

## Exhibit No. 16



# 2022/2023 Planning Resource Auction (PRA) Results

April 14, 2022

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# Executive Summary



- The Reliability Imperative was started to address the complex challenges that accompany the evolution of the generation fleet; the 2022 PRA results reveal an acceleration of those risks as it relates to resource adequacy
- Results from MISO's 2022-23 Planning Resource Auction (PRA) indicate a capacity shortfall for the MISO North/Central Regions, thus exposing entities with net short positions to the clearing price of Cost of New Entry (CONE) for the planning year.
- The 2020-21 OMS-MISO survey projected a small surplus for planning year 2022-23, which was eroded by an increased load forecast, less capacity entering the auction as result of retirements, and the decreased accredited capacity of new resources.
- The auction results indicate that MISO North/Central Regions have a slightly increased risk of needing to implement temporary controlled load sheds.
- In addition to the Reliability Imperative work already underway, MISO will need to address the growing gap between the accredited capacity of retiring resources and that of the new resources coming online.

# Load Serving Entities have multiple options to demonstrate resource adequacy in the annual Planning Resource Auction (PRA)

## Options available:

- Submit a Fixed Resource Adequacy Plan (FRAP)
- Utilize bilateral contracts with another resource owner
- Participate in the Planning Resource Auction (PRA)

The Independent Market Monitor (IMM) reviews the auction results for physical and economic withholding

## PRA Inputs

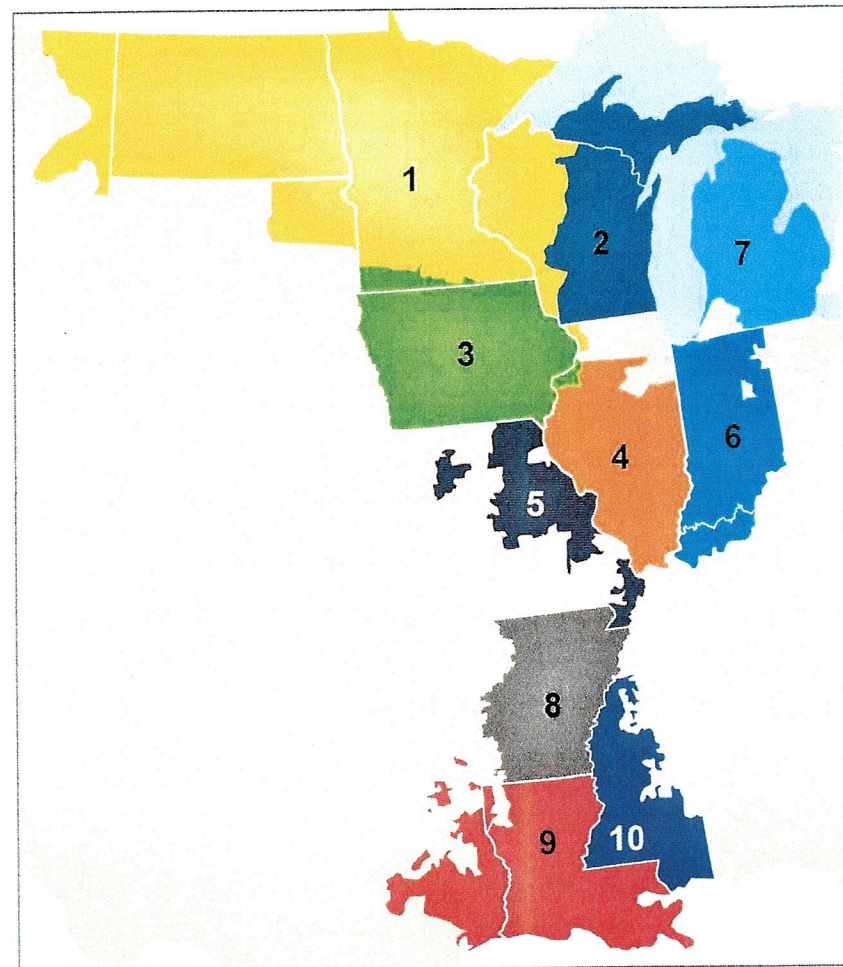
- Local Clearing Requirement (LCR) = capacity required from within each zone
- MISO-wide reserve margin requirements, which can be shared among the Zones, and Zones may import capacity to meet this requirement above LCR
- Capacity Import/Export Limits (CIL/CEL) = Zonal transmission limitations
- Sub-Regional contractual limitations such as between MISO's South and Central/North Regions

## PRA Outputs

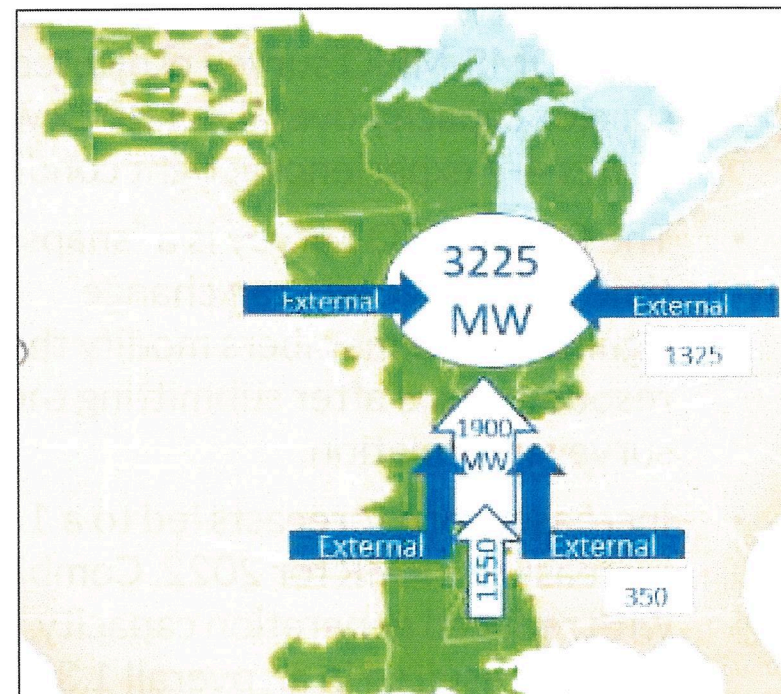
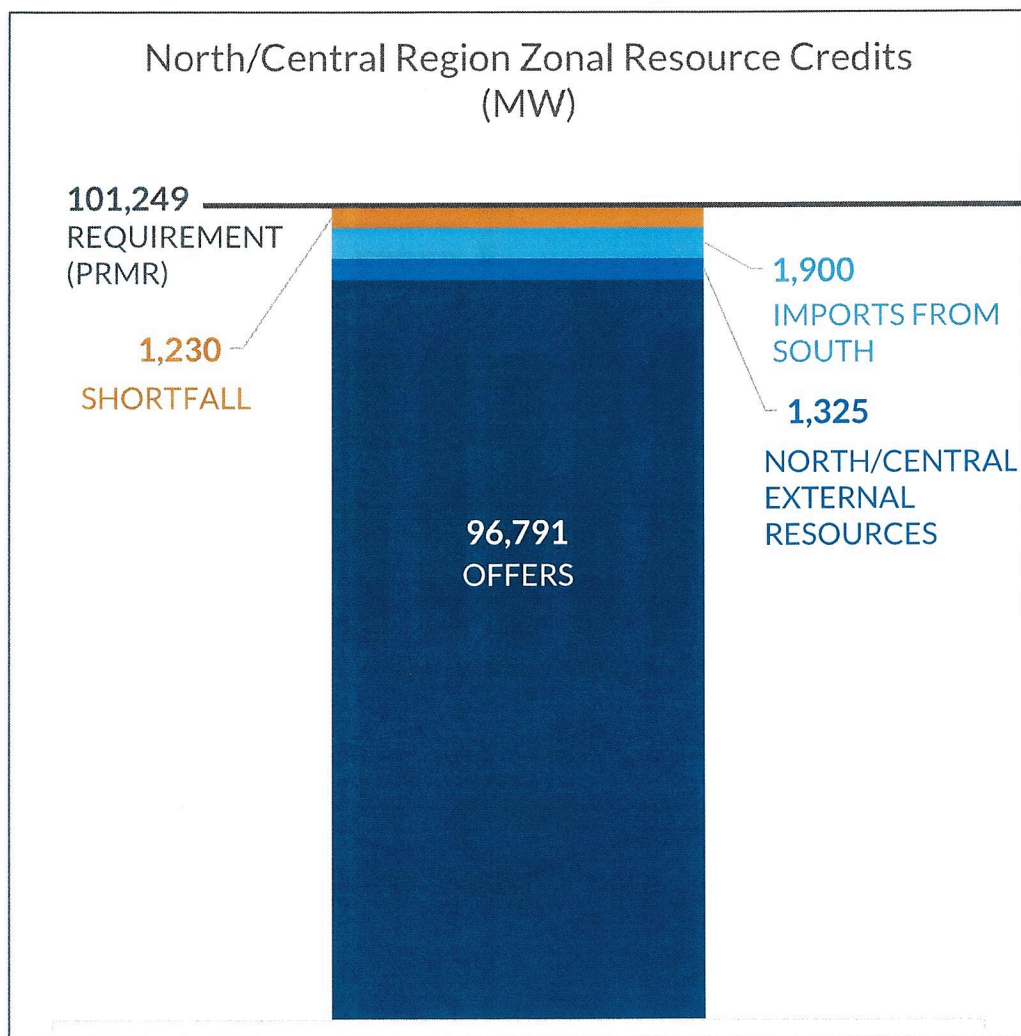
- Commitment of capacity to the MISO region, including performance obligations
- Capacity price (ACP = Auction Clearing Price) for each Zone
- ACP price drives the settlements process
- Load pays the Auction Clearing Price for the Zone in which it is physically located
- Cleared capacity is paid the Auction Clearing Price for the Zone where it is physically located

# Clearing prices from MISO's 2022-2023 PRA reflect capacity shortfalls in four zones, exposing nearly 8 GW in MISO North/Central to the Cost of New Entry

Zone	Local Balancing Authorities	Price \$/MW-Day
1	DPC, GRE, MDU, MP, NSP, OTP, SMP	\$236.66
2	ALTE, MGE, UPPC, WEC, WPS, MIUP	\$236.66
3	ALTW, MEC, MPW	\$236.66
4	AMIL, CWLP, SIPC, GLH	\$236.66
5	AMMO, CWLD	\$236.66
6	BREC, CIN, HE, IPL, NIPS, SIGE	\$236.66
7	CONS, DECO	\$236.66
8	EAI	\$2.88
9	CLEC, EES, LAFA, LAGN, LEPA	\$2.88
10	EMBA, SME	\$2.88
ERZ	KCPL, OPPD, WAUE (SPP), PJM, OVEC, LGEE, AECI, SPA, TVA	\$133.70-236.66

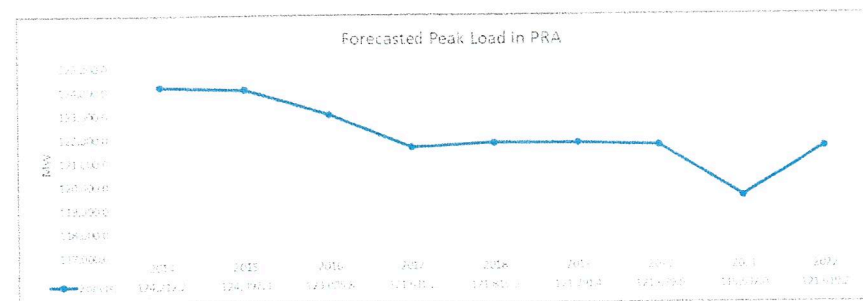
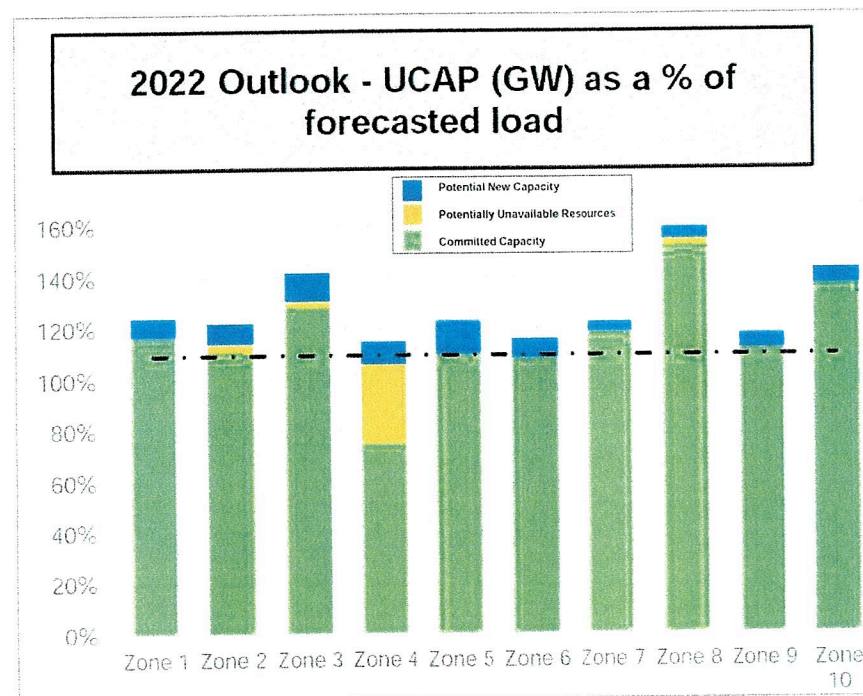


# Despite importing over of 3,000 MW, MISO's North/Central zones still experienced a shortfall against the requirement

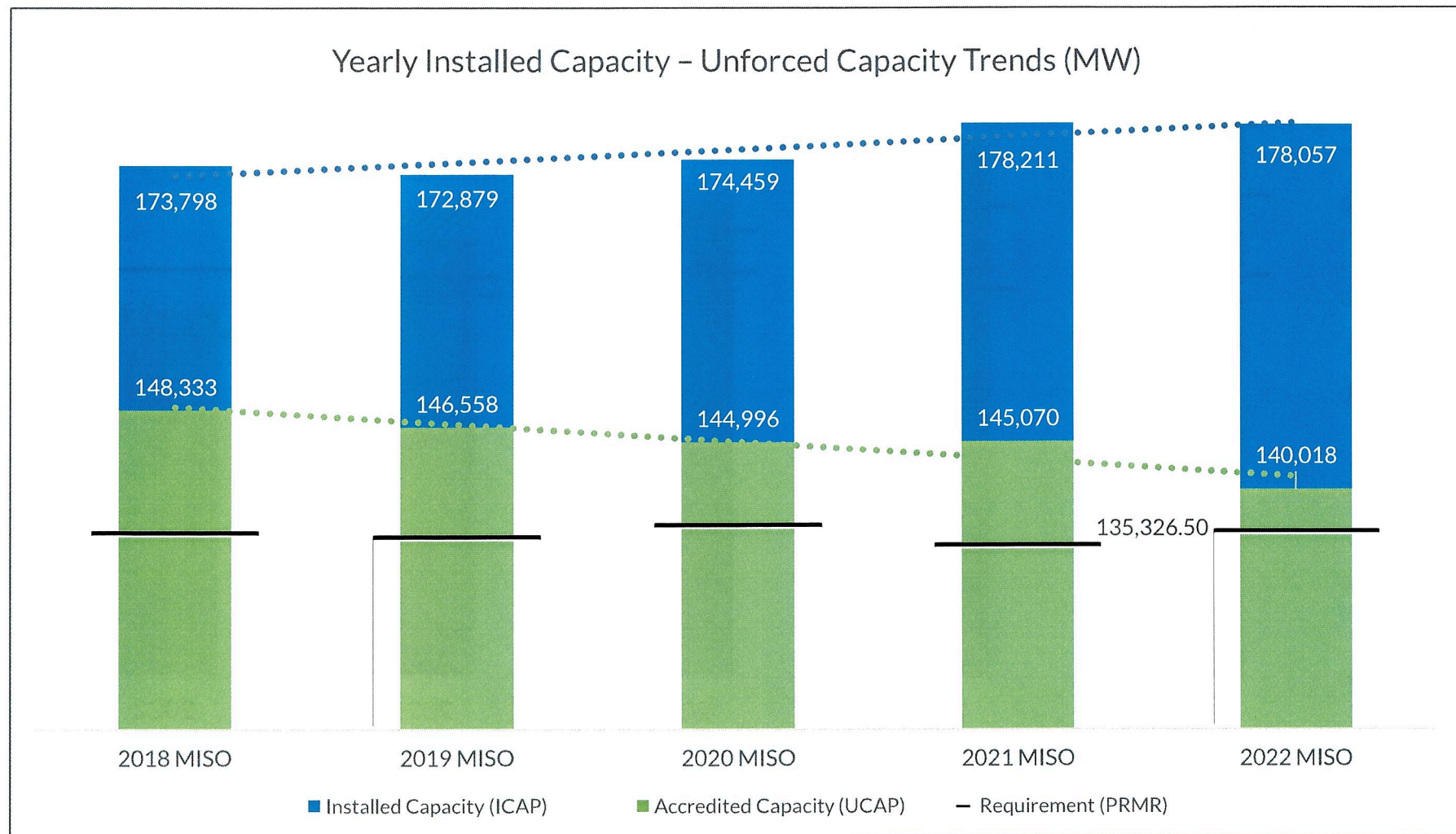


# Last year's OMS-MISO survey projected tight conditions in Zones 4-7 for 2022, and post-COVID load increases drove even higher requirements for this year's auction

- MISO's vertical demand curve does not provide a warning signal; however, the 2021 OMS-MISO survey projected surplus capacity overall for 2022 with Zones 4-7 experiencing tight conditions.
- The OMS-MISO Survey is a "snapshot in time," and forecasts can change significantly if members modify their resource plans after submitting their survey information.
- Increased load forecasts led to a 1.4 GW increase in PRMR for 2022. Combined with reduced generation capacity, the auction resulted in an overall 1.3 GW shortfall, as opposed to the projected minimum survey surplus.

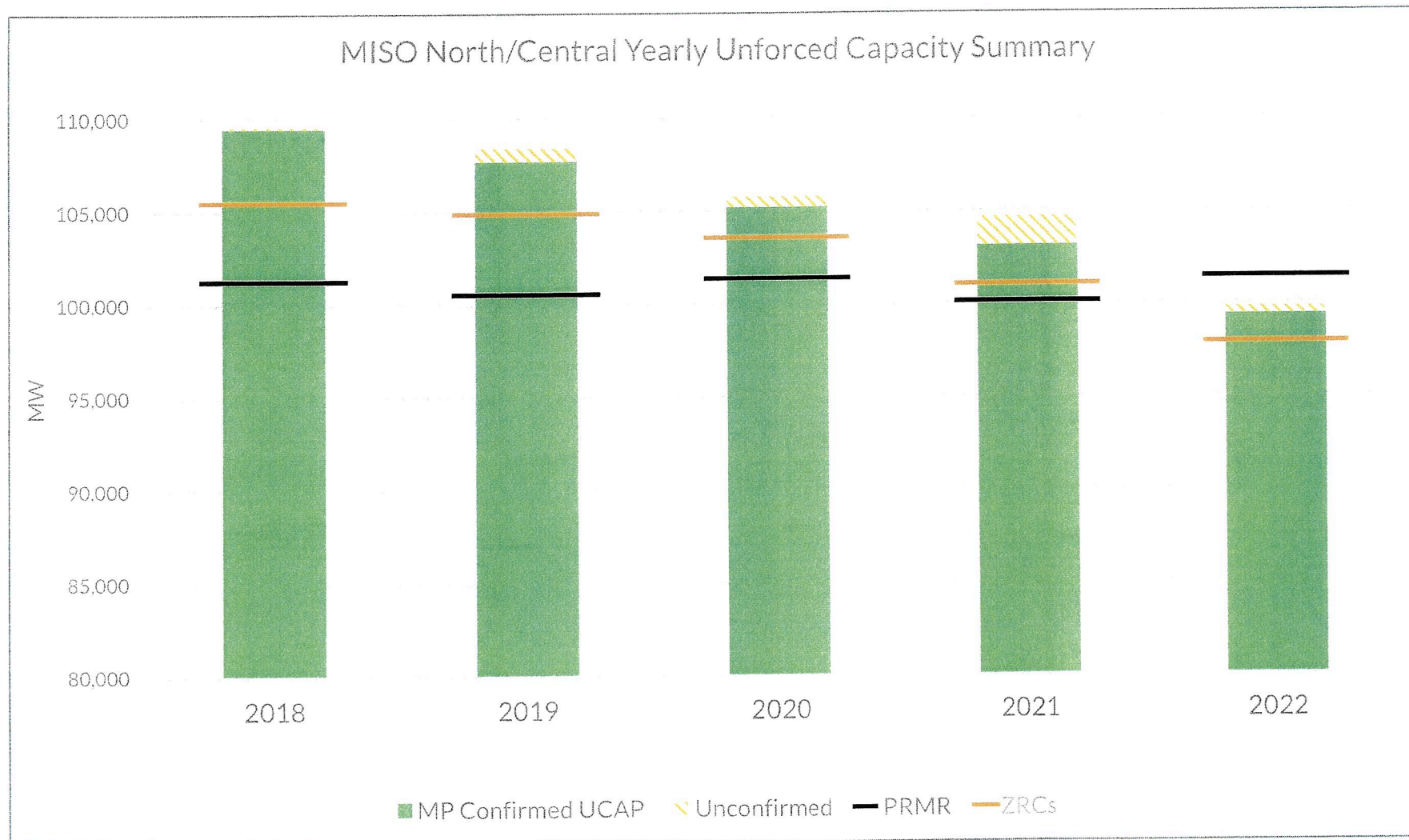


# Although installed capacity has increased in the last five years, accredited capacity has decreased due to thermal retirements and the increasing transition to renewables





# Capacity in MISO North/Central fell by 3.2 GW since the last auction



# Unless more capacity is built that can supply reliable generation, shortfalls such as those highlighted in this year's auction will continue

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## Reliability Impact of the 2022-23 PRA Results:

- The overall stability and reliability of the system will not be compromised, as MISO will continue to implement any actions that may be necessary to prevent uncontrolled, cascading outage
- Zones 1-7 have an increased risk of needing to implement temporary, controlled load sheds

Overall, the results of this year's PRA reflect the challenges we are addressing through the Reliability Imperative, but additional areas of focus may be needed

## Next Steps

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- **April 15** – Conference call presentation of PRA results
- **May 14** – Posting of PRA masked offer data
- **May 25** – Zonal Deliverability Benefits and additional PRA analytics presented at the May RASC
- **May 25** – MISO publishes cleared LMRs to Operations tools
- **June 1** – New Planning Year starts

# Appendix

## Primary changes since 2021 Auction

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### **LMR RAN Filing (ER20-1846)**

FERC accepted a Tariff filing on August 2020, effective this PRA, proposing enhancements to Load Modifying Resources (LMR) accreditation to help ensure increased availability during emergency conditions. This did not result in a significant difference in accreditation in this year's auction.

### **Ongoing Fleet Change**

The auction results reflect the industry's ongoing shift away from coal-fired generation and increasing reliance on gas-fired resources and renewables, as well as other trends discussed in the [MISO Forward report](#).

# 2022/23 PRA Results by Zone

	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	ERZ	System
<b>PRMR</b>	18,641.2	13,606.4	10,314.1	9,930.8	8,274.1	18,594.0	21,886.3	7,906.0	21,365.6	4,808.0	N/A	135,326.5
<b>Offer Submitted (Including FRAP)</b>	20,561.5	13,755.8	10,687.1	7,622.2	6,901.9	15,773.8	21,488.9	10,495.4	22,412.6	5,532.8	1,675.4	136,906.1
<b>FRAP</b>	15,064.3	11,346.6	4,104.3	681.4	51.4	1,502.7	1,470.9	481.7	175.1	1,420.0	93.4	36,390.5
<b>Self Scheduled (SS)</b>	3,323.1	2,109.7	6,210.5	5,619.3	6,295.8	9,245.9	19,992.9	9,419.5	19,880.6	3,363.7	1,323.1	86,784.1
<b>Non-SS Offer Cleared</b>	2,174.1	299.5	372.3	1,321.5	554.7	5,025.2	25.1	235.5	378.0	275.3	258.9	10,920.1
<b>Committed (Offer Cleared + FRAP)</b>	20,561.5	13,755.8	10,687.1	7,622.2	6,901.9	15,773.8	21,488.9	10,136.7	20,433.7	5,059.0	1,675.4	134,094.7
<b>LCR</b>	15,349.1	12,486.8	5,720.7	2,924.1	4,484.9	13,102.0	21,229.5	6,176.2	20,157.3	4,183.7	-	N/A
<b>CIL</b>	4,629.0	1,923.0	5,664.0	10,349.0	6,072.0	7,213.0	3,749.0	4,114.0	4,194.0	3,033.0	-	N/A
<b>ZIA</b>	4,627.0	1,923.0	5,561.0	9,332.0	6,072.0	6,952.0	3,749.0	3,989.0	3,389.0	3,033.0	-	N/A
<b>Import</b>	0.0	0.0	0.0	2,308.6	1,372.2	2,820.2	397.4	0.0	931.9	0.0	-	7,830.3
<b>CEL</b>	3,273.0	2,246.0	3,739.0	NLF*	NLF*	7,370.0	2,392.0	4,628.0	1,508.0	842.0	1,737.4	N/A
<b>Export</b>	1,920.3	149.4	373.0	0.0	0.0	0.0	0.0	2,230.7	0.0	251.0	1675.4	6,599.80
<b>ACP (\$/MW-Day)</b>	236.66	236.66	236.66	236.66	236.66	236.66	236.66	2.88	2.88	2.88	133.70-236.66	N/A

# Supply Offered and Cleared

Planning Resource	Offered (ZRC)			Cleared (ZRC)		
	2020-21	2021-22	2022-23	2020-21	2021-22	2022-23
Generation	125,341	125,225	121,506.5	120,143	118,884	118,745.0
External Resources	3,832	3,914	3,638.9	3,736	3,798	3,638.9
Behind the Meter Generation	3,997	4,131	4,169.3	3,892	4,068	4,169.3
Demand Resources	7,754	7,294	7,591.4	7,557	7,152	7,541.5
Energy Efficiency	650	0	0	650	0	0
<b>Total</b>	<b>141,574</b>	<b>140,564</b>	<b>136,906.1</b>	<b>135,979</b>	<b>133,903</b>	<b>134,094.7</b>

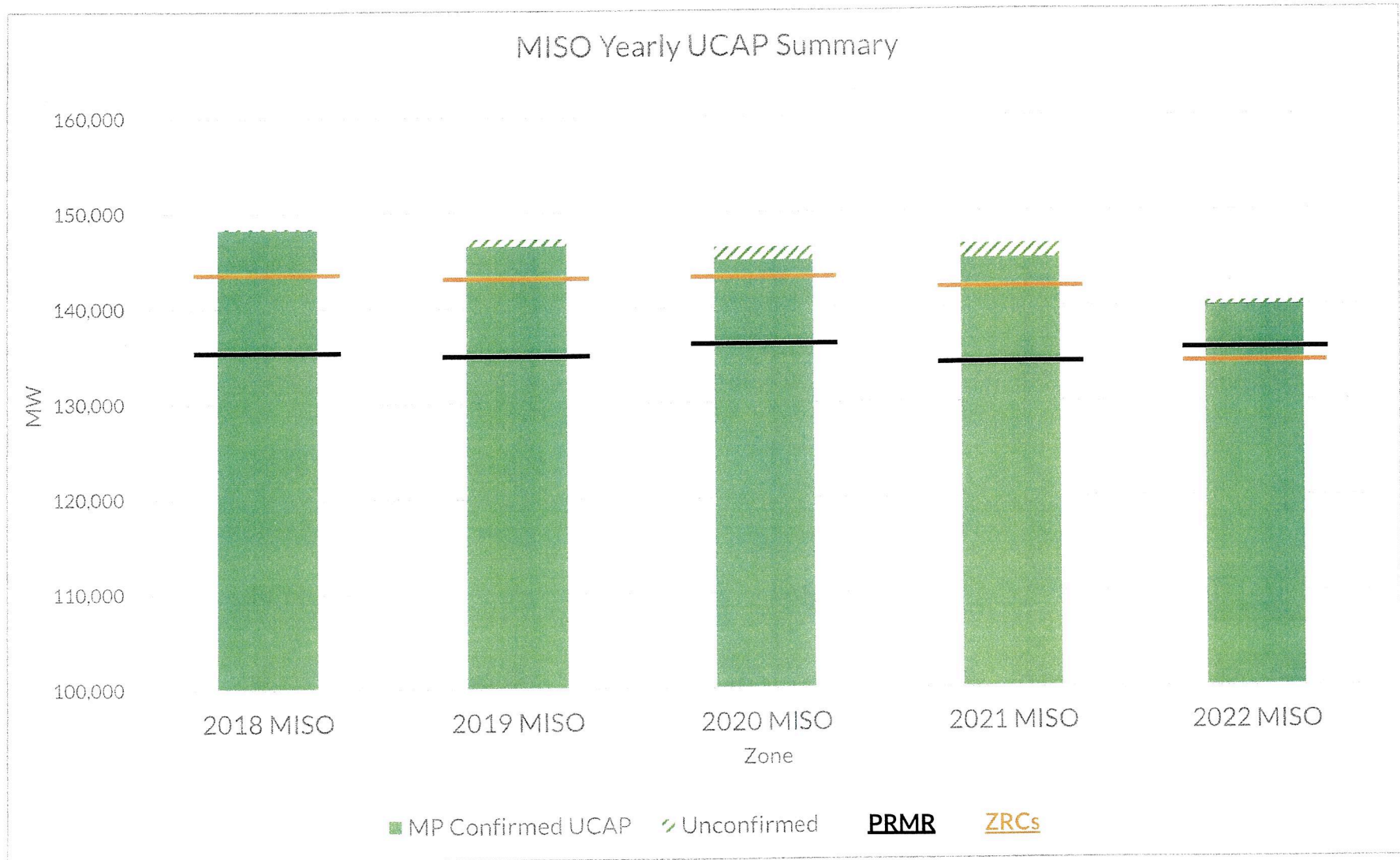
# Historical Auction Clearing Price Comparison

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		\$133.70- 236.66
IMM Conduct Threshold	25.01	24.52	23.67	24.74	26.63	24.40	25.69	23.10	22.88	22.84	26.67
Cost of New Entry	250.05	245.18	236.66	247.40	266.27	243.95	256.90	230.99	228.82	228.44	266.68

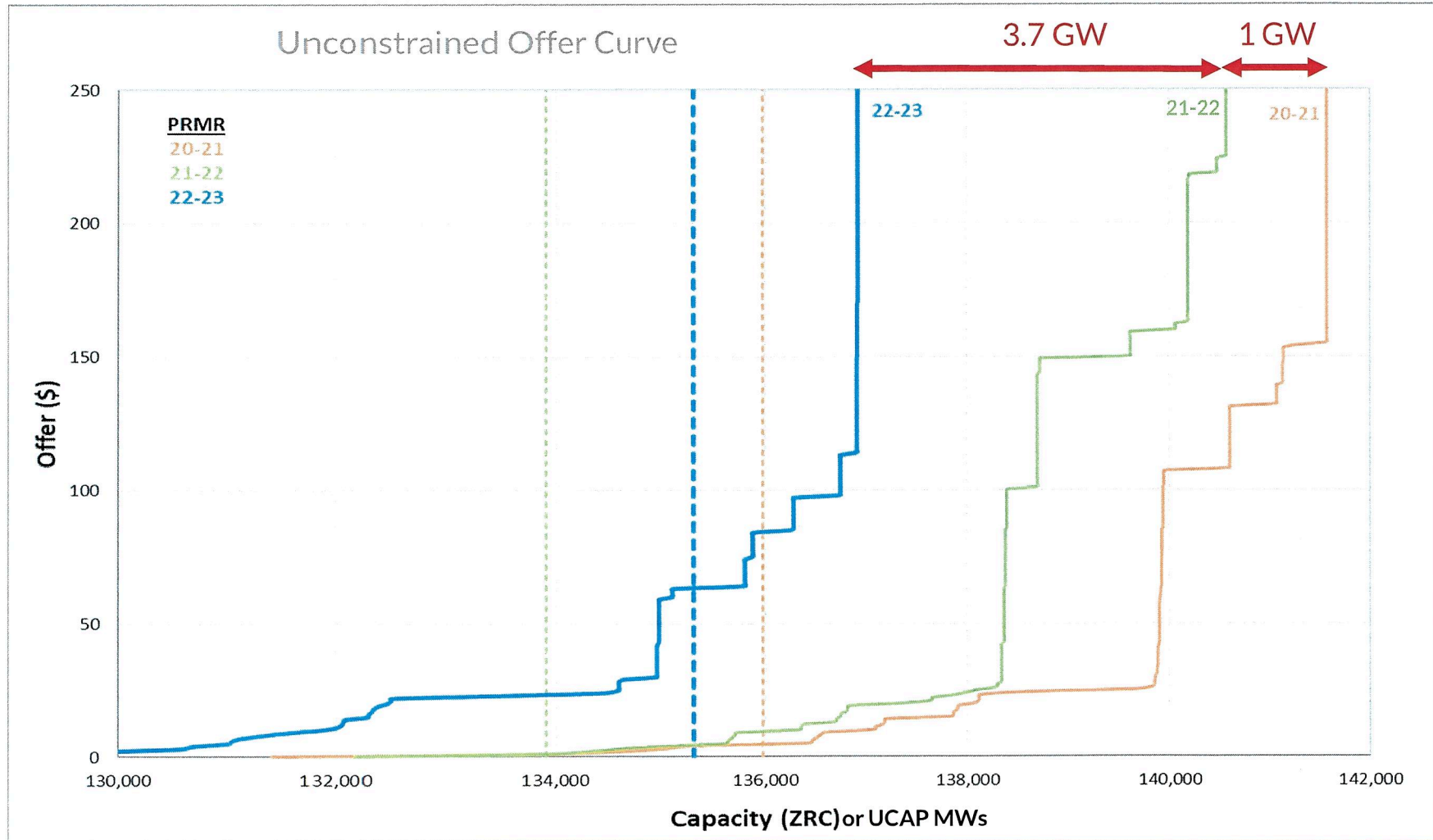
- Auction Clearing Prices shown in \$/MW-Day
- Conduct Threshold is 10% of Cost of New Entry (CONE)



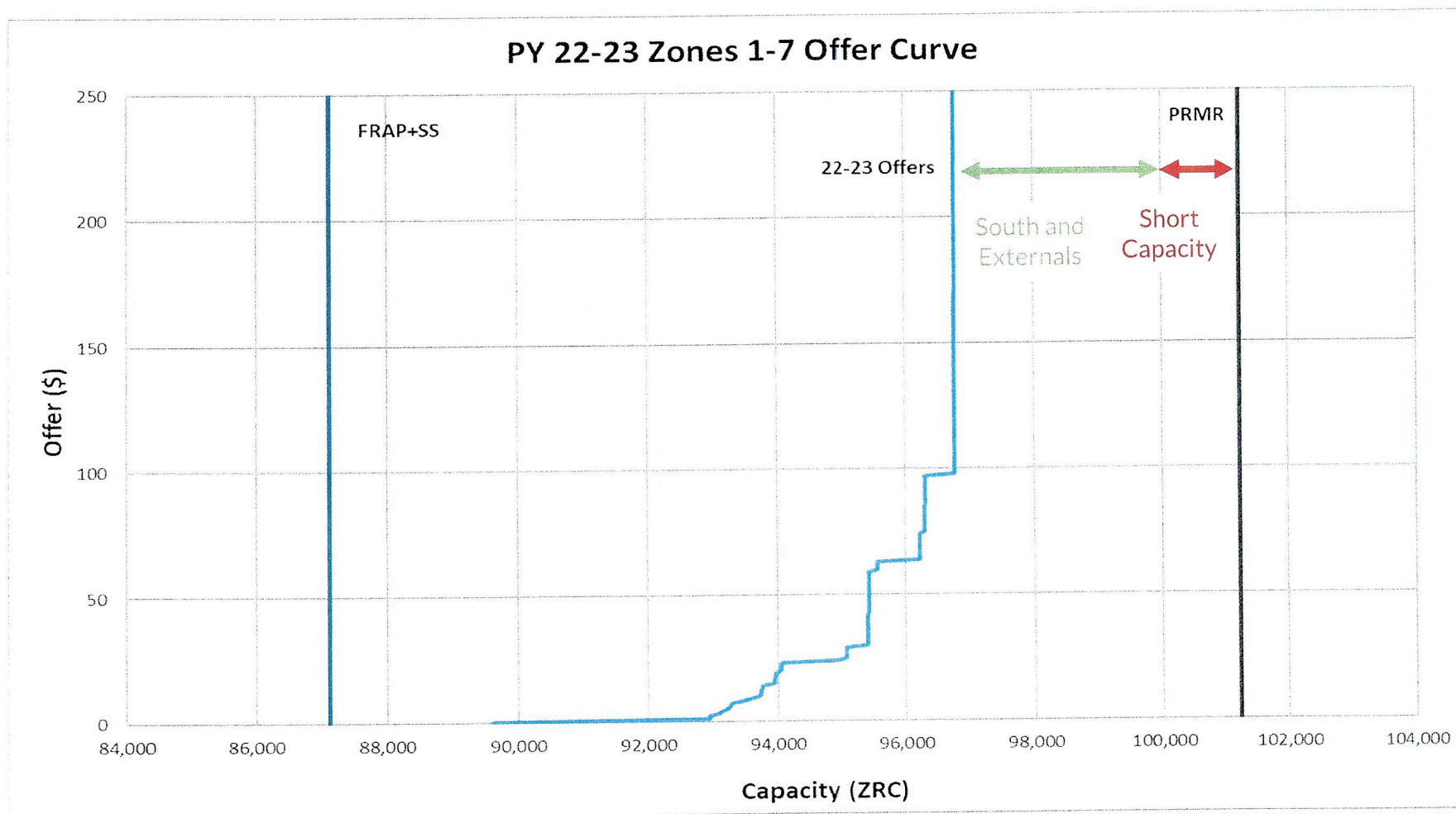
# Year-over-year MISO Unforced Capacity (UCAP)



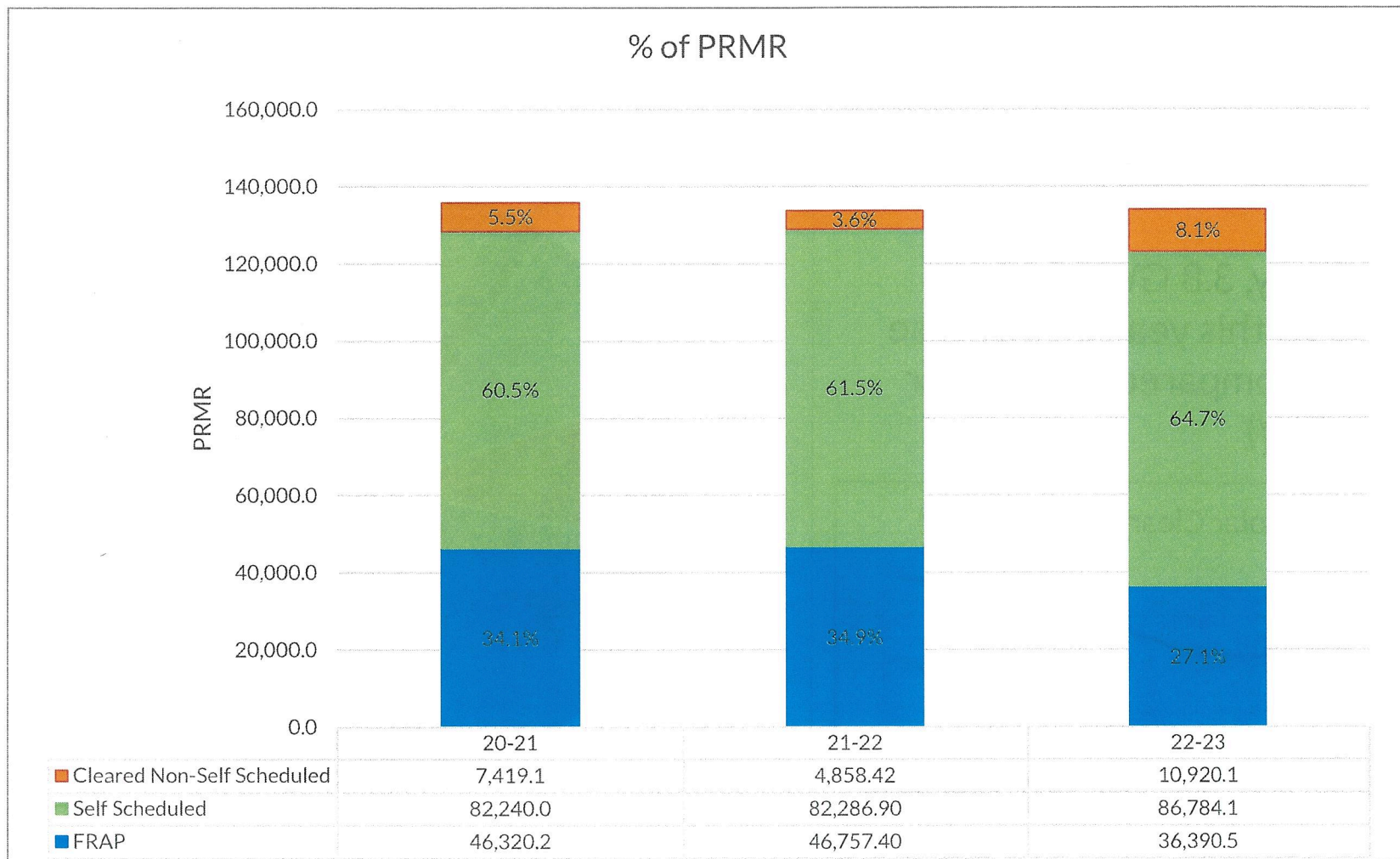
# The amount of capacity offered into the MISO PRA has been decreasing year-over-year



# Despite capacity imports from MISO South and external zones closing the gap, capacity offers fell 1230 MW short of PRMR in the MISO North/Central zones

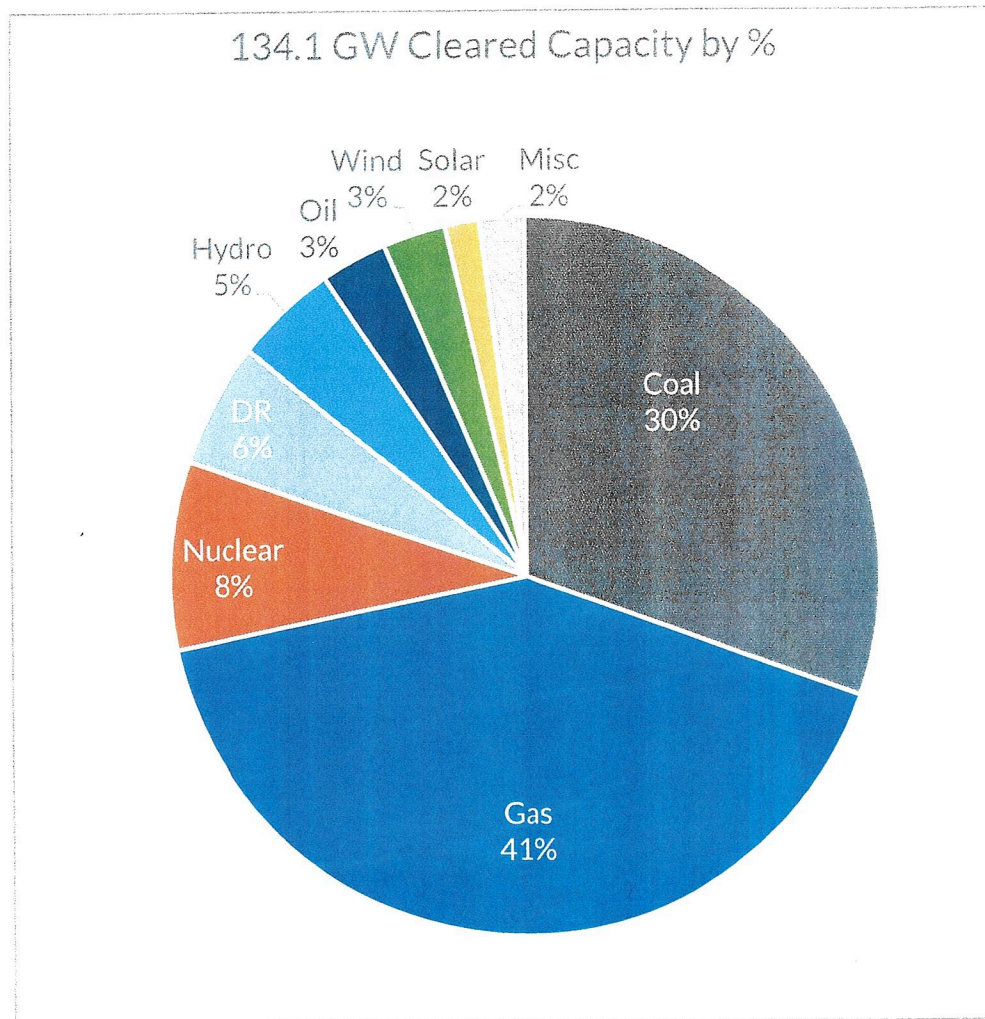
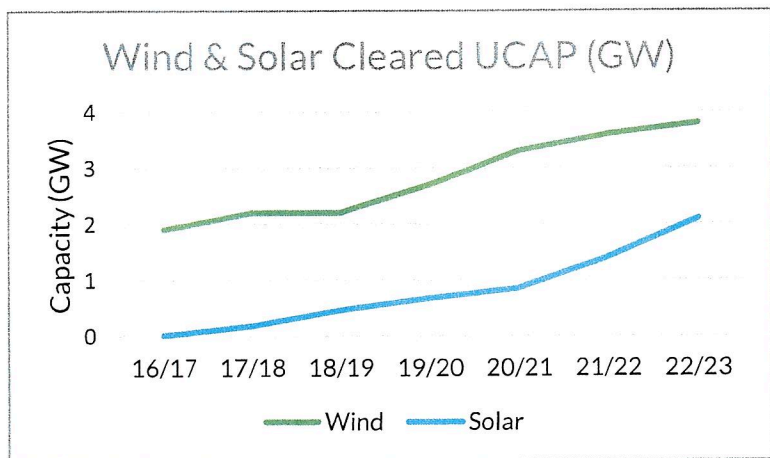


# Most members continue to meet resource adequacy requirements through fixed plans and self-scheduling, despite fixed plans decreasing by over 10,000 MW this year

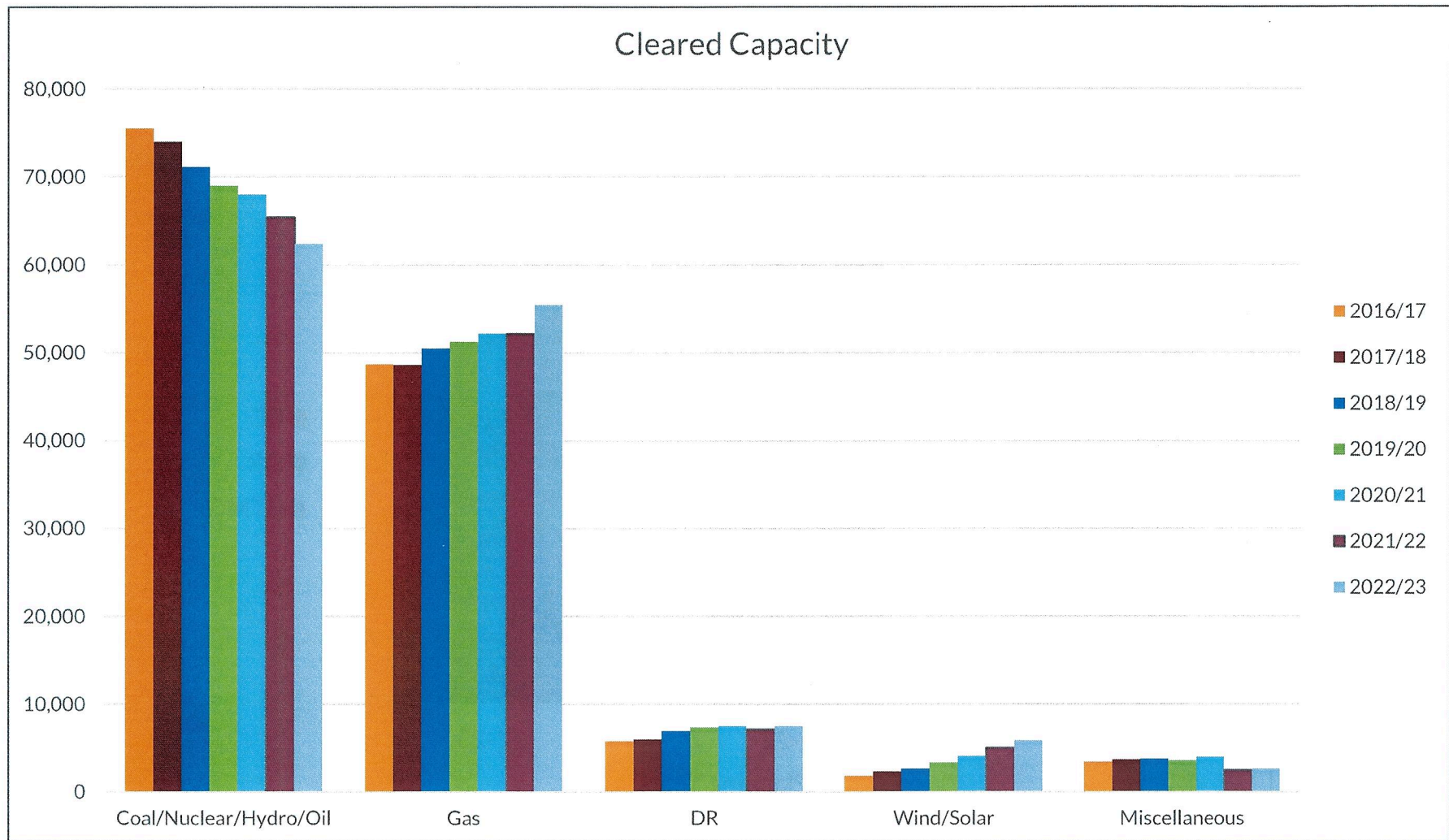


# Although conventional generation still provides the majority of capacity, wind and solar continue to grow

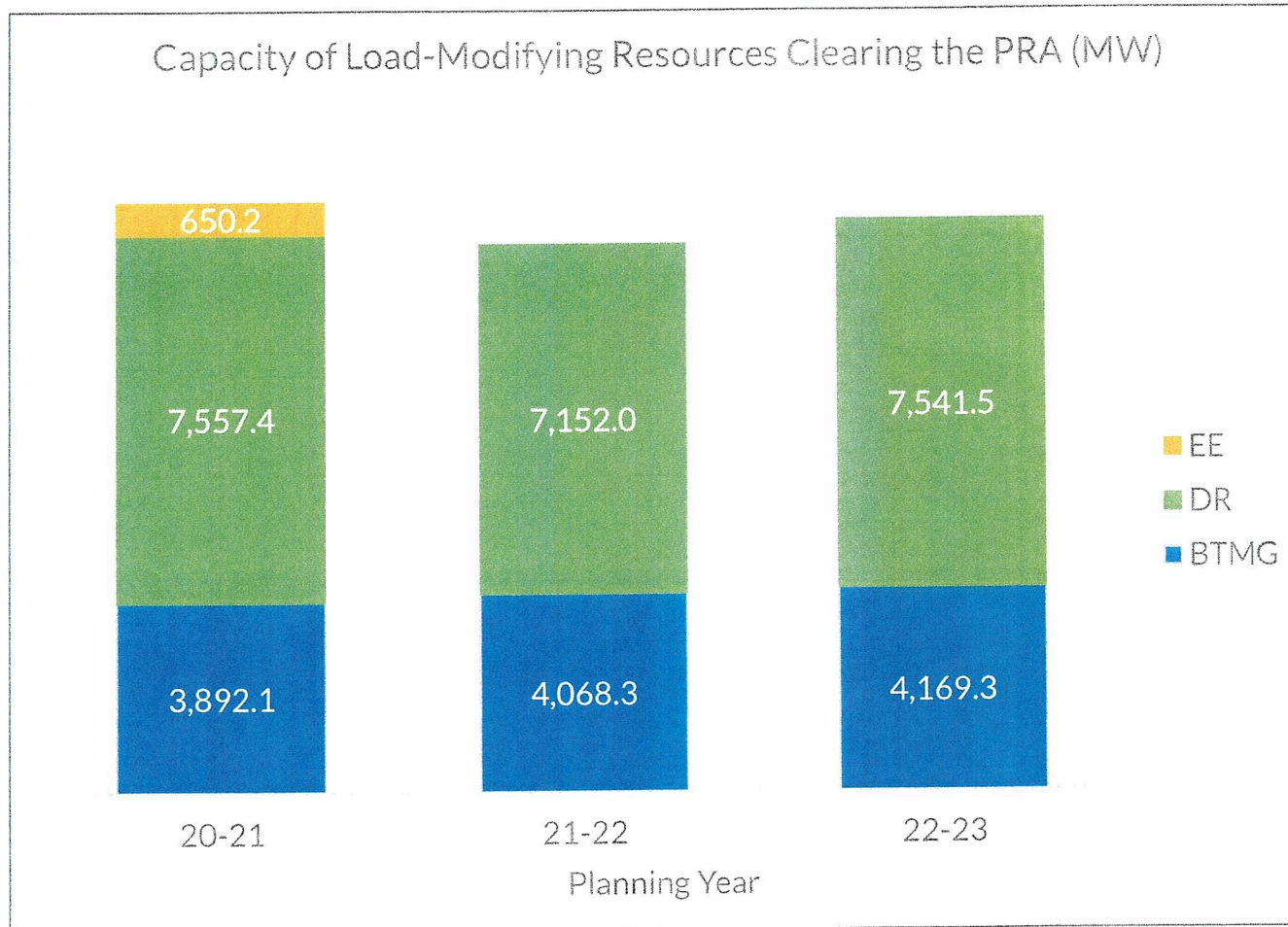
- 2.1 GW of solar cleared this year's auction—an increase of 48% from Planning Year 2021-22 (1.4 GW)
- Similarly, 3.8 GW of wind cleared this year, an increase of 5% compared to last year (3.6 GW)



# The planning resource mix shows the continuation of a multi-year trend toward less solid fuel and increased gas and non-conventional resources



# Despite recent enhancements to Load Modifying Resources (LMR) accreditation, the capacity of LMRs that cleared the PRA increased by 4.4% for planning year 2022-23



# Acronyms

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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

SS: Self Schedule

SFT: Simultaneous Feasibility Test

UCAP: Unforced Capacity

ZIA: Zonal Import Ability

ZRC: Zonal Resource Credit



# Reports

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- **LOLE Study Report**

- <https://cdn.misoenergy.org/PY%202022-23%20LOLE%20Study%20Report601325.pdf>

- **Wind & Solar Capacity Credit Report**

- <https://cdn.misoenergy.org/2022%20Wind%20and%20Solar%20Capacity%20Credit%20Report618340.pdf>



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