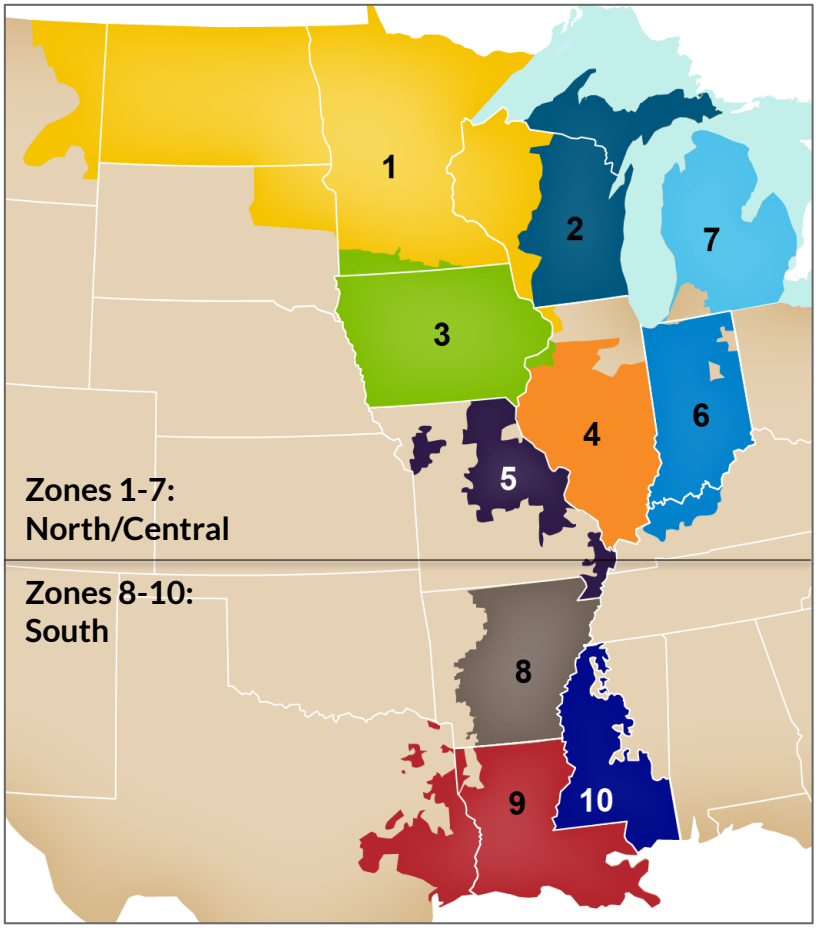
    Summer: $10, Fall: $15, Winter: $2, Spring: $10/MW-day
  - Exception: Zone 9 (LA/TX) with $59 in Fall and $19 in Winter (required higher priced supply within the zone to meet its Local Clearing Requirement).
- Actions taken by Market Participants such as delaying retirements and making additional existing capacity available to the region, resulted in adequate capacity.
- Many of these actions may not be repeatable and the residual capacity and resulting prices do not reflect the risks posed by the portfolio transition.
- MISO's response to the Reliability Imperative reinforces need for urgent reforms to MISO's resource adequacy construct and market design.

2023 PRA demonstrated sufficient capacity at regional, sub-regional and zonal level to meet PRMRs and LCRs

2023 PRA Results

Zone	Local Balancing Authorities	Price $/MW-Day			
		Summer	Fall	Winter	Spring
1	DPC, GRE, MDU, MP, NSP, OTP, SMP	$10.00	$15.00	$2.00	$10.00
2	ALTE, MGE, UPPC, WEC, WPS, MIUP	$10.00	$15.00	$2.00	$10.00
3	ALTW, MEC, MPW	$10.00	$15.00	$2.00	$10.00
4	AMIL, CWLP, SIPC, GLH	$10.00	$15.00	$2.00	$10.00
5	AMMO, CWLD	$10.00	$15.00	$2.00	$10.00
6	BREC, CIN, HE, IPL, NIPS, SIGE	$10.00	$15.00	$2.00	$10.00
7	CONS, DECO	$10.00	$15.00	$2.00	$10.00
8	EAI	$10.00	$15.00	$2.00	$10.00
9	CLEC, EES, LAFA, LAGN, LEPA	$10.00	$59.21	$18.88	$10.00
10	EMBA, SME	$10.00	$15.00	$2.00	$10.00
ERZ	KCPL, OPPD, WAUE (SPP), PJM, OVEC, LGEE, AECI, SPA, TVA	$10.00	$15.00	$2.00	$10.00

MISO Resource Adequacy Zones



PRMR: Planning Reserve Margin Requirement

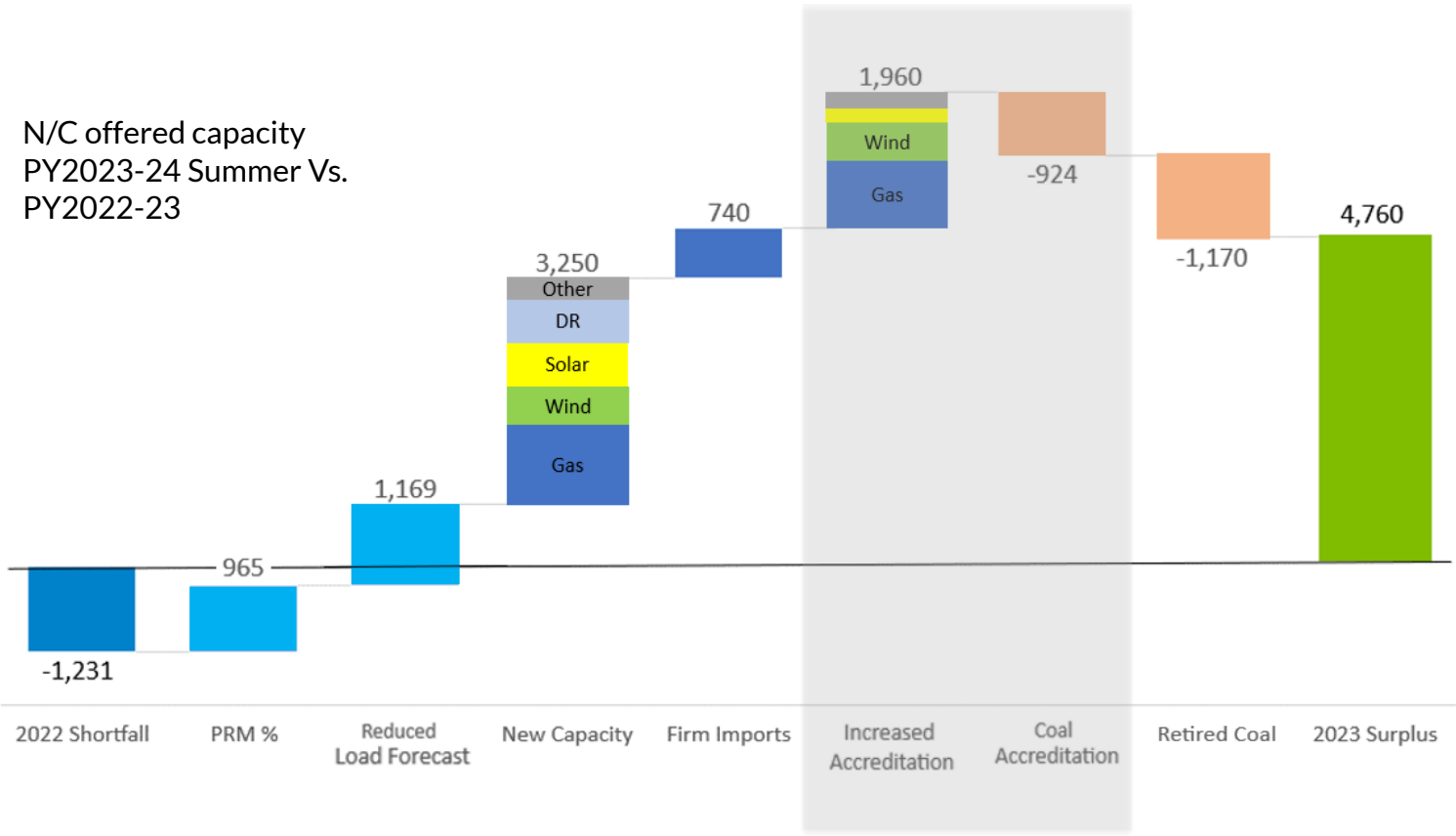
LCR: Local Clearing Requirements

ERZ: External Resource Zone

4 Highlighted prices show price separation for the zone/season.

North/Central region demonstrated adequate supply driven by a combination of lower demand, new generation, delayed retirements, additional imports and higher accreditation

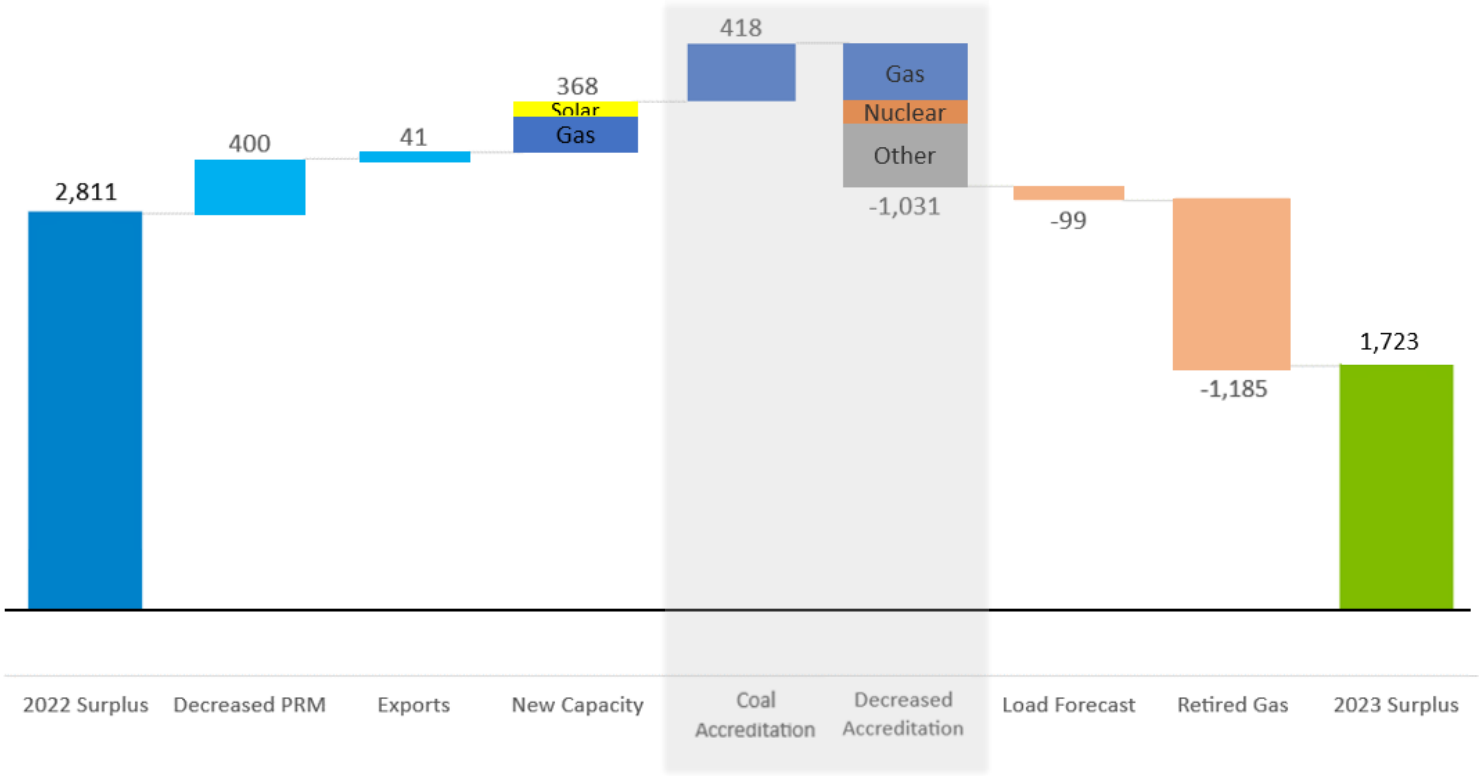
Capacity offered in N/C exceeds requirements by 4,760 MW (4.7%)



5 Capacity indicated is all accredited values.

South region continues to remain adequate in PY 2023-24 however offered capacity shows decline driven largely by retirements.

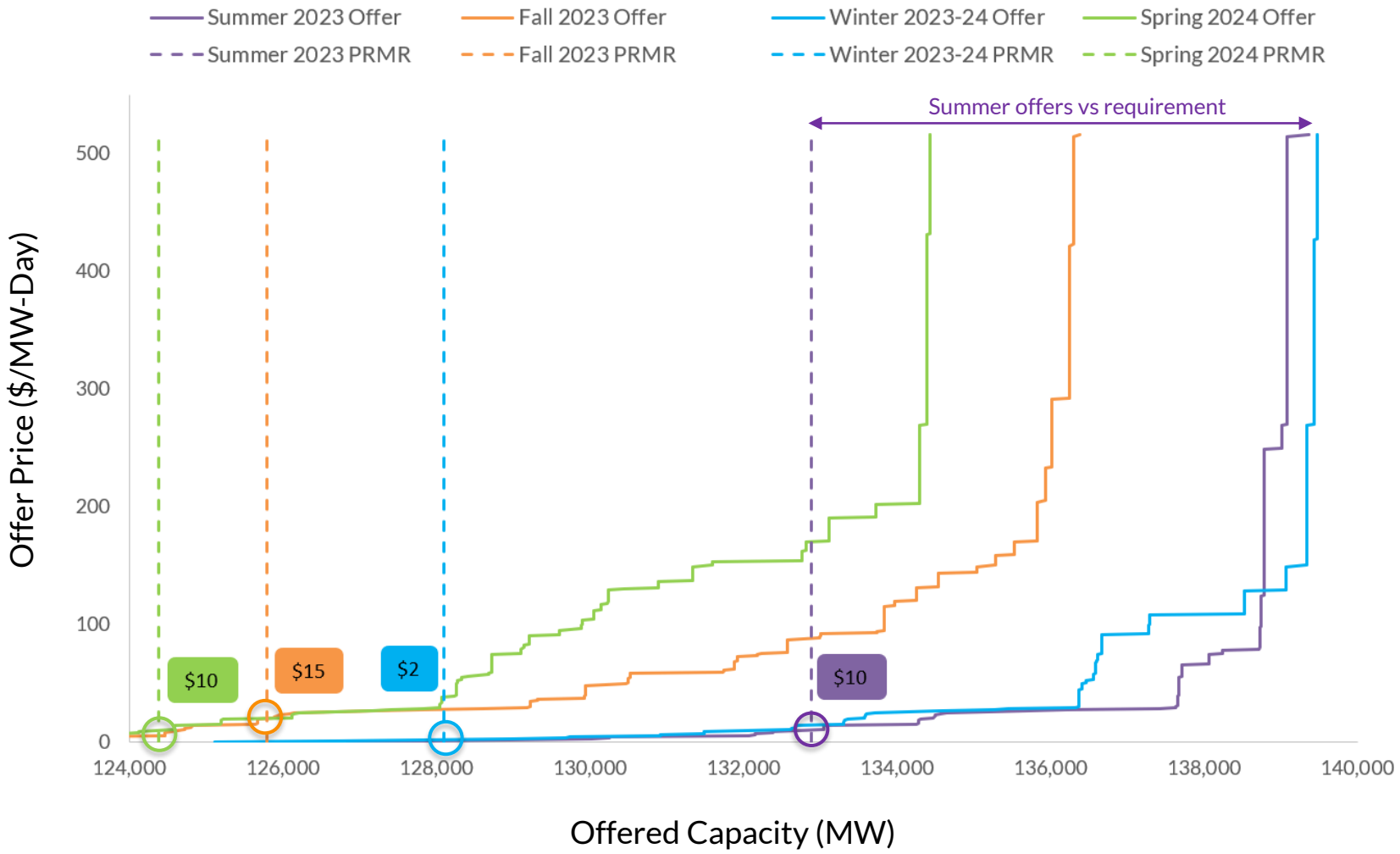
Capacity offered in South exceeds requirements by 1,723 MW (5.1%)



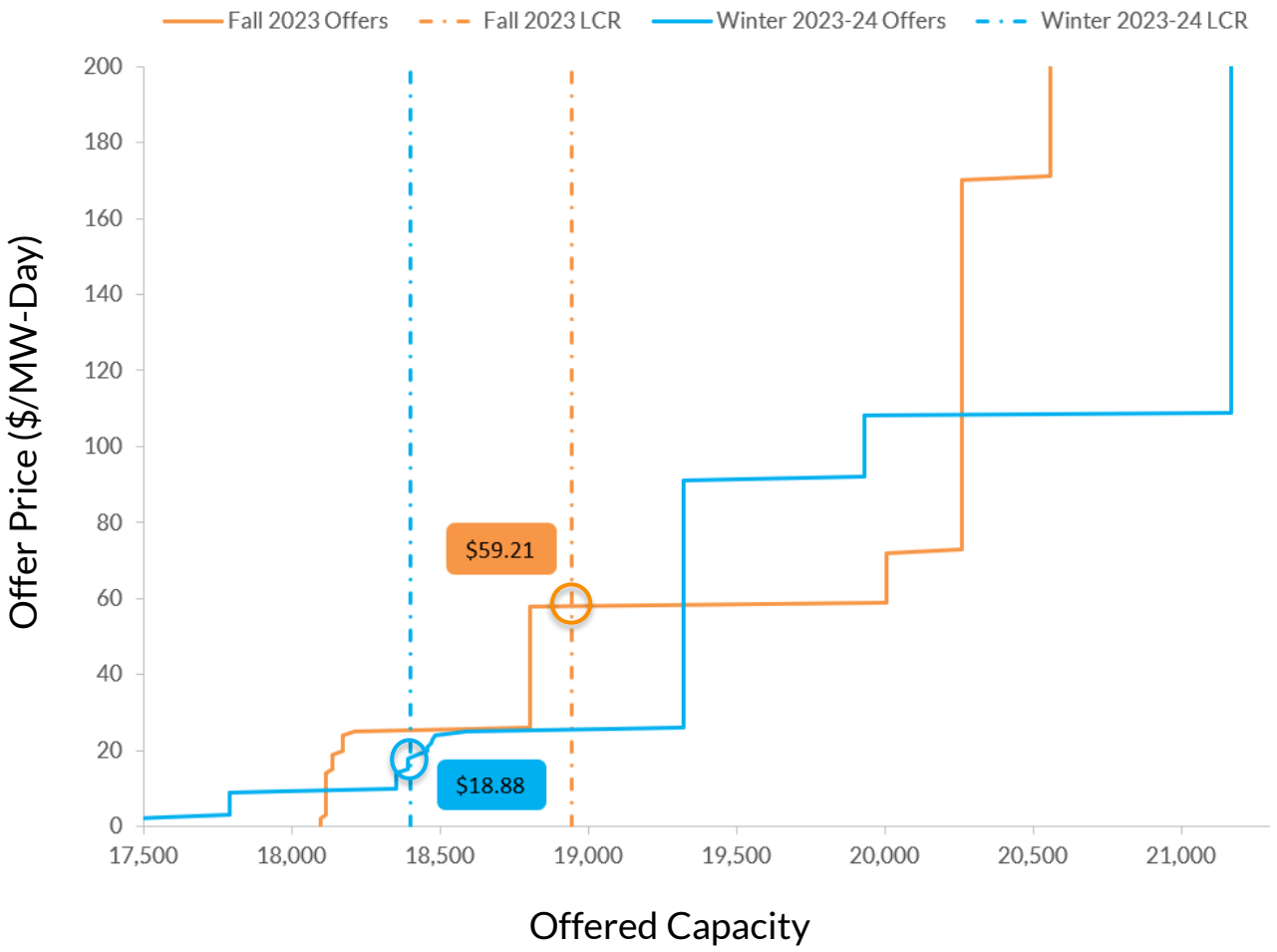
South offered capacity PY2023-24 Summer Vs. PY2022-23

Capacity indicated is all accredited values.

Adequate supply resulted in flat auction clearing prices across the footprint for all seasons, with the exception of Zone 9



In Fall and Winter, LRZ9 required higher priced supply within the zone to meet its local clearing requirement

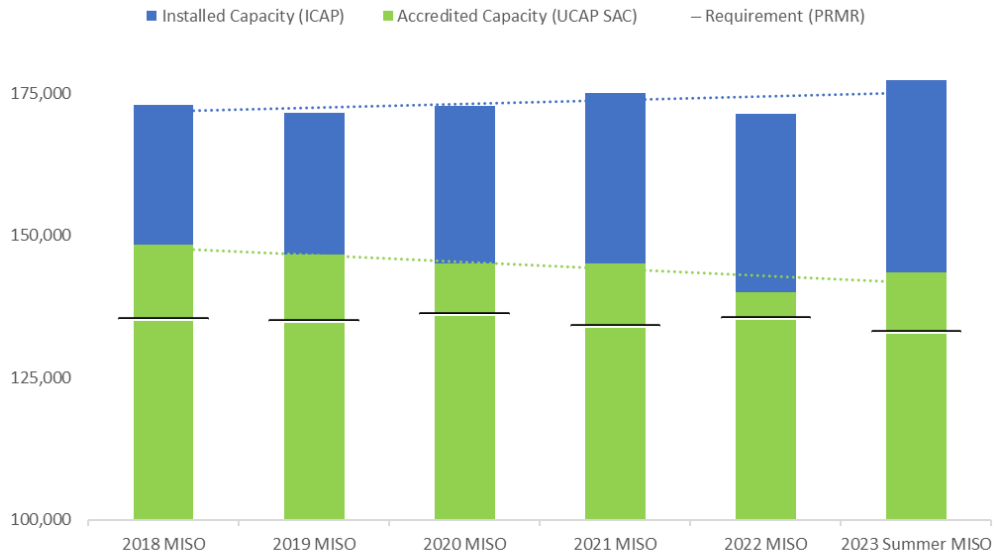


Note: Generation used to meet the Summer and Spring LCR was priced at or lower than MISO South region Auction Clearing Price.

Chart with all seasons included in appendix on slide 36.

Adequate supply this summer and the resulting prices do not reflect the continued risks posed by the portfolio transition

- Impacts of the seasonal construct such as reduced summer PRM and seasonal accounting of retirements contributed to the surplus capacity.
- Reduced load forecasts and actions taken by members such as delayed retirements and increased imports may not be repeatable.
- Historic trends and projections based on member-announced plans* show a continued decline in accredited capacity even as installed capacity increases.



Urgent reforms to MISO's resource adequacy and market design are necessary to ensure continued reliability.

PRM: Planning Reserve Margin

* From 2022 Regional Resource Assessment Survey Results

MISO's workplan includes the work needed to evolve our plans and processes to meet the Reliability Imperative

Issue	Challenges	Mitigation
Fleet Change	Declining accredited capacity, declining reserve margins, and changing risk profile	• Continue developing attributes criteria and improved accreditation for resources
Reliability Planning	Reliability is not a yes/no criteria, it's a continuum that considers numerous factors and range or risk tolerance	• Update loss-of-load assessments • Develop Reliability Based Demand Curve • Ensure alignment of market and reliability procedures during extreme events
Forecasting	Load and intermittent generation forecasting needs to be more accurate	• Improve forecasting data and methods, including uncertainty forecasting. • Enhance control room automation
Intraregional and Interregional Support	Increased reliance on geographic scope Increased reliance on gas industry performance during critical events	• Continue developing transmission (JTIQ and LRTP Tranche 2) • Improved agreements with neighbors for emergency scenarios • Improve gas/electric coordination

Next Steps

- **May 19** – Conference call presentation of PRA results
- **May 23**
  - Zonal Deliverability Benefits presented at the May RASC
  - MISO publishes cleared LMRs to Operations tools
- **June 1** – New Planning Year starts
- **June 19** – Posting of PRA masked offer data per Module E 69.A.7.4

https://help.misoenergy.org/support/

Appendix

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Acronyms

ACP: Auction Clearing Price

ARC: Aggregator of Retail Customers

BTMG: Behind the Meter Generator

CIL: Capacity Import Limit

CEL: Capacity Export Limit

CONE: Cost of New Entry

DR: Demand Resource

EE: Energy Efficiency

ER: External Resource

ERZ: External Resource Zones

FRAP: Fixed Resource Adequacy Plan

ICAP: Installed Capacity

IMM: Independent Market Monitor

LCR: Local Clearing Requirement

LMR: Load Modifying Resource

LRZ: Local Resource Zone

LSE: Load Serving Entity

PRA: Planning Resource Auction

PRM: Planning Reserve Margin

PRMR: Planning Reserve Margin Requirement

RASC: Resource Adequacy Sub-Committee

SAC: Seasonal Accredited Capacity

SS: Self Schedule

SFT: Simultaneous Feasibility Test

UCAP: Unforced Capacity

ZIA: Zonal Import Ability

ZRC: Zonal Resource Credit

Summer 2023 PRA Results by Zone

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	ERZ	System
PRMR	18,234.4	13,371.2	10,491.9	9,559.5	8,115.3	18,107.7	21,232.8	7,915.8	21,234.3	4,628.3	N/A	132,891.2
Offer Submitted (Including FRAP)	21,293.8	14,191.9	11,323.8	8,482.5	7,392.0	15,473.9	21,730.0	11,083.2	21,198.7	4,755.5	2,448.6	139,373.9
FRAP	14,042.9	11,237.4	4,245.7	537.4	0.0	949.7	1,457.5	535.2	166.2	1,315.6	309.1	34,796.7
Self Scheduled (SS)	5,302.9	2,431.7	6,557.7	5,673.2	7,372.0	9,940.7	19,918.7	9,777.1	19,359.6	3,071.6	1,569.6	90,974.8
Non-SS Offer Cleared	168.9	443.5	517.4	1,312.0	20.0	3,423.1	4.4	449.4	331.5	321.7	127.8	7,119.7
Committed (Offer Cleared + FRAP)	19,514.7	14,112.6	11,320.8	7,522.6	7,392.0	14,313.5	21,380.6	10,761.7	19,857.3	4,708.9	2,006.5	132,891.2
LCR	15,076.1	10,552.0	6,806.3	2,935.0	6,529.5	11,567.6	18,785.5	7,134.5	18,931.4	3,690.0	-	N/A
CIL	5,301	3,477	6,108	7,884	3,576	8,492	5,087	4,139	5,268	3,064	-	N/A
ZIA	5,299	3,477	6,043	6,992	3,576	8,092	5,087	4,091	4,456	3,064	-	N/A
Import	0.0	0.0	0.0	2,036.9	723.3	3,794.2	0.0	0.0	1,377.0	0.0	-	7,931.4
CEL	3,959	2,550	4,310	NLF*	NLF*	2,703	3,953	5,503	1,574	1,794	-	N/A
Export	1,280.3	741.4	828.9	0.0	0.0	0.0	147.8	2,845.9	0.0	80.6	2,006.5	7,931.4
ACP ($/MW-Day)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	N/A

Values displayed in MW UCAP **NLF = No Limit Found: Tier 1 & 2 source capacity is less than the study transfer limit*

Fall 2023 PRA Results by Zone

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	ERZ	System
PRMR	16,789.4	12,181.8	9,979.6	8,811.7	7,645.6	17,237.2	19,760.9	7,580.1	21,082.1	4,727.0	N/A	125,795.4
Offer Submitted (Including FRAP)	20,783.4	14,173.2	11,628.6	8,303.0	6,793.8	15,298.0	20,849.7	10,546.1	20,848.3	5,087.3	2,070.8	136,382.2
FRAP	12,864.0	10,064.9	3,936.7	428.5	0.0	926.5	1,410.5	469.8	164.4	1,354.3	169.8	31,789.4
Self Scheduled (SS)	4,950.8	2,858.9	6,104.5	5,850.8	6,740.3	9,203.7	18,745.0	8,815.1	17,527.4	3,307.5	1,528.5	85,632.5
Non-SS Offer Cleared	691.0	580.0	689.7	1,211.5	0.0	3,160.7	4.5	157.9	1,250.9	370.6	256.7	8,373.5
Committed (Offer Cleared + FRAP)	18,505.8	13,503.8	10,730.9	7,490.8	6,740.3	13,290.9	20,160.0	9,442.8	18,942.7	5,032.4	1,955.0	125,795.4
LCR	13,064.2	8,764.3	0.0	4,552.3	4,358.7	13,290.9	20,059.0	5,608.2	18,942.7	4,307.8	-	N/A
CIL	6,528	4,411	14,375	5,173	5,380	6,070	4,285	4,705	6,045	2,425	-	N/A
ZIA	6,526	4,411	14,310	4,281	5,380	5,670	4,285	4,657	5,233	2,425	-	N/A
Import	0.0	0.0	0.0	1,320.9	905.3	3,946.3	0.0	0.0	2,139.4	0.0	-	8,311.9
CEL	3,804	3,577	4,354	NLF*	1,992	1,701	3,990	5,080	1,526	2,878	-	N/A
Export	1,716.4	1,322.0	751.3	0.0	0.0	0.0	399.1	1,862.7	0.0	305.4	1,955.0	8,311.9
ACP ($/MW-Day)	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	59.21	15.00	15.00	N/A

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Winter2023/24 PRA Results by Zone

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	ERZ	System
PRMR	18,245.5	11,708.9	10,215.4	9,093.9	8,231.1	18,290.9	16,927.7	8,518.6	22,110.4	4,761.8	N/A	128,104.2
Offer Submitted (Including FRAP)	22,178.0	13,934.4	13,349.6	7,738.9	6,906.5	14,999.3	21,569.9	10,042.5	21,215.3	5,058.7	2,489.4	139,482.5
FRAP	13,361.7	9,638.1	4,464.0	459.1	0.0	854.0	1,316.7	396.9	149.3	1,788.9	299.5	32,728.2
Self Scheduled (SS)	7,639.4	2,649.7	6,626.9	6,286.2	6,906.5	10,182.7	19,356.0	9,642.9	17,283.8	3,145.6	1,817.7	91,537.4
Non-SS Offer Cleared	64.7	1,024.6	379.3	645.2	0.0	710.3	4.3	0.0	965.0	29.1	16.1	3,838.6
Committed (Offer Cleared + FRAP)	21,065.8	13,312.4	11,470.2	7,390.5	6,906.5	11,747.0	20,677.0	10,039.8	18,398.1	4,963.6	2,133.3	128,104.2
LCR	15,797.1	8,596.5	3,628.8	6,009.0	6,022.8	10,854.4	15,693.1	5,691.3	18,398.1	4,519.4	-	N/A
CIL	4,937	4,905	11,039	3,928	3,811	8,818	6,340	4,729	6,080	2,396	-	N/A
ZIA	4,935	4,905	10,974	3,036	3,811	8,418	6,340	4,681	5,268	2,396	-	N/A
Import	0.0	0.0	0.0	1,703.4	1,324.6	6,543.9	0.0	0.0	3,712.3	0.0	-	13,284.2
CEL	3,501	4,198	7,002	NLF*	6,348	1,242	4,350	5,351	877	1,980	-	N/A
Export	2,820.3	1,603.5	1,254.8	0.0	0.0	0.0	3,749.3	1,521.2	0.0	201.8	2,133.3	13,284.2
ACP ($/MW-Day)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	18.66	2.00	2.00	N/A

Values displayed in MW UCAP **NLF = No Limit Found: Tier 1 & 2 source capacity is less than the study transfer limit*

Spring 2024 PRA Results by Zone

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	ERZ	System
PRMR	17,304.2	12,009.8	9,590.0	8,033.5	7,392.2	17,552.4	19,038.9	7,678.5	21,272.9	4,516.7	N/A	124,389.1
Offer Submitted (Including FRAP)	19,822.1	14,216.1	11,399.5	8,082.2	7,180.0	14,991.5	19,772.5	10,728.6	20,962.5	4,931.4	2,351.8	134,438.2
FRAP	12,916.5	10,051.5	3,934.4	411.2	0.0	892.0	1,320.2	362.7	151.0	1,388.7	307.4	31,735.6
Self Scheduled (SS)	5,624.3	2,842.2	6,037.4	5,762.5	6,014.5	9,298.6	17,395.3	9,377.4	18,162.1	3,125.0	1,540.1	85,179.4
Non-SS Offer Cleared	54.9	1,031.4	888.5	1,325.8	0.0	2,742.4	104.0	413.7	714.9	79.2	119.3	7,474.1
Committed (Offer Cleared + FRAP)	18,595.7	13,925.1	10,860.3	7,499.5	6,014.5	12,933.0	18,819.5	10,153.8	19,028.0	4,592.9	1,966.8	124,389.1
LCR	13,171.6	8,039.5	5,175.3	3,539.5	5,829.2	10,978.3	15,654.3	5,907.1	18,105.2	4,303.5	-	N/A
CIL	6,185	4,454	7,675	5,906	3,881	8,162	5,559	4,606	6,250	2,144	-	N/A
ZIA	6,183	4,454	7,610	5,014	3,881	7,762	5,559	4,558	5,438	2,144	-	N/A
Import	0.0	0.0	0.0	534.0	1,377.7	4,619.4	219.4	0.0	2,244.9	0.0	-	8,995.4
CEL	4,321	3,679	6,173	NLF*	3,724	2,344	4,413	5,472	2,240	2,720	-	N/A
Export	1,291.5	1,915.3	1,270.3	0.0	0.0	0.0	0.0	2,475.3	0.0	76.2	1,966.8	8,995.4
ACP ($/MW-Day)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	N/A

Values displayed in MW UCAP **NLF = No Limit Found: Tier 1 & 2 source capacity is less than the study transfer limit*

Supply Offered and Cleared Comparison Trend

	Offered (ZRC)			Cleared (ZRC)		
Planning Resource	2021-22	2022-23	Summer 23-24	2021-22	2022-23	Summer 23-24
Generation	125,225	121,506.5	122,375.6	118,884	118,745.0	116,989.7
External Resources	3,914	3,638.9	4,514.6	3,798	3,638.9	4,072.5
Behind the Meter Generation	4,131	4,169.3	4,175.2	4,068	4,169.3	4,129.4
Demand Resources	7,294	7,591.4	8,303.5	7,152	7,541.5	7,694.6
Energy Efficiency	0.0	0.0	5.0	0.0	0.0	5.0
Total	**140,564**	**136,906.1**	**139,373.9**	**133,903**	**134,094.7**	**132,891.2**

2023-2024 Seasonal Supply Offered and Cleared

	Offered (ZRC)				Cleared (ZRC)			
Planning Resource	Summer 2023	Fall 2023	Winter 2023-2024	Spring 2024	Summer 2023	Fall 2023	Winter 2023-2024	Spring 2024
Generation	122,375.6	121,403.5	122,375.6	121,403.5	116,989.7	111,713.8	116,989.7	110,195.8
External Resources	4,514.6	4,095.4	4,514.6	4,095.4	4,072.5	3,979.6	4,072.5	3,409.1
Behind the Meter Generation	4,175.2	3,874.2	4,175.2	3,874.2	4,129.4	3,842.8	4,129.4	4,058.9
Demand Resources	8,303.5	7,004.2	8,303.5	7,004.2	7,694.6	6,254.4	7,694.6	6,720.0
Energy Efficiency	5.0	4.9	5.0	4.9	5.0	4.8	5.0	5.3
Total	**139,373.9**	**136,382.2**	**139,373.9**	**136,382.2**	**132,891.2**	**125,795.4**	**132,891.2**	**124,389.1**

Historical Auction Clearing Price Comparison

PY	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	ERZs
2015-2016	$3.48			$150.00	$3.48			$3.29		N/A	N/A
2016-2017	$19.72	$72.00						$2.99			N/A
2017-2018	$1.50										N/A
2018-2019	$1.00	$10.00									N/A
2019-2020	$2.99						$24.30	$2.99			
2020-2021	$5.00						$257.53	$4.75	$6.88	$4.75	$4.89-$5.00
2021-2022	$5.00							$0.01			$2.78-$5.00
2022-2023	$236.66							$2.88			$2.88-236.66
Summer 2023-2024	$10.00										

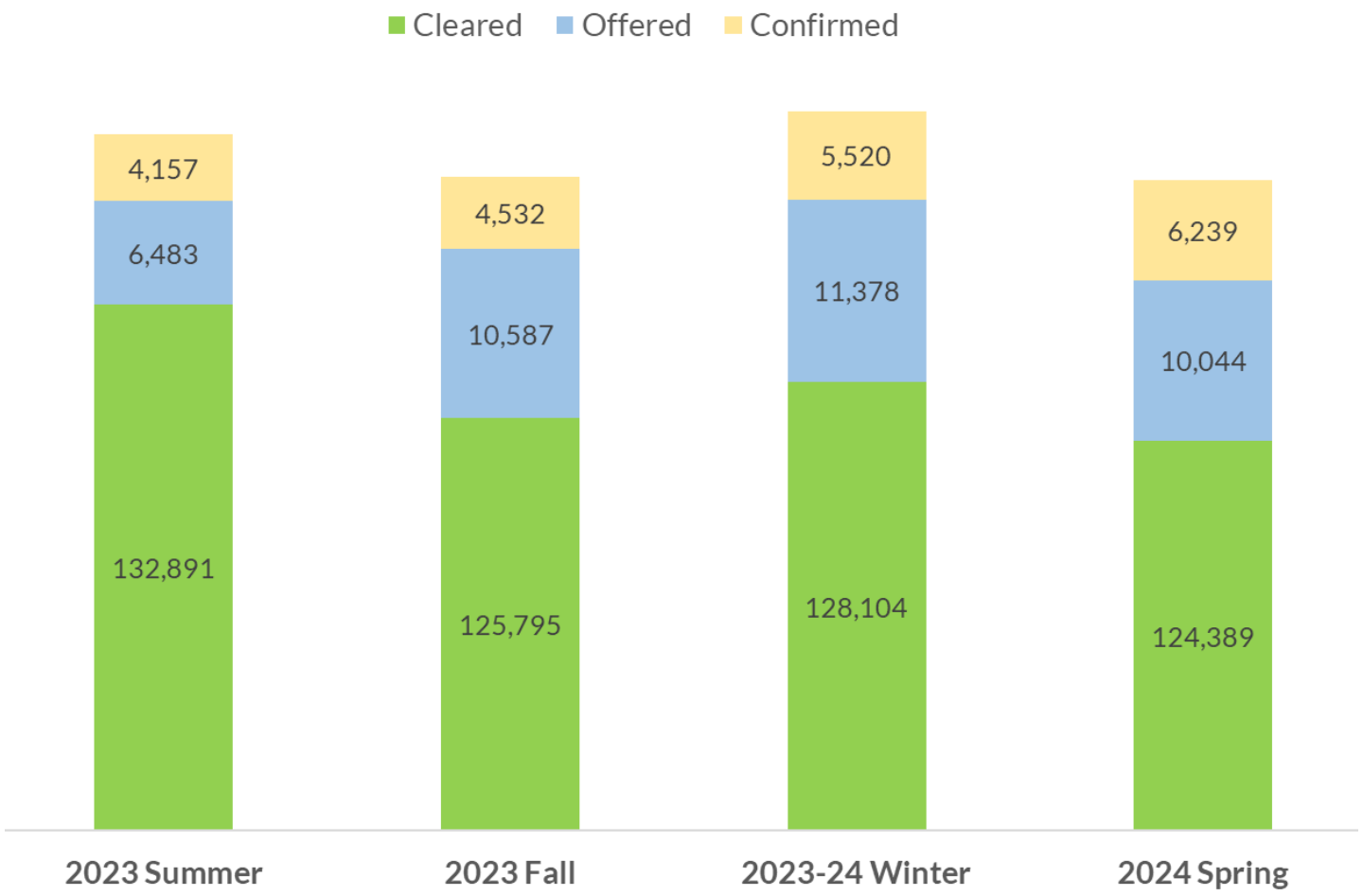
- Auction Clearing Prices shown in $/MW-Day

2023-2024 Seasonal Auction Clearing Price Comparison

PY	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	ERZs
Summer	$10.00										
Fall	$15.00								$59.21	$15.00	
Winter	$2.00								$18.88	$2.00	
Spring	$10.00										
IMM Conduct Threshold	28.54	28.01	27.01	28.00	30.02	27.01	29.02	26.00	25.78	25.70	30.02
Cost of New Entry (Daily)	285.40	280.11	270.11	280.00	300.22	270.11	290.16	259.97	257.75	257.04	300.22
Cost of New Entry (Annual)	104,170	102,240	98,590	102,200	109,580	98,590	105,910	94,890	94,080	93,820	109,580

- There was price separation in the Fall and Winter for Zone 9 since it required higher priced supply within the zone to meet its local clearing requirement.
- Auction Clearing Prices shown in $/MW-Day
- Conduct Threshold is 10% of Cost of New Entry (CONE)

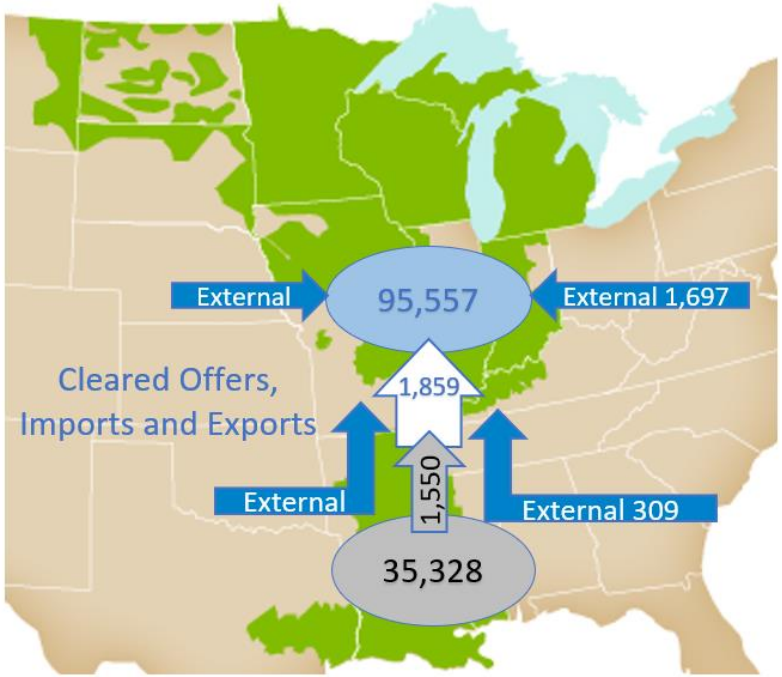
2023-2024 MISO-wide Seasonal Capacity



- Offered and confirmed capacity values are incremental
- PRMR equals cleared capacity
- Surplus is offered capacity in excess of PRMR

Summer 2023 – Offered Capacity & PRMR (MW)

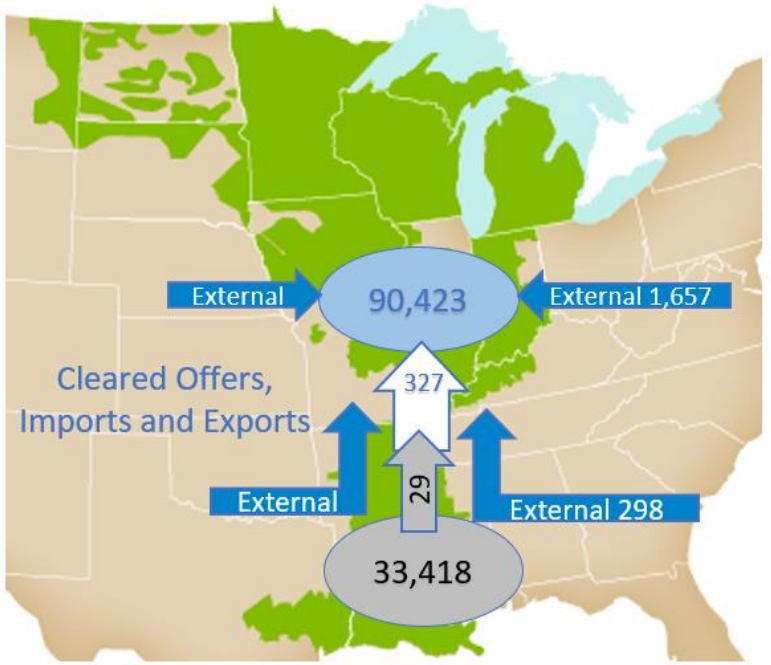
Summer 2023 –Cleared Capacity, Imports & Exports (MW)



Offers includes Fixed Resource Adequacy Plan (FRAP), Self-scheduled and price sensitive offers

Fall 2023 – Offered Capacity & PRMR (MW)

Fall 2023 –Cleared Capacity, Imports & Exports (MW)



Offers includes Fixed Resource Adequacy Plan (FRAP), Self-scheduled and price sensitive offers

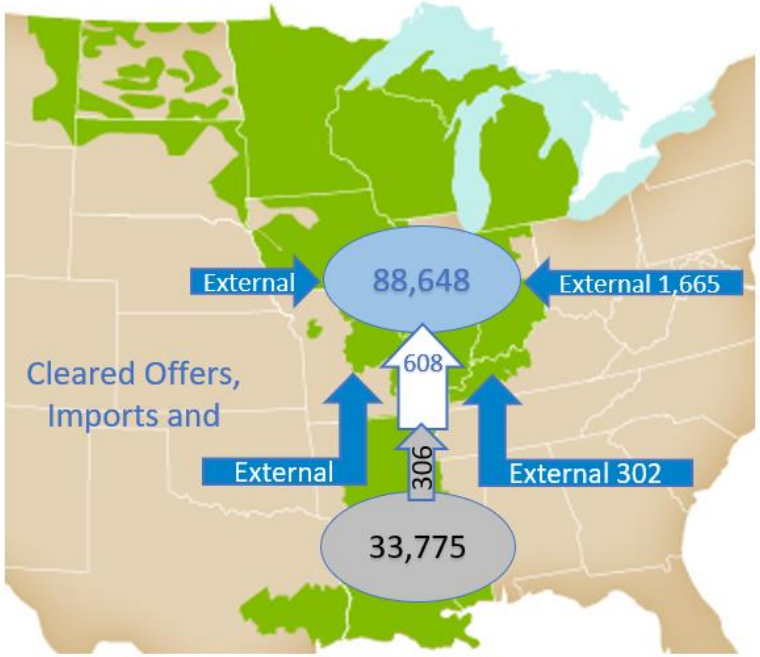
Winter 2023/24 – Offered Capacity & PRMR (MW)

Winter 2023/24 –Cleared Capacity, Imports & Exports (MW)

Offers includes Fixed Resource Adequacy Plan (FRAP), Self-scheduled and price sensitive offers

Spring 2024 – Offered Capacity & PRMR (MW)

Spring 2024 –Cleared Capacity, Imports & Exports (MW)

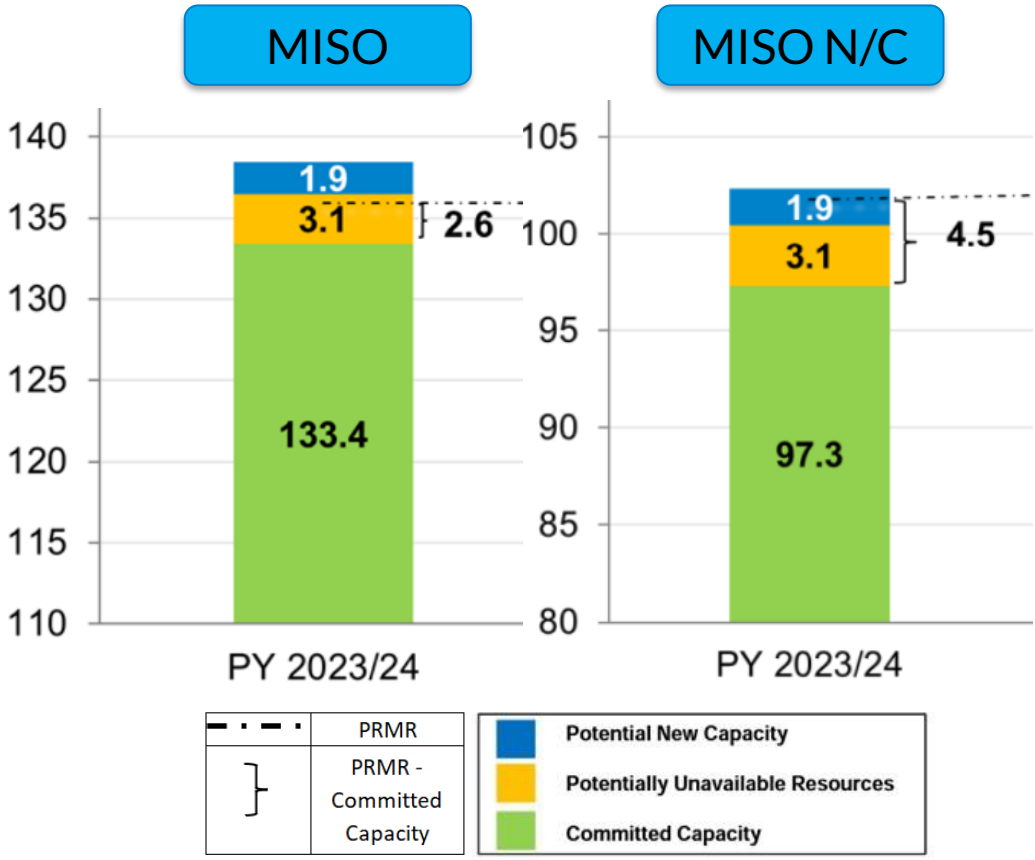


Offers includes Fixed Resource Adequacy Plan (FRAP), Self-scheduled and price sensitive offers

2022 OMS-MISO survey projected deficit in MISO and MISO N/C. Decreased PRMR, participation of potentially unavailable resources, increased imports and accreditation bridged the gap.

2022 OMS-Survey Results vs. Summer 2023 PRA outcomes

- Delayed retirements – 3.54 GW
  - 2.7 of the 3.1GW of Potentially Unavailable Resources offered into the 2023 Summer PRA
  - 443 MW reported as 0 in the 2022 OMS-MISO Survey participated in the 2023 Summer PRA
  - Additionally 400MW of resources participated in the 2023 Summer PRA that did not in 22-23 or the 2022 survey
- 3GW lower PRMR in 2023 Summer PRA vs. Survey comprised of lower PRM% and lower demand forecast
- 700MW new firm imports
- 750MW footprint wide accreditation increase for wind resources



MISO-wide, there was 2.6 GW more of **ZRCs offered** in the Summer 2023 than in 2022. Coal retirements offset by new gas, capacity addition from renewables and LMRs

Offers (GW)	2022	Summer 2023	Change
Gas	58.5	59.9	1.4
Wind	3.8	5.0	1.2
Solar	2.1	3.0	0.9
Water	6.3	6.6	0.3
Nuclear	11.3	11.3	0.0
Coal	40.4	38.9	-1.5
Other Fuels	6.7	6.3	-0.5
DR	7.6	8.3	0.7
Total Offers	**136.8**	**139.4**	**2.6**

Offers (GW)	2022	Summer 2023	Change
Gen	121.5	122.4	0.9
BTMG	4.2	4.2	0.0
ER	3.6	4.5	1.0
DR	7.6	8.3	0.7
Total Offers	**136.8**	**139.4**	**2.6**

There was 3.4 GW more of **Confirmed ICAP** in the Summer 2023 than in 2022. Coal retirements offset by new gas, capacity addition from renewables and LMRs

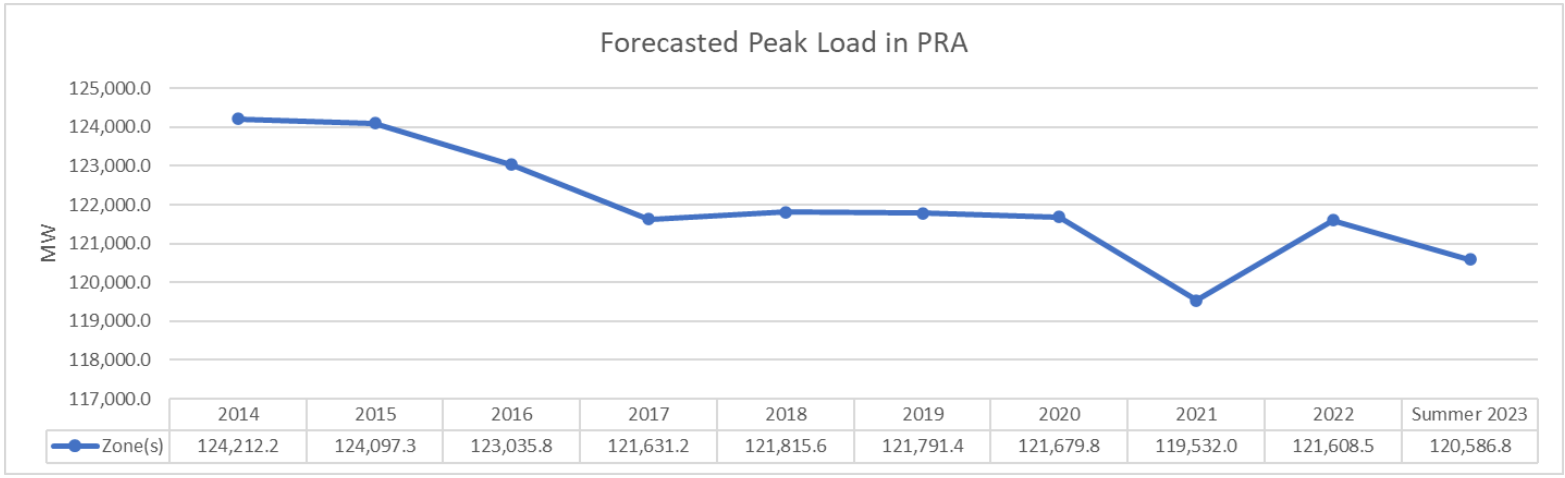
ICAP (GW)	2022	Summer 2023	Change
Gas	64.5	66.3	1.8
Wind	25.8	28.5	2.7
Solar	2.7	4.1	1.4
Water	6.7	6.9	0.2
Nuclear	12.0	12.0	0.0
Coal	47.7	45.4	-2.3
Other Fuels	7.5	7.4	-0.1
DR	7.1	7.5	0.5
Total Offers	**173.9**	**178.1**	**4.3**

ICAP (GW)	2022	Summer 2023	Change
Gen	158.6	161.2	2.6
BTMG	4.5	4.6	0.1
ER	3.7	4.7	1.1
DR	7.1	7.5	0.5
Total Offers	**173.9**	**178.1**	**4.3**

Coal retirements offset by new gas, surplus created with renewables and LMRs

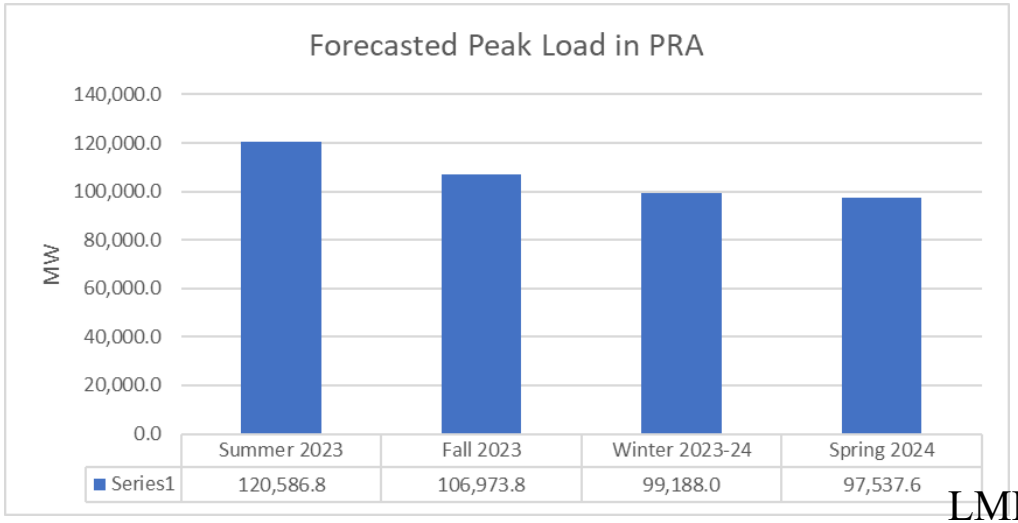
Forecasted Peak Load (CPF)

Year over year the summer CPF (-1.0 GW), PRM (-1.3%) and PRMR (2.44 GW) are lower.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	Summer 2023
Zone(s)	124,212.2	124,097.3	123,035.8	121,631.2	121,815.6	121,791.4	121,679.8	119,532.0	121,608.5	120,586.8

2023-2024 Seasonal Forecasted Peak

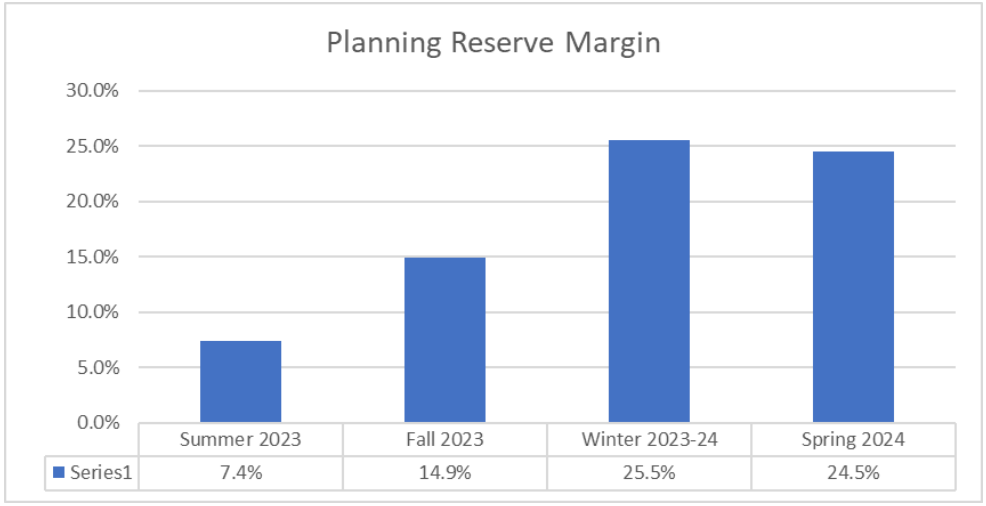


	Summer 2023	Fall 2023	Winter 2023-24	Spring 2024
Series1	120,586.8	106,973.8	99,188.0	97,537.6

Planning Reserve Margin (%)

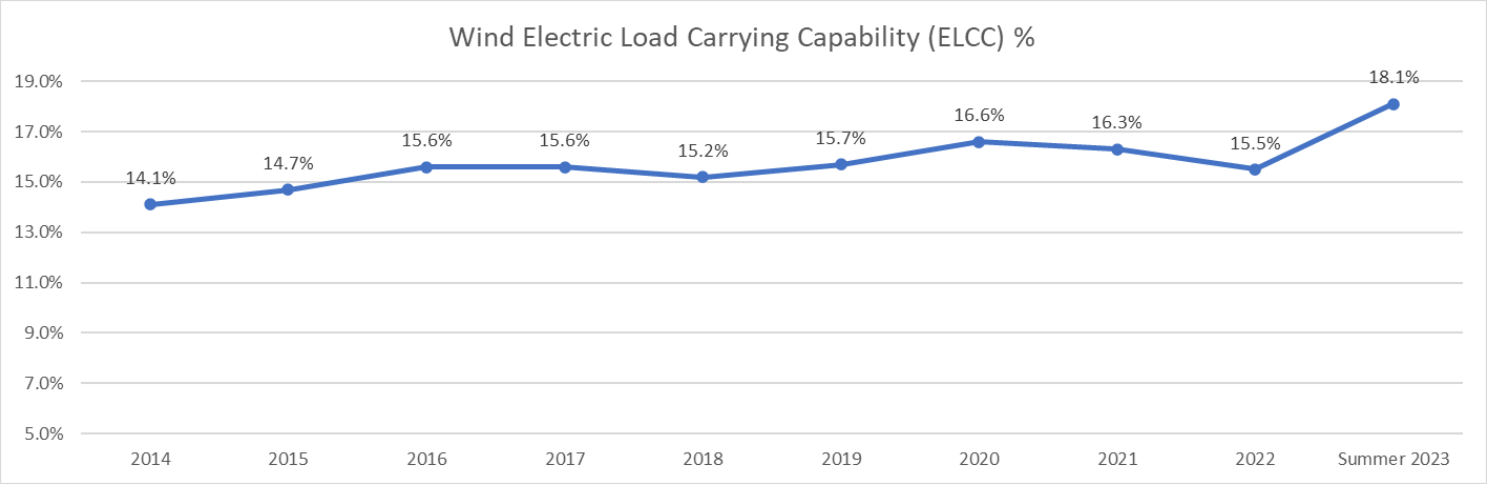
Historic PRM Trend

2023-2024 Seasonal PRM

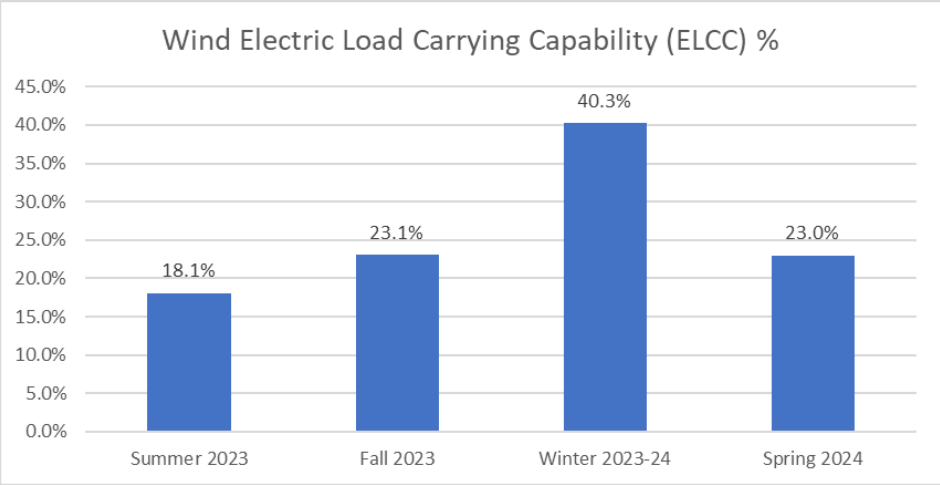


Wind Effective Load Carrying Capacity (%)

Historic ELCC Trend

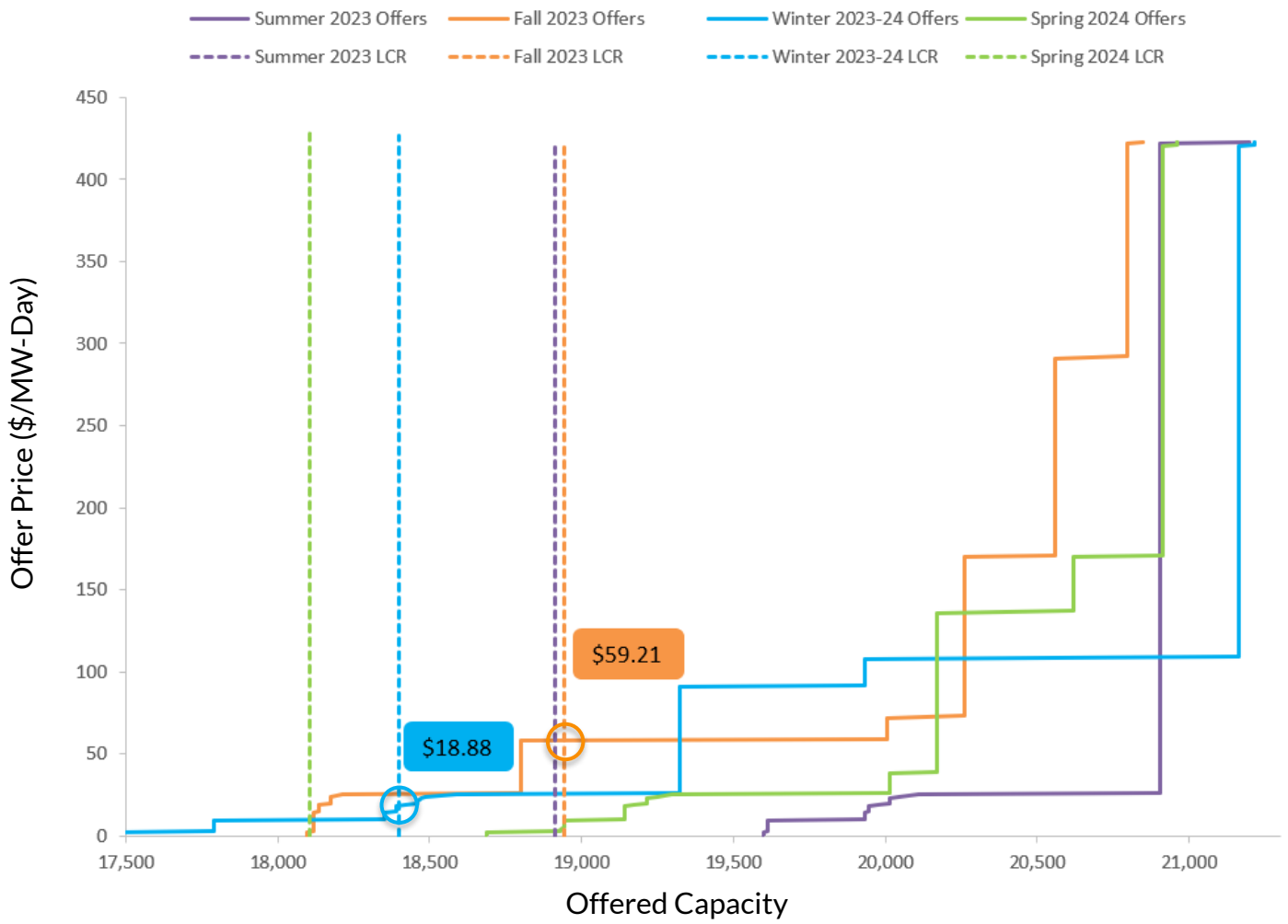


2023-24 ELCC Seasonal

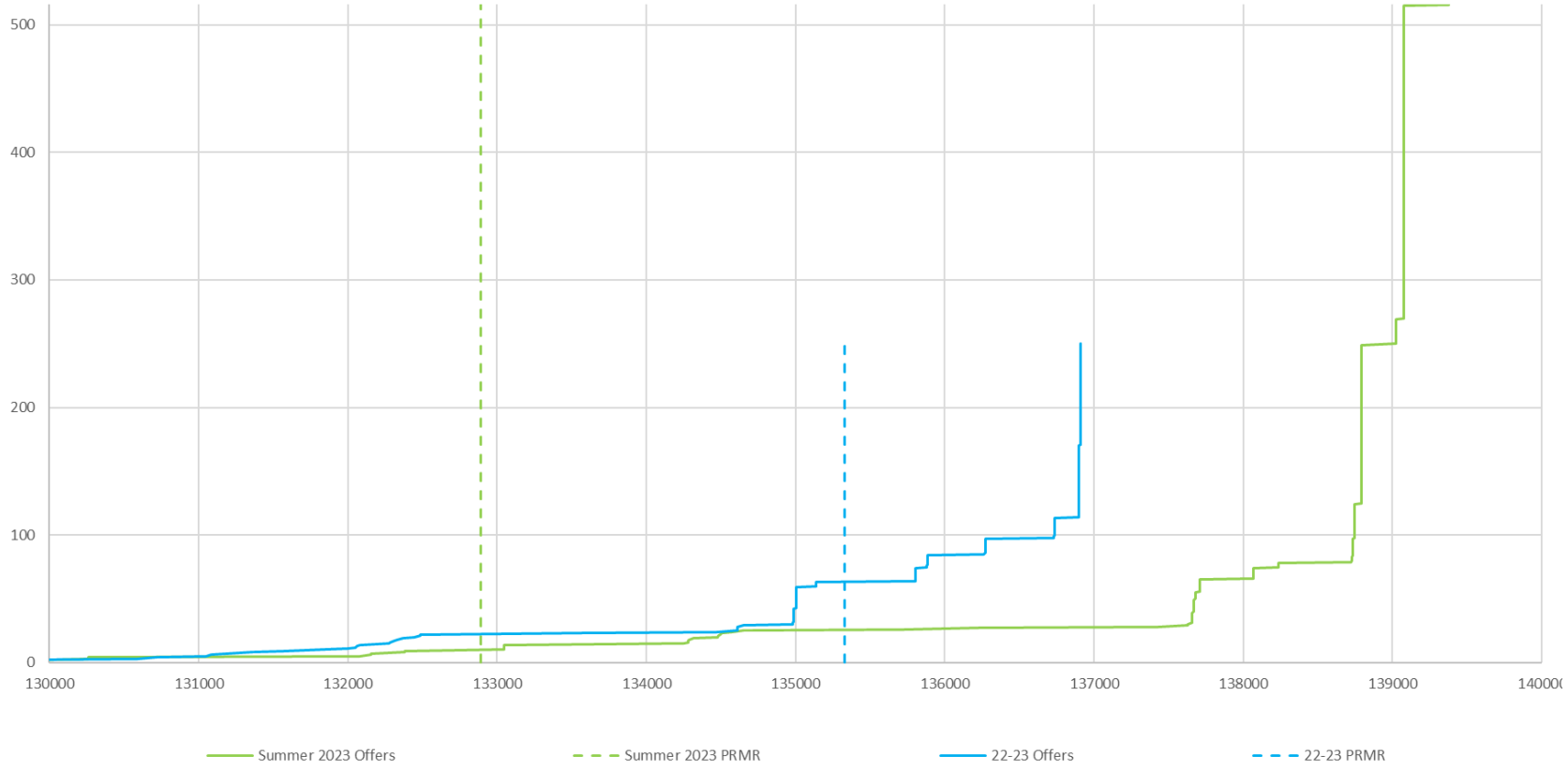


- No change to wind or solar accreditation methodology from previous years
- Methodology applied on a seasonal basis
- Wind ELCC and new solar capacity is established in the LOLE Study
- New solar
  - Summer, Fall, Spring 50%
  - Winter 5%

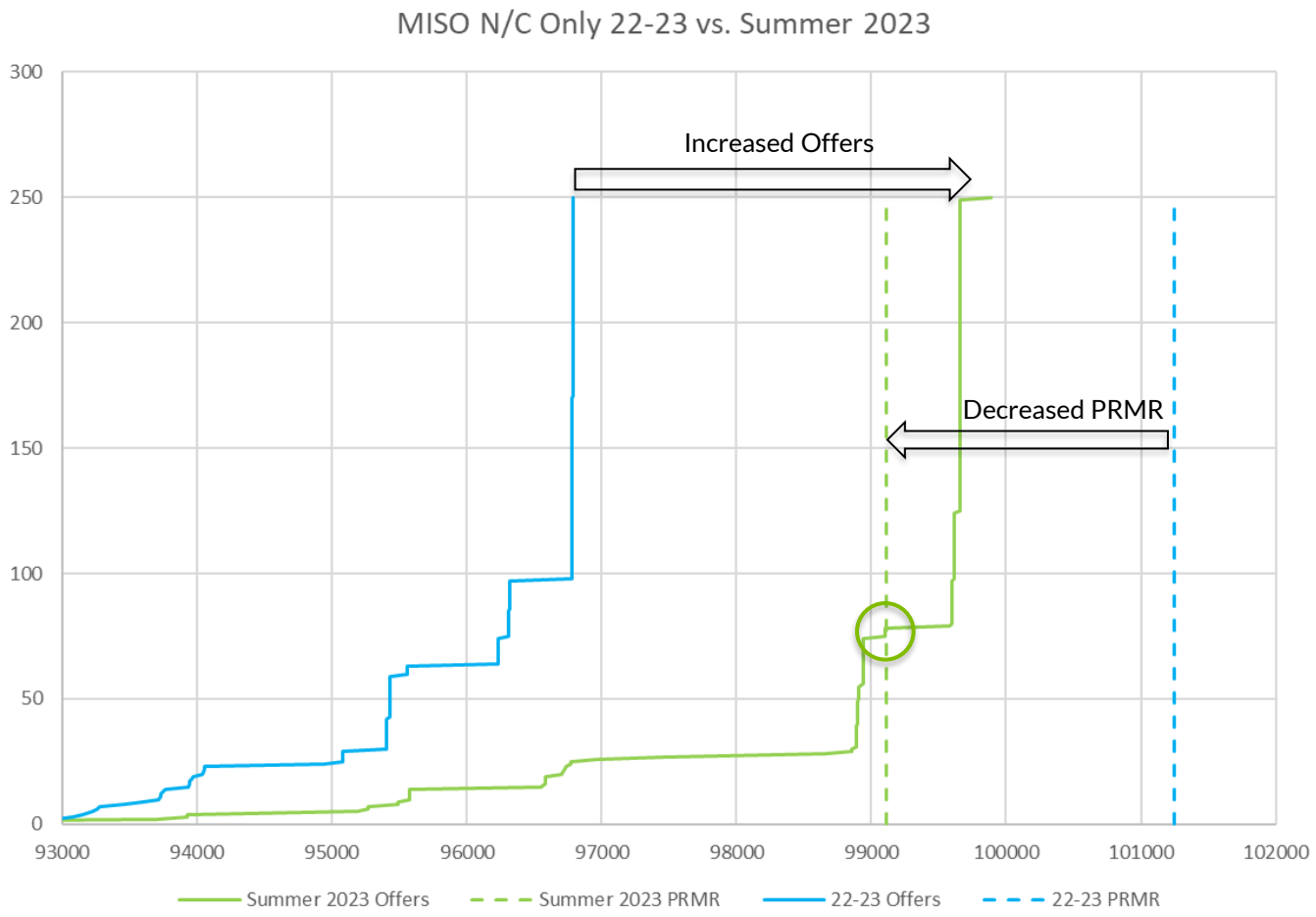
LRZ9 seasonal offer curves and local clearing requirements



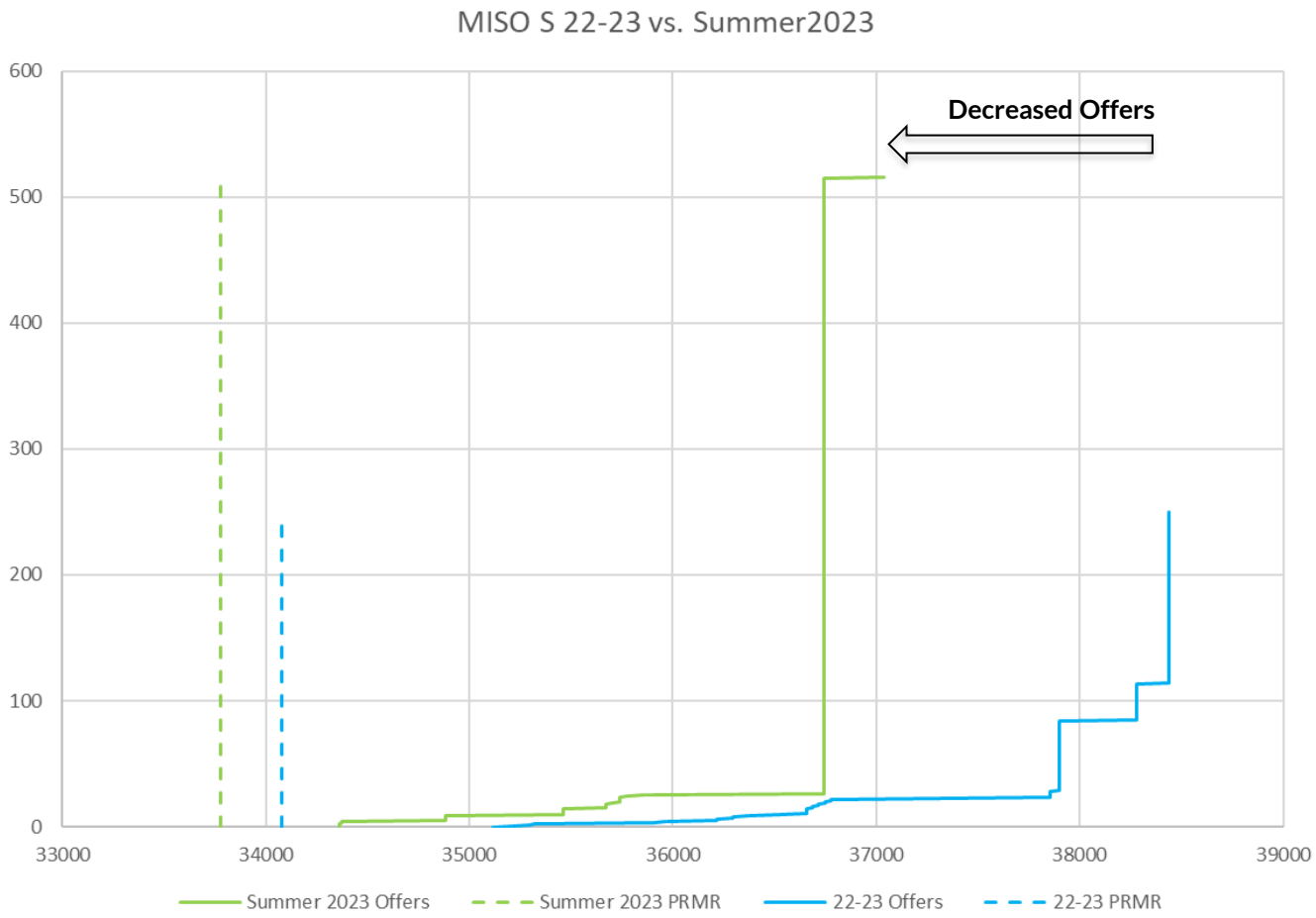
MISO PRMR and Supply curves
Summer 2023 vs. 2022-23PY



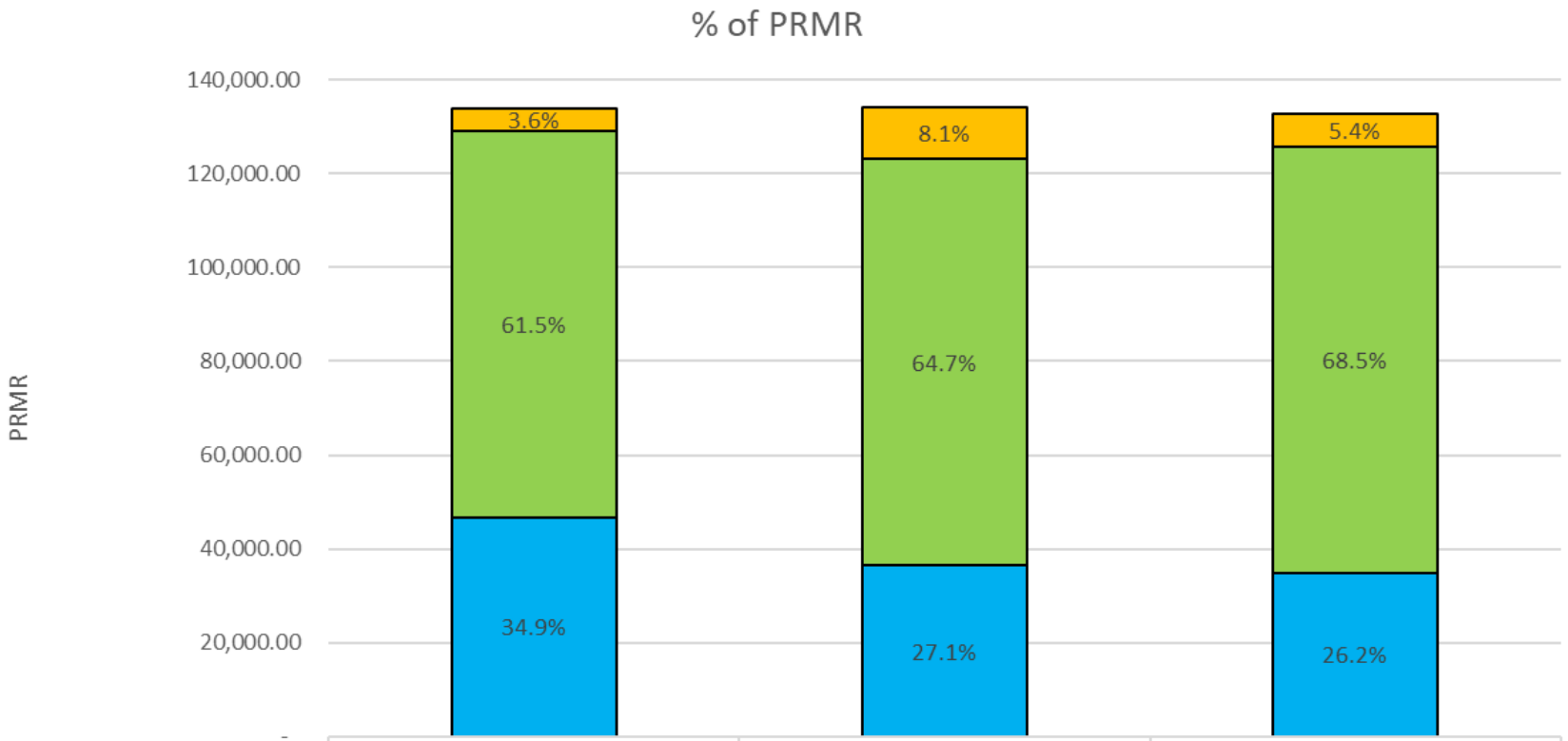
North/Central had sufficient capacity to meet PRMR ($79) without imports unlike PY 22-23 but utilized cheaper imports from MISO South and Externals



MISO South has capacity beyond the region's PRMR and exported to N/C but the offered capacity has decreased since last year

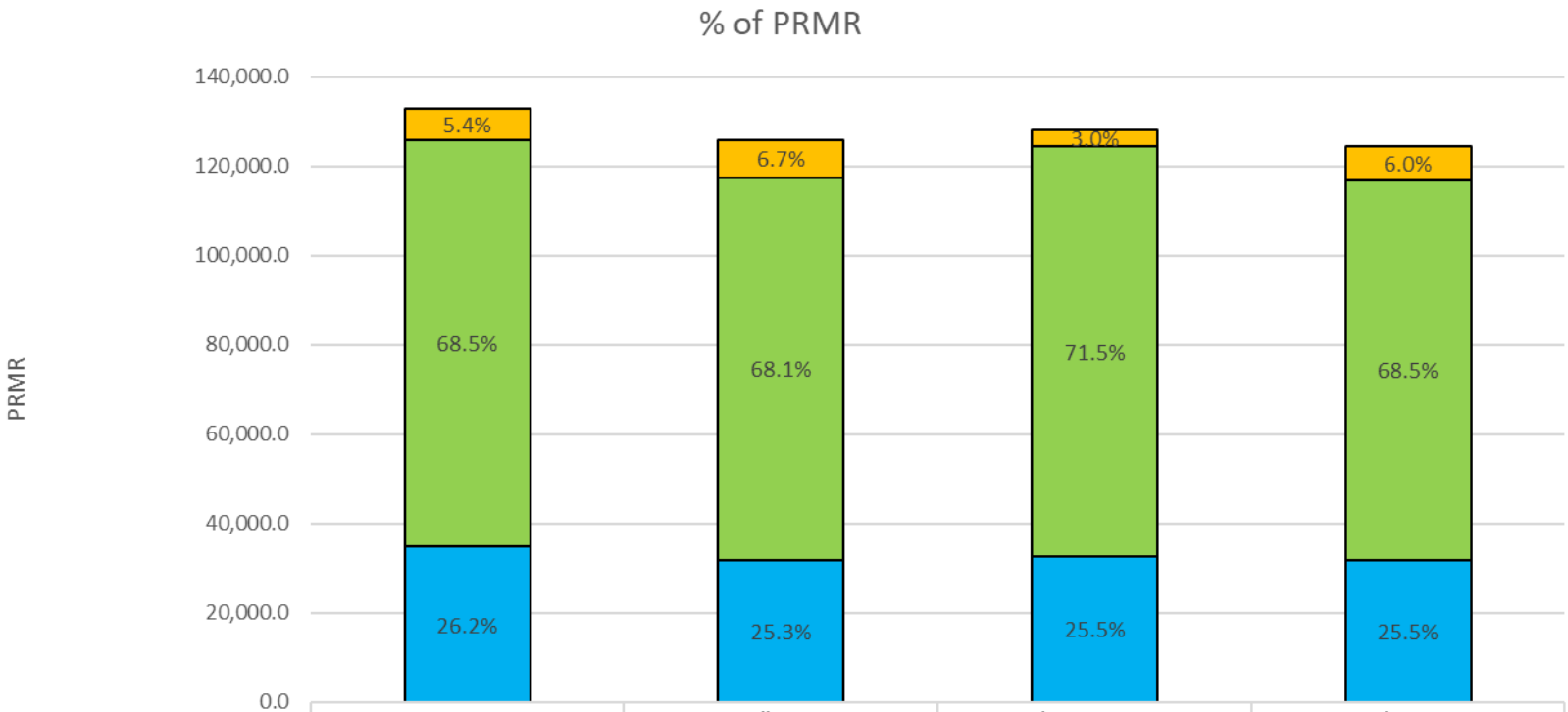


Most members continue to meet resource adequacy requirements through fixed plans and self-scheduling



	2021-22	2022-23	Summer 2023
Cleared Non-Self Scheduled	4,858.42	10,920.10	7,119.7
Self Scheduled	82,286.90	86,784.10	90,974.8
FRAP	46,757.40	36,391.80	34,796.7

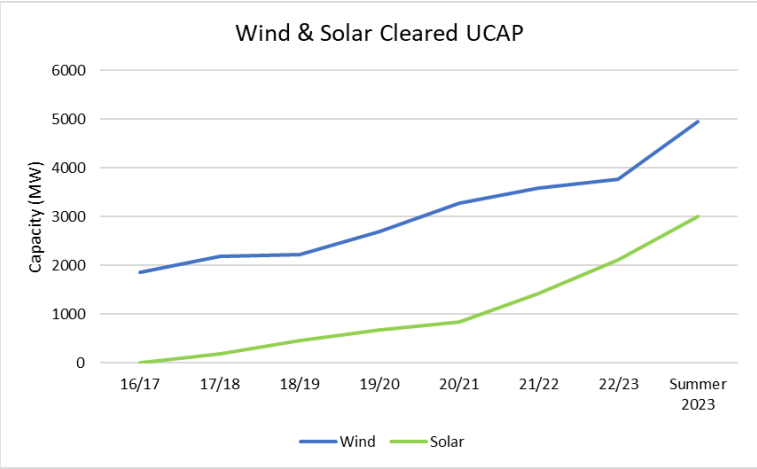
2023-2024 Seasonal Resource Adequacy Requirements are fulfilled similarly across all four seasons

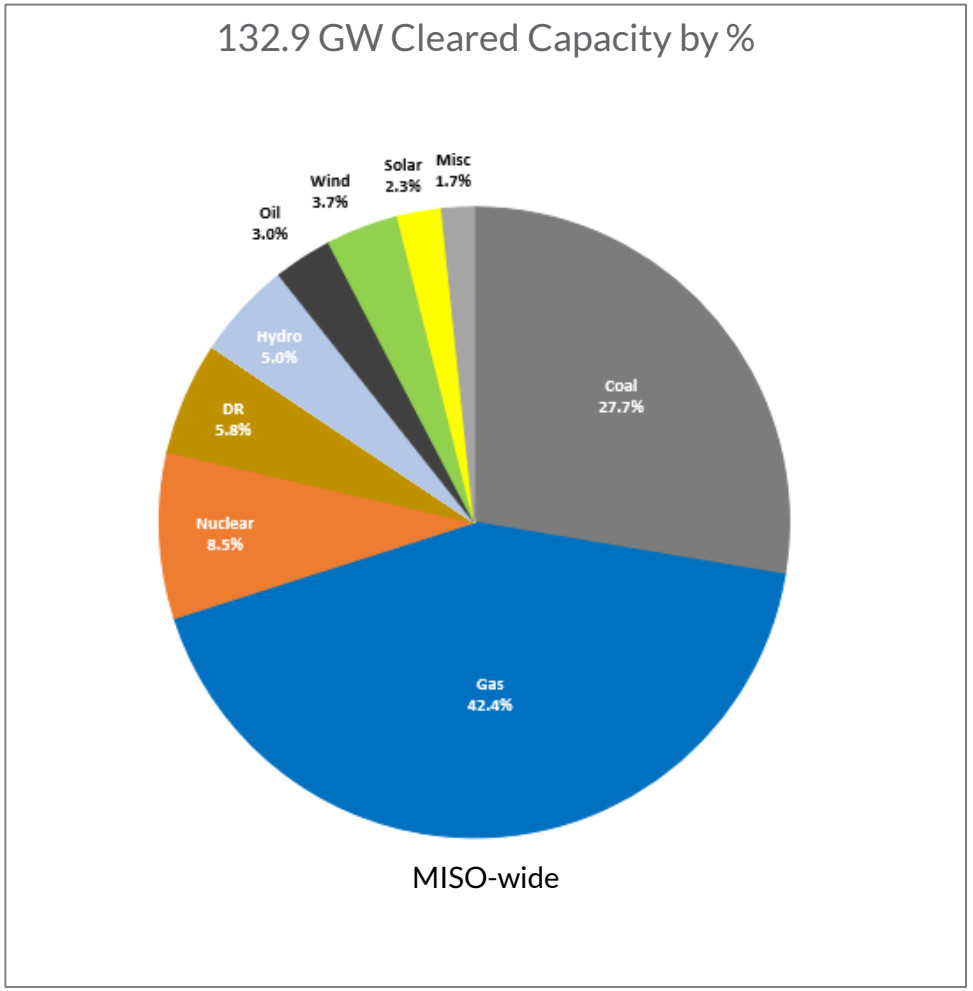


	Summer 2023	Fall 2023	Winter 2023-24	Spring 2024
Cleared Non-Self Scheduled	7,119.7	8373.5	3838.6	7474.1
Self Scheduled	90,974.8	85632.5	91537.4	85179.4
FRAP	34,796.7	31789.4	32728.2	31735.6

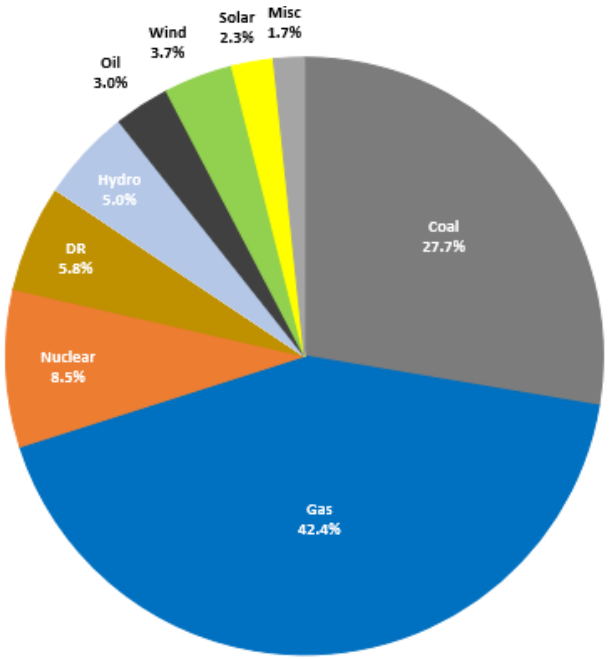
For the Summer 2023, although conventional generation still provides most of the capacity, wind and solar continue to grow

- 3.0 GW of solar cleared this year's auction—an increase of 42% from Planning Year 2022-23 (2.1 GW)
- Similarly, 5.0 GW of wind cleared this year, an increase of 32% compared to last year (3.8 GW)





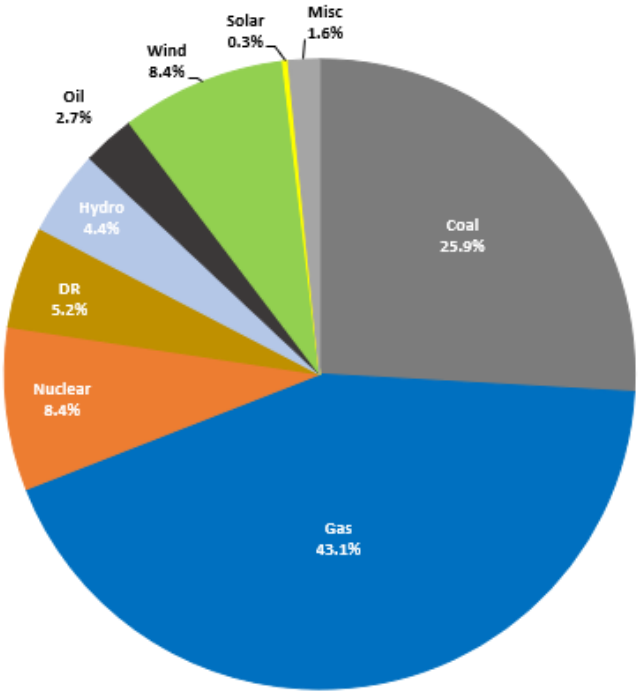
Winter PRMR is 4.8 GW (3.6%) lower than the summer. There were less thermal, hydro and solar resources and significantly more wind to meet PRMR in the Winter versus the Summer.



Summer 2023
Cleared Capacity

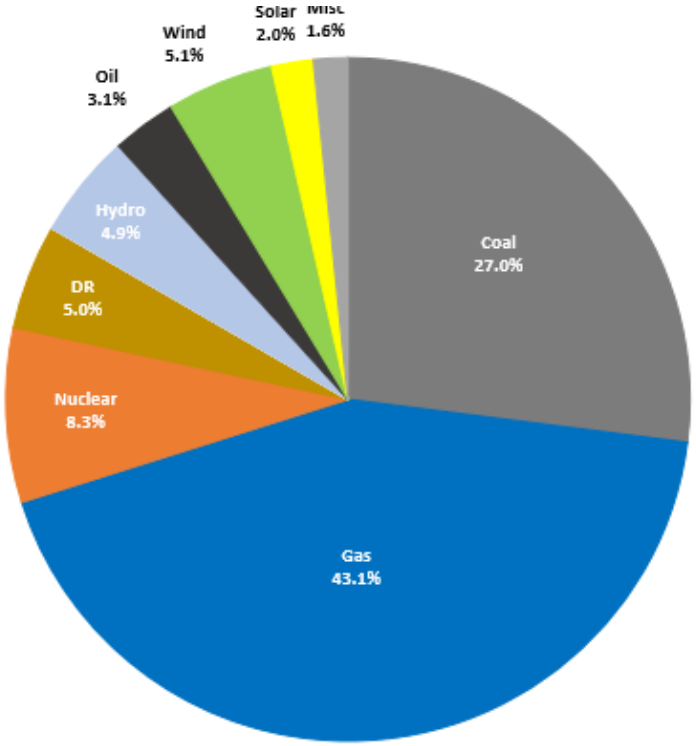
MISO-wide

Cleared ZRCs	Summer 2023	Winter 2023-24	Difference
Coal	36,749.7	33,177.9	3,571.8
Gas	56,384.1	55,276.0	1,108.1
Nuclear	11,317.7	10,708.4	609.3
DR	7,694.6	6,702.4	992.2
EE	5.0	6.7	-1.7
Hydro	6,604.1	5,599.4	1,004.7
Oil	3,980.1	3,423.6	556.5
Wind	4,952.2	10,800.2	-5,848.0
Solar	3,008.2	371.8	2,636.4
Misc	2,195.5	2,037.8	157.7
PRMR	132,891.2	128,104.2	4,787.0



Winter 2023-24
Cleared Capacity

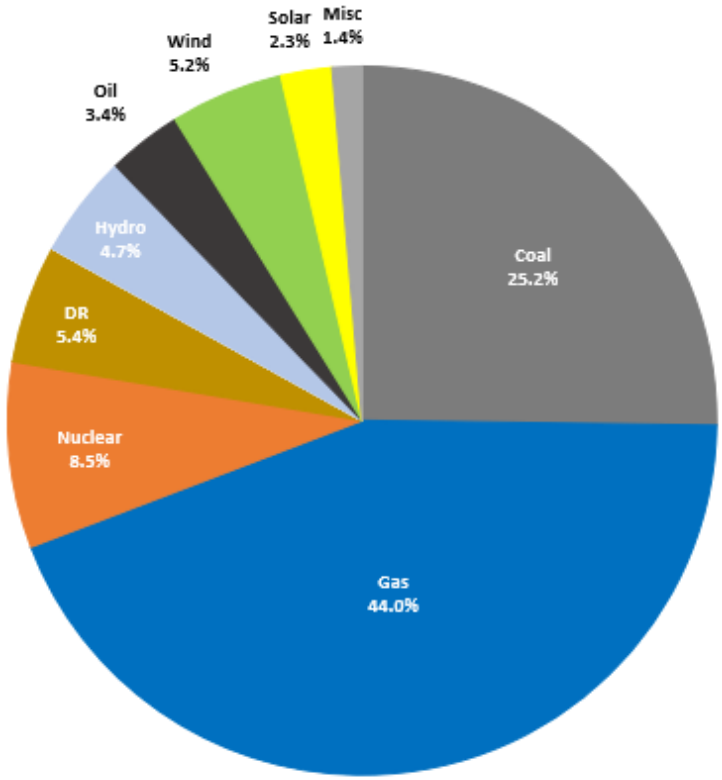
Fall 2023 and Spring 2024 - Cleared ZRCs and PRMR



Fall 2023
Cleared Capacity

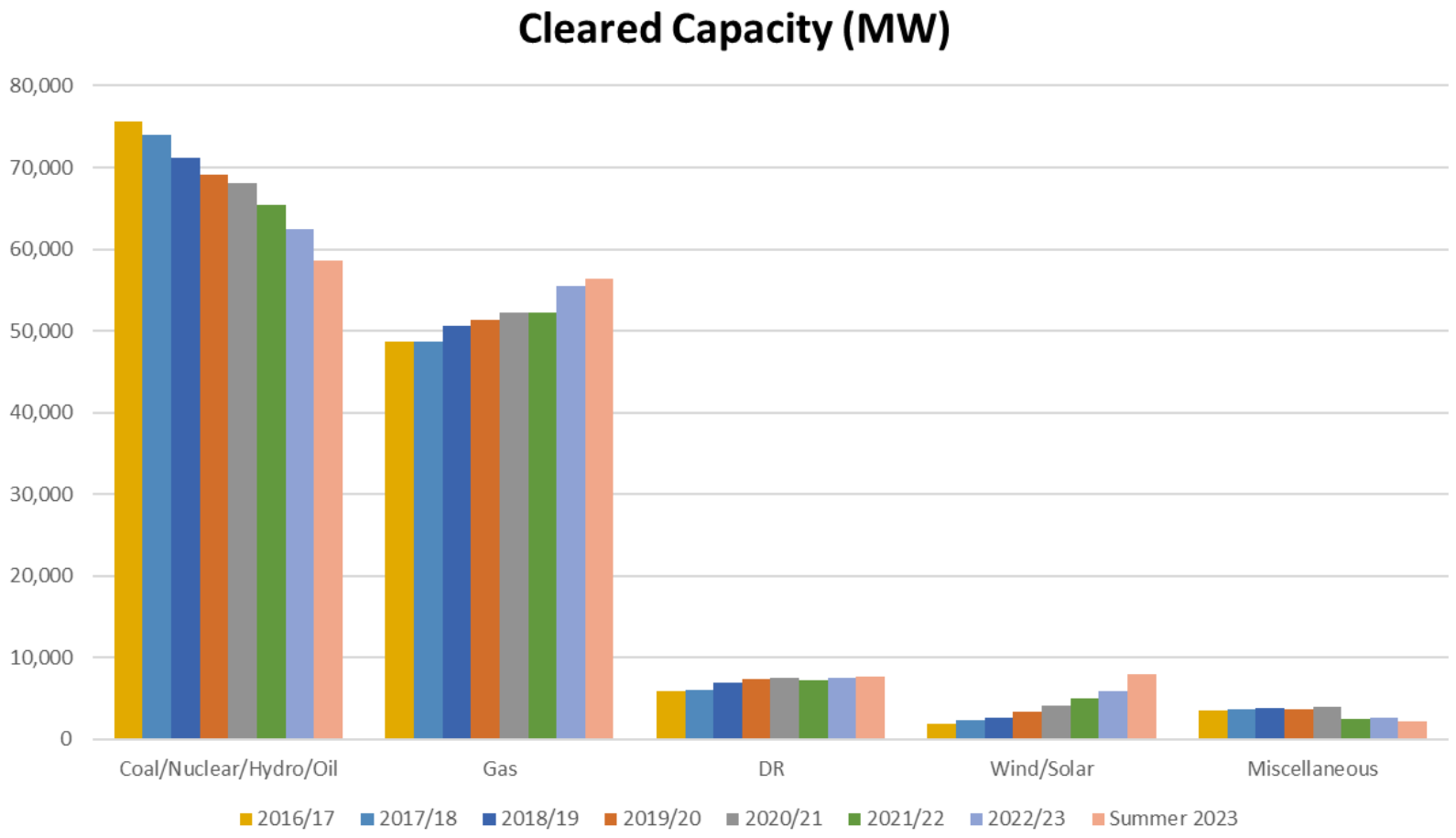
MISO-wide

Cleared ZRCs	Fall 2023	Spring 2024
Coal	33,978.5	31,366.6
Gas	54,243.2	54,701.3
Nuclear	10,382.2	10,539.4
DR	6,254.4	6,720.0
EE	4.8	5.3
Hydro	6,223.3	5,850.4
Oil	3,837.9	4,207.9
Wind	6,357.1	6,413.1
Solar	2,485.8	2,903.8
Misc	2,028.2	1,681.3
PRMR	125,795.4	124,389.1

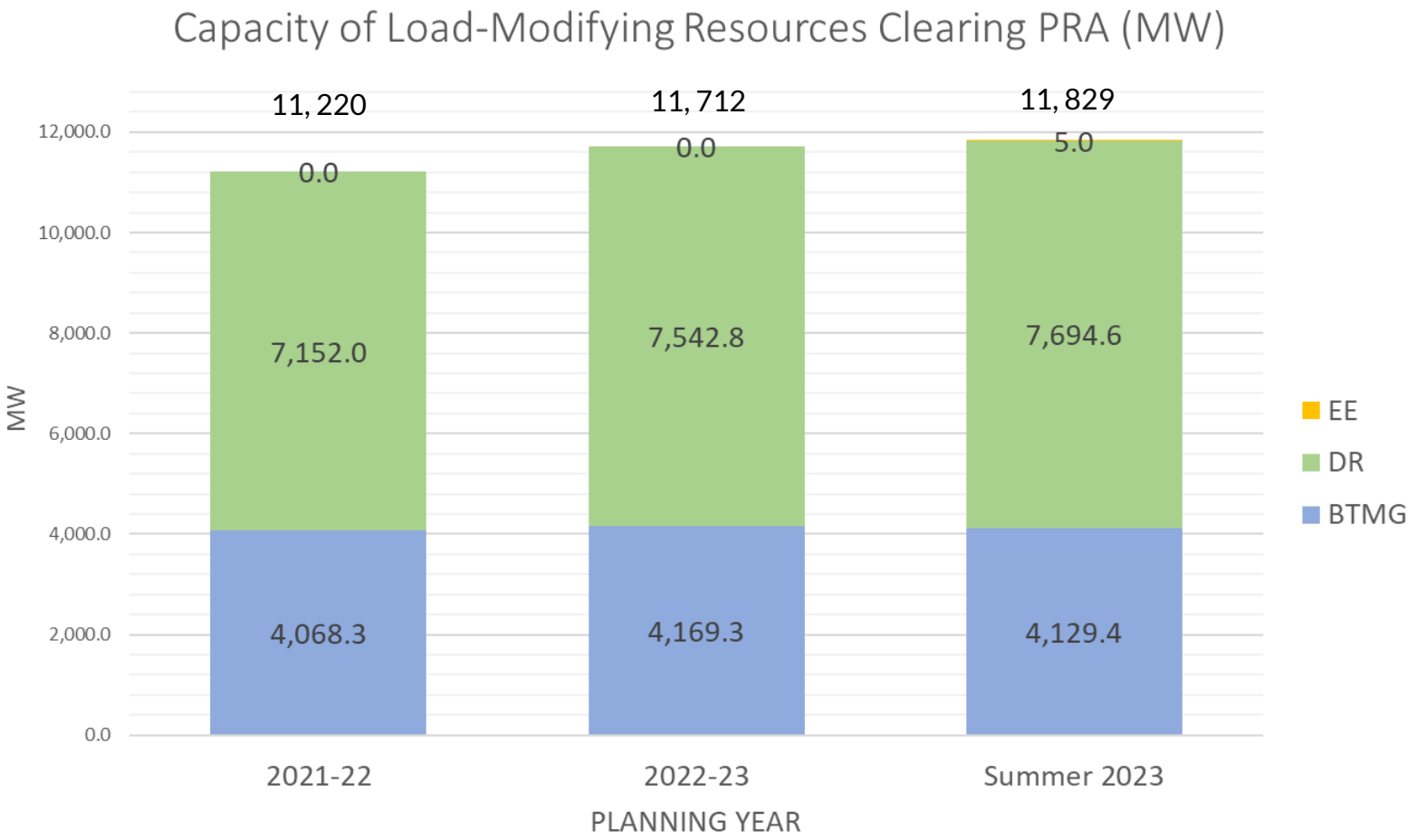


Spring 2024
Cleared Capacity

The planning resource mix shows the continuation of a multi-year trend toward less coal/nuclear/hydro/oil and increased gas and non-conventional resources

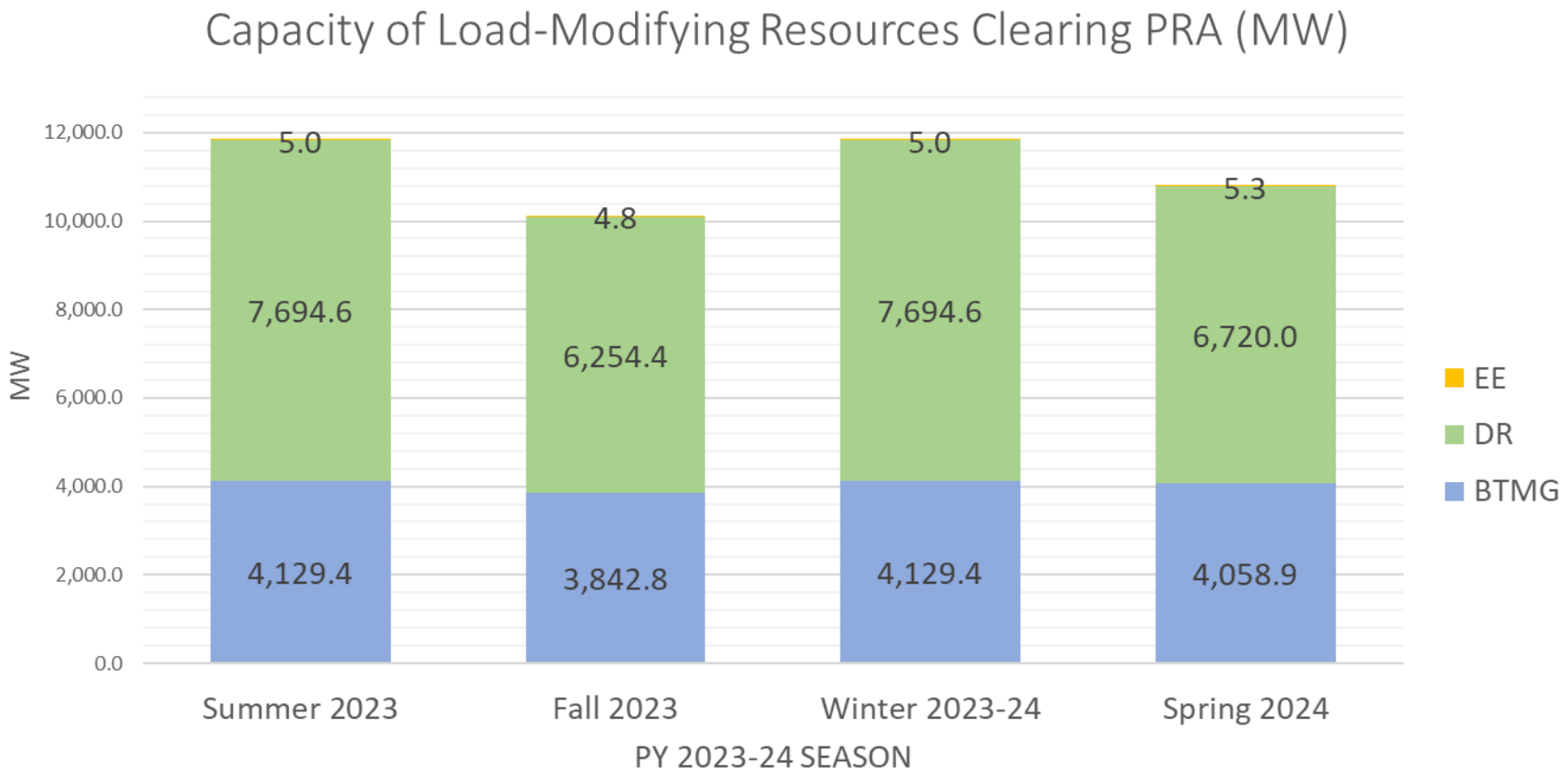


Historical trend for LMRs (DR, EE and BTMG) cleared in the PRA



Around 600 additional DRs were offered in for the 2023-24 PRA that did not clear the auction.

2023-2024 Seasonally Cleared LMR Comparison



Study Reports

- **LOLE Study Report**
  - https://cdn.misoenergy.org/PY%202023%202024%20LOLE%20Study%20Report626798.pdf
- **Wind & Solar Capacity Credit Report**
  - https://cdn.misoenergy.org/2023%20Wind%20and%20Solar%20Capacity%20Credit%20Report628118.pdf
- CIL/CEL
  - https://cdn.misoenergy.org/20221003%20LOLEWG%20Item%2004%20PY%202023-24%20Final%20CIL-CEL%20Results_Updated626464.pdf
- SRIC/SREC
  - https://cdn.misoenergy.org/SRIC_SREC%20Posting%20for%202023_24%20PRA628233.pdf

https://help.misoenergy.org/support/