2023 OMS-MISO Survey Results

Furthering our joint commitment to regional resource adequacy, OMS and MISO are pleased to announce the results of the 2023 OMS-MISO Survey

July 14, 2023

Results of the 2023 OMS-MISO survey reinforce the need for continued reforms to MISO's resource adequacy construct to reliably manage portfolio transition

- Survey responses reflect market actions such as delayed retirements and capacity additions resulting in 1.5 GW of residual capacity for Planning Year (PY) 2024/25.
- Without continuation of such actions, a capacity deficit of 2.1 GW is projected for the summer of 2025/26 which grows in subsequent years.
- Non-summer seasons indicate sufficient, yet declining capacity over the survey horizon.
- The North/Central subregion shows potential capacity deficits starting in summer of PY 2025/26, while the South subregion shows increasing tightness and a potential deficit starting in winter 2027/28.
- Demand growth is projected to continue for five years across all four seasons at 0.8 GW or 0.68% per year on average.

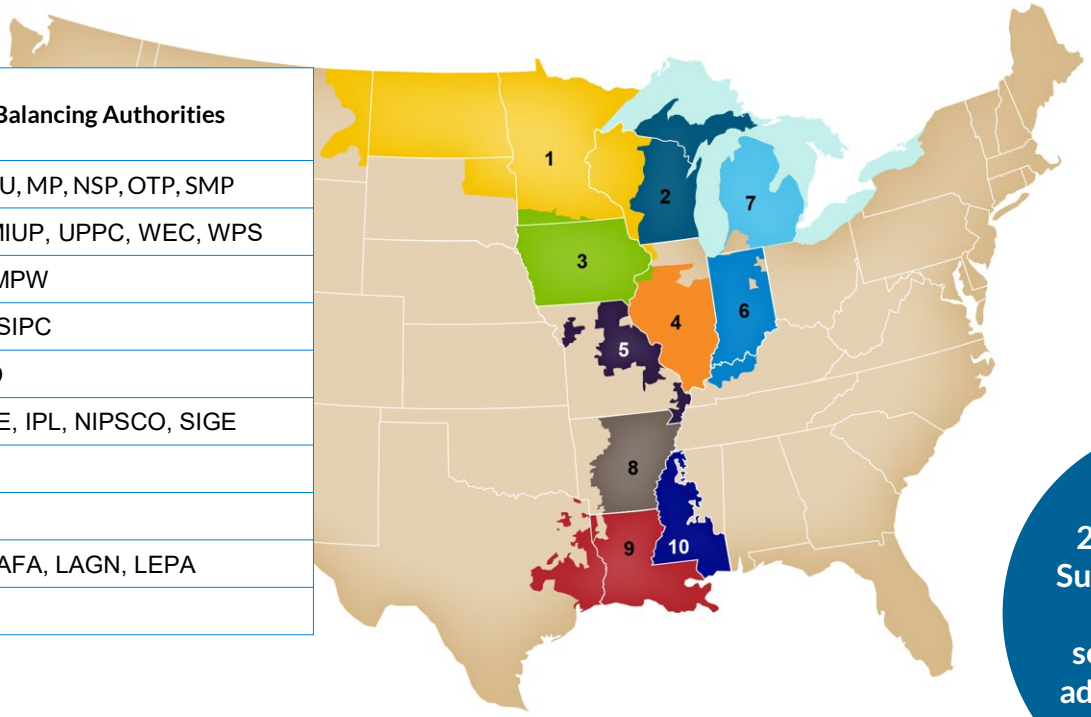
All presentation references to capacity indicate seasonal accredited capacity (SAC)

Approximately 90% of existing generation capacity participated in OMS-MISO Survey in 2023. Updated assumptions for representation of future generation from the interconnection queue (October 2022 RASC).

The OMS-MISO Survey provides a resource adequacy view over a five-year horizon based on currently available information

- Load serving entities within each zone must have sufficient resources to meet load and required reserves
- Surplus resources may be shared among load serving entities with resource deficits to meet reserve requirements

Local Resource Zone	Local Balancing Authorities
1	DPC, GRE, MDU, MP, NSP, OTP, SMP
2	ALTE, MGE, MIUP, UPPC, WEC, WPS
3	ALTW, MEC, MPW
4	AMIL, CWLP, SIPC
5	AMMO, CWLD
6	BREC, CIN, HE, IPL, NIPSCO, SIGE
7	CONS, DECO
8	EAI
9	CLEC, EES, LAFA, LAGN, LEPA
10	EMBA, SME



2023 OMS-MISO Survey incorporates MISO's new seasonal resource adequacy construct

The survey uses different categories to characterize relative levels of resource certainty

Committed Capacity

- Consists of installed generation resources and projects with interconnection agreements with commercial operation dates expected during survey horizon.*
- Survey assumes that these resources will be used to meet the Planning Reserve Margin Requirement (PRMR) in the zone and region they are physically located.

Signed GIA Capacity- Alternative estimate

- Consists of projects with signed interconnection agreements with commercial operation dates expected during survey horizon.
- Cumulative capacity added from signed GIA projects assumed to be 2.5 GW/year based on historical trend of 2-3 GW energized annually.

Potentially Unavailable Resources

- Consists of installed generation resources with unclear commitment to MISO.
- Survey assumes that these resources will NOT be used to meet the PRMR.

Potential New Capacity

- Consists of projects in MISO's generation interconnection queue that do not have a GIA, with capacity weighted to reflect progress through the queue*

* Descriptions of Resource Categories and Queue Treatment provided on slides 18-19

External factors can impact projected deficits or surpluses that are observed in the survey

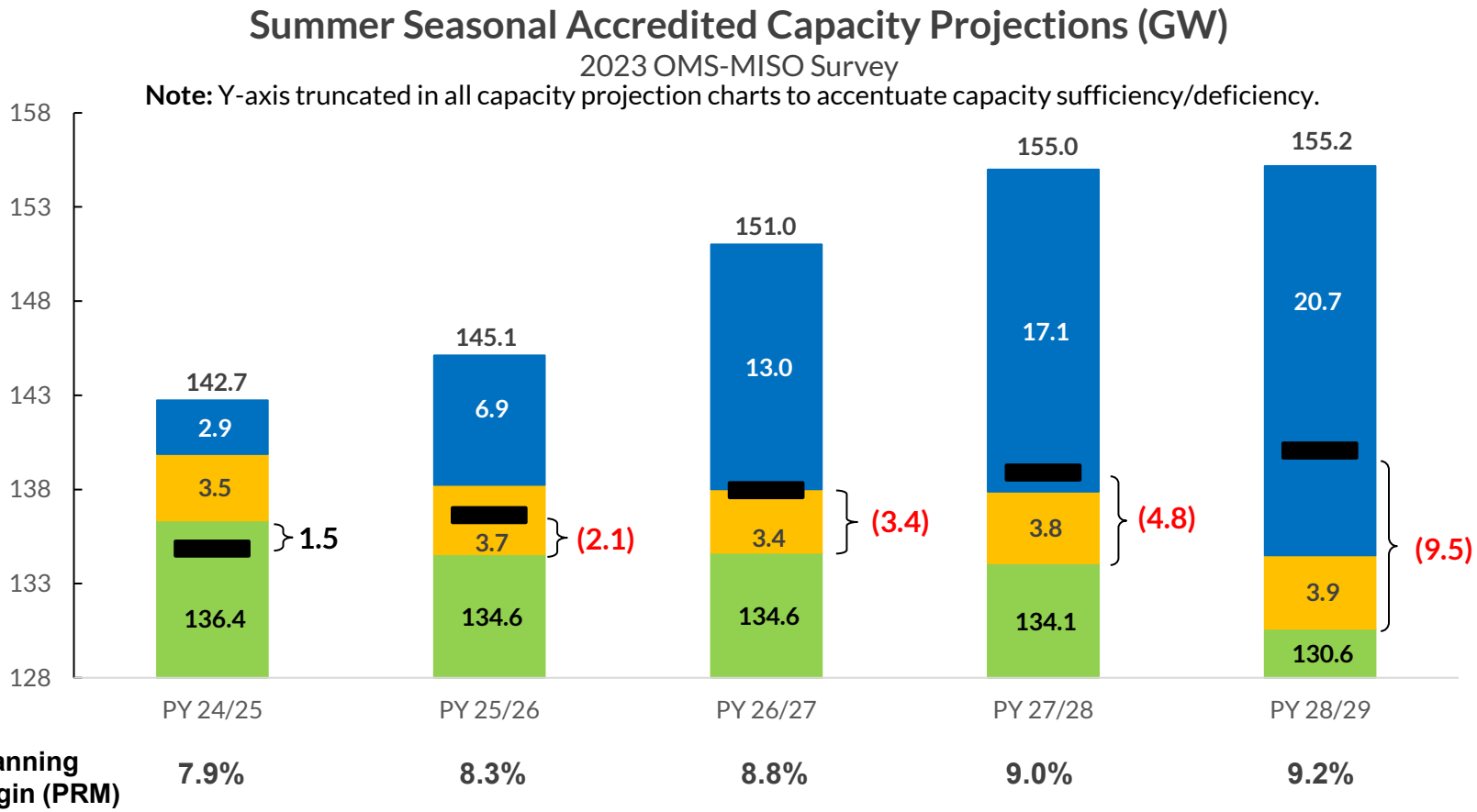
Downside Risks

- Higher load growth due to electrification
- Accelerated retirements
- Continued queue challenges
- Delays in capacity addition due to continued supply chain bottlenecks
- Reduction in imported capacity
- Bulk of new resources are at lower capacity accreditations

Upside Possibilities

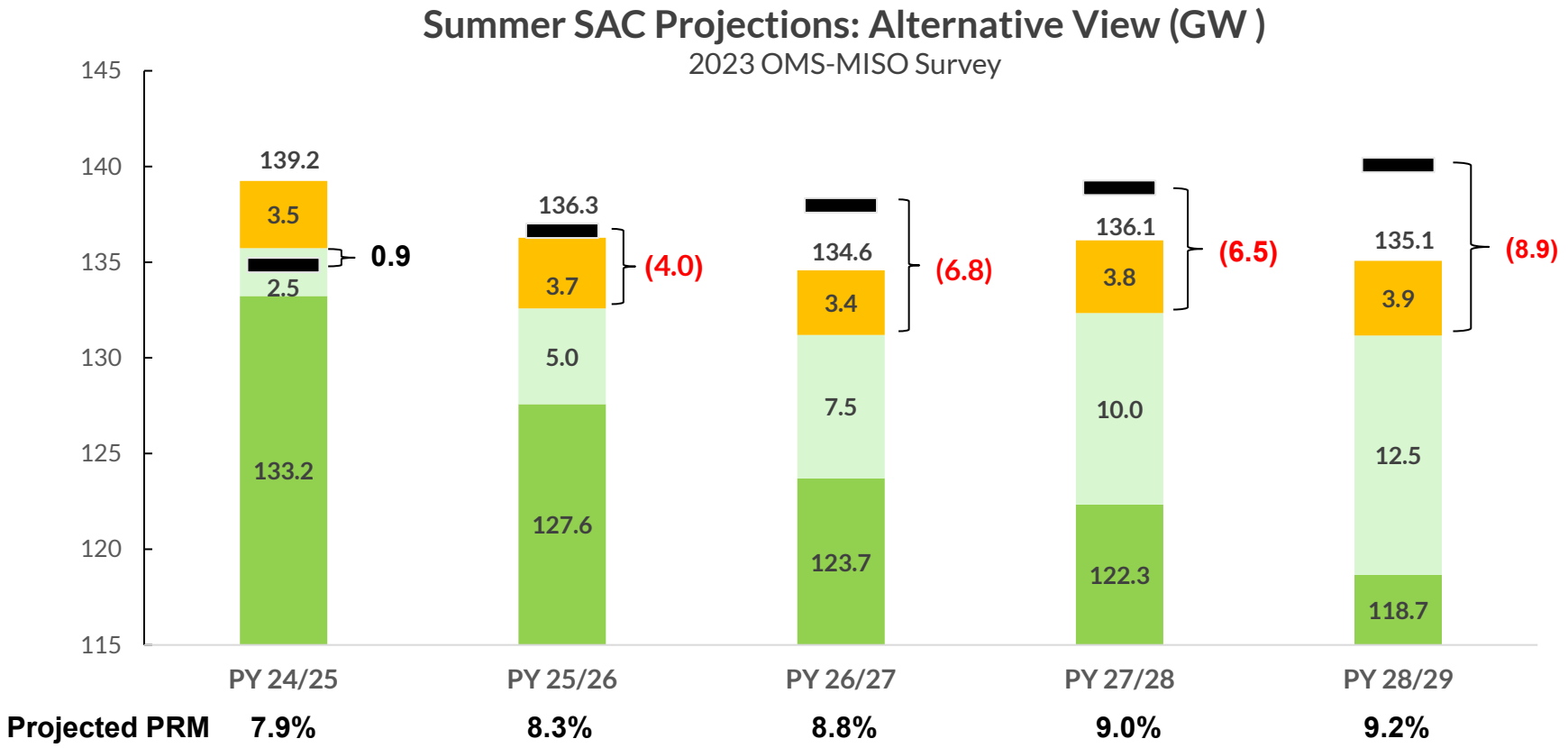
- Lower than expected load growth
- Sustained market responses from 2022 Planning Resource Auction (PRA)
  - Deferred retirements and return to service of suspended resources
  - Additional External Resources
  - Additional LMR registrations
- Higher accreditation due to improved availability and performance in times of need
- Continued queue improvements
- Easing of supply chain bottlenecks enabling substantial new capacity
- Lower planning reserve margins than currently projected

Committed Capacity shows declines over survey window with potential resource deficits starting in PY 2025/26



Bracketed values indicate difference between Committed Capacity and projected PRMR.
Committed Capacity includes signed GIA projects shown on slide 19.
Capacity accreditation values and PRM projections based on current practices.
Timing/GW of potential New Capacity projected per methodology noted in Oct 2022 RASC.
Regional Directional Transfer (RDT) limit of 1900 MW is reflected in this chart

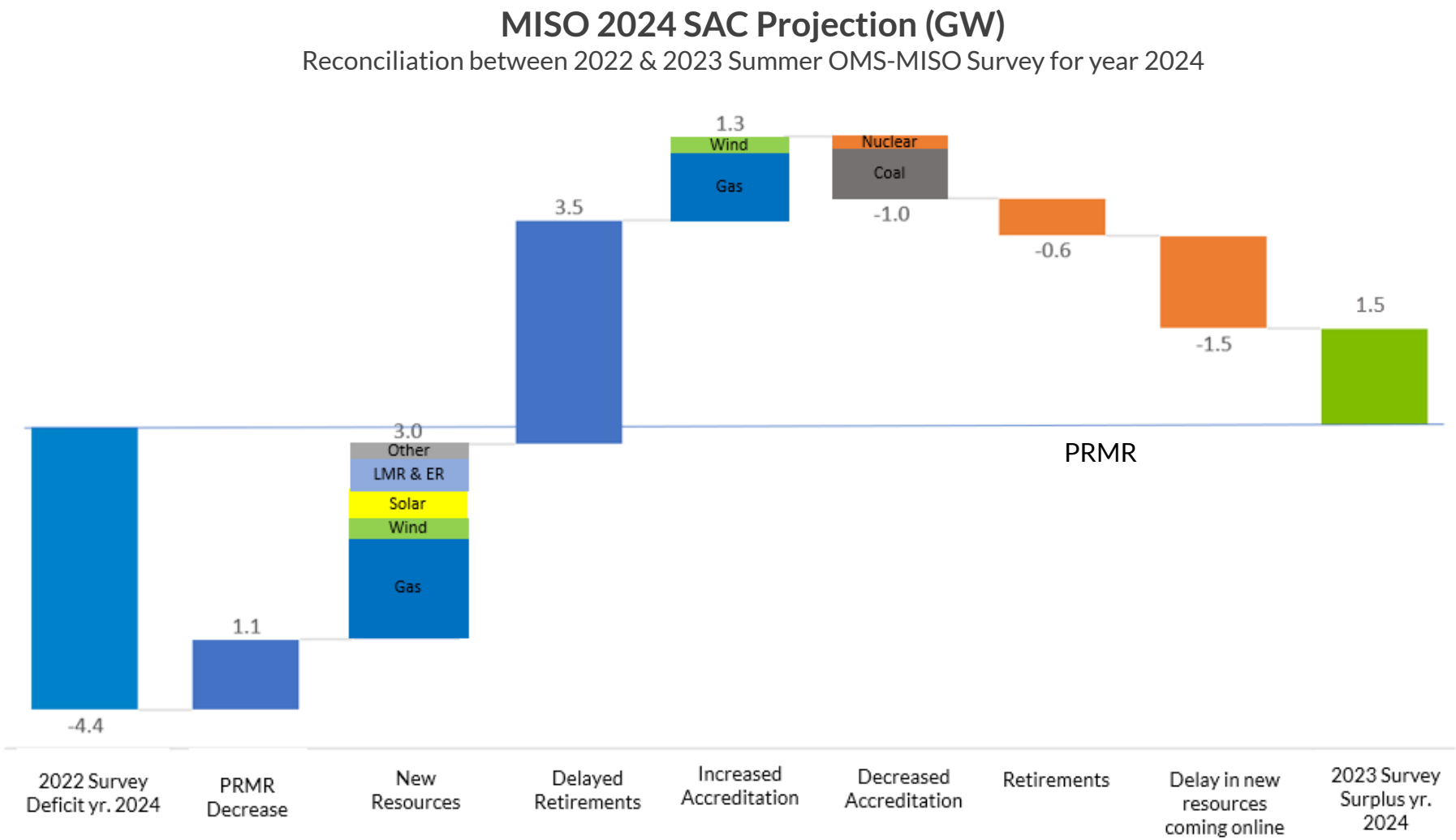
Alternative capacity projections based on historical additions of 2.5 GW/year indicate higher resource adequacy risk from PY 2025/26



Bracketed values indicate difference between Committed Capacity and projected PRMR.
Committed capacity includes installed generation but does **not** include resources with GIA that are not online.
Signed GIA Capacity additions assumed to be 2.5GW/year based on historical trend.
Capacity accreditation values and PRM projections based on current practices.

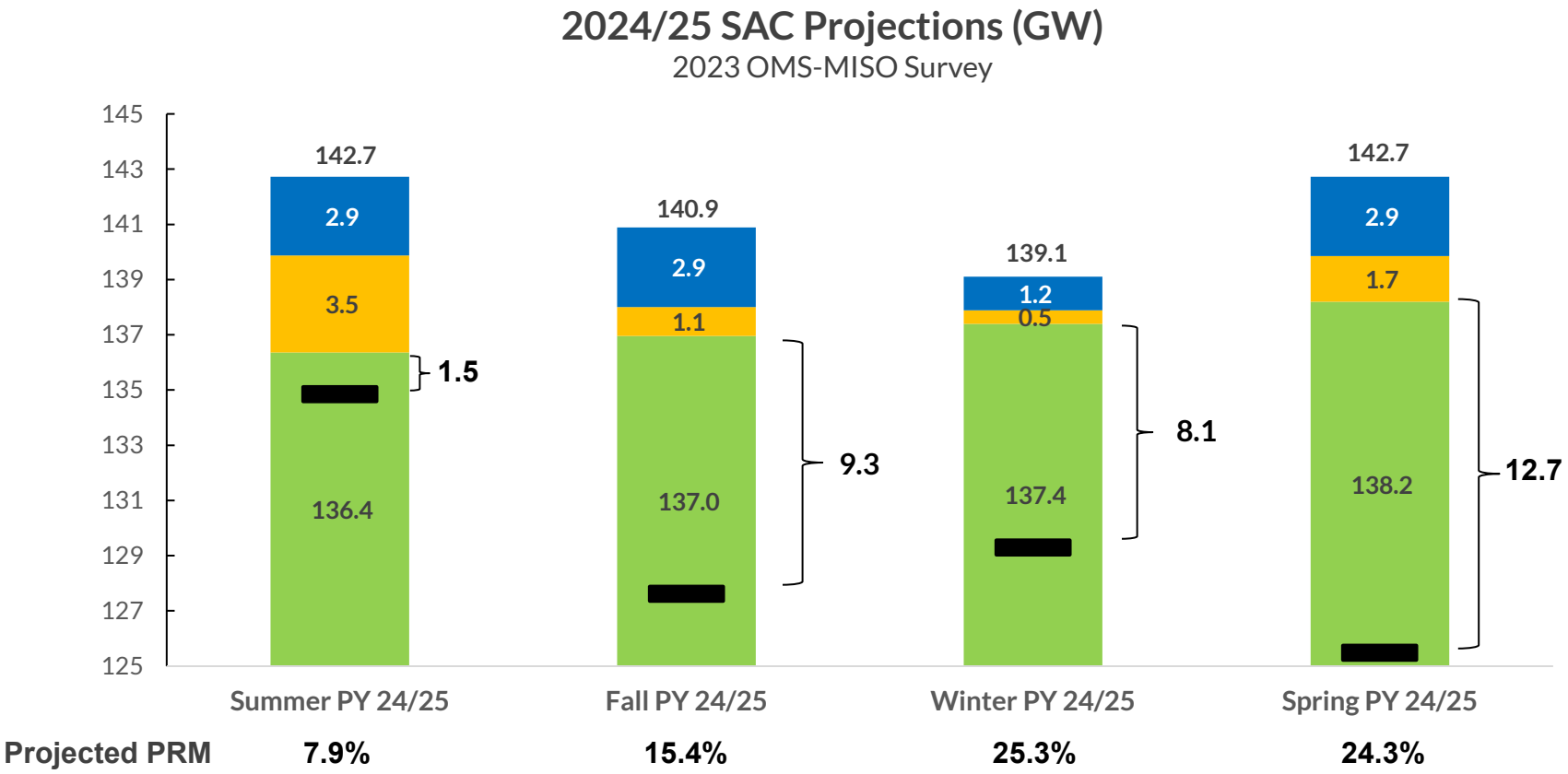
PRM - Planning Reserve Margin (%); PRMR – Planning Reserve Margin Requirement (GW)
RDT limit of 1900 MW is reflected in this chart

Year-over-year survey results for 2024 show a change from deficit to adequate supply due to delayed retirements, new resources and lower load forecast



Lower load forecast noted under 'PRMR decrease'

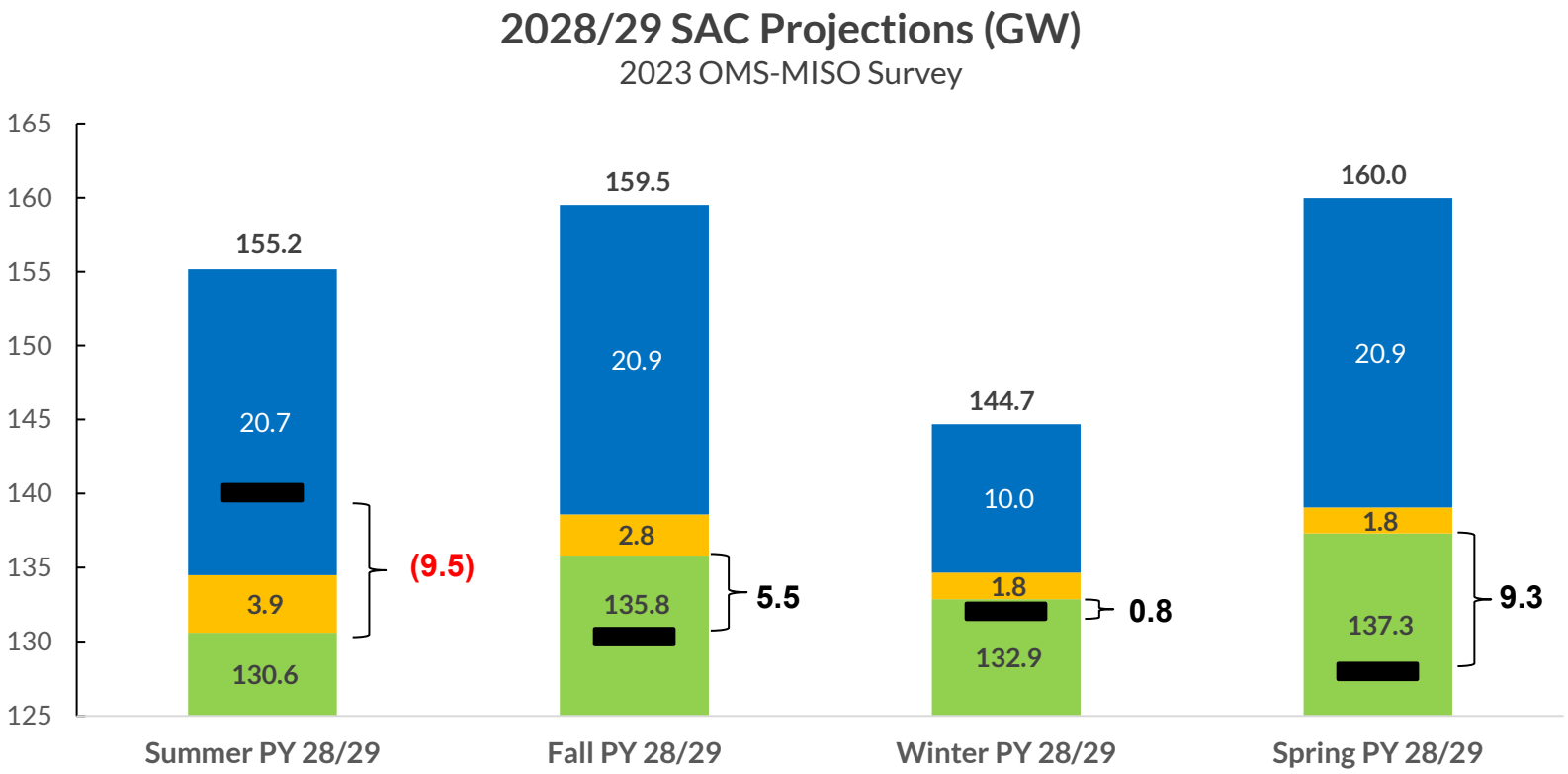
2024/2025 seasonal projections show adequate margins with summer having the tightest margins



Committed Capacity
Potentially Unavailable Resources
Potential New Capacity
Projected PRMR

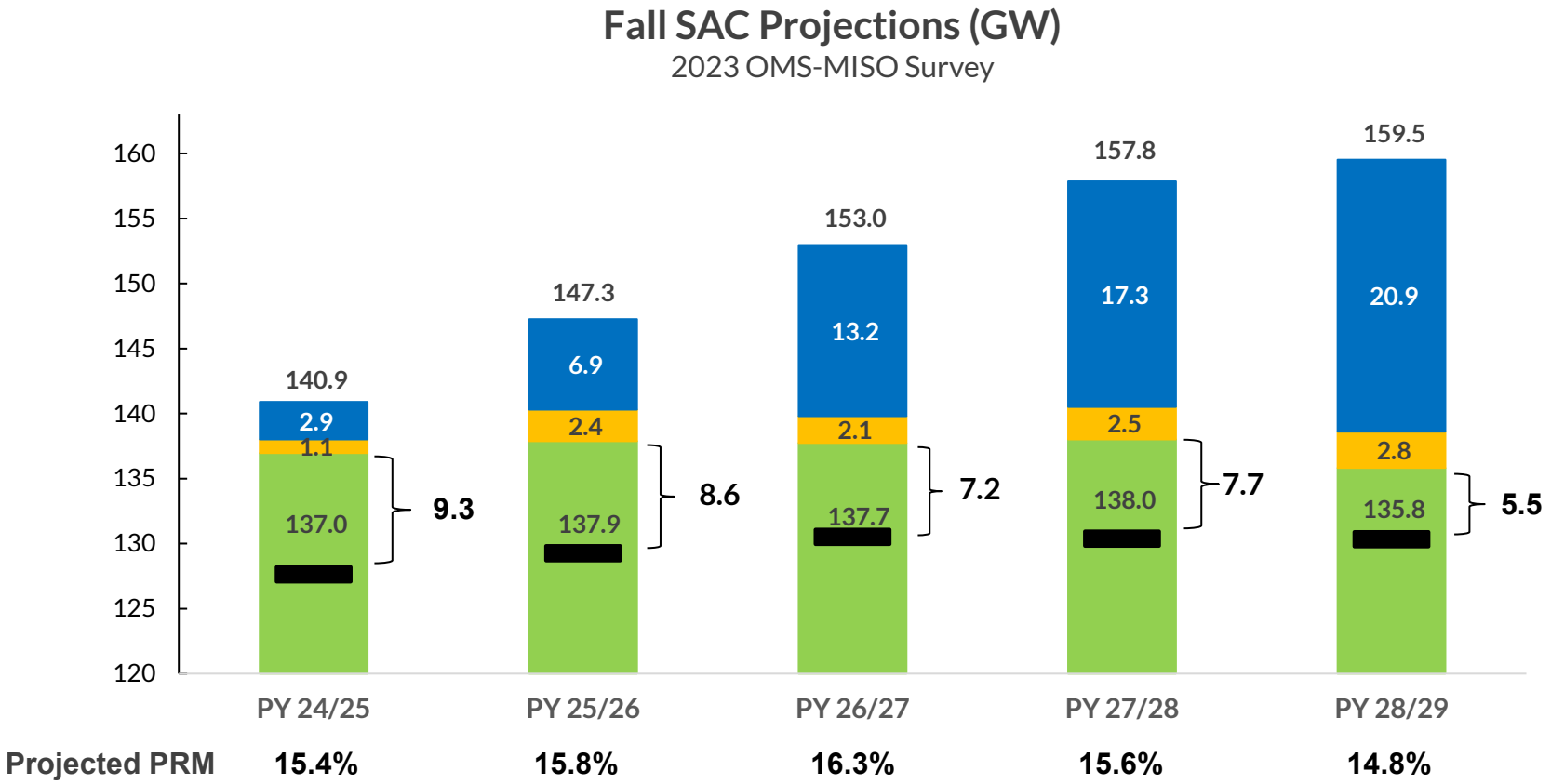
Bracketed values indicate difference between Committed Capacity and projected PRMR.
Capacity accreditation values and PRM projections based on current practices.
Timing/GW of potential New Capacity projected per methodology noted in Oct 2022 RASC.
RDT limit of 1900 MW is reflected in this chart.

2028/2029 projections show tighter conditions and increased reliance on new resources to meet PRMR



Bracketed values indicate difference between Committed Capacity and projected PRMR.
Capacity accreditation values and PRM projections based on current practices.
Timing/GW of potential New Capacity projected per methodology noted in Oct 2022 RASC.
RDT limit of 1900 MW is reflected in this chart.

Fall season projections indicate sufficient capacity but show decrease in committed capacity in future years

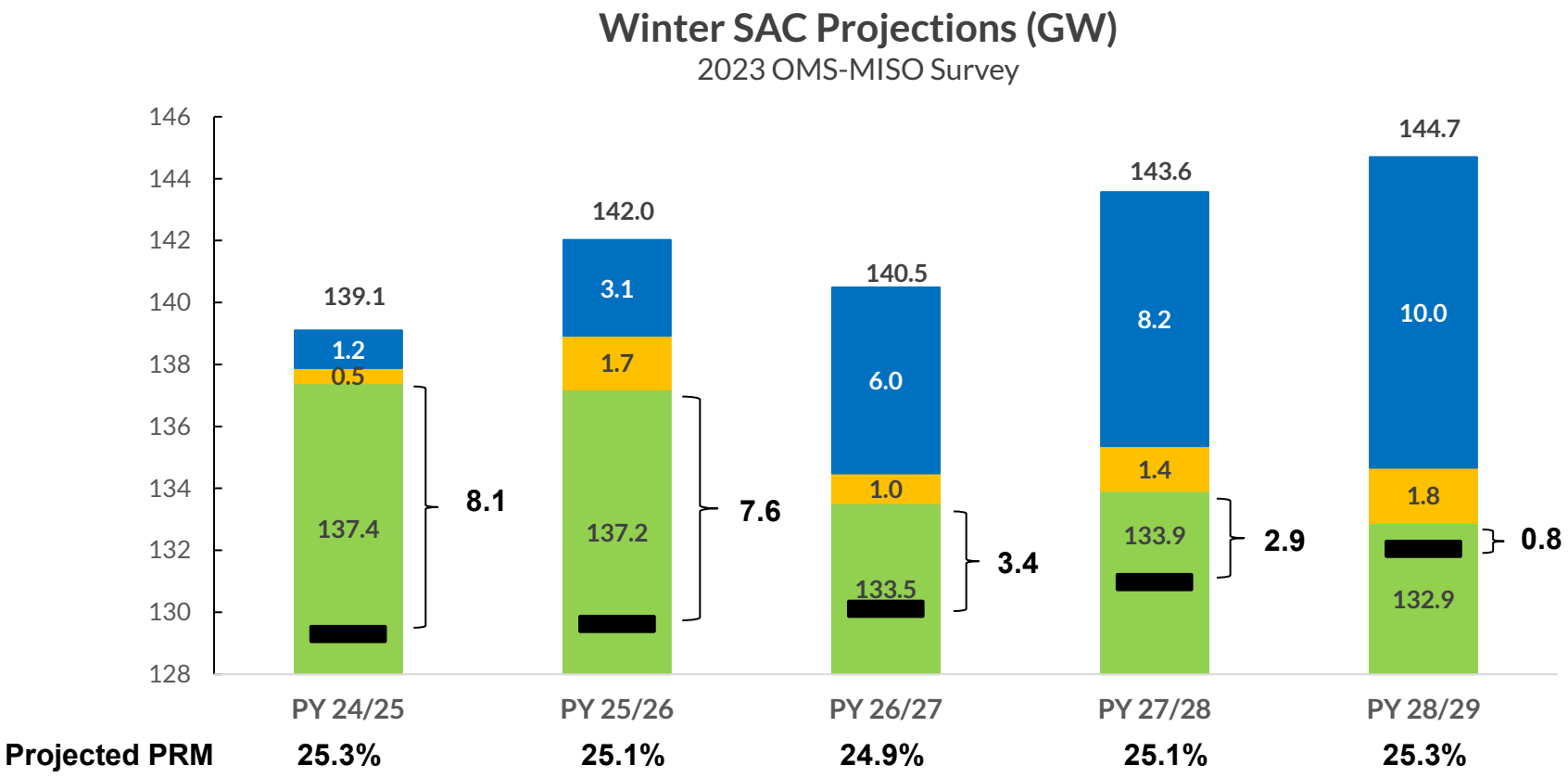


Committed Capacity
Potentially Unavailable Resources
Potential New Capacity
Projected PRMR

Bracketed values indicate difference between Committed Capacity and projected PRMR.
Capacity accreditation values and PRM projections based on current practices.
Timing/GW of potential New Capacity projected per methodology noted in Oct 2022 RASC.
RDT limit of 1900 MW is reflected in this chart.

Fall demand and PRMR calculated by using summer demand forecast percent change seen year-over-year since out year Non- Coincident Peak Forecast (NCPF) is not submitted for out years for fall and spring.

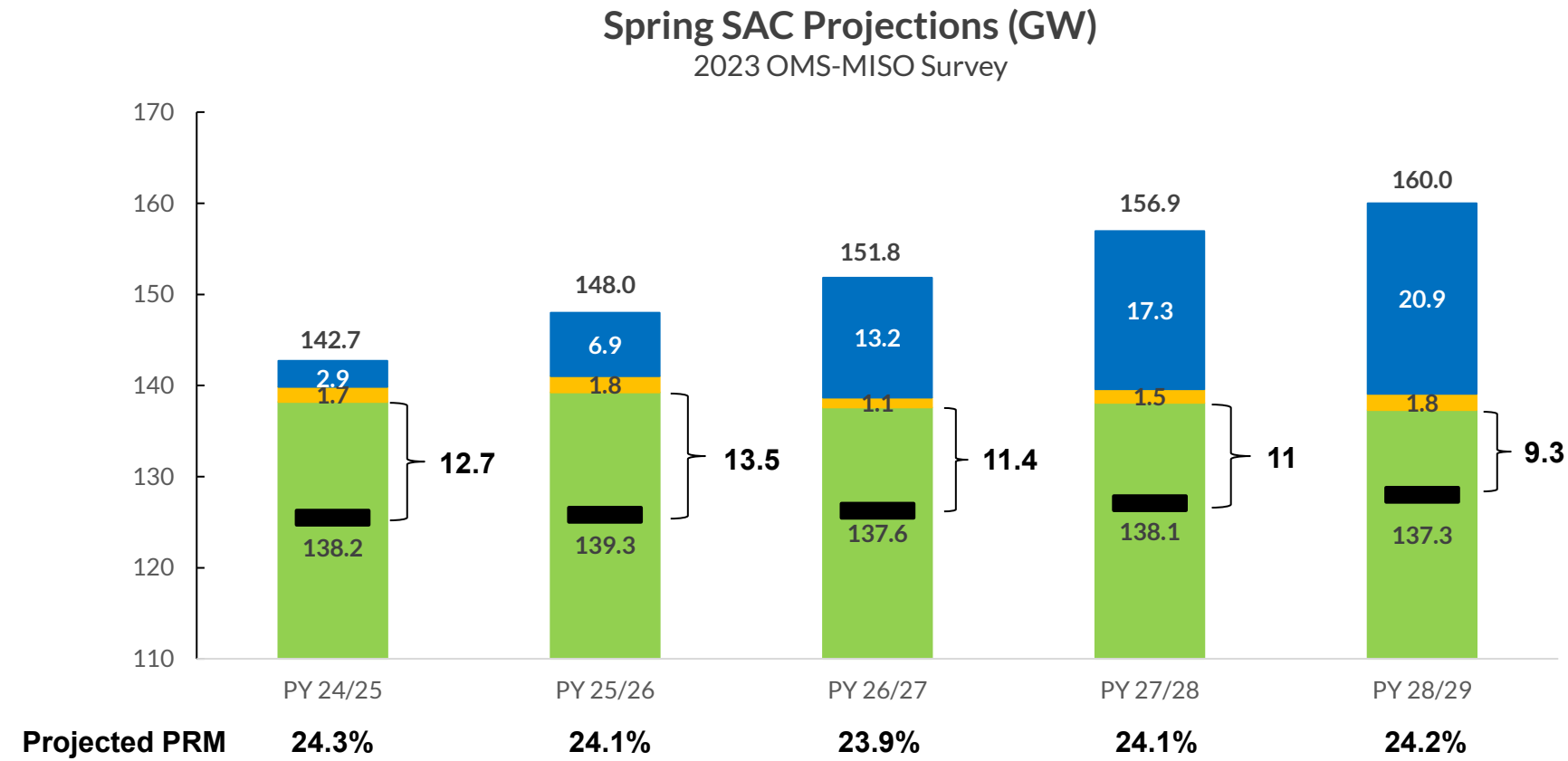
Winter season projections indicate sufficient capacity in the near term but tight conditions by PY2028/29



Committed Capacity
Potentially Unavailable Resources
Potential New Capacity
Projected PRMR

Bracketed values indicate difference between Committed Capacity and projected PRMR.
Capacity accreditation values and PRM projections based on current practices.
Timing/GW of potential New Capacity projected per methodology noted in Oct 2022 RASC.
RDT limit of 1900 MW is reflected in this chart.

Spring season projections indicate sufficient capacity over the survey horizon

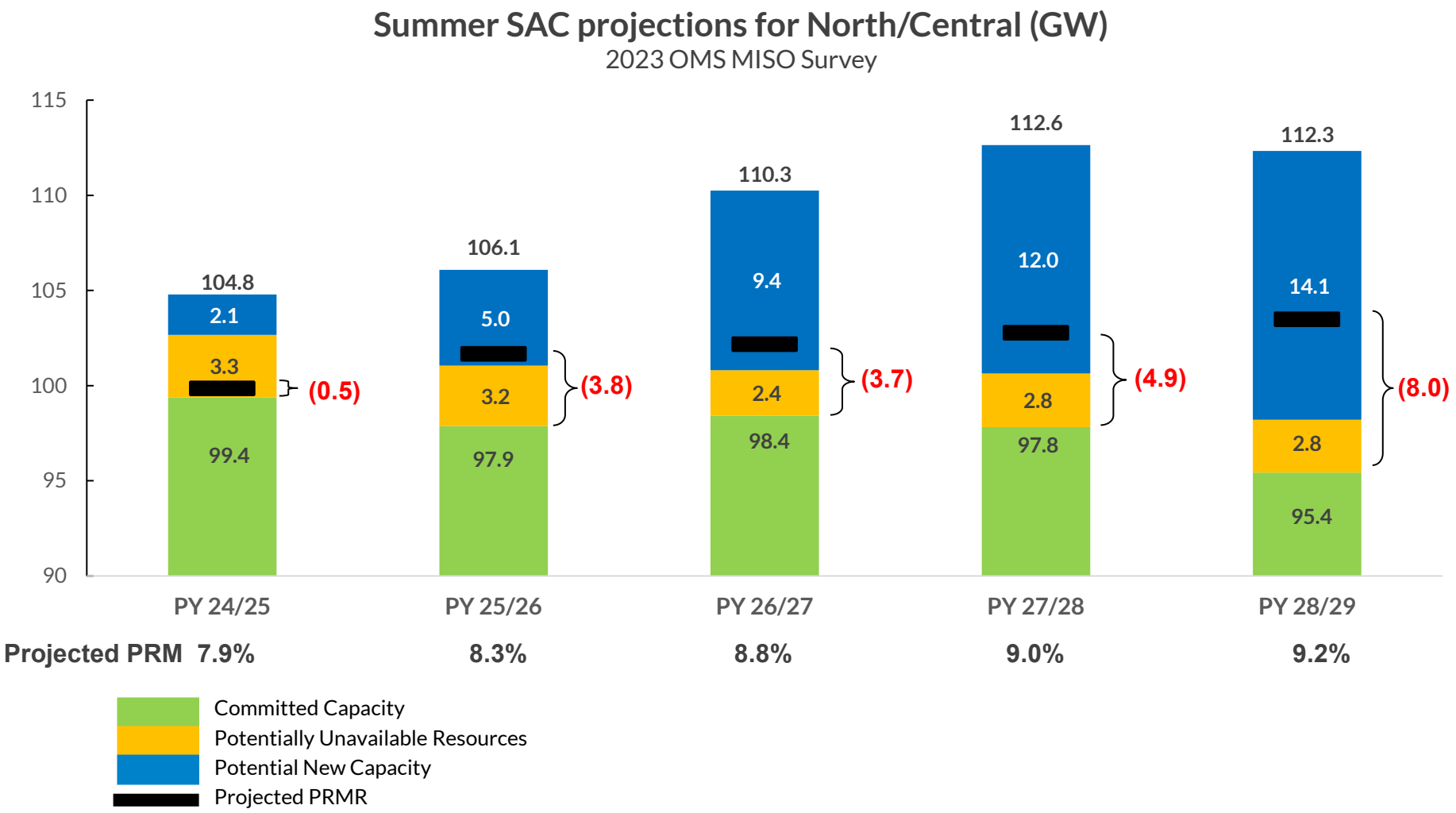


Committed Capacity
Potentially Unavailable Resources
Potential New Capacity
Projected PRMR

Bracketed values indicate difference between Committed Capacity and projected PRMR.
Capacity accreditation values and PRM projections based on current practices.
Timing/GW of potential New Capacity projected per methodology noted in Oct 2022 RASC.
RDT limit of 1900 MW is reflected in this chart.

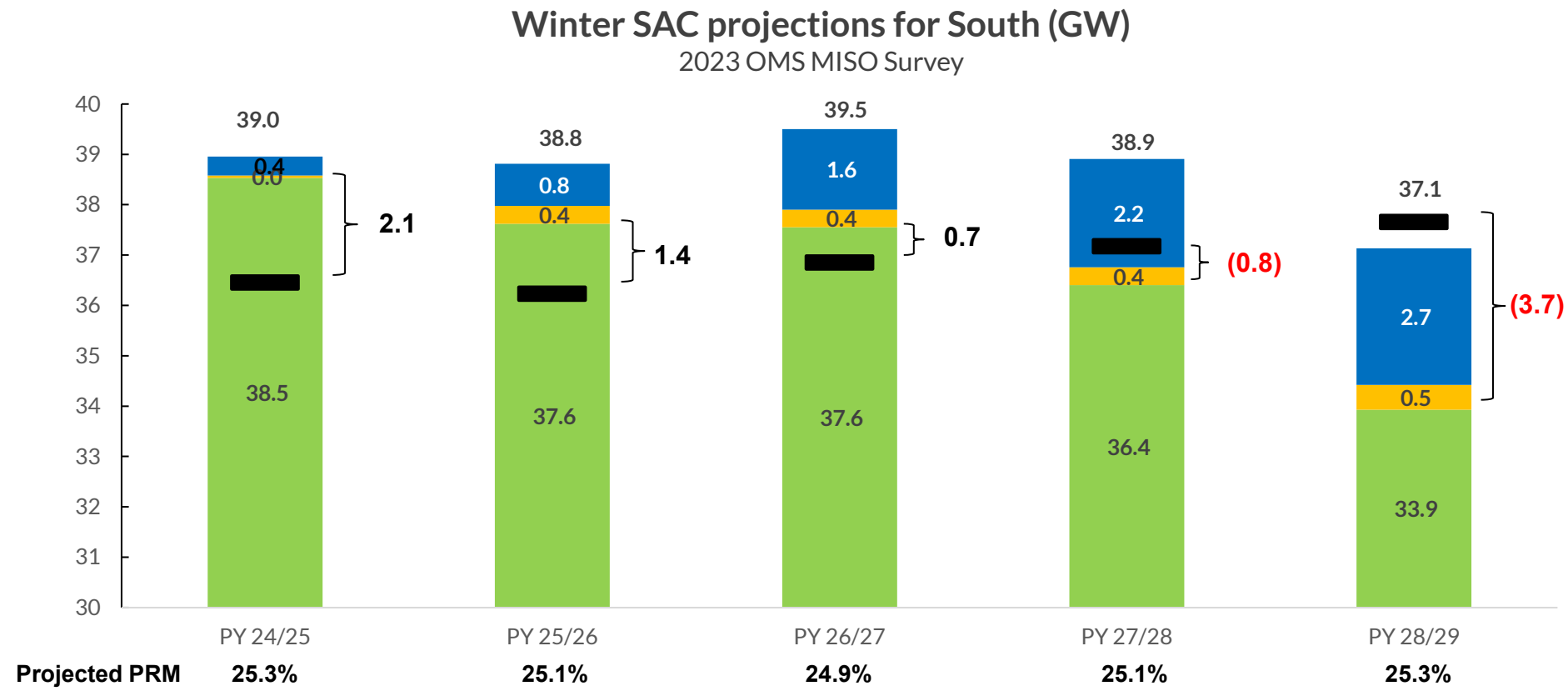
Spring demand and therefore PRMR is calculated by using Winter demand forecast percent change seen year over year since out year NCPF is not submitted for out years for Fall and Spring.

Sub-regional projections show an increasing gap in summer in North/Central and…



While RDT is not reflected in these charts the limit is currently modeled at 1900 MW in Resource Adequacy

… a similar outcome in Winter for South



While RDT is not reflected in these charts the limit is currently modeled at 1900 MW in Resource Adequacy

Appendix

Understanding Resource Categories

- **Committed Capacity** - resources committed to serving MISO load
  - Resources within MISO utilities' rate base
  - External resources with firm contracts to MISO load
  - Non-rate base units without announced retirements or commitments to non-MISO load
  - New generators with signed interconnection agreements not yet in service
- **Potentially Unavailable Resources** - resources that may be available to serve MISO load but may not have firm commitments to do so
  - Indicated as Low Certainty in survey results by Market Participants
  - Includes potential retirements or suspensions
- **Potential New Capacity** – New projects in the MISO Generator Interconnection Queue accredited at the current (2022) new resource capacity credit levels and adjusted for projected queue certainty factors
- **Unavailable resources** are not included in the survey totals
  - Resources with firm commitments to non-MISO load
  - Resources with finalized retirements or suspensions
  - Potential new generation which are not currently in the MISO Generator Interconnection Queue

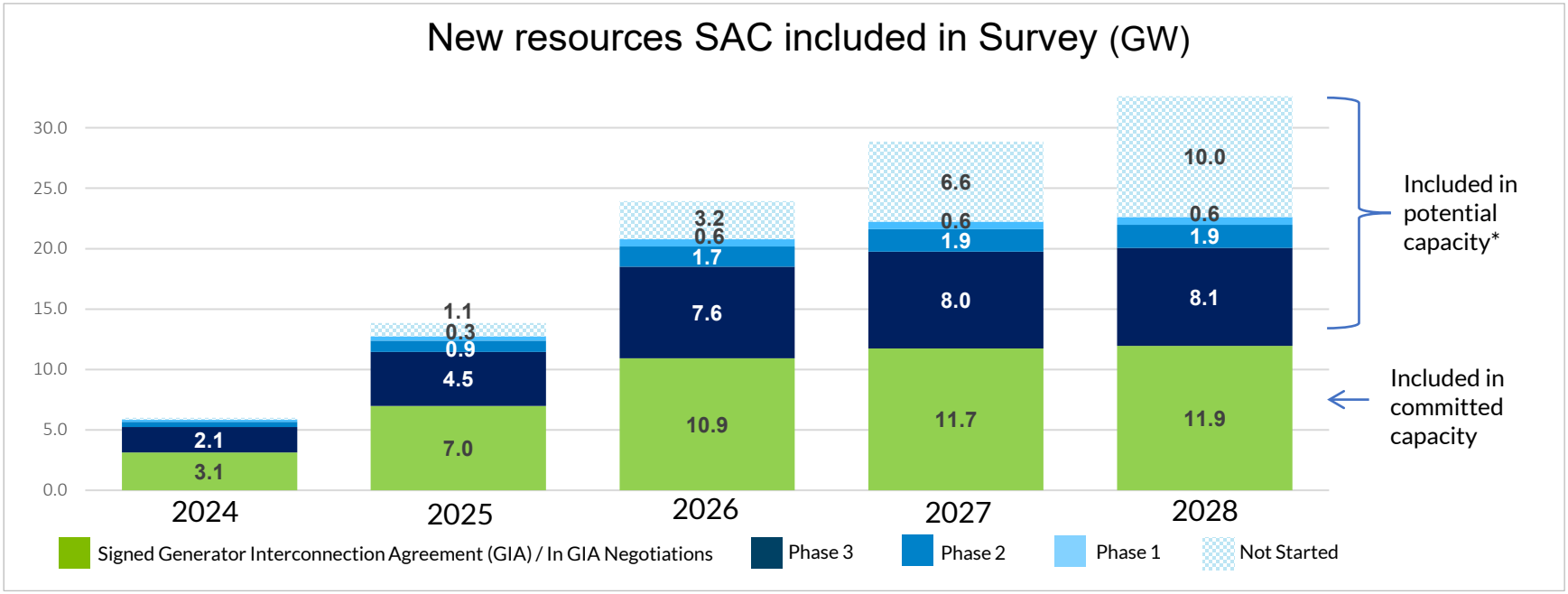
2023 OMS-MISO Survey Queue Treatment

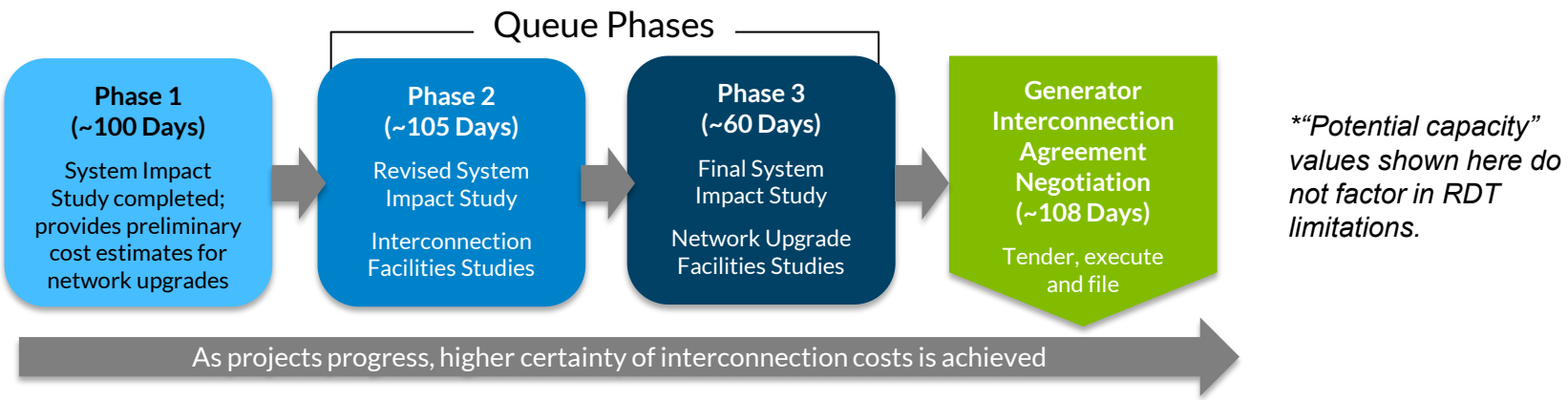
Apply Capacity Credit	Apply DPP Study Phase Weighting	Capacity Assumptions for Pre-GIA Projects*	Capacity Assumptions for Post-GIA Projects*
Wind: Summer 18.1% Fall 23.1 Winter 40.3% Spring 23%	Not Started and Phase 1= 10%	30% in COD + 1 year	80% in COD + 1 year
Solar: Winter 5% All other seasons 50%	Phase 2 = 75% Non-Intermittent, 50% Intermittent	30% in COD + 2 years	15% in COD + 2 years
Hybrid : Winter 15% All other seasons 60%	GIA in Progress and Phase 3 = 90%	40% in COD + 3 years	5% in COD + 3 years
ESR: 95% for all seasons			
All other 100%			

*Assumptions were discussed at the October 2022 RASC and are repeated here for reference.

Definitive Planning Phase (DPP) Study Phase Weighting is applied to recognize that as projects move through the queue process, the likelihood of completion generally becomes more certain. Pre-GIA projects use Application Commercial Operation Date (COD). Post-GIA projects use negotiated COD.

Future summer resource ranges will shift as planned generation interconnections are firmed up

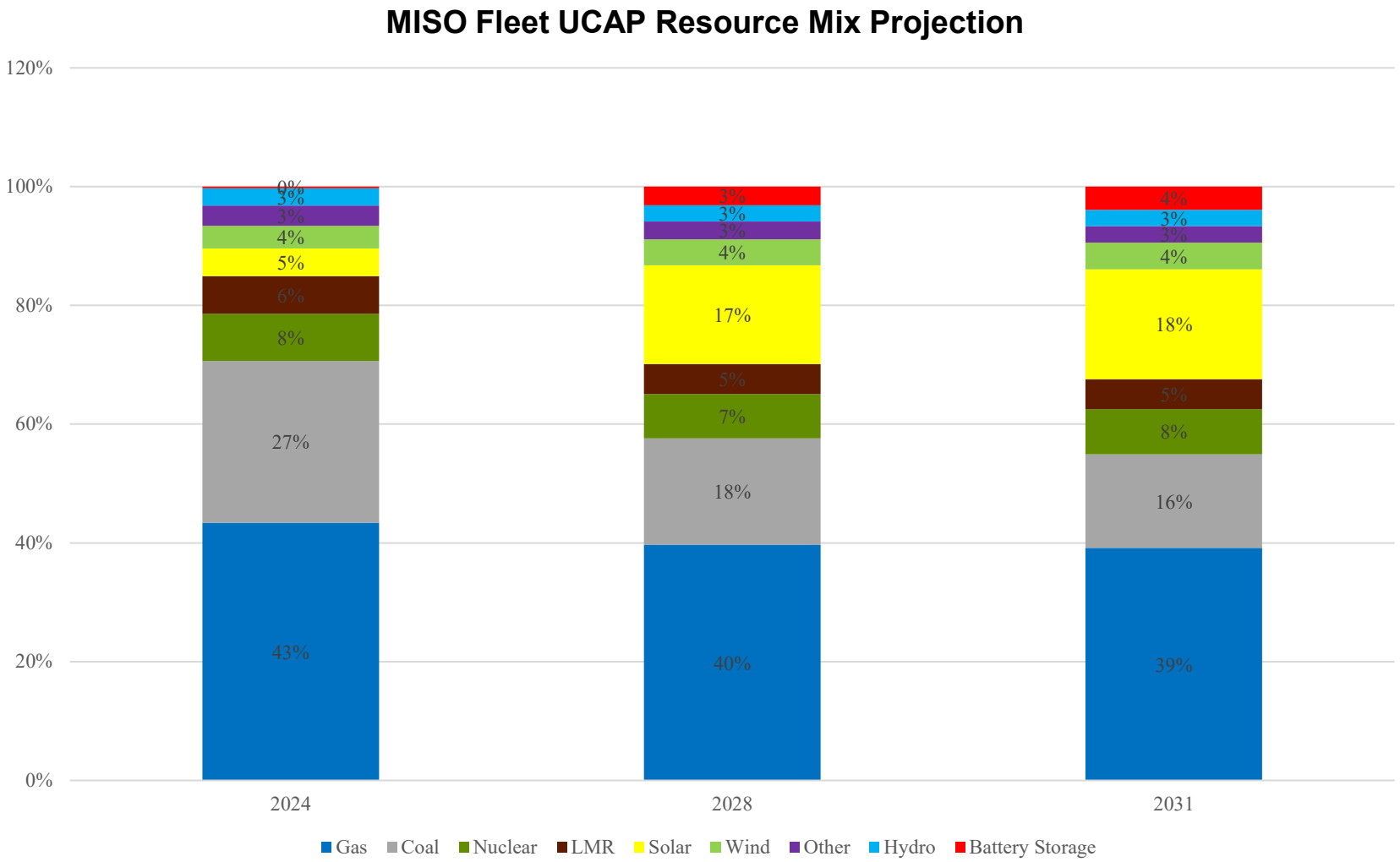




*"Potential capacity" values shown here do not factor in RDT limitations.

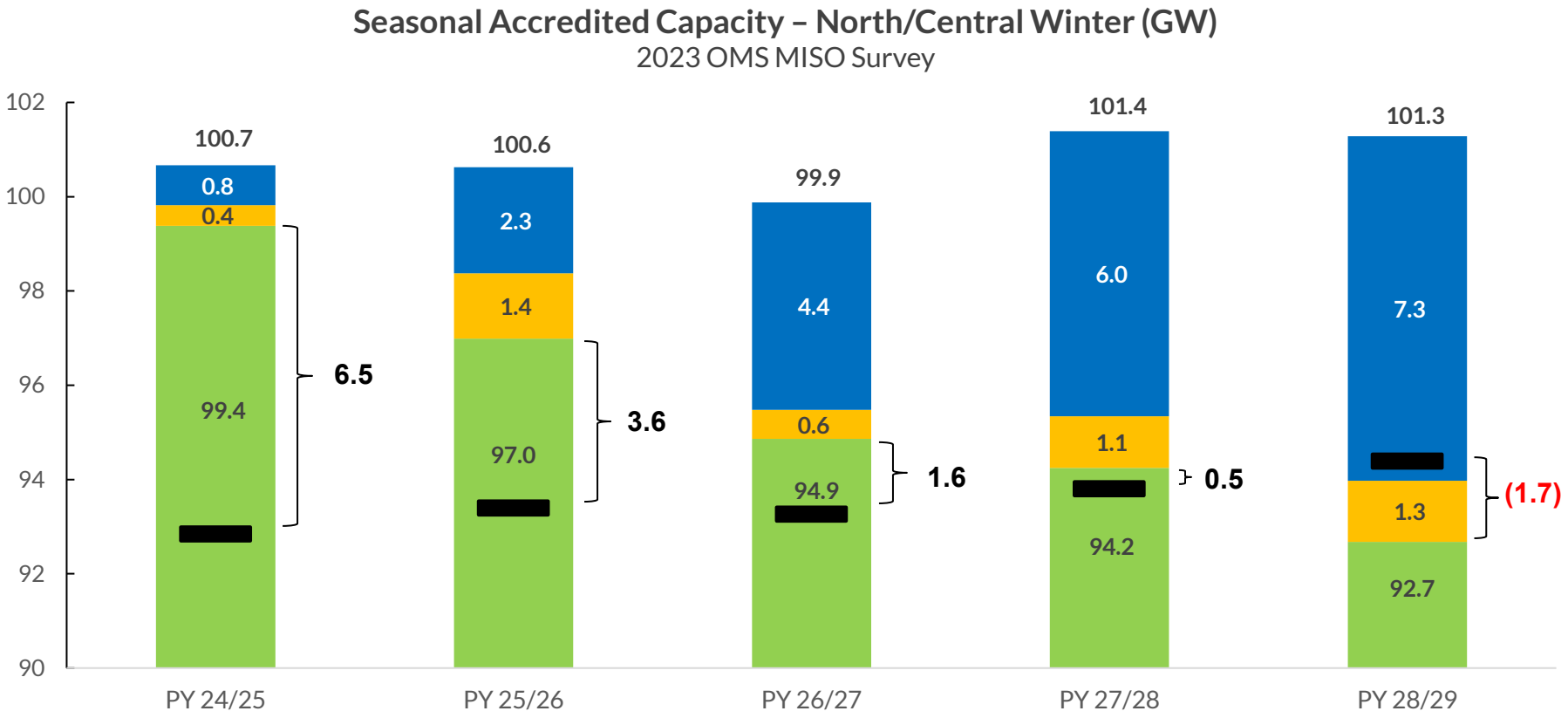
Resources with GIA's and Potential New Capacity represents the MISO Generator Interconnection Queue as of May 1st, 2023.

Interconnection Queue shows a significant increase in solar penetration



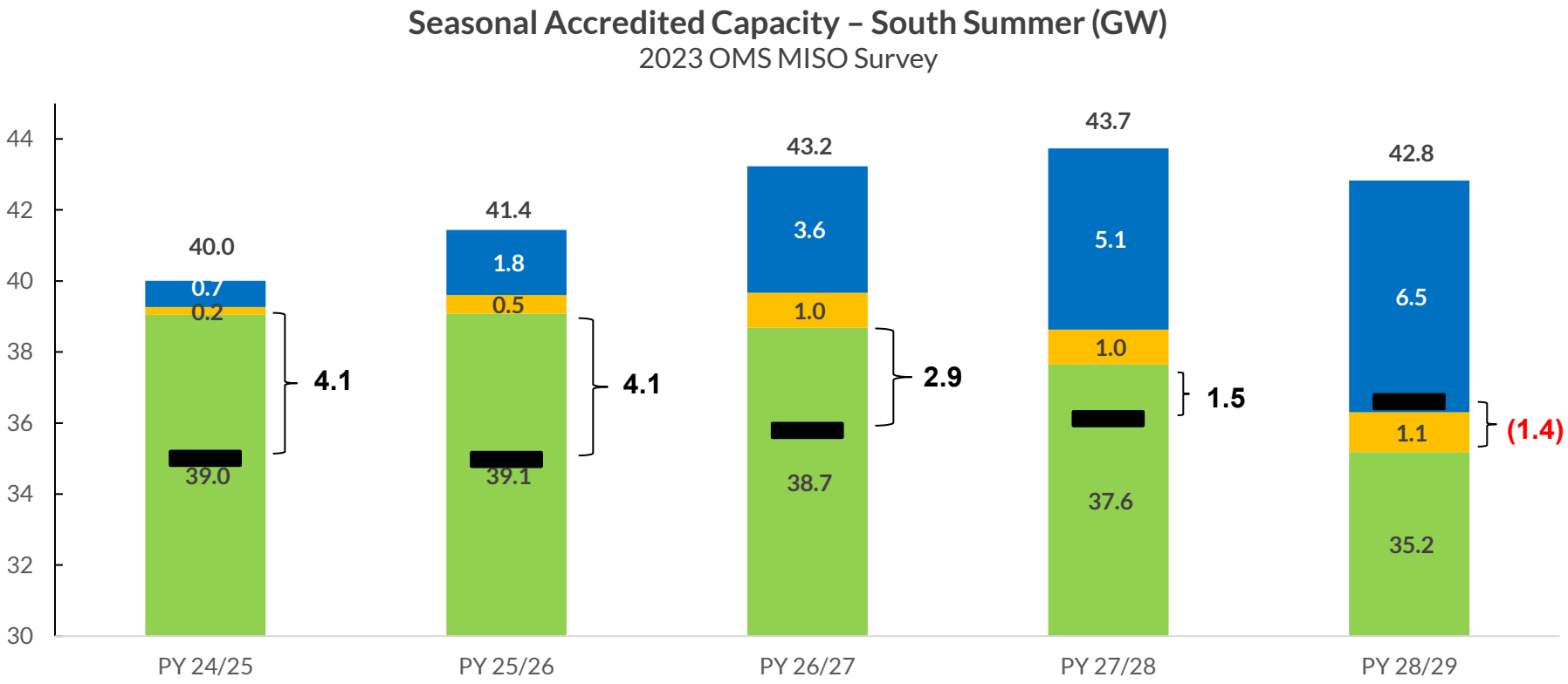
Wind and solar resources shown at current new resource capacity credit accreditation (15.5% ELCC for Wind, 50% for solar). Hybrid resources combined in solar category in OMS survey ~3.5GW in 2028, ~4.28 GW in 2031

For Winter, North/Central increasingly trends towards reduced surpluses over five years, with 2028/29 winter showing a deficit



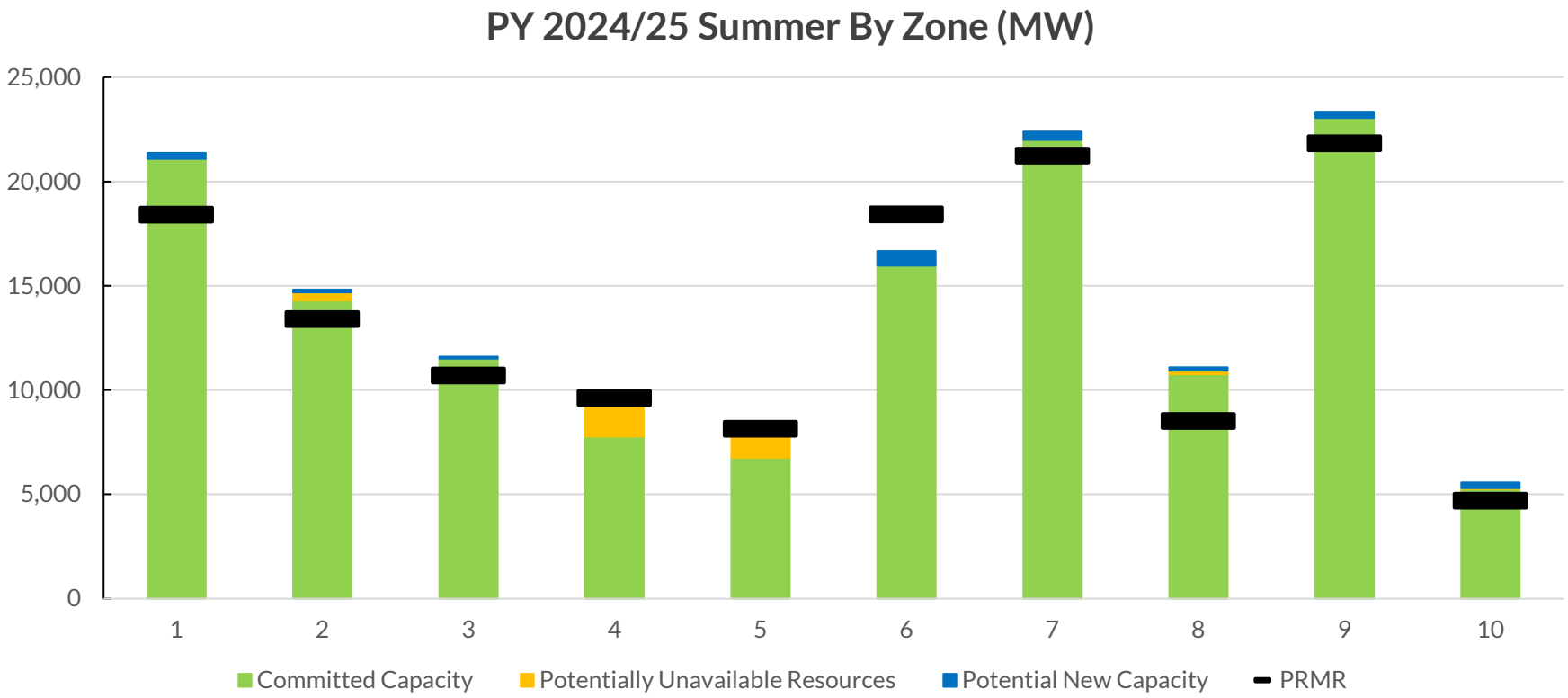
While RDT is not reflected in these charts, the limit is currently 1900 MW in Resource Adequacy.

For Summer, South does not show a deficit until PY 2028/29



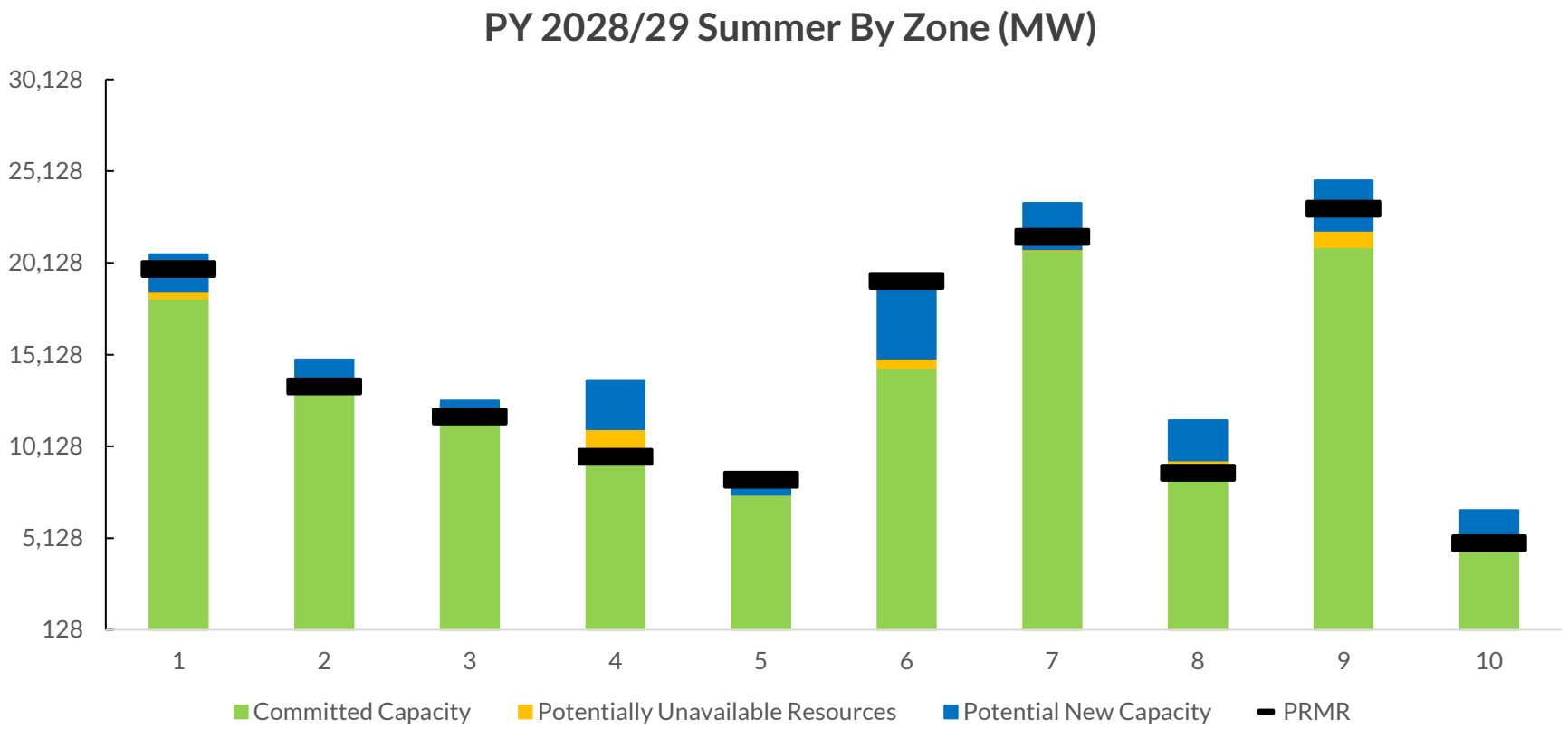
While RDT is not reflected in these charts, the limit is currently 1900 MW in Resource Adequacy.

Zonal view for Summer 2024/25 shows that most zonal PRMRs can be met with resources located within respective zones

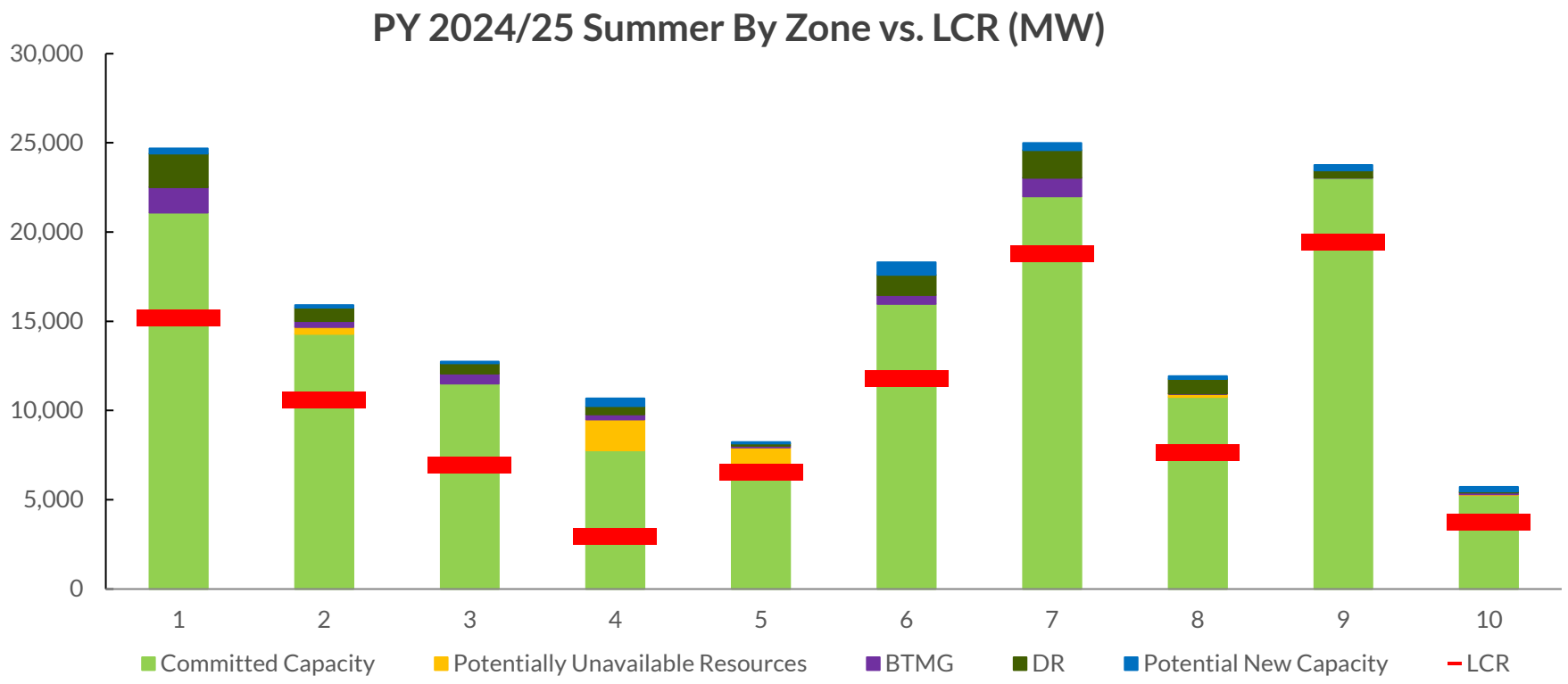


Note: Survey assumes that only resources physically located within the zone will be used to meet the zonal PRMR.

Looking out, 2028/29 zonal view shows the necessity of new capacity to meet PRMRs

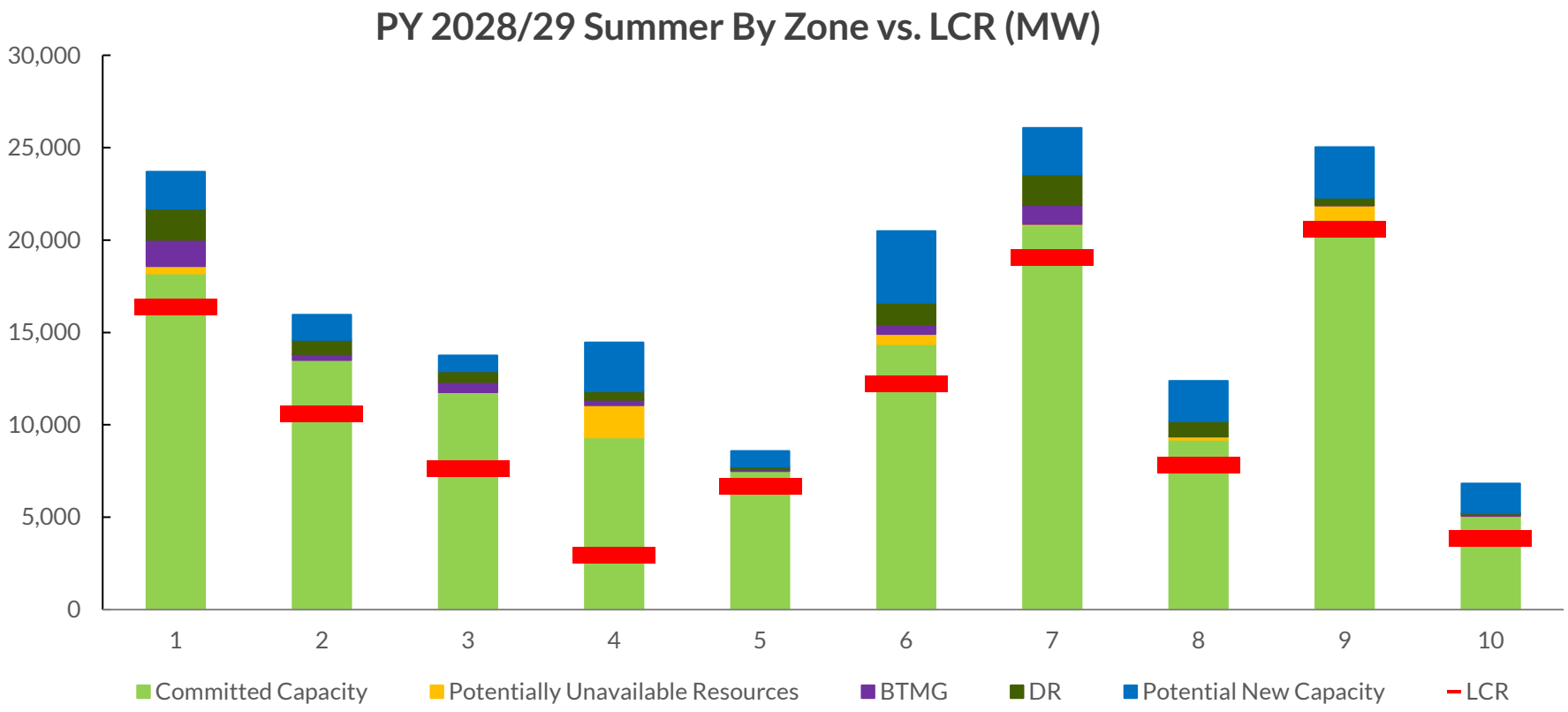


For Summer 2024/25, there is adequate capacity to meet Local Clearing Requirements (LCRs)



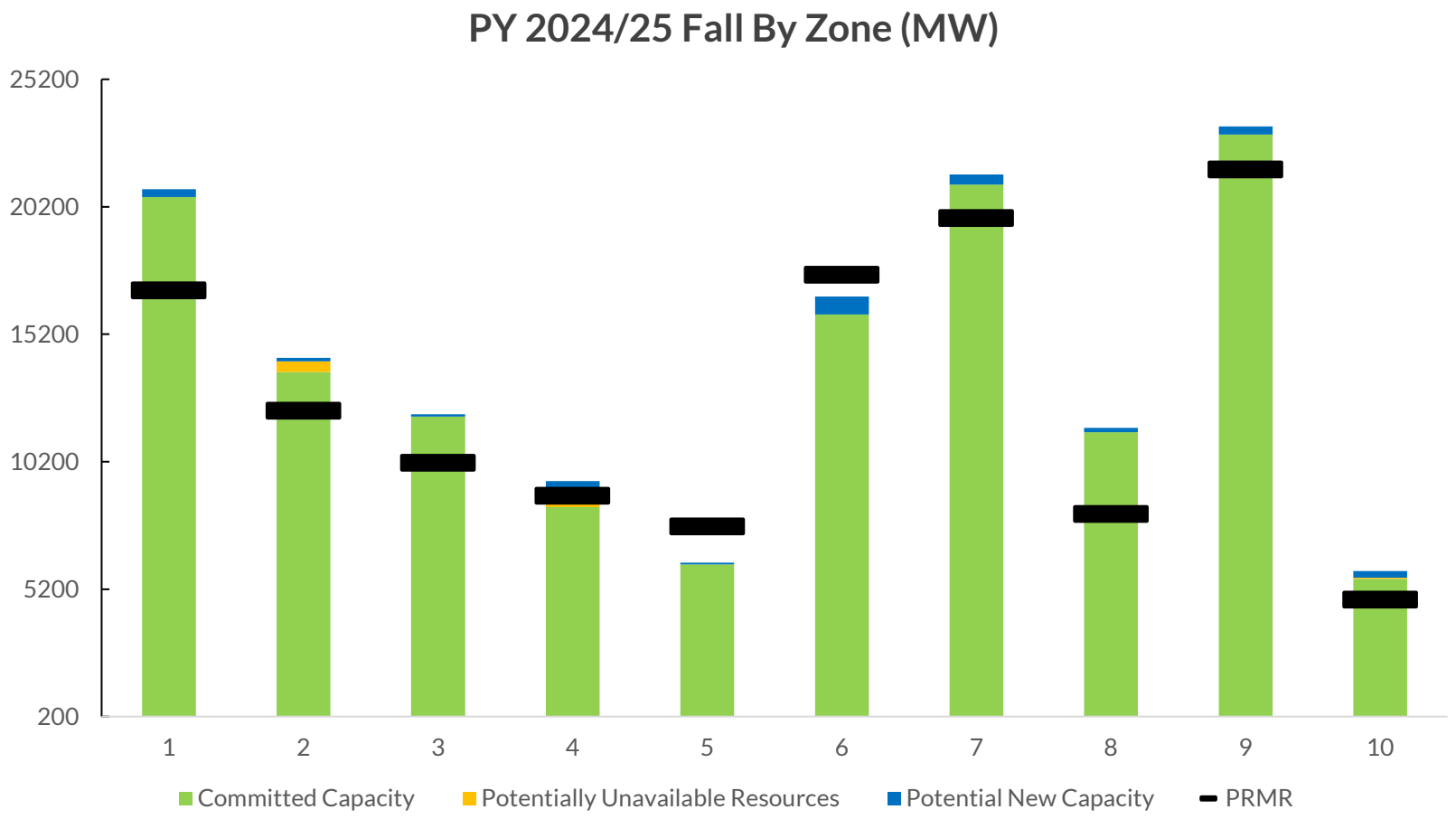
Includes only projected capacity resources within the zone, i.e., does not include imports and interzonal transfers. Potential Capacity includes both new generation and potential retirements. Load Modifying Resources include Demand Response (DR) and Behind the Meter Generation (BTMG).

For Summer 2028/29, some zones show reduced residual capacity to meet LCRs



Includes only projected capacity resources within the zone, i.e., does not include imports and interzonal transfers. Potential Capacity includes both new generation and potential retirements. Load Modifying Resources include Demand Response (DR) and Behind the Meter Generation (BTMG).

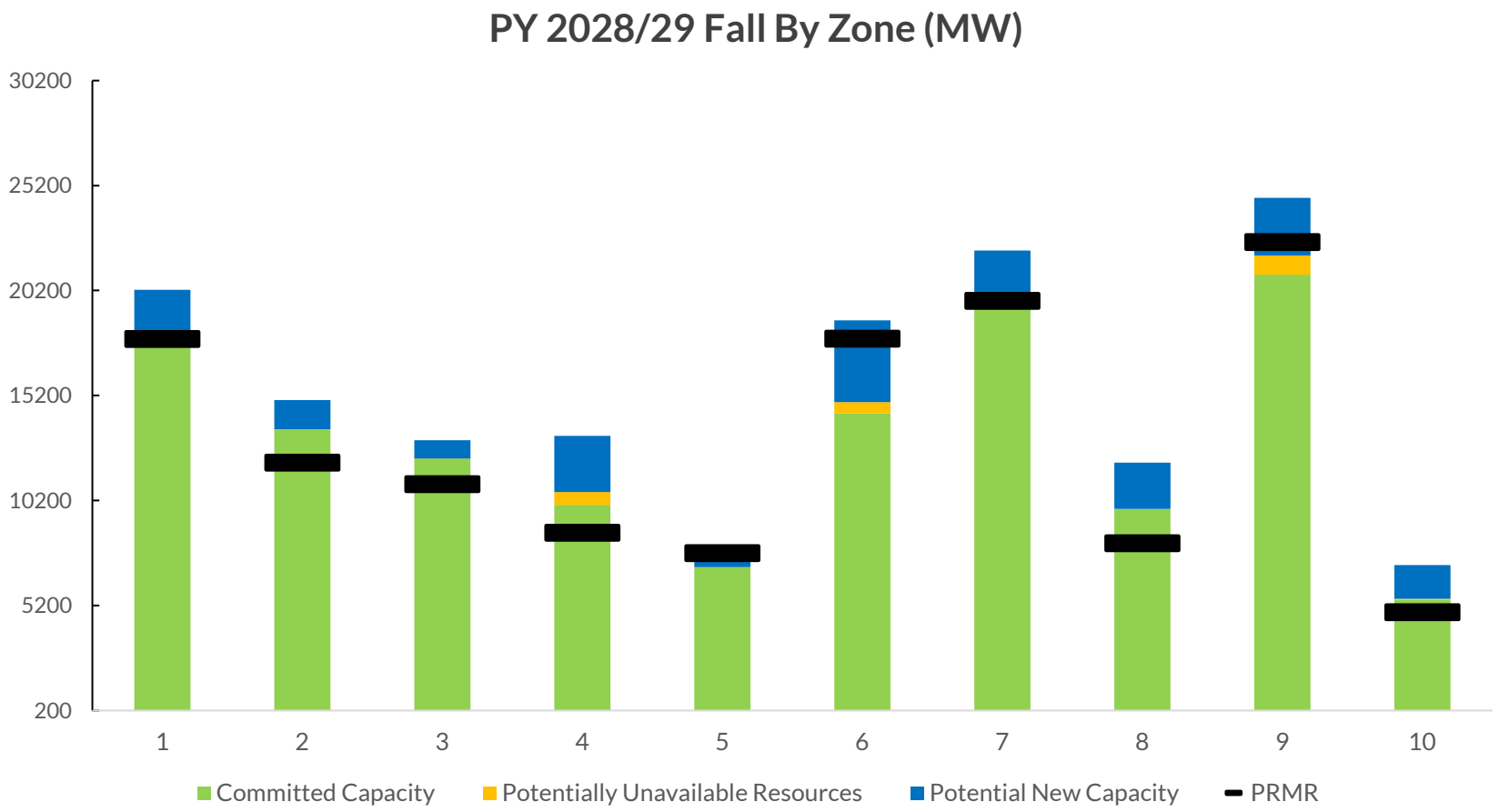
Zonal view for Fall 2024/25 shows that most zonal PRMRs can be met with resources located within respective zones



Note: Survey assumes that only resources physically located within the zone will be used to meet the zonal PRMR.

Fall Demand and therefore PRMR is calculated by using Summer Demand Forecast percent change seen year over year since out year non-coincident peak forecast is not submitted for out years for Fall and Spring.

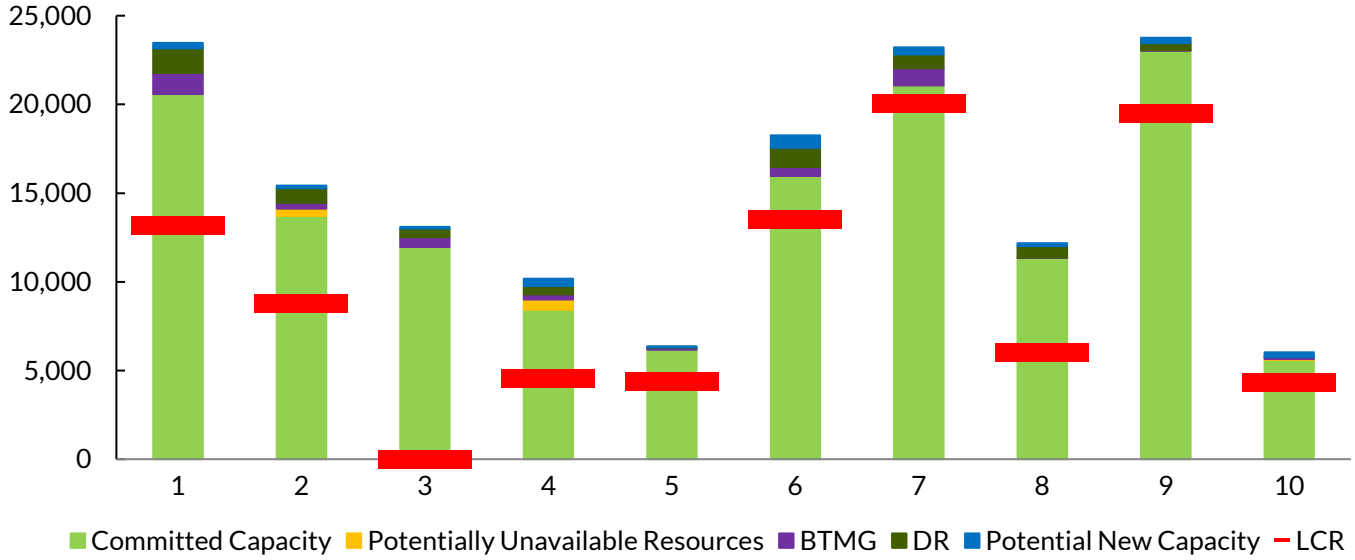
Looking out to Fall season for PY 2028/29, multiple zones rely on potential new capacity



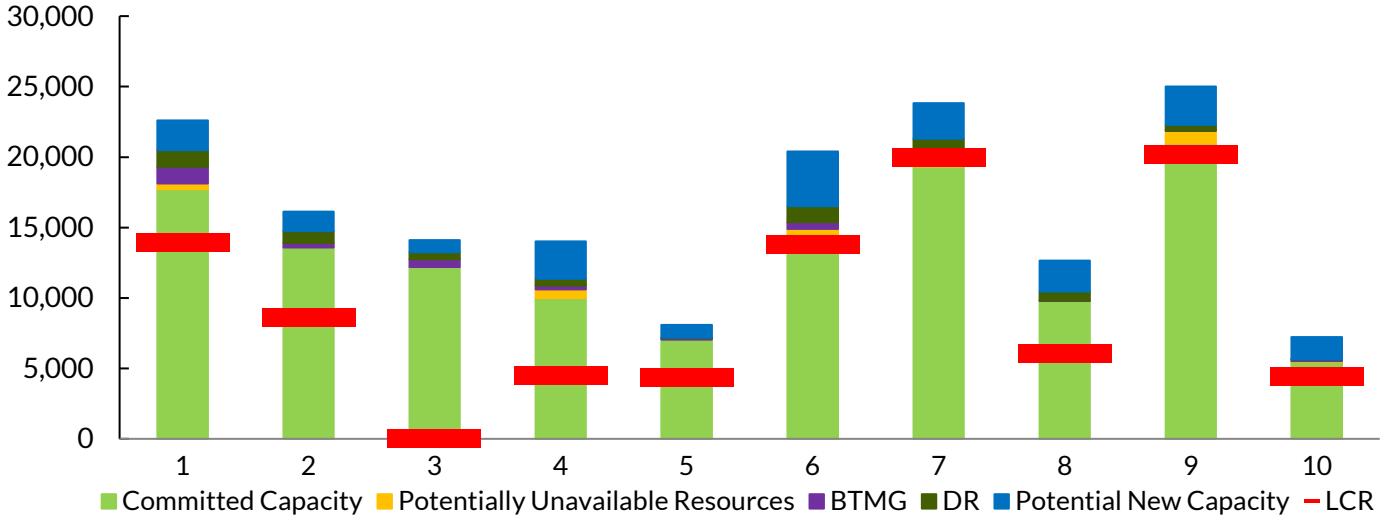
Fall Demand and therefore PRMR is calculated by using Summer Demand Forecast percent change seen year over year since out year non-coincident peak forecast is not submitted for out years for Fall and Spring.

Fall is sufficient in the near-term, but PY 2028/29 may require new capacity addition to meet LCRs

PY 2024/25 Fall By Zone vs. LCR (MW)

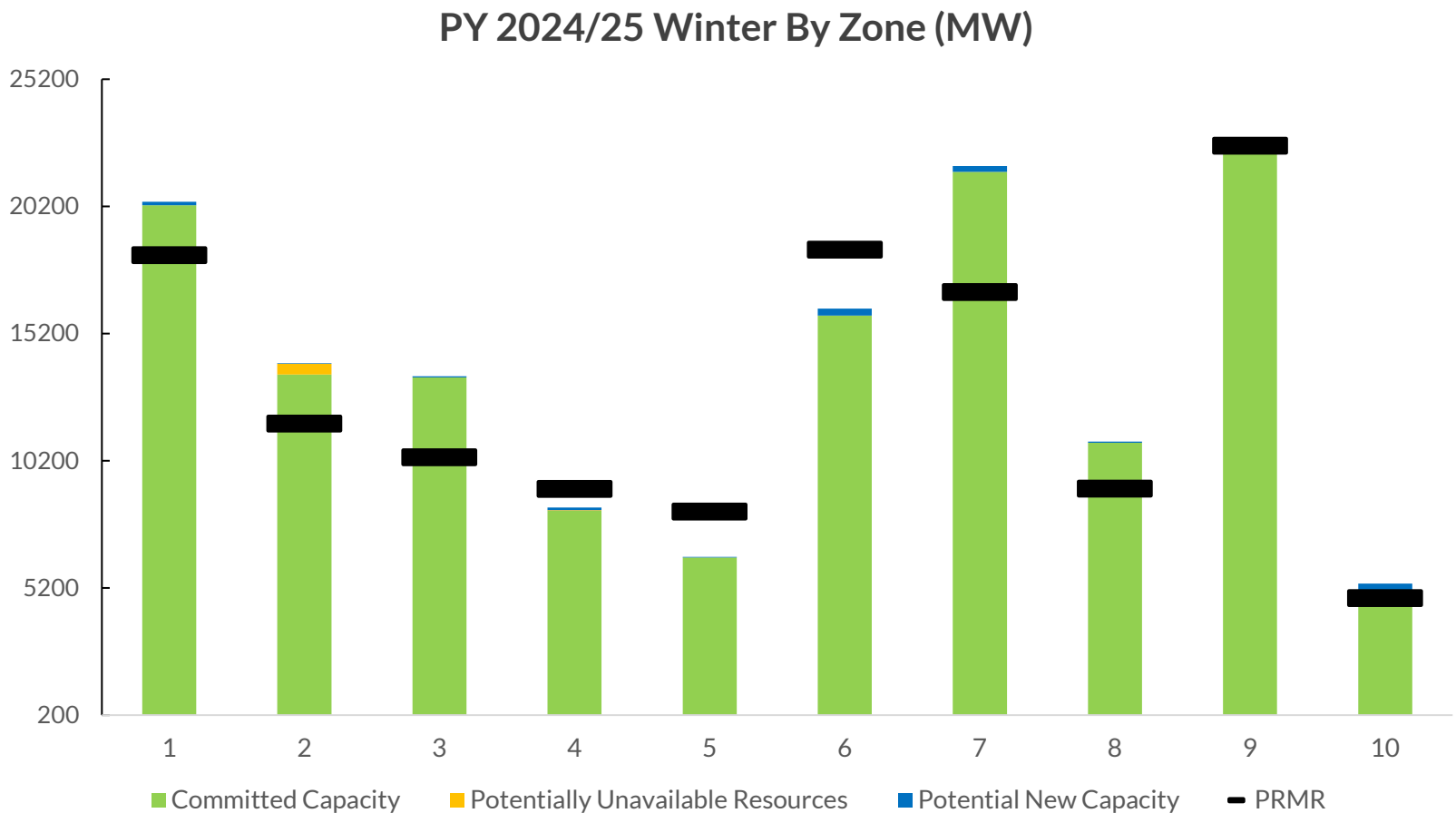


PY 2028/29 Fall By Zone vs. LCR (MW)



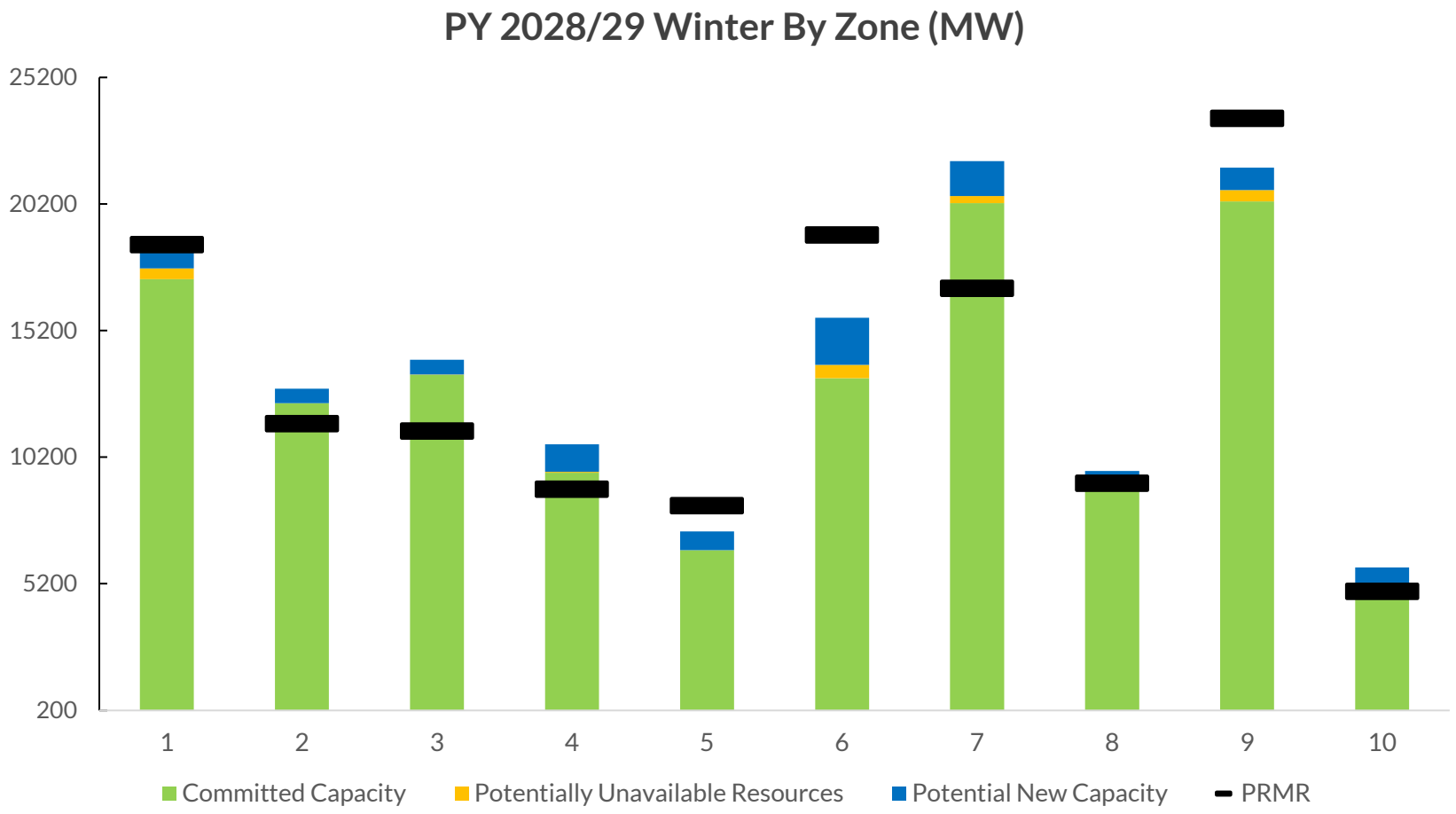
Includes only projected capacity resources within the zone, i.e., does not include imports and interzonal transfers. Potential Capacity includes both new generation and potential retirements. Load Modifying Resources include Demand Response (DR) and Behind the Meter Generation (BTMG).

Zonal view for Winter 2024/25 shows that some zonal PRMRs cannot be met with resources located within respective zones



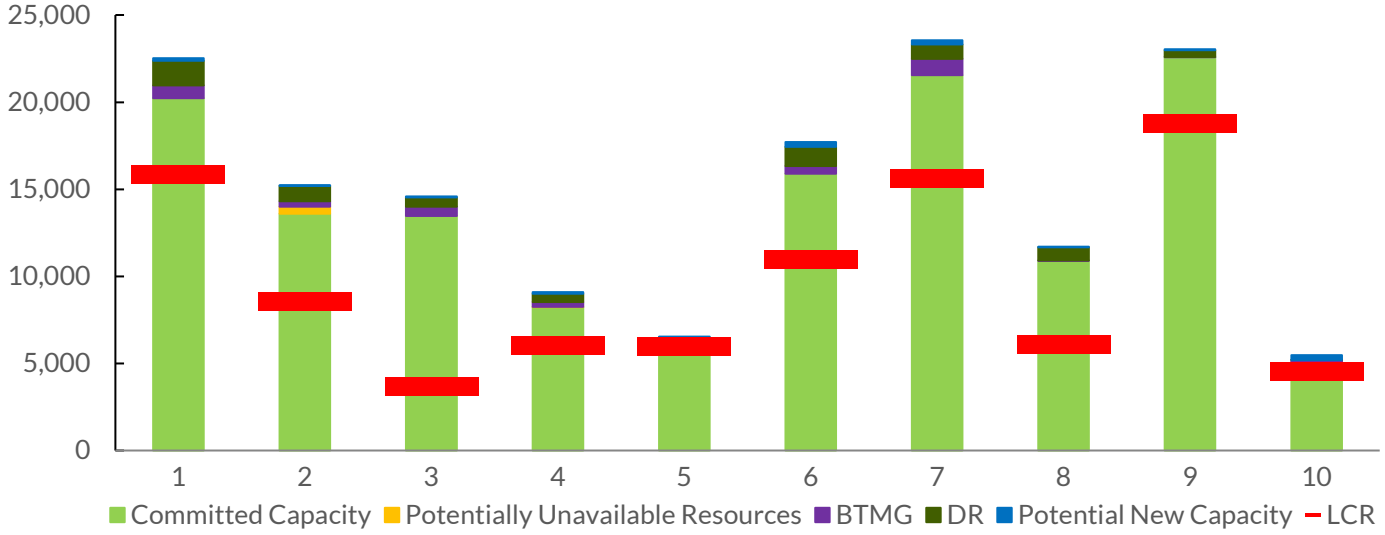
Note: Survey assumes that only resources physically located within the zone will be used to meet the zonal PRMR.

Looking out, Winter 2028/29 zonal view shows the necessity of new capacity to meet PRMRs

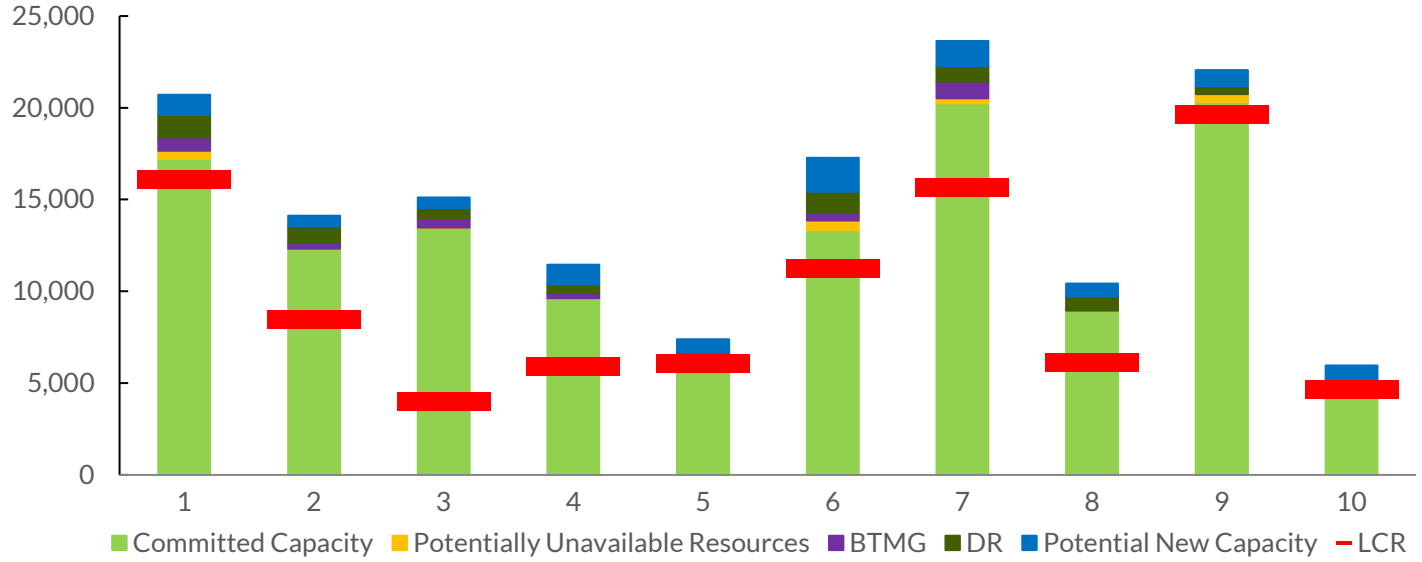


Winter is sufficient in the near-term, but some zones may require capacity additions by 2028/29 to meet LCRs

PY 2024/25 Winter By Zone vs. LCR (MW)

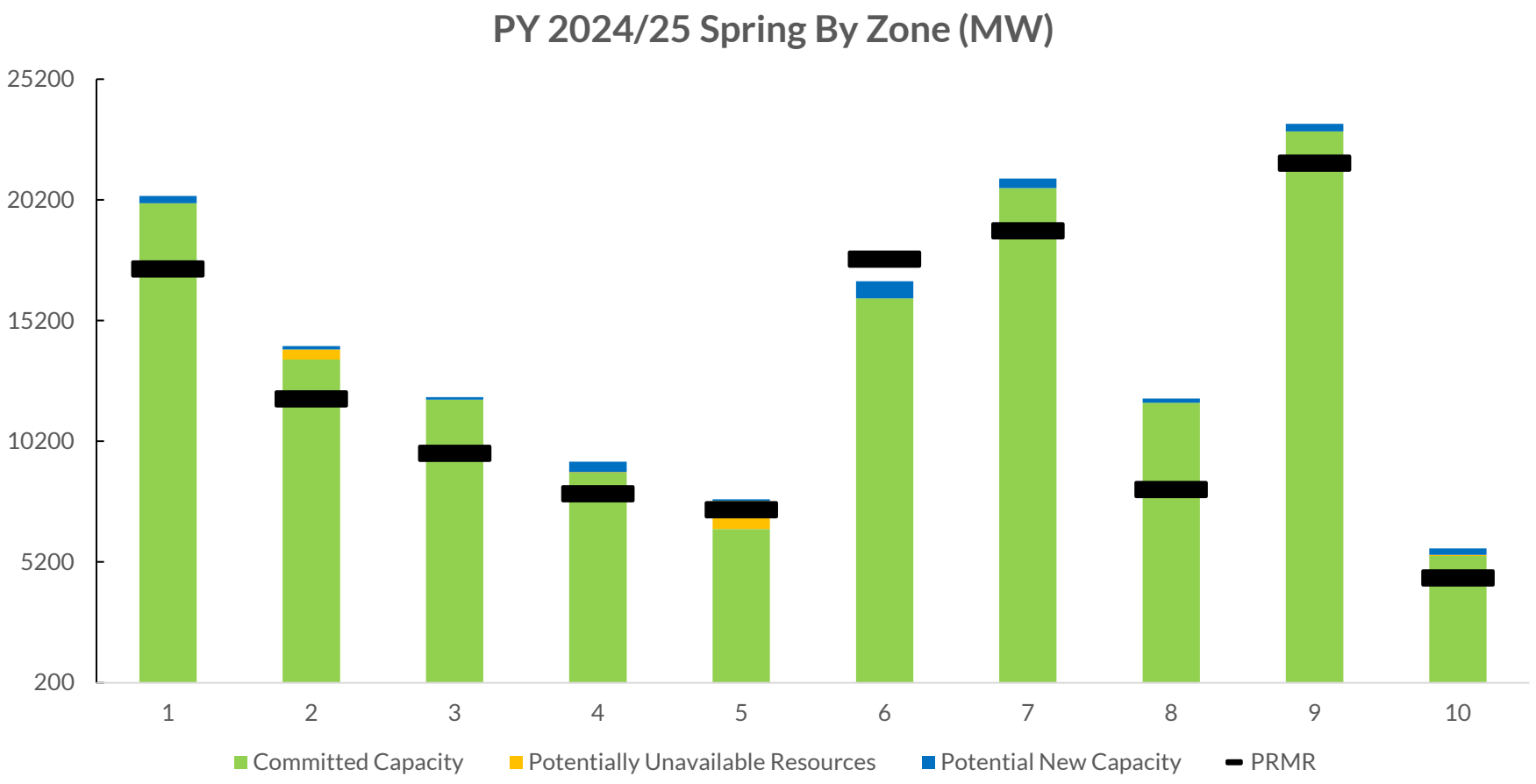


PY 2028/29 Winter By Zone vs. LCR (MW)



Includes only projected capacity resources within the zone, i.e., does not include imports and interzonal transfers. Potential Capacity includes both new generation and potential retirements. Load Modifying Resources include Demand Response (DR) and Behind the Meter Generation (BTMG).

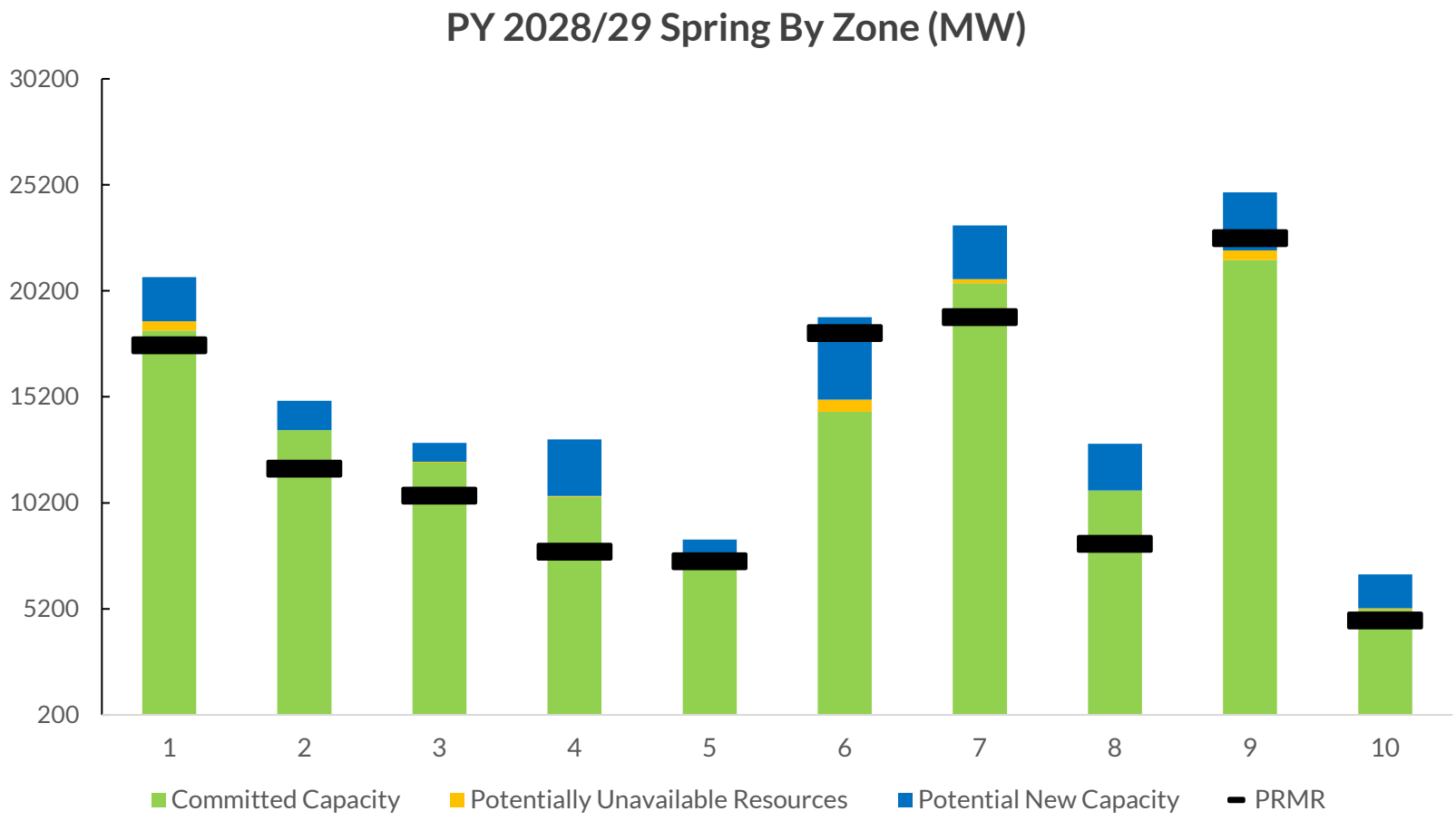
Zonal view for Spring 2024/25 shows that most zonal PRMRs can be met with resources located within respective zones



Note: Survey assumes that only resources physically located within the zone will be used to meet the zonal PRMR.

Spring Demand and therefore PRMR is calculated by using Winter Demand Forecast percent change seen year-over-year since out year NCPF is not submitted for out years for fall and spring.

Looking out to Spring season for PY 2028/29, some zones rely on potential new capacity

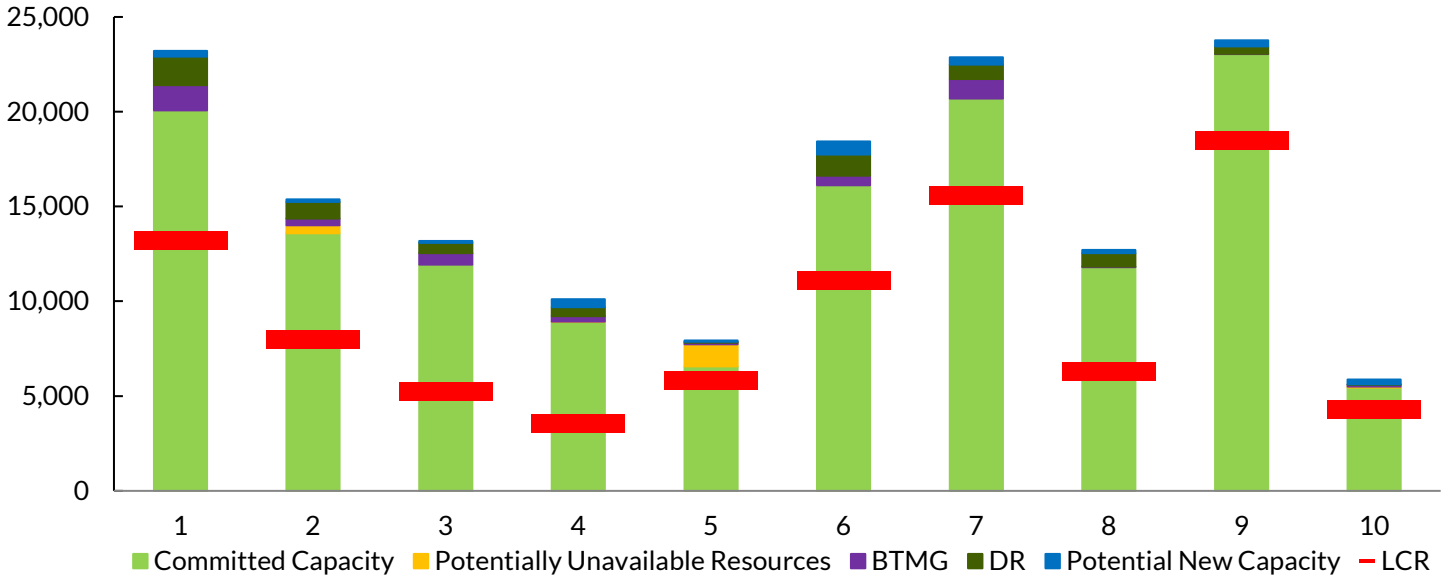


Spring Demand and therefore PRMR is calculated by using Winter Demand Forecast percent change seen year-over-year since out year NCPF is not submitted for out years for fall and spring.

Spring is sufficient over the survey horizon, however there is increased tightness by 2028/29 to meet LCRs

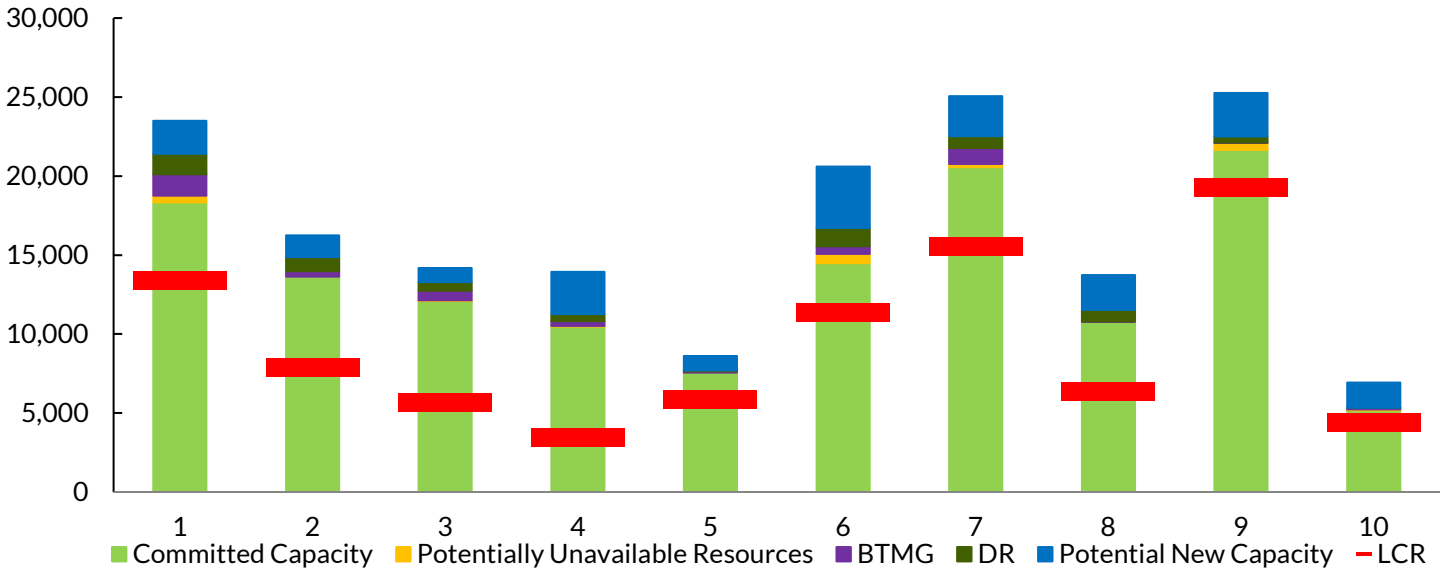
PY 2024/25 Spring By Zone vs. LCR (MW)

2023 OMS MISO Survey



PY 2028/29 Spring By Zone vs. LCR (MW)

2023 OMS MISO Survey



Includes only projected capacity resources within the zone, i.e., does not include imports and interzonal transfers. Potential Capacity includes both new generation and potential retirements. Load Modifying Resources include Demand Response (DR) and Behind the Meter Generation (BTMG).