2025 Integrated Resource Plan

Technical Advisory Committee
Winter 2025 – Meeting 4

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Manitoba Hydro
energy for life

Land acknowledgment

Manitoba Hydro has a presence right across Manitoba – on Treaty 1, Treaty 2, Treaty 3, Treaty 4 and Treaty 5 lands – the original territories of the Anishinaabe, Anishininew, Cree, Dakota, and Dene peoples and the National Homeland of the Red River Métis.

We also acknowledge the ancestral lands of the Inuit in northern Manitoba.

We acknowledge these lands and pay our respects to the ancestors of these territories. The legacy of the past remains a strong influence on Manitoba Hydro's relationships with Indigenous communities today, and we remain committed to establishing and maintaining strong, mutually beneficial relationships with Indigenous communities.

Objectives of the Session

Feedback was shared that there was interest in better understanding key concepts of energy planning at Manitoba Hydro and how that relates to resource options.

This session was added to:

- Share high level information on what Manitoba Hydro considers when it conducts energy planning.
- Continue discussion on resource options and their characteristics
- Provide an opportunity for further discussion with participating TAC members

Agenda

Purpose:
Cover key energy planning concepts and revisit resource options for further discussion

Topics

1. The 2025 IRP & Integrated Resource Planning
2. Key Concepts in Energy Planning
3. Resource Options

Introductions

Questions Received

Resource Options you would like to hear more about:

1. More discussion of roof top wind for residential/commercial applications as an efficiency/generation asset.
2. Treatment of Energy Efficiency as a Resource Option, Load Scenarios created for the IRP process.
3. The projected energy storage options over the next 5 - 10 -20 years.

Additional questions for discussion:

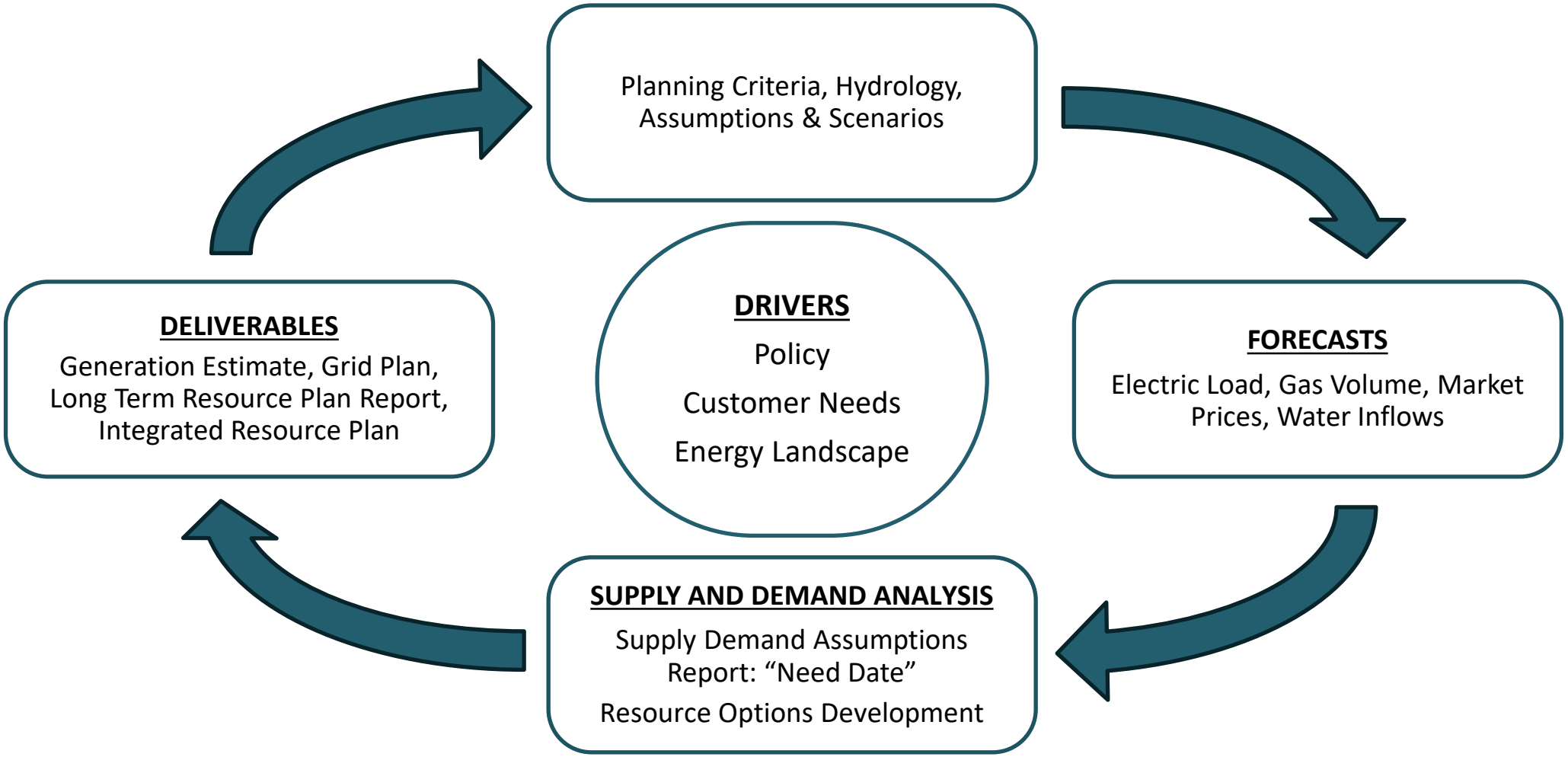
4. At first glance, self-generation options have the ability to expand generation quickly and allow MB Hydro to defer capital expenditures on system upgrades or new generation. Can the IRP team expand further on these opportunities and detail the challenges of smaller, dispersed generation assets within the electric system? Are there any roadblocks outside of MB Hydro that may prohibit this expansion?
5. How is Artificial Intelligence (AI) anticipated to impact the projections? I understand the use of AI can require a significant energy demand. Also, how might AI create efficiencies in our energy usage?
6. Has any consideration been given to what effect tariffs on energy exports might have on the IRP decisions?

The 2025 IRP & Integrated Resource Planning

What is an Integrated Resource Plan (IRP)?

- **A process utilities use to understand and plan for future energy needs.**
- For Manitoba Hydro, it accounts for both our electricity and natural gas systems and reflects combinations of customer needs, service territory, the energy products offered to customers, existing assets, and policy drivers.
- A key part of an IRP is that it **includes engagement** with customers and interested parties as part of its development to ensure openness and transparency in the energy planning process.
- Developing an IRP is a **repeatable process** that can be updated as future conditions evolve.

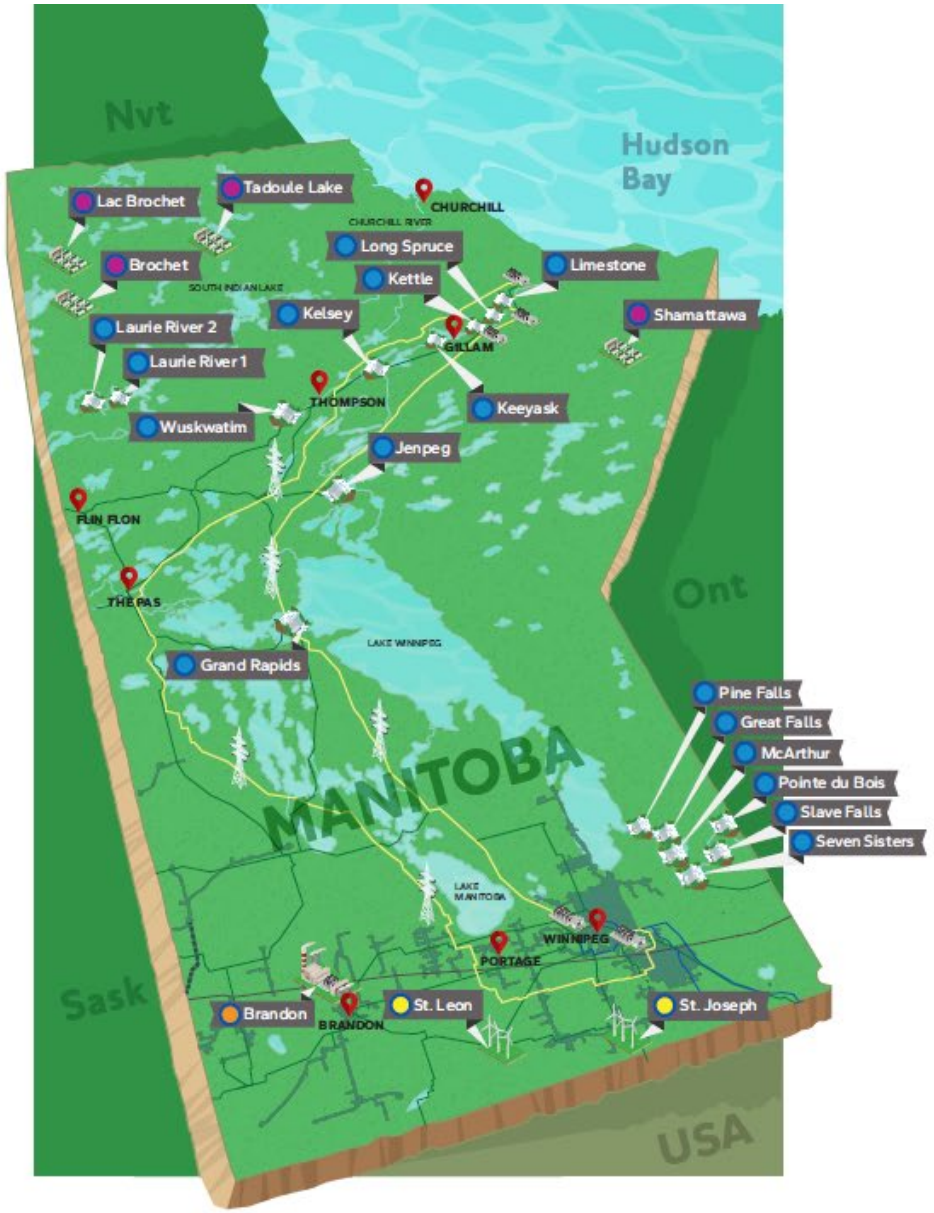
Integrated Resource Plan is part of the ongoing planning cycle at Manitoba Hydro



Key Concepts in Energy Planning

2023 IRP Appendix 1 - Existing System and Load
https://www.hydro.mb.ca/docs/corporate/irp/irp-2023-a1-existing-system-and-load.pdf

Major Facilities

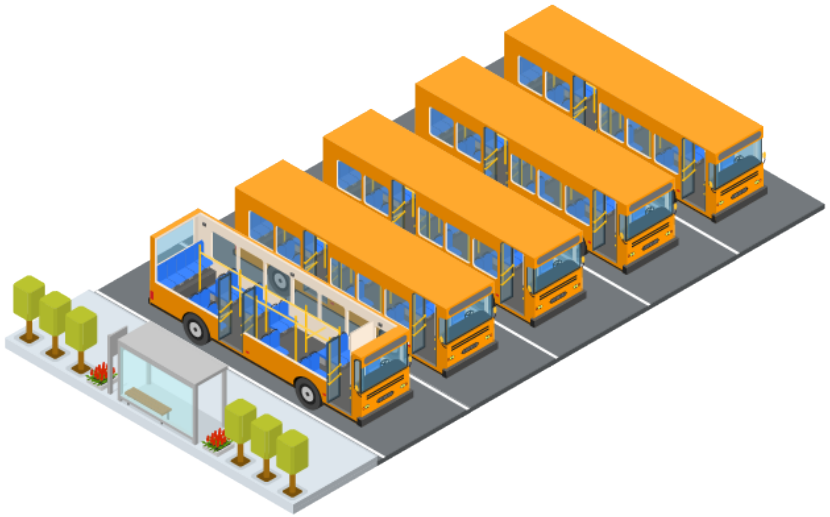


- Hydro generation
- Thermal generation
- Diesel generation
- Wind generation
- Converter station
- HVdc transmission
- 500-kV transmission
- 230-kV transmission
- Future 230-kV transmission
- TransCanada pipeline
- Gas distribution
- Minell pipeline (CER)

Terminology: Capacity, Energy and Peak Demand

Capacity

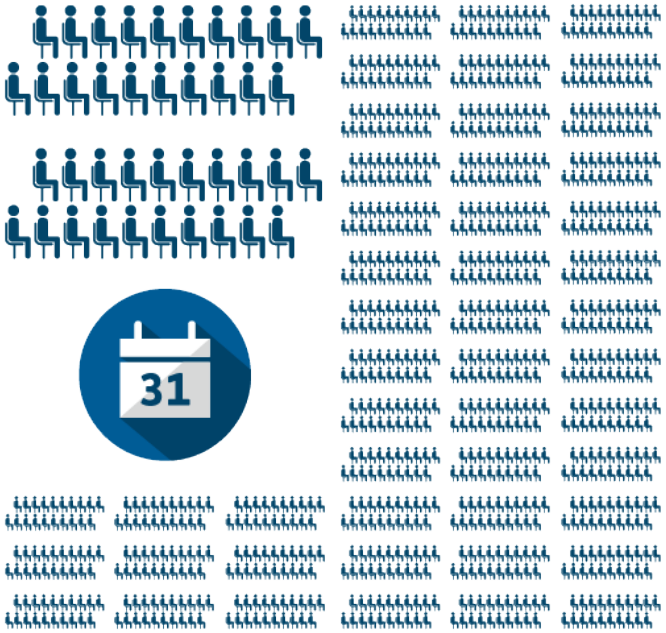
Maximum generator output (MW)



5 buses with 20 seats = 100 riders

Energy

Electricity produced in time period (MWh)



Riders per day: 1,000 riders

Peak demand

Greatest hourly electricity use (MW)

Peak ridership: 75 in morning rush hour

Reliability: Planning Criteria

Planning criteria are consistent with industry best practices

Energy Planning Criteria

- Plan to have sufficient energy to meet firm demand during worst drought on record (Dependable Energy)
- Consistent with many other major hydroelectric utilities

Capacity Planning Criteria

- Capacity supply must exceed Manitoba peak load + export obligations + Planning Reserve Margin (PRM)
- Consistent with North American Electricity Reliability Corporation (NERC)

Gas System Planning Criteria

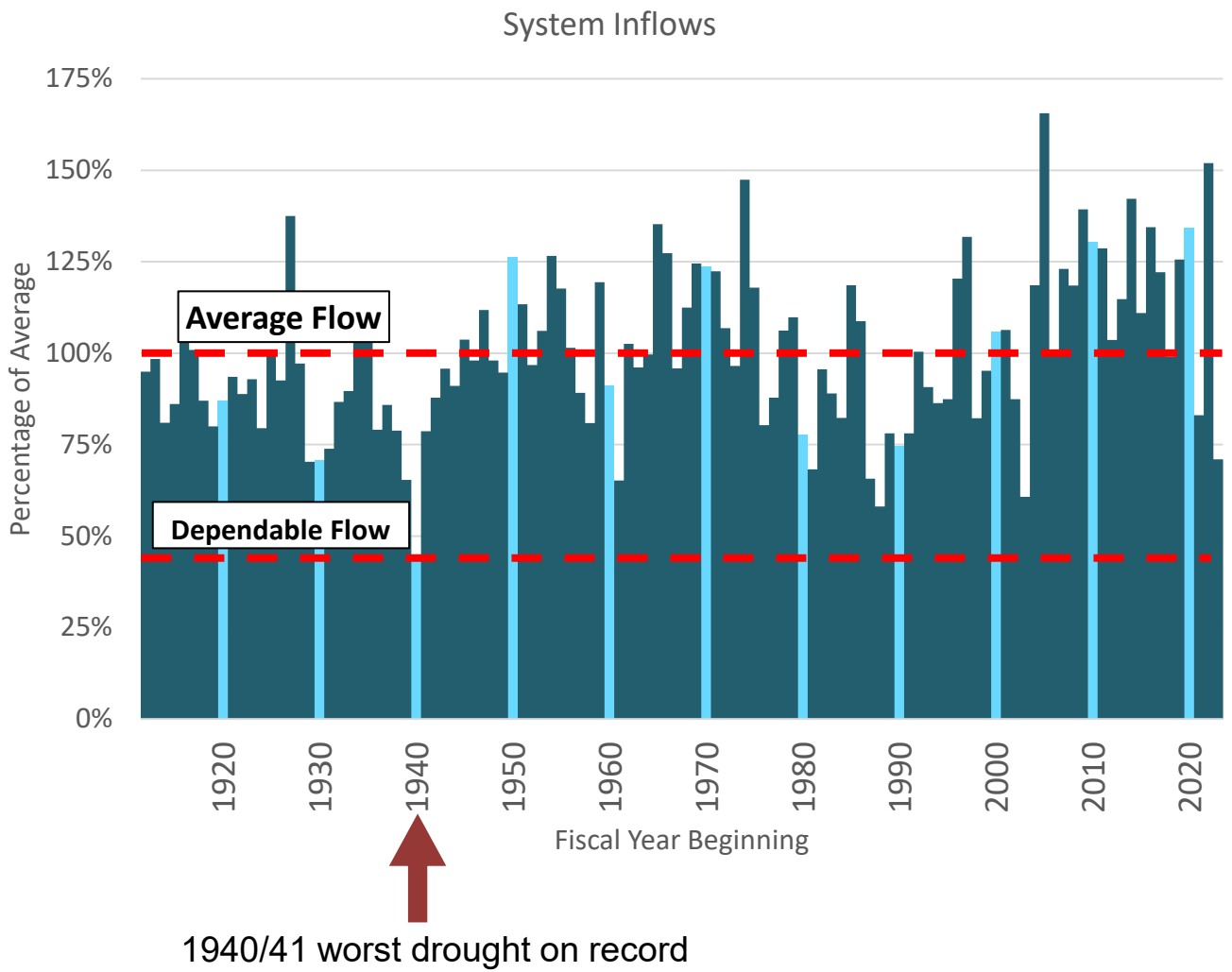
- Gas distribution systems are planned to deliver firm customer demand on a “design day” (a coldest day) while maintaining adequate pressure for reliable service
- Consistent with many other gas distribution utilities operating in cold climates

Transmission Planning Criteria

- Defines technical requirements for interconnecting generator or customer load facilities
- Consistent with North American Electricity Reliability Corporation (NERC) standards

Water Flows Drive Hydro Generation and Energy Planning

- **Water flows can vary significantly year-to-year**
- Hydroelectric generation depends primarily on water supply
  - Generation in a flood year is approximately 2 times that of the worst drought year
- Manitoba Hydro plans to **supply both Manitoba demand and dependable exports** under all flow conditions, **including worst drought on record**



Manitoba Hydro's Interconnections Provide Reliability and Enable Economic Operations

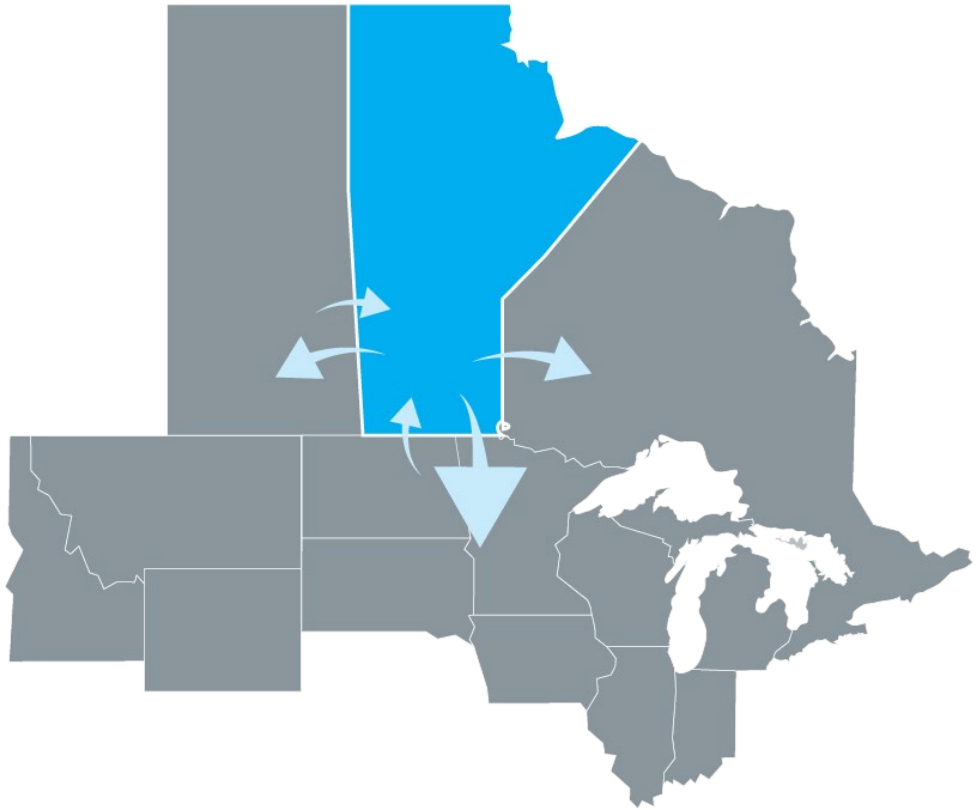
Interconnections facilitate imports and exports of electricity, **enhancing reliability for Manitoban's and allowing for sale of excess electricity.**

- Provides diversity of **supply to manage drought.**
- Enables use of reservoirs to **import power overnight** when prices are low and **export during the day** when prices are higher.
- **Outlet for surplus energy** when water conditions are favourable.

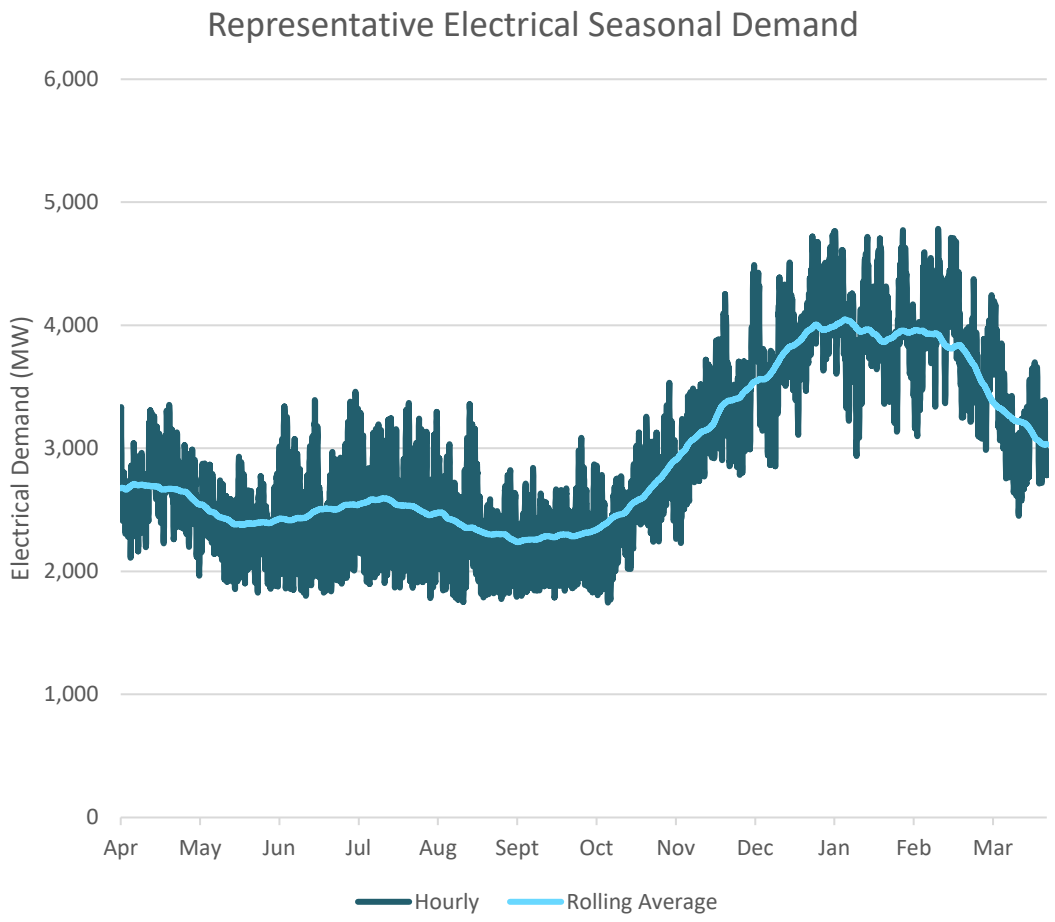
Enable Exports

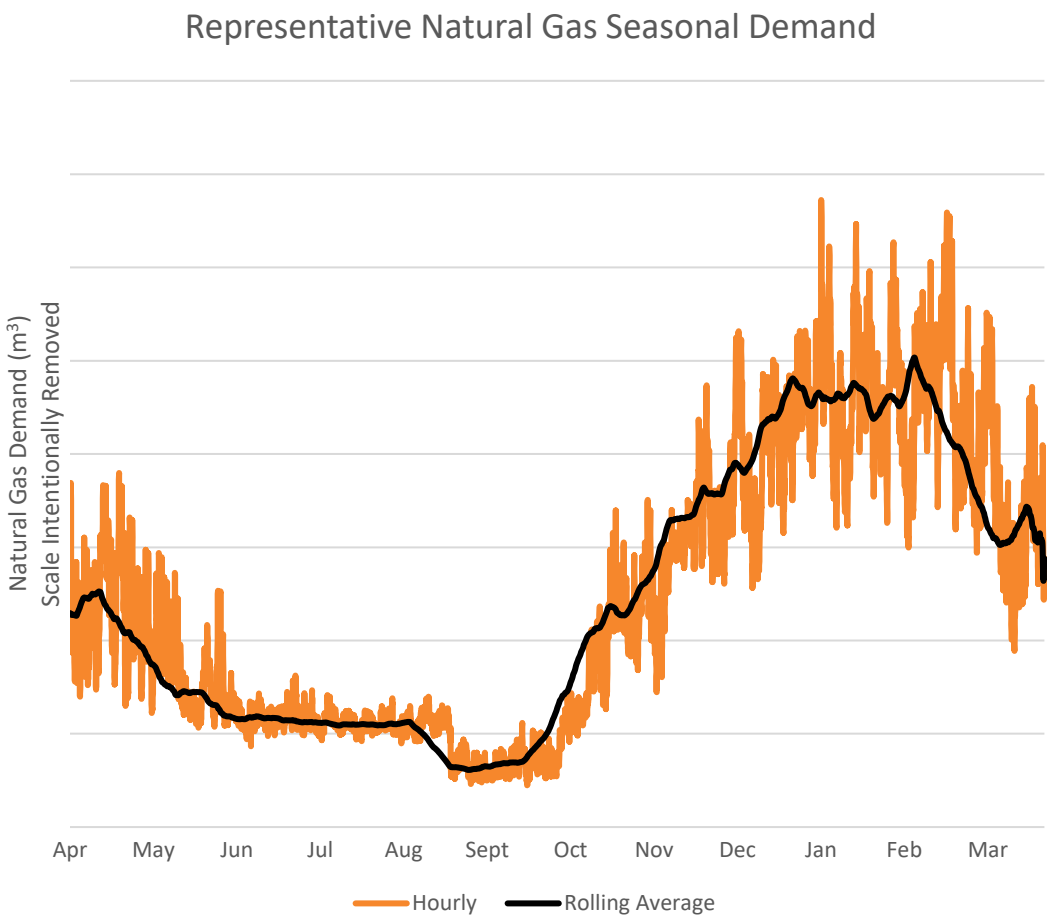
- Long term contracts ("dependable" sales)
- Water supply dependent "opportunity" sales

Maximize regional benefits through capacity sharing



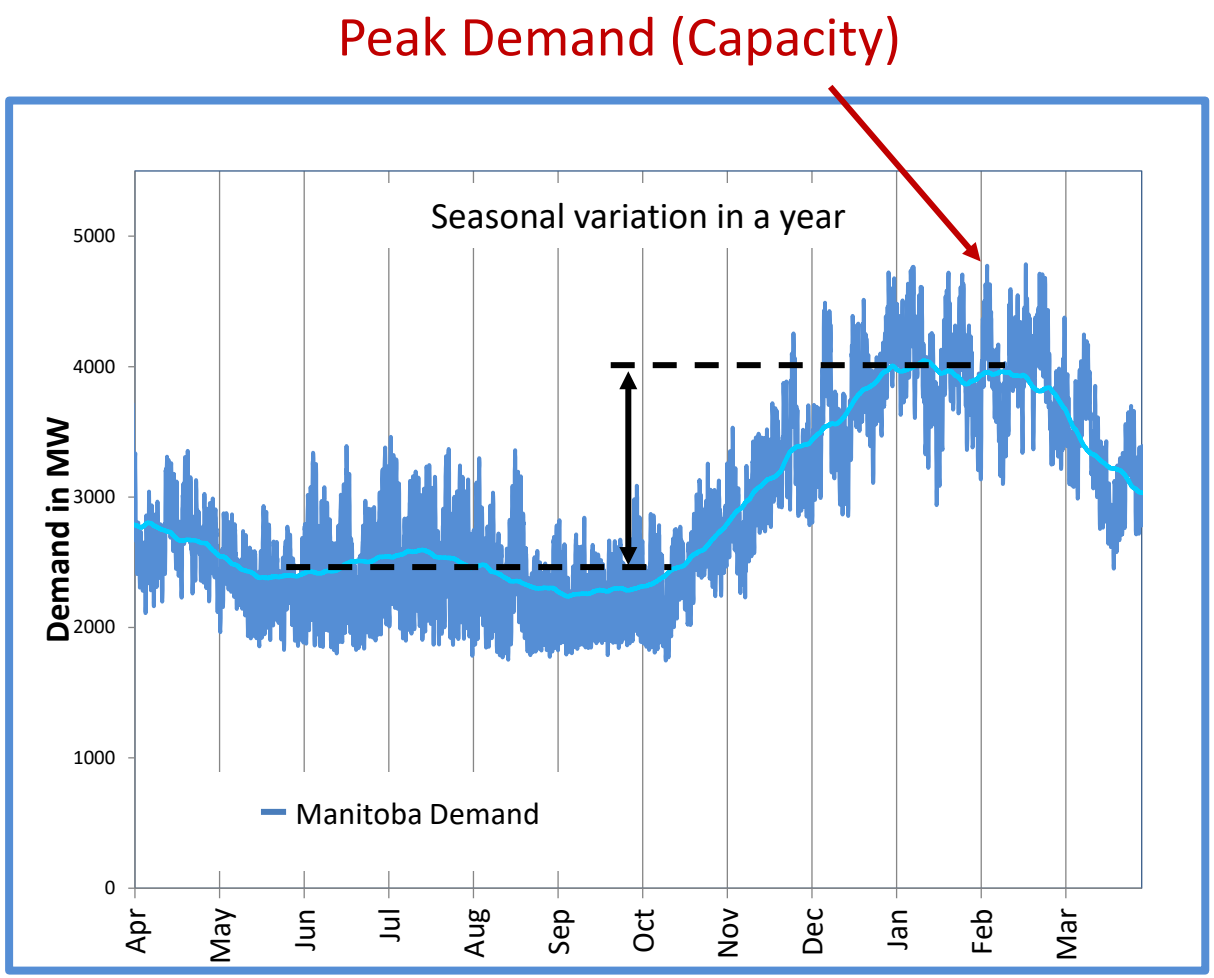
Manitoba's Electricity and Natural Gas Demand Varies

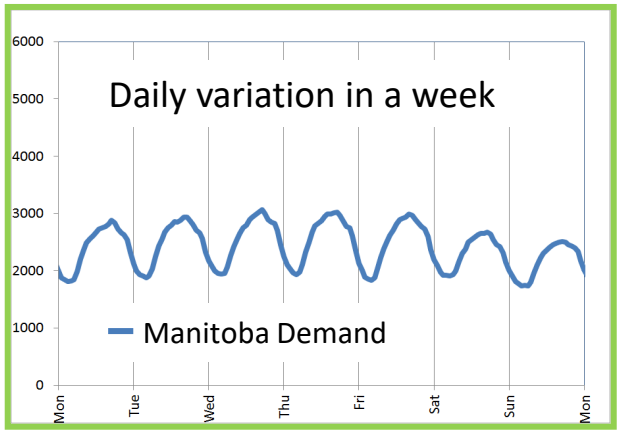


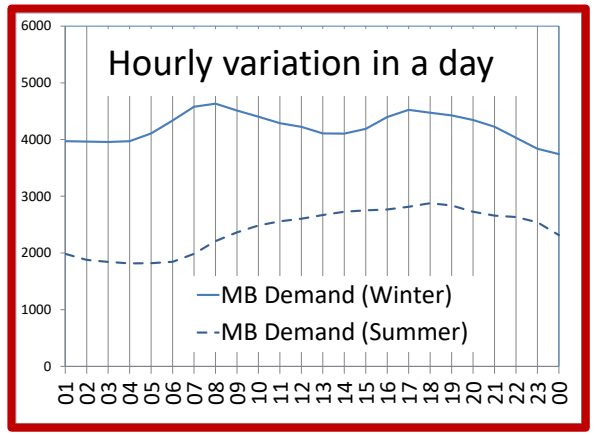


Energy demand changes across seasons, weeks, and days

Example: Electricity demand shown across different time frames







Electrical peak demand occurs in winter typically before the sun rises or in the evening, after sunset.

Supply and demand must always be in balance so when load increases, generation must increase.

Natural Gas System

Key considerations

- The North American natural gas market is highly integrated.
- Gas distribution systems are planned to deliver firm customer demand on a “design day” (the coldest day) while maintaining adequate pressure for reliable service.
- On the coldest days, Manitoba Hydro's gas distribution system delivers the equivalent capacity of 1.4x the electric system.
- Historic reliability of the natural gas system is 99.99%

Transmission & Distribution

Key considerations

- Interconnecting new distributed generation across the province (i.e. Wind)
- Large Industrial Economic Development opportunities may require significant transmission asset investments
- Distribution is mostly geographically localized
  - Concentration of electric load changes has significant considerations to the distribution system

Source: Generated using Microsoft Copilot, January 29, 2025

Resource Options

2023 IRP Appendix 2 – New Resource Options
https://www.hydro.mb.ca/docs/corporate/irp/irp-2023-a2-new-resource-options.pdf

Resource Options Inventory

Dispatchable & Mature | Intermittent & Mature | Dispatchable & Emerging

All **resources have different** characteristics such as **cost, emissions, dispatchability, maturity, and time to in service.**

This list shows all potential resource options available, however, some may not be available under specific Resource Options Strategies.

Resource Options Have Different Characteristics

Characteristics captured in our modelling include:

- Installed Capacity
- Firm Capacity
- Operating Parameters
- Dependable Energy
- Development Timelines
- Economic Life
- Capital Costs
- Transmission Costs
- Fixed Operating Costs
- Variable Operating Costs
- Fuel Costs
- GHG Emissions

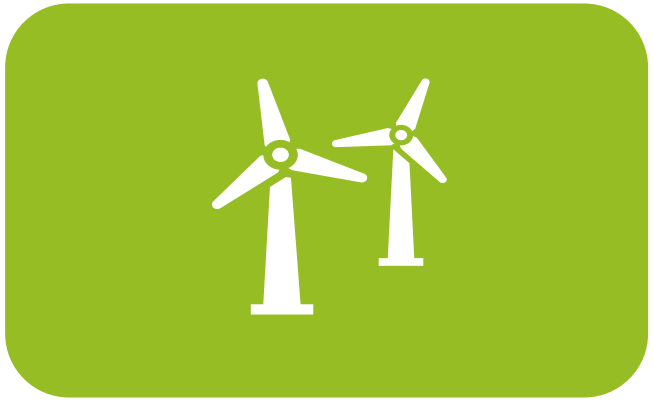
Characteristics define how each resource can operate within the energy supply system.

Resource Options Characteristics Example

	Wind
Rated Capacity	■■■■■
Firm Capacity	■
Dependable Energy	■■■■■
Development Timelines	■■■■
Capital Costs	■■
Operating Costs	■■■
Operating Fuel Costs	
Operating GHG Emissions	

More is better

Less is better



Wind

Less ■■■■■ More

Resource Options Characteristics Example*

Less ■■■■■ More

	Intermittent & Mature	Dispatchable & Mature	Dispatchable & Emerging
	Wind	Combustion Turbines	Small Modular Nuclear Reactors
Rated Capacity	■■■■■	■■■■■	■■■■■
Firm Capacity	■	■■■■■	■■■■■
Dependable Energy	■■■■■	■■■■■	■■■■■
Development Timelines	■■■■	■■■■	■■■■■
Capital Costs	■■	■	■■■■■
Operating Costs	■■■	■	■■■■■
Operating Fuel Costs		■■■■■	■■■■
Operating GHG Emissions		■■■■	

More is better

Less is better

* The resources options shown were chosen to illustrate the variation in characteristics across different options and do not represent all available resources.

CHECK-IN

Resource Options Inventory

Dispatchable & Mature | Intermittent & Mature | Dispatchable & Emerging

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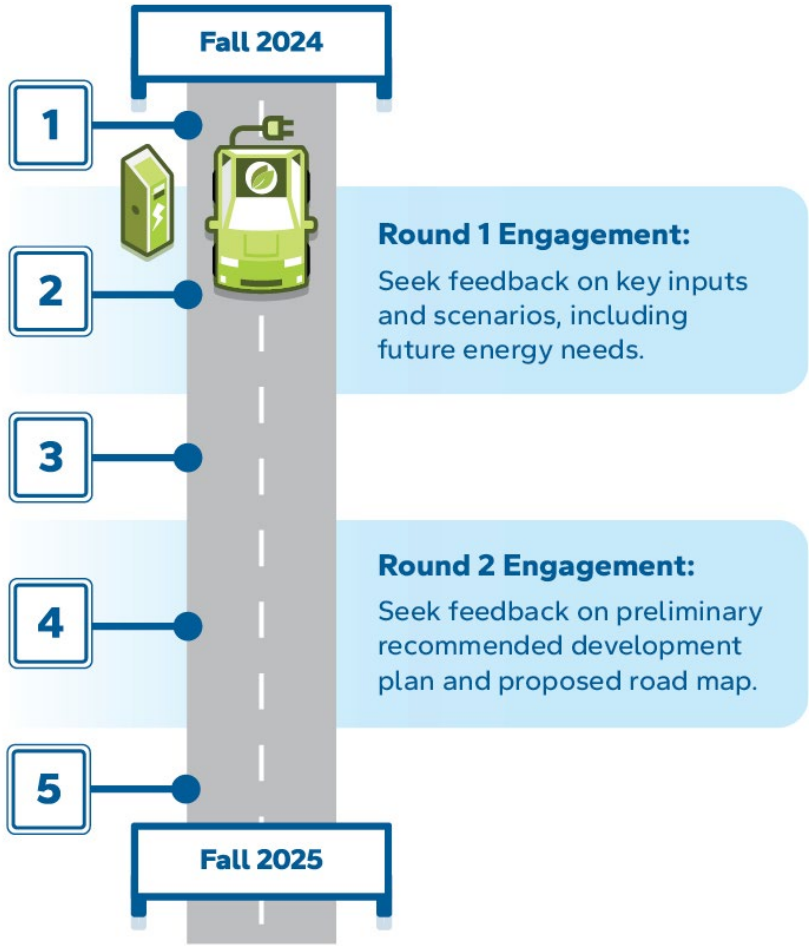
Next Steps

2025 IRP process overview

1. Setting direction
2. Develop key inputs and scenarios
3. Modelling, analysis, and evaluations
4. Preliminary recommendation
5. Finalize the Integrated Resource Plan



What's Next

February 24, 2025 - Meeting 5

What we heard in Round 1 Engagement

Final Key Inputs, Scenarios and Evaluations Metrics

Thank you!

Hydro.mb.ca/future

Email us at: IRP@hydro.mb.ca

To request accessible formats visit hydro.mb.ca/accessibility.

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