

Manitoba Hydro 2023/24 & 2024/25 General Rate Application May 16th, 2023

Exports, Drought Management and Hydrology Panel

MH's Direct Evidence Outline

- Energy Operations Planning and Drought Management
 - Plans for all conditions including extreme events
 - Uncertainty exists on when, not whether they will occur
 - Follows established procedures and standard practices
- Net Export Revenues
 - Update on recent water conditions
 - Update on recent market conditions
 - Supply and demand outlook
 - US market and wholesale customer activities

Energy operations, supply planning and export revenue forecast are based on a system approach




MANITOBA CUSTOMERS



Supply & Demand Must Balance



EXPORTS ?



IMPORTS ?

Net Export Revenue (NER)¹

NER =

Export Revenues

- Long term contract revenues from energy and capacity
- 💧 Opportunity revenues from:
 - Market energy sales
 - Short term contract sales for capacity and energy
- Ancillary services
- Merchant sales
- Renewable Energy Certificates
- Other

—

(Less)

Generation Costs

- 💧 Water rentals
- 💧 Power purchases, including imports and energy from MB wind farms
- 💧 Fuel supply and delivery costs for combustion turbine generation
- Transmission charges
- Market charges
- Other

Notes:

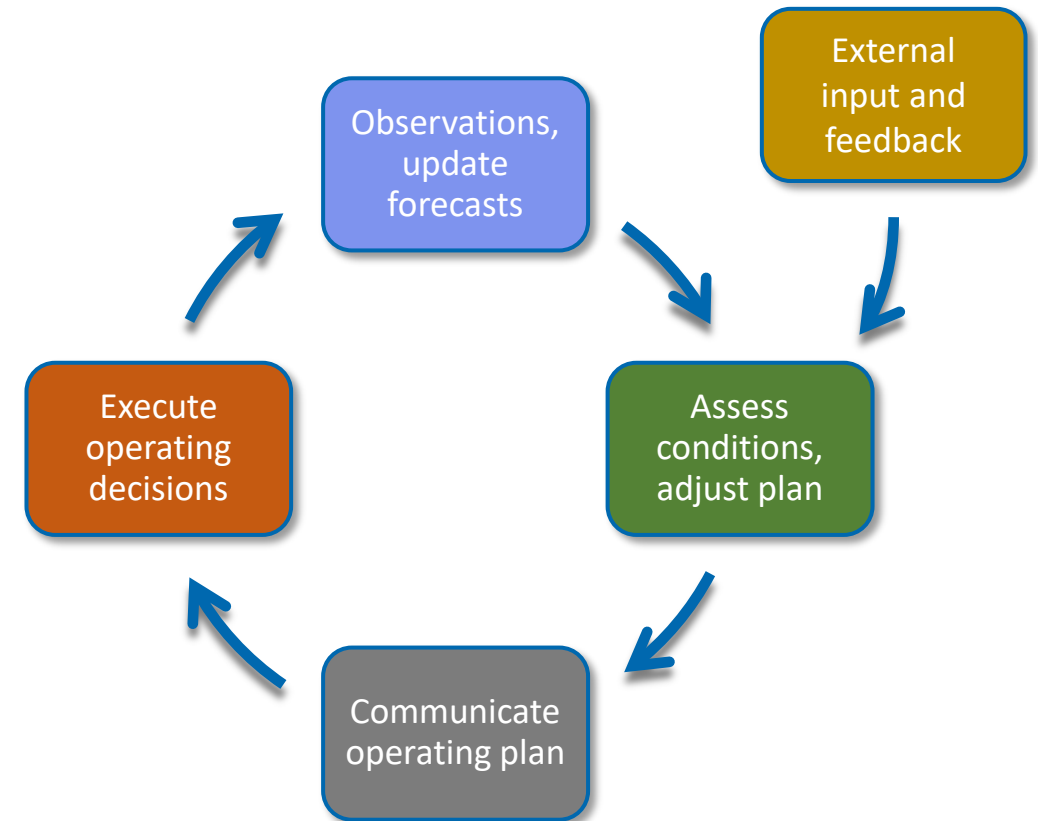
1. Net Export Revenues referred to in Tab 4 include other factors such as “assessments” and diesel costs.

2. Components that largely depend on water supply conditions denoted by “💧”

Hydrology and Drought Operations

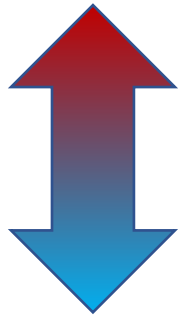
MH has robust operations planning processes, technology, and depth of expertise

- Established priorities, policies, procedures
- Collaboration between experts across the enterprise:
 - hydrometrics, water resources, energy operations planning, power trading, enterprise risk, indigenous & community relations, licensing, environmental services, generating stations, system control
- Continuous monitoring, updating, communicating
- Executive oversight



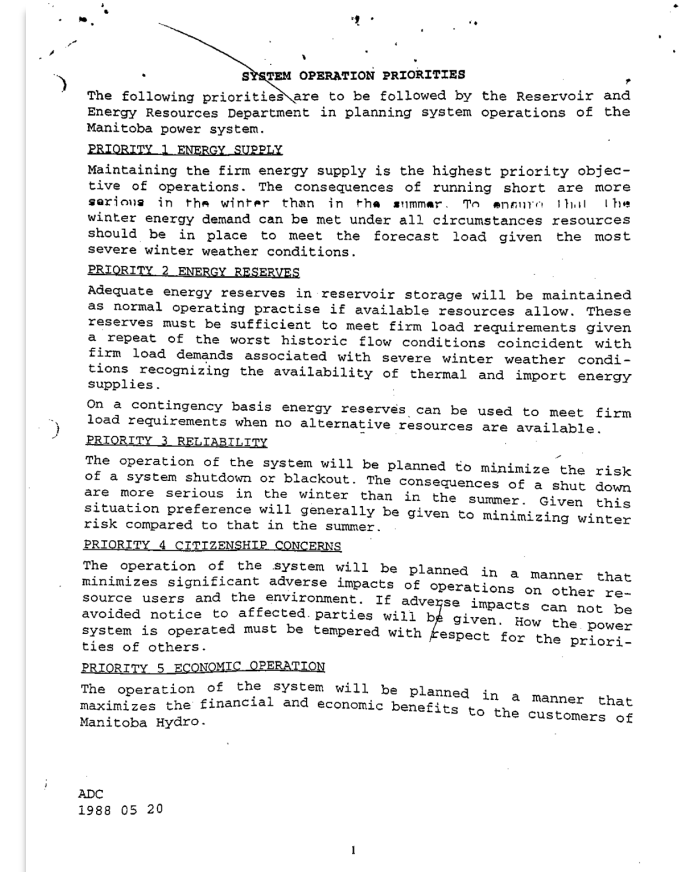
Operations are guided by long-established priorities that apply under all water conditions

HIGHEST



LOWEST

1. Safety
2. Energy Supply
3. Energy Reserves
4. Short Term Reliability
5. Stakeholders/Environment
6. Economics

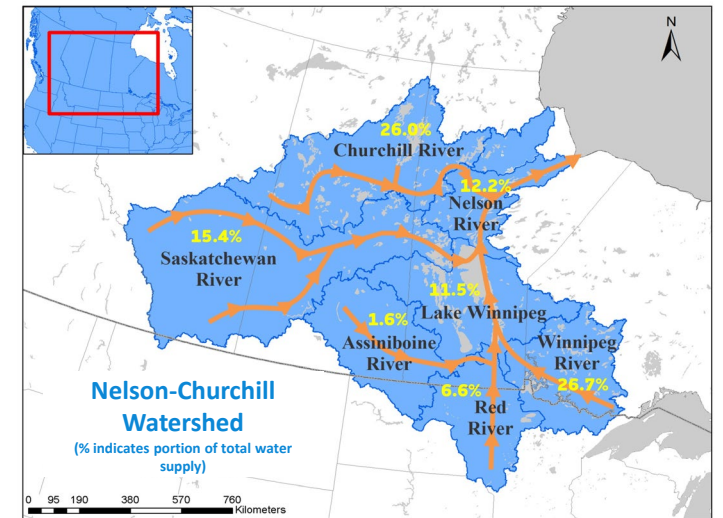
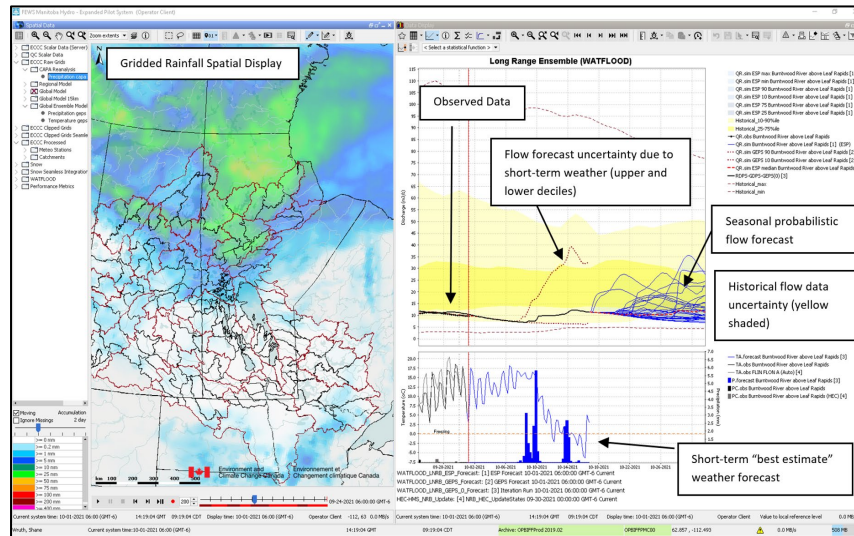
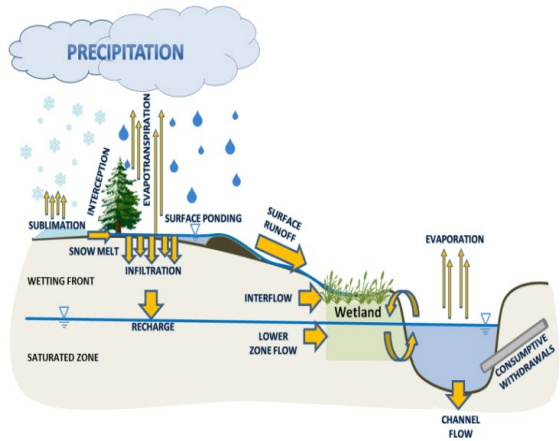


MH has implemented improvements related to energy operations, market interactions, and long-term planning

- System
- Market Participation
- Practices
- Tools



Manitoba Hydro has made transformational improvements to its near-term inflow forecasting



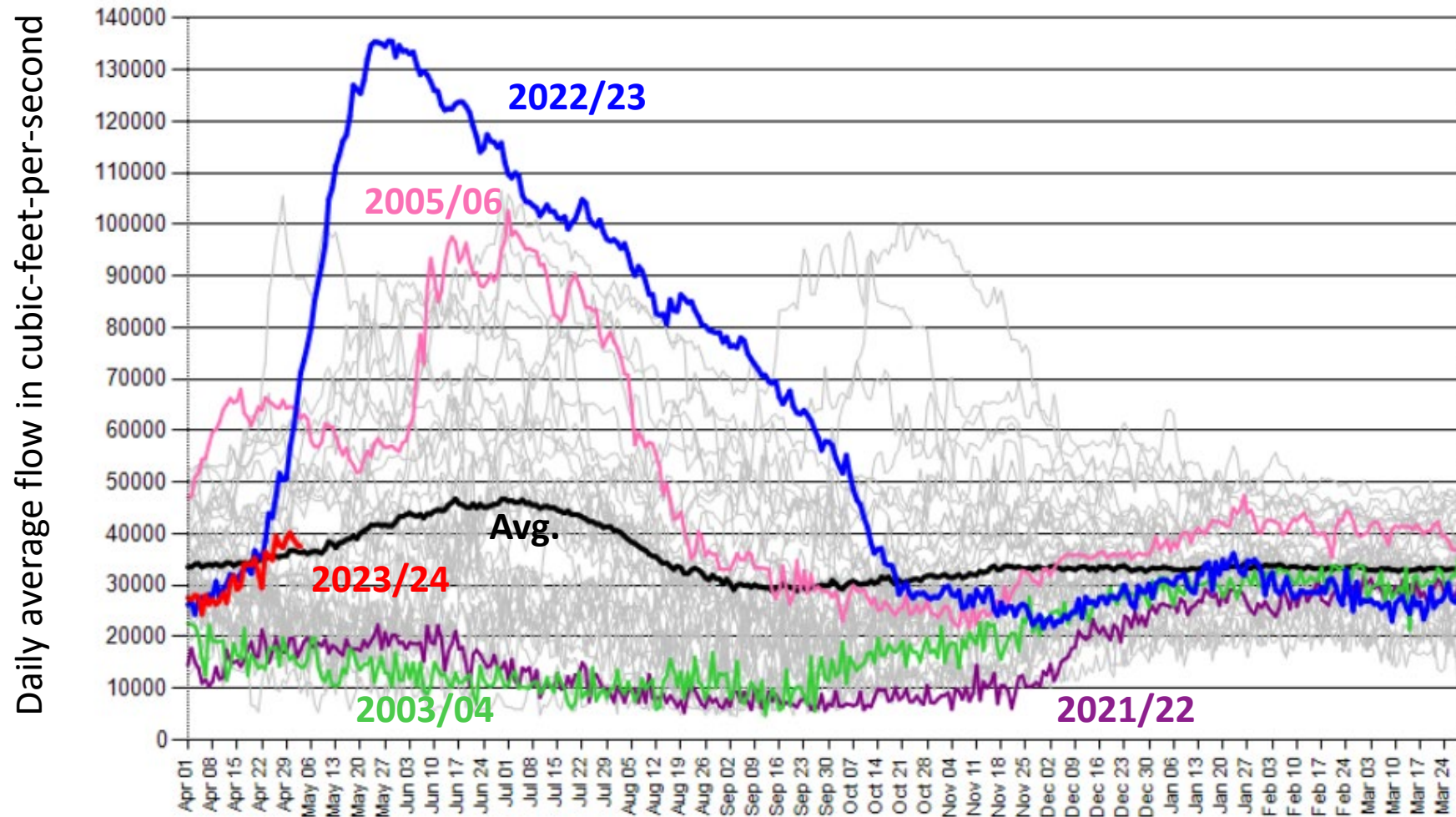
**New Primary Process:
Physically Based Forecasts**

**Modernized Flow Forecasting
Platform**

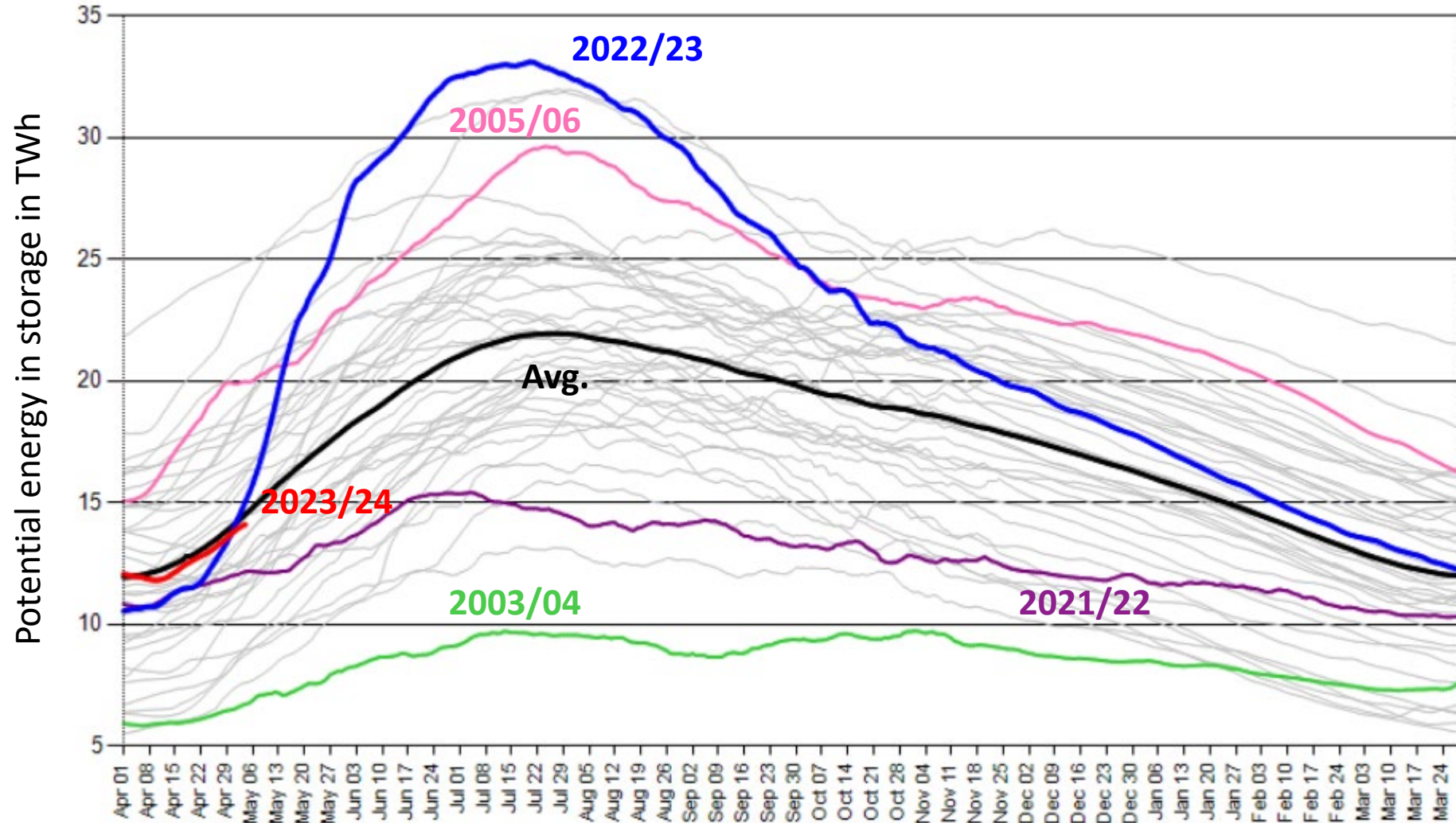
**Manitoba Hydro's
Drainage Basin (1.4 million km²)**

Water Conditions and Hydraulic Generation

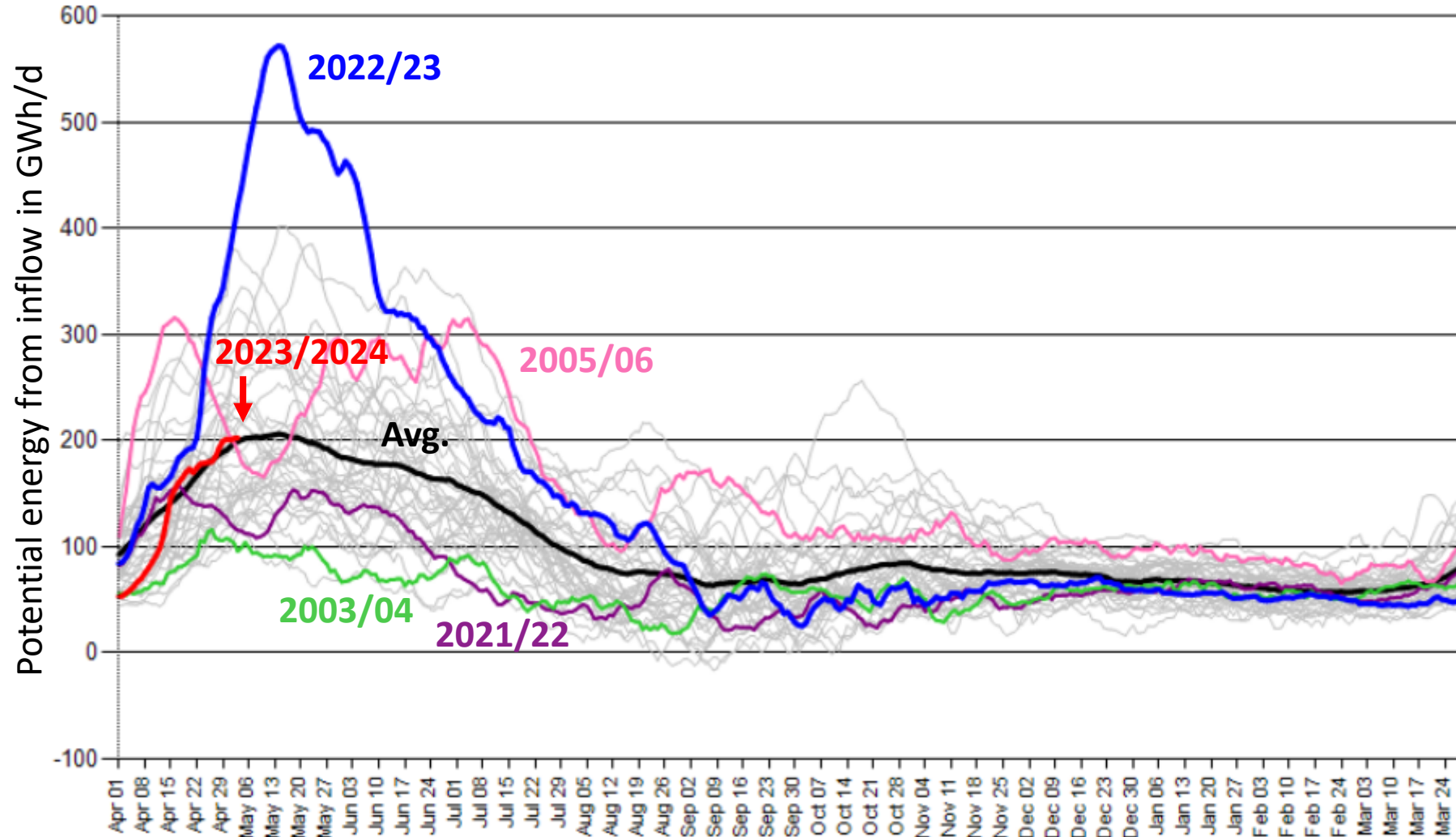
Winnipeg River flows went from extreme low to record high in less than 6 months



Energy in reservoir storage is near average

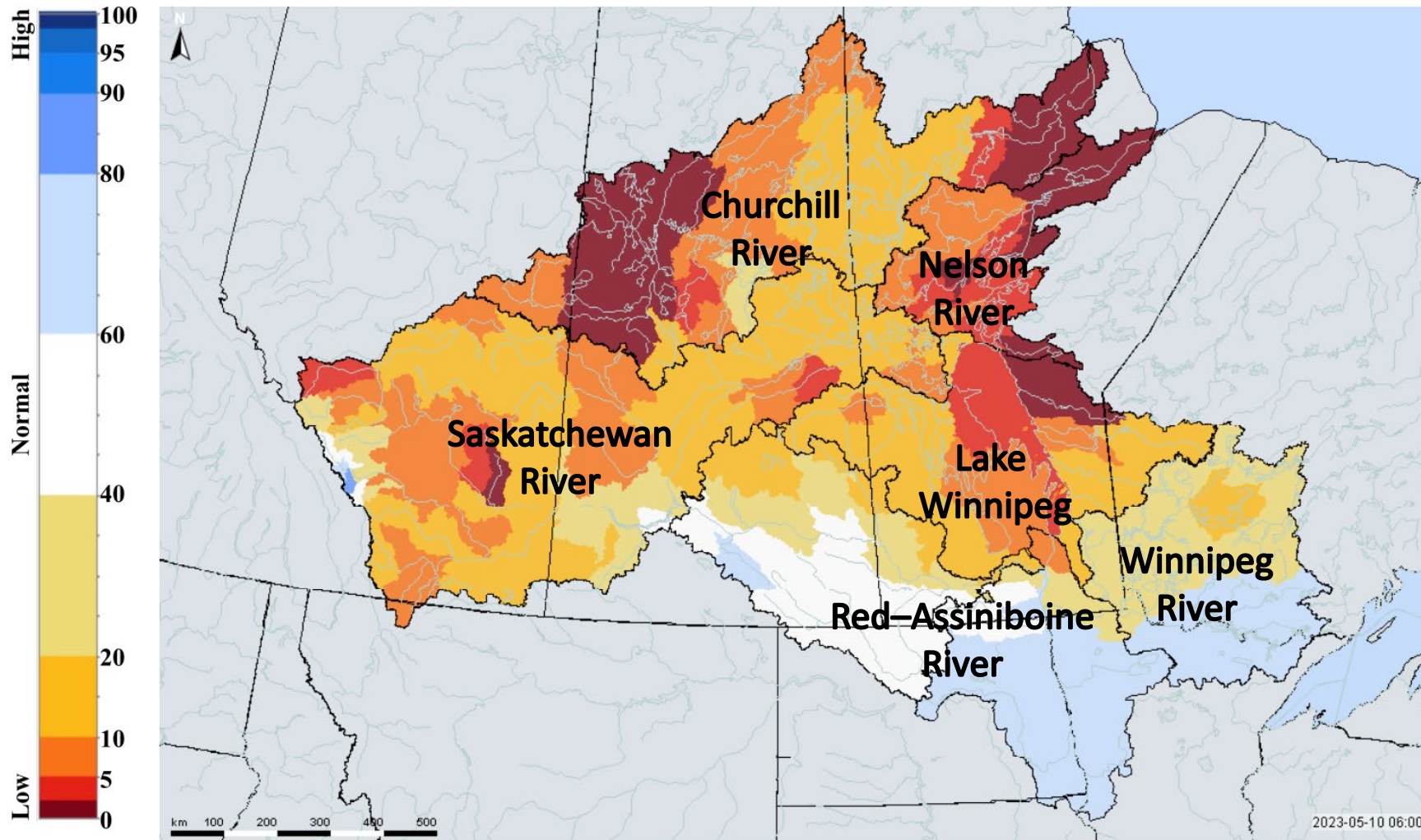


System inflows are near average



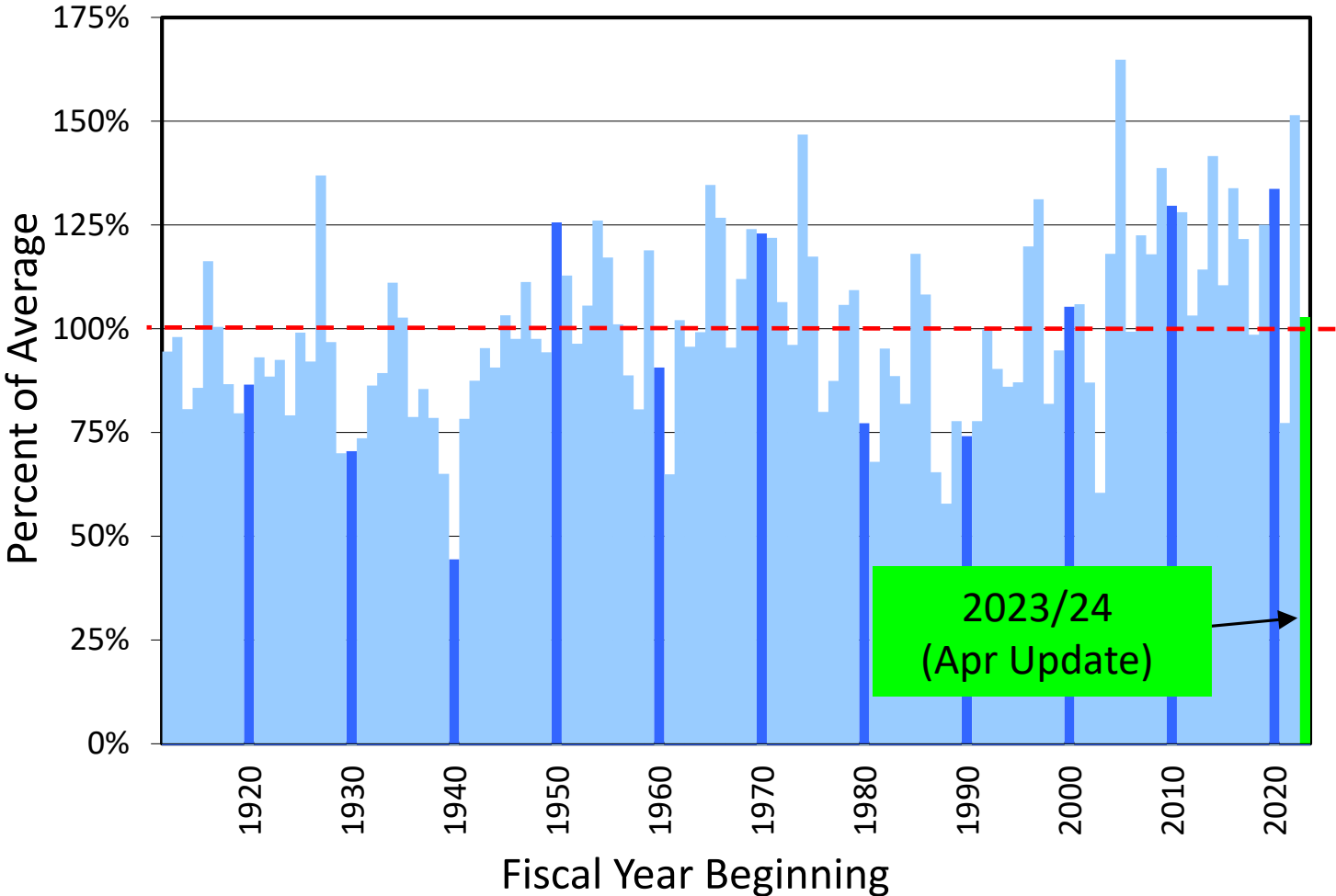
Recent precipitation has been below average

OBSERVED (CaPA) - 60-day precipitation percentiles as of May 12, 2023

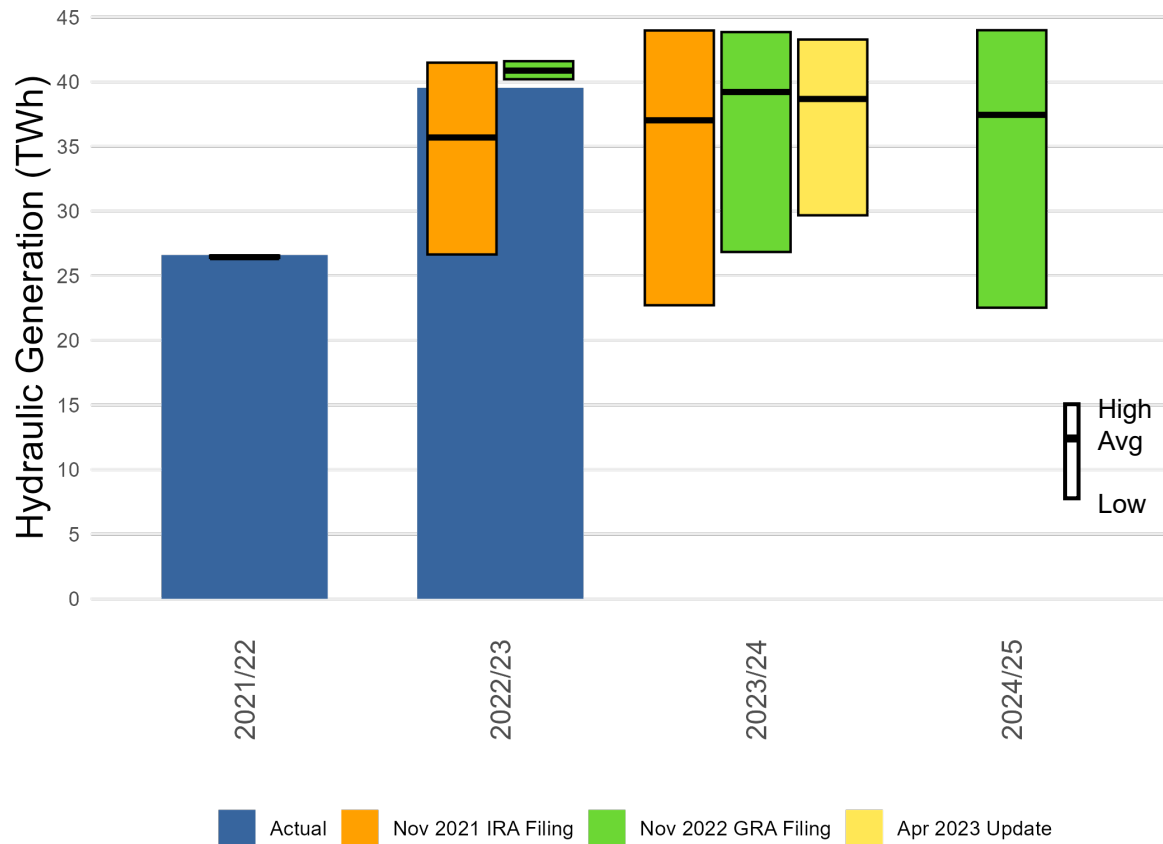


Precipitation	% of Avg	Percentile
Churchill River Basin		
28.1 mm	48.7	3.3
Nelson River Basin		
24.3 mm	40.5	0.0
Lake Winnipeg Basin		
32.5 mm	50.0	5.4
Winnipeg River Basin		
74.6 mm	91.0	44.5
Red-Assiniboine River Basin		
56.4 mm	83.9	32.8
Saskatchewan River Basin		
26.5 mm	48.3	4.5
System Total		
38.6 mm	61.9	5.8

System inflows in 2023/24 will largely depend on rainfall this summer/fall



2023/24 hydraulic generation projected to be close to budget, however there is a range of uncertainty

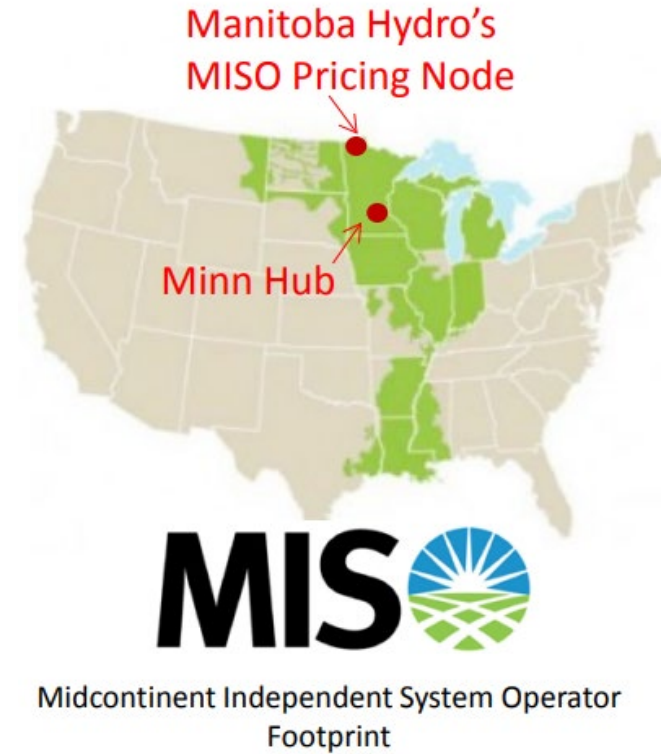
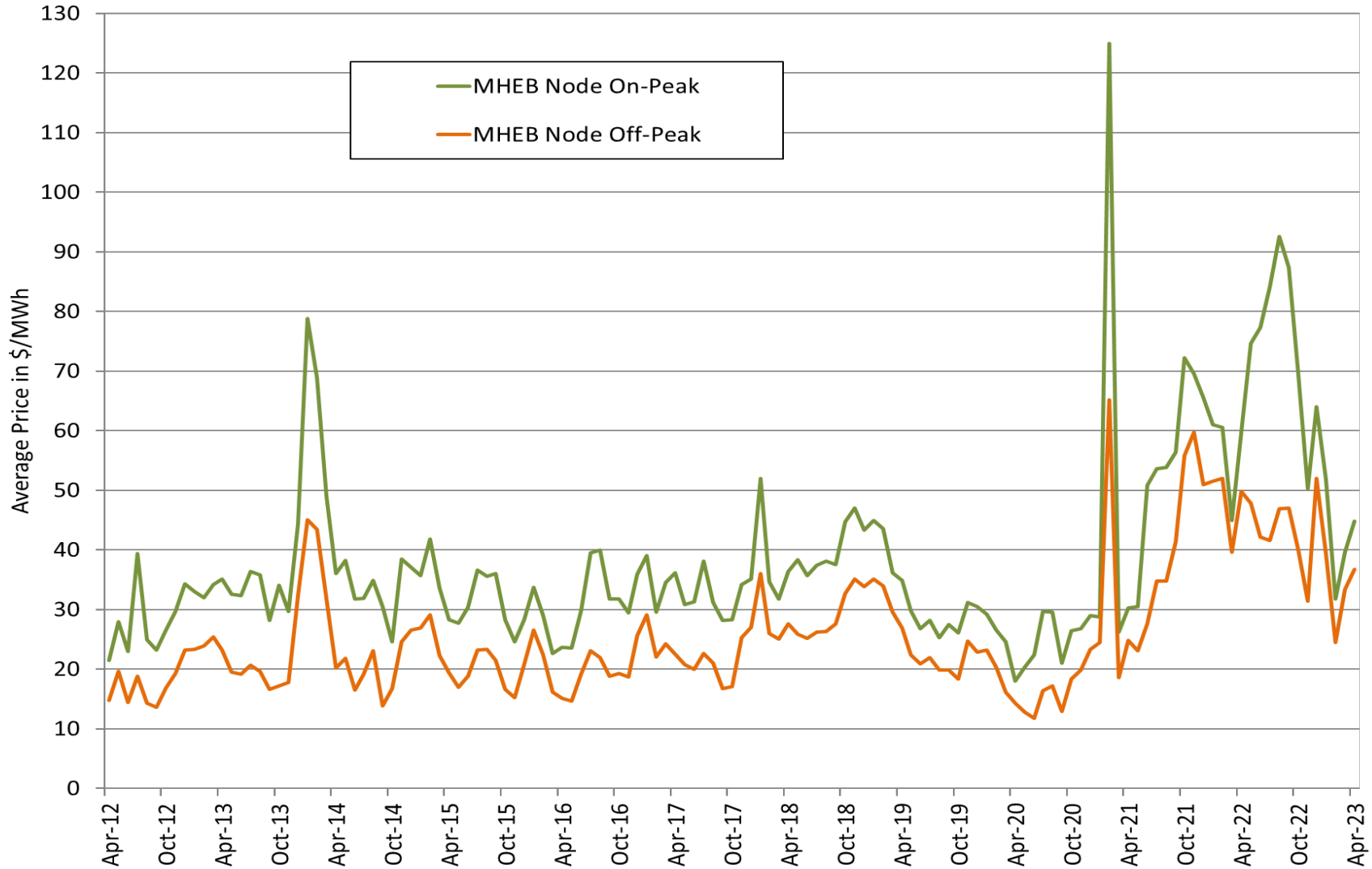


Forecast Hydraulic Generation (TWh)

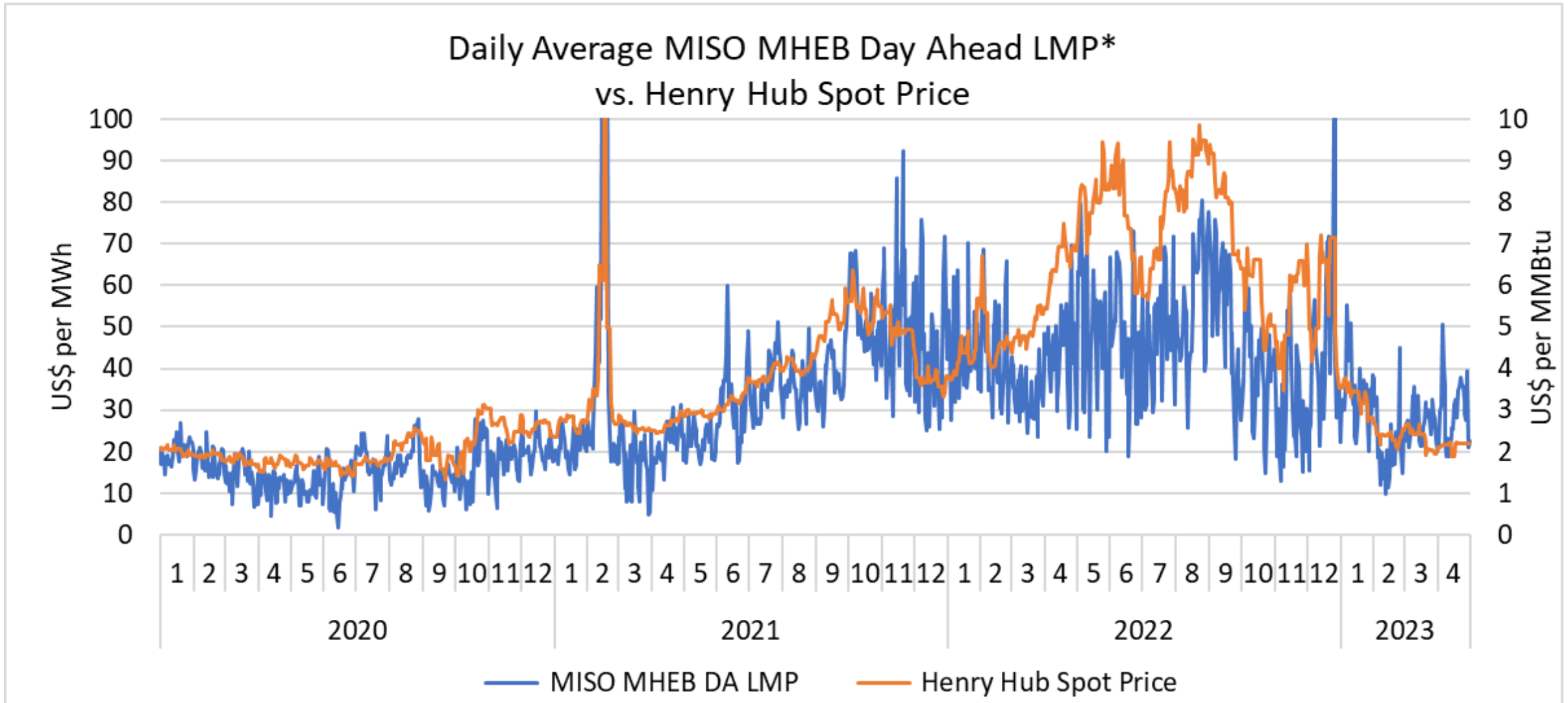
	2021/22	2022/23	2023/24	2024/25
2021 IRA	26.4 (26.4-26.6)	35.7 (26.6-41.5)	37.0 (22.7-44.0)	
2022 GRA		40.9 (40.2-41.6)	39.2 (26.8-43.8)	37.4 (22.5-44.0)
Apr. 2023 Update			38.7 (29.7-43.3)	
Actual	26.6	39.5		

Market Conditions Update

MISO Market Prices



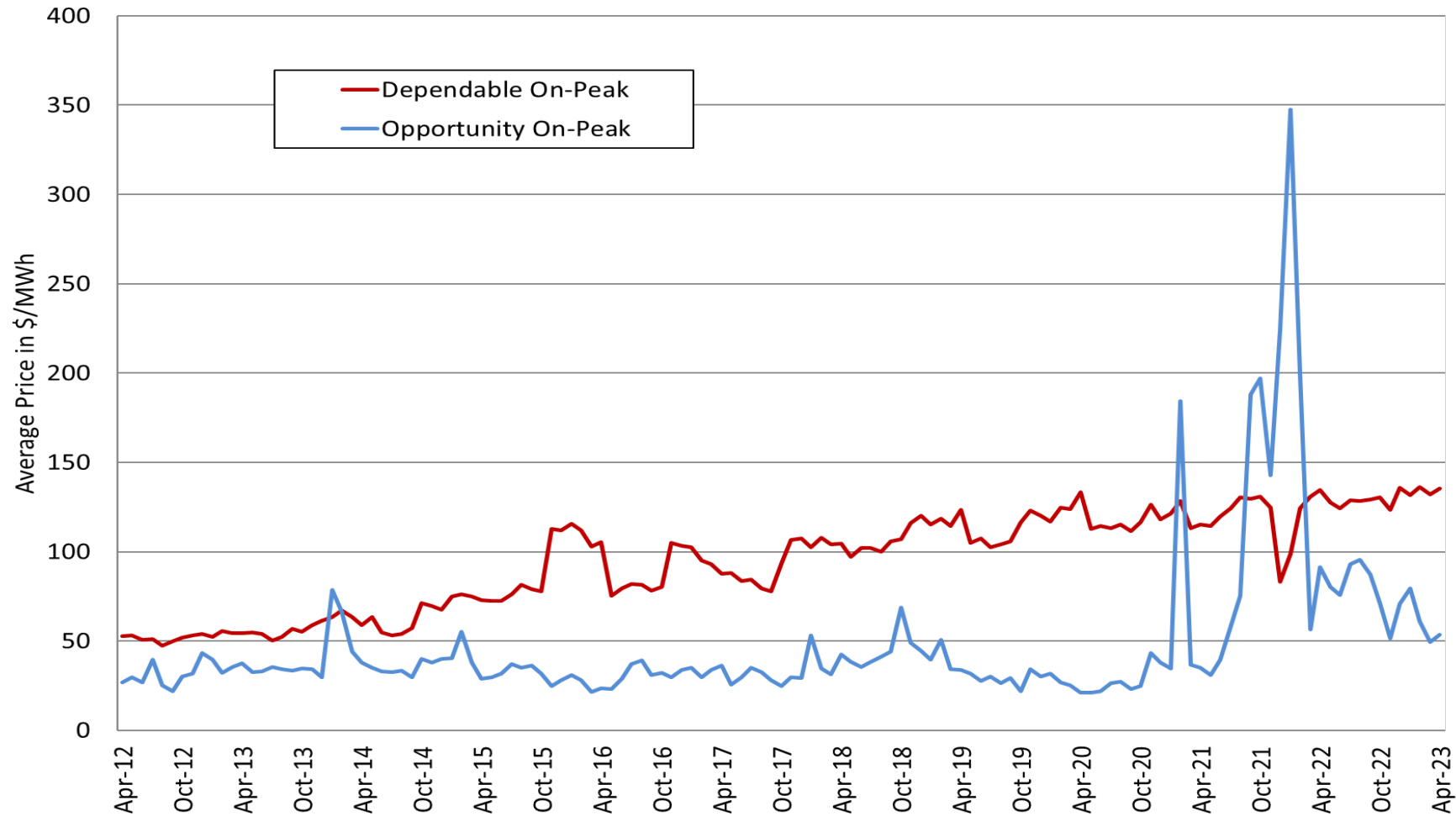
MISO & Gas Prices 2020 -2023



*LMP: Locational Marginal Price

Contract Prices vs. Market Prices

Long term contracts provide additional value, price stability and certainty relative to opportunity market



Export Contracts

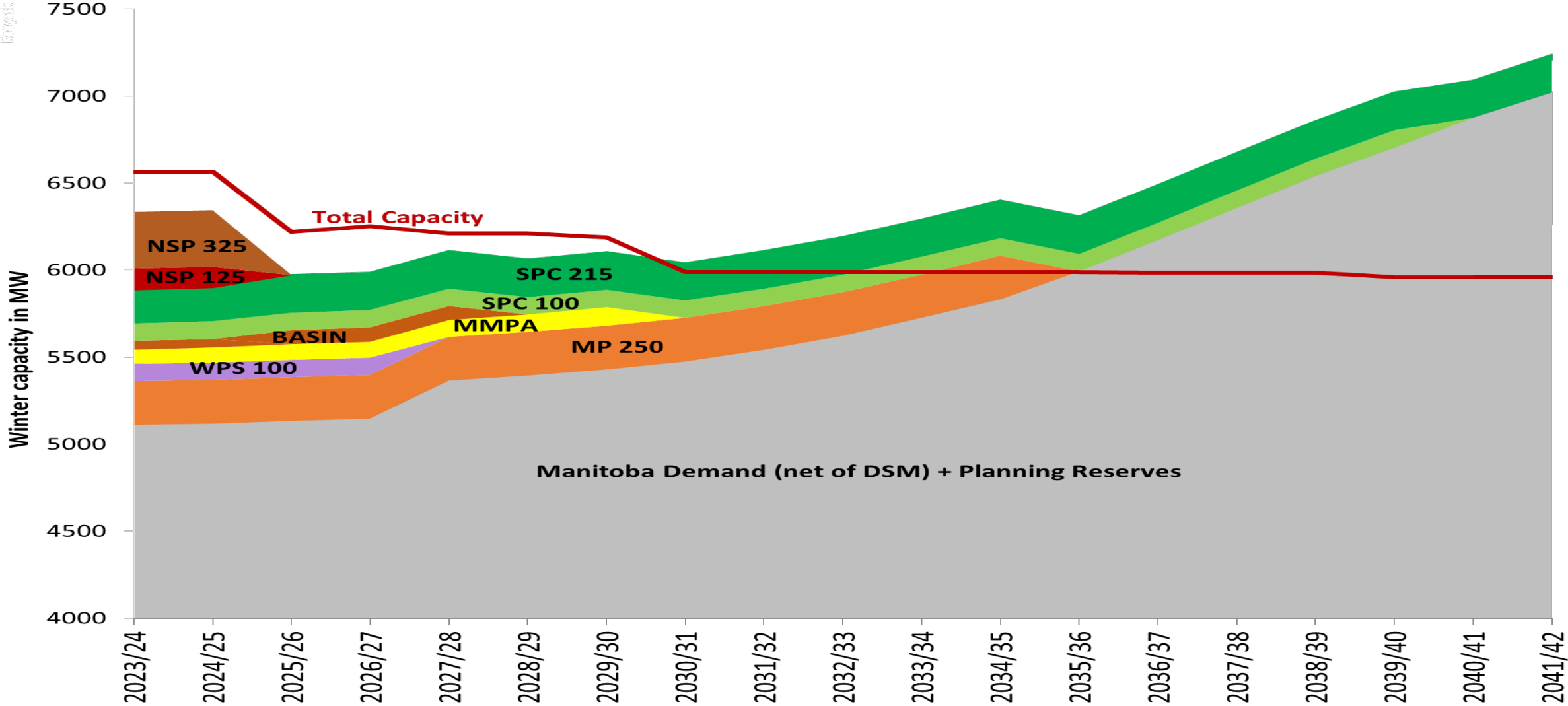
Existing Export Contracts Analysis

- Timeline - Fall of 2021 and was completed in the summer of 2022
- Key findings:
 - Contract performance well against the market
 - Continue to provide *revenue certainty* against ever-changing market conditions as long-term hedges
 - Continue to facilitate low, stable domestic rates in Manitoba

Existing Export Contracts Analysis

Contract	Start Date	End Date
Basin 50 – 80 MW Capacity Sale	June 2023	May 2028
Dairyland 50 MW Diversity Exchange	June 2022	May 2027
Minnesota Municipal Power Agency 65 – 105 MW Capacity Sale	June 2020	May 2030
SaskPower 215 MW System Power Sale	June 2022	May 2052

Winter Capacity Profile 2023/34 - 2041/42



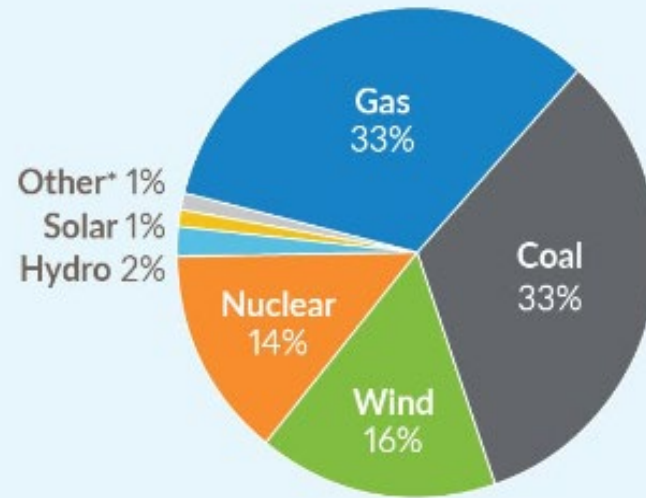
MISO Market Overview



MISO's reliability footprint and regional control center locations.

GENERATION MIX

Jan-Dec 2022

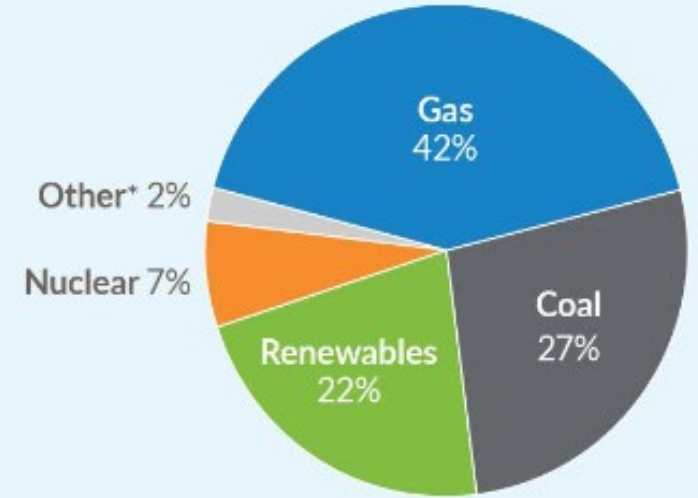


651 Million MWh

*Other: Hydro, Diesel, Biomass, Storage, Demand Response Resources

MARKET CAPACITY

December 2022



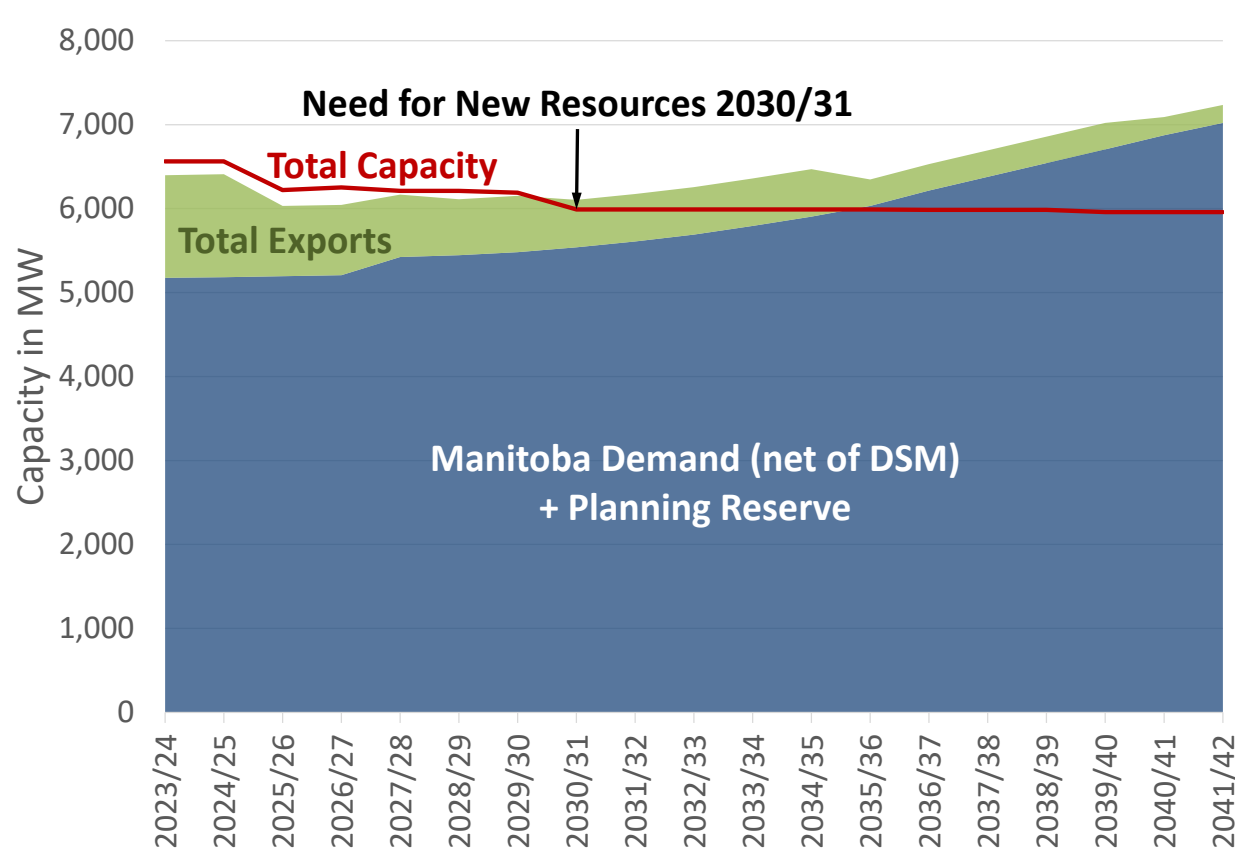
Total Installed = 190 GW

2022 Supply/Demand Scenario

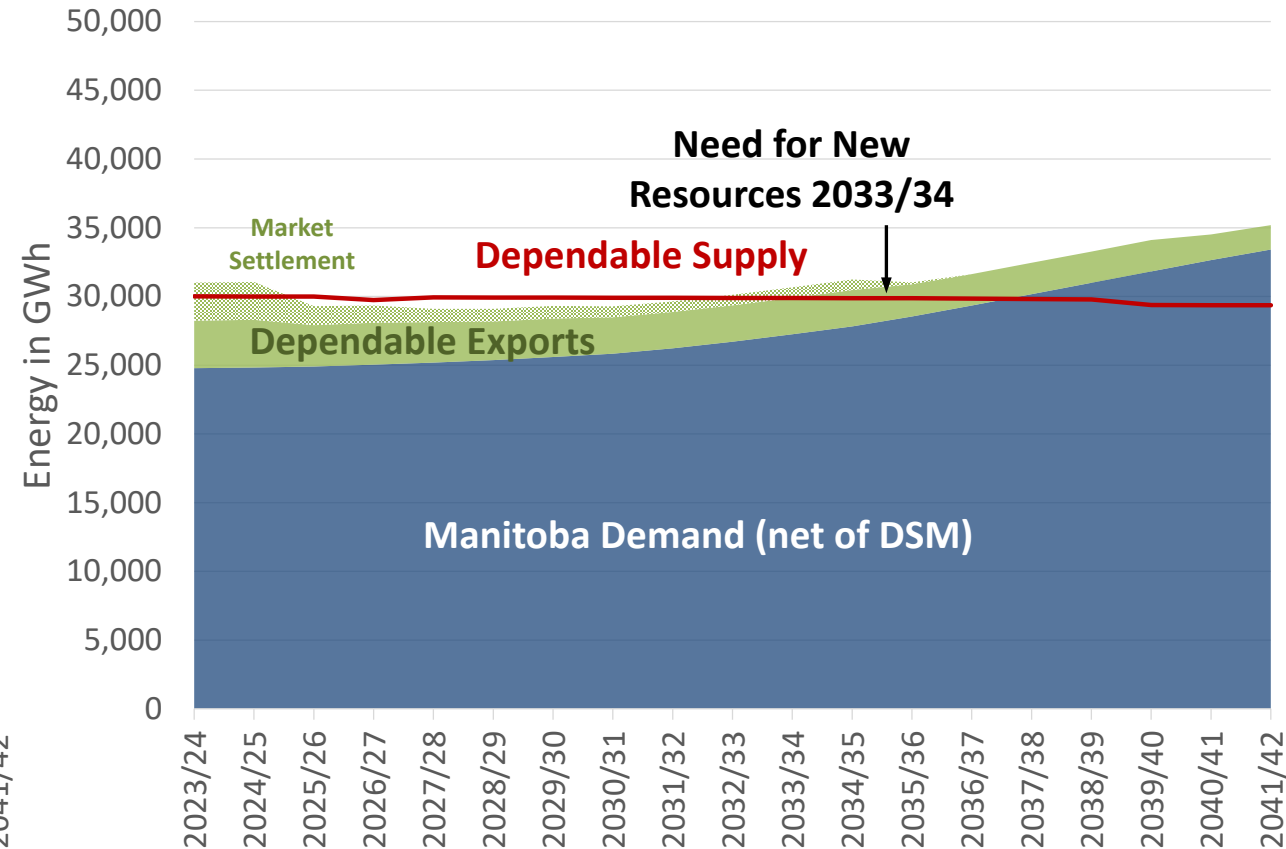
Anticipate the need for resources in early 2030s

Note: Numerous factors can and do change over time that affect supply and demand. This creates uncertainty in the need date for new resources.

Capacity

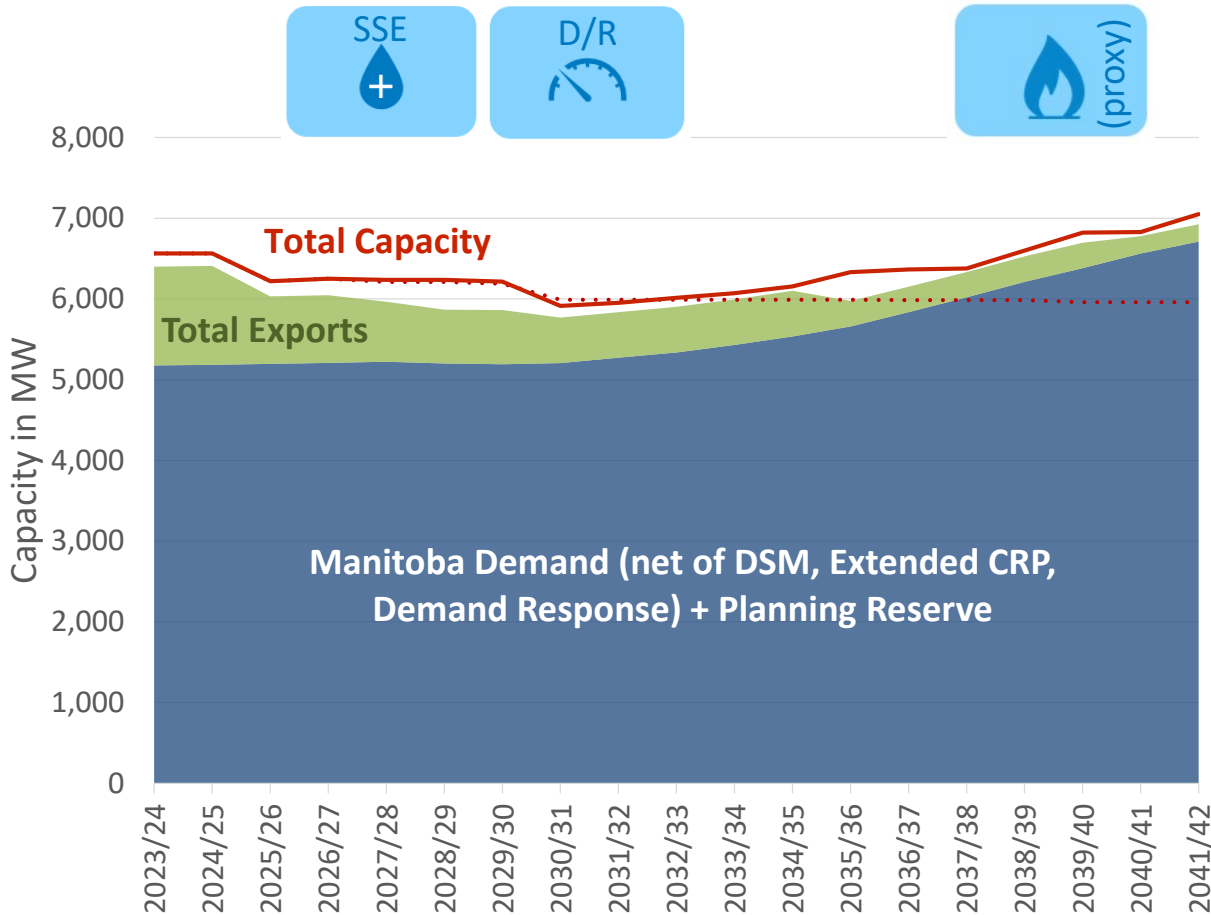


Energy

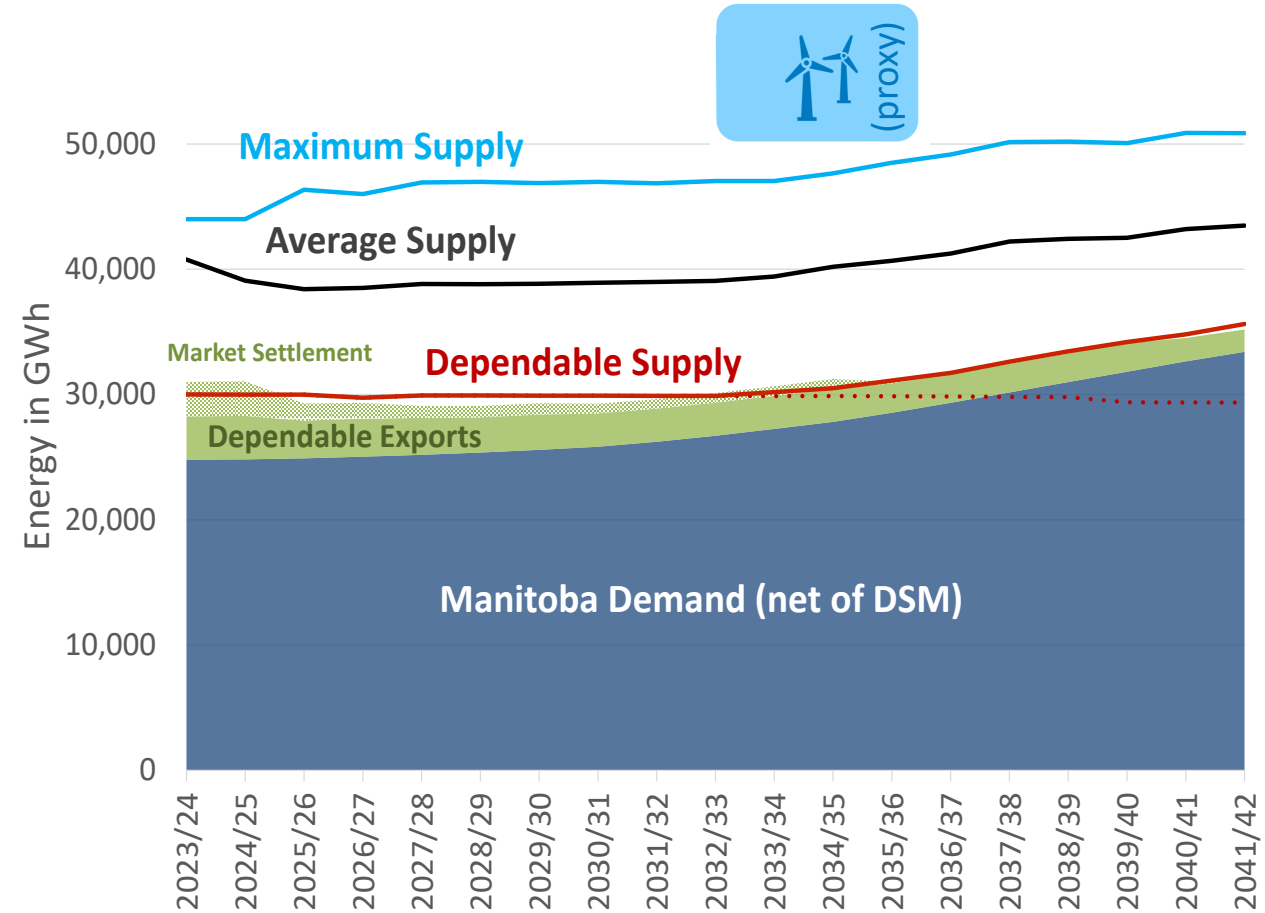


Supply and demand will be closely balanced in the future

Capacity



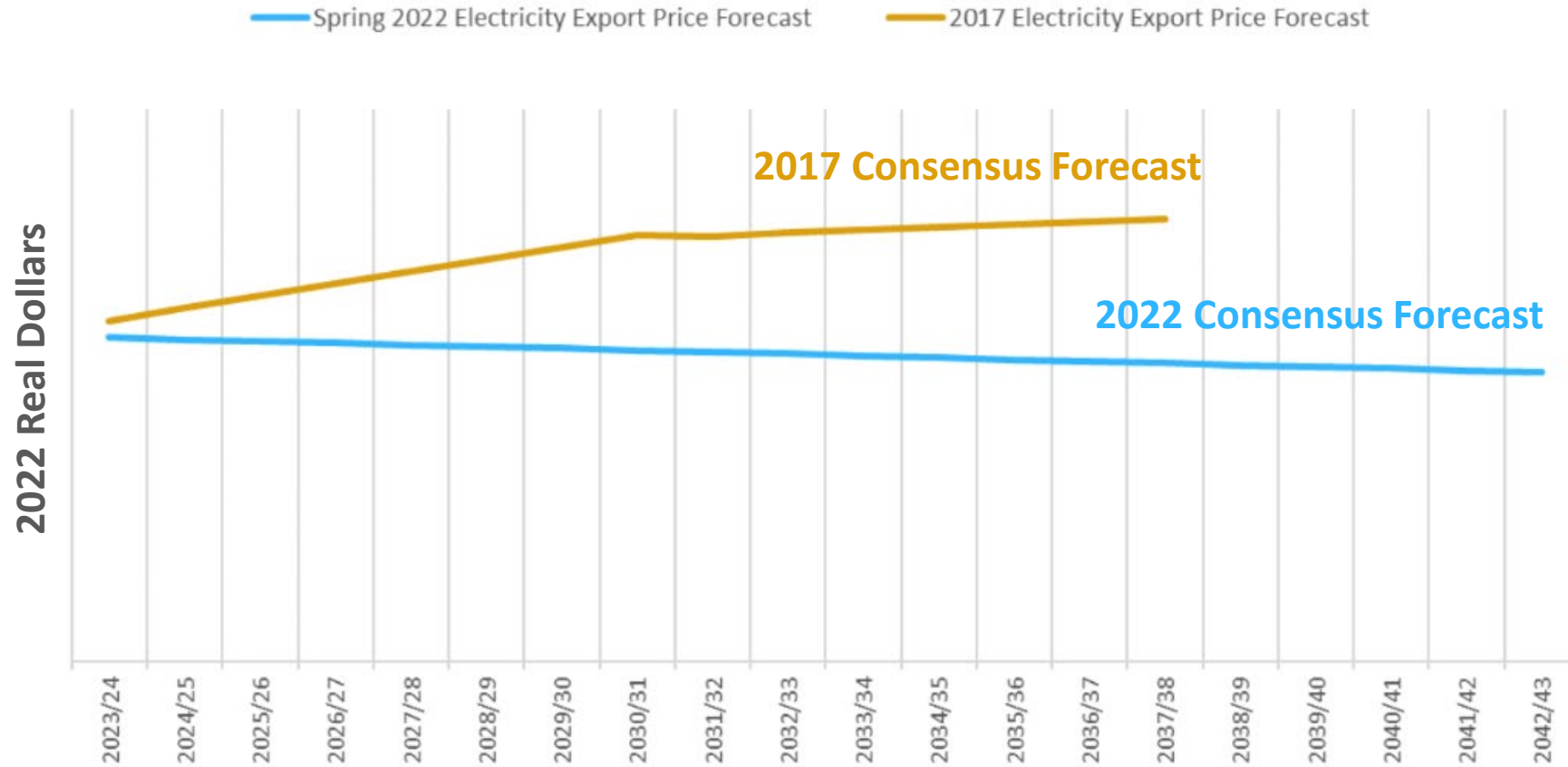
Energy



Long Term Export Price Forecast

Export market energy price projected to be in slight decline, in real terms

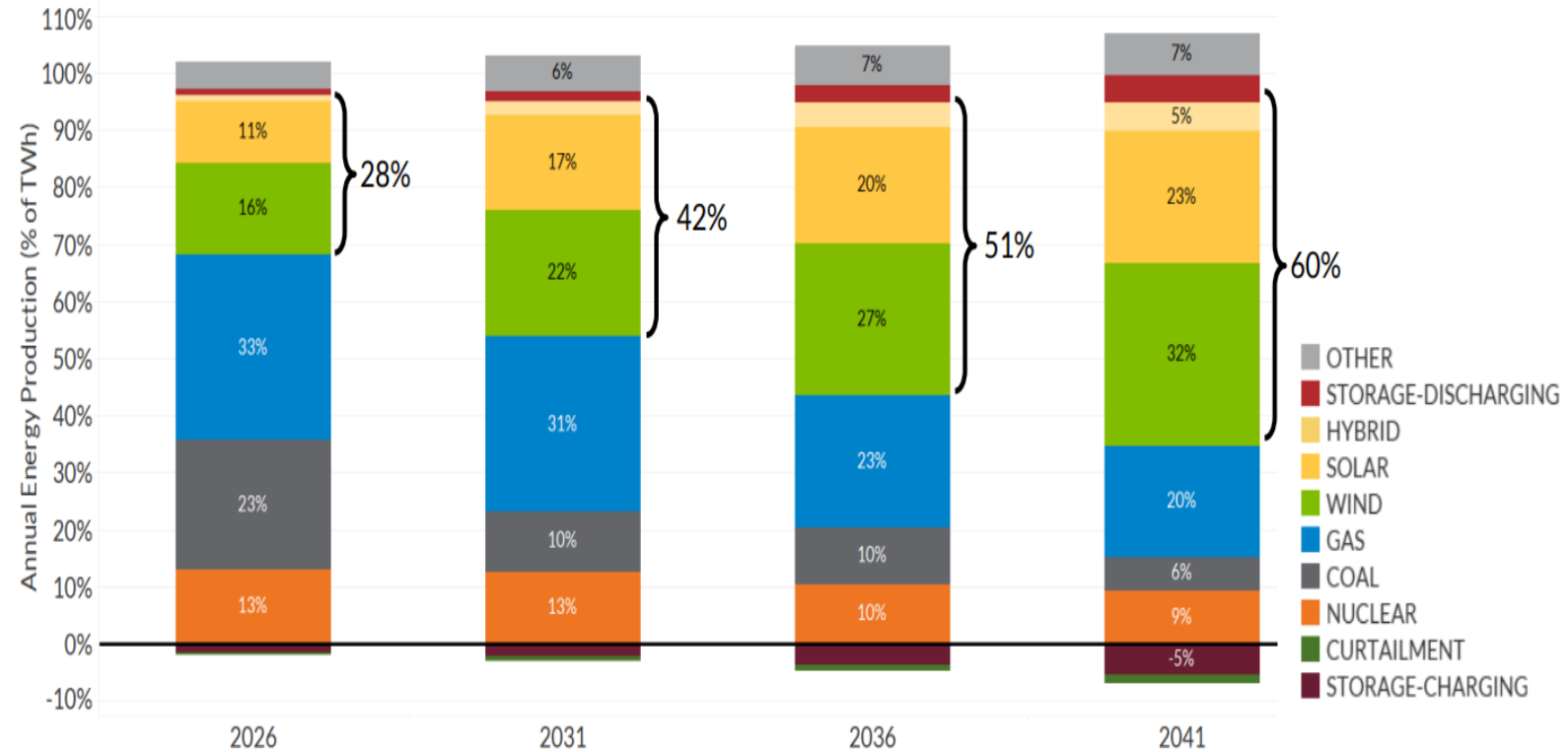
Figure 4.7 Trajectory of 2017 and 2022 Long Term Price Forecasts



MISO Resource Mix and Load Profile are Evolving

- Higher cost thermal resources are being replaced with low cost “Variable Renewable Resources”
- Wind and solar generation produced 17% of MISO energy in 2022, and this could approach 30% within 5 years and 60% by 2041
- MISO Generation Interconnection Queue at 243,800 MW of generation, including 131,000 MW of solar and 81,500 MW of battery storage and solar/storage hybrids
- The load profile in MISO is also evolving, with the winter peak growing faster than the summer peak. MISO Futures Report stated: “once it transforms to dual summer and winter peaking as renewable energy and projected demand increase.”

Resource Assessment results indicate MISO’s system could approach 30% of annual energy from renewables within 5 years, and renewable penetration levels may increase by ~10% every 5 years after



6

*Solar includes DGPV, while “Other” includes demand response and energy efficiency
 Note: expansion was performed for each LRZ using a model that does not include the transmission system



Source: MISO Regional Resource Assessment (RRA) October 12, 2022

Thank You

