Appendix 3

# Existing System

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# 1 | Introduction

This appendix offers a broad overview of Manitoba's energy demand and the systems and programs in place to meet that demand reliably. It provides an overview of Manitoba's current energy landscape, including energy demand and associated provincial greenhouse gas (GHG) emissions. It explores the variability in electricity and natural gas demand and outlines the current state of existing infrastructure and systems that Manitoba Hydro operates to supply and deliver energy across the province. In addition, it highlights customer-side solutions that contribute to managing demand and improving energy efficiency.

# 2 | Energy & Emissions in Manitoba

Energy in Manitoba is supplied by a diverse mix of sources, including refined petroleum products, natural gas, electricity, biofuels, and others. This section provides an overview of energy use in the province, highlighting energy sources, associated greenhouse gas (GHG) emissions, and patterns of energy demand.

## 2.1. End-use Energy

Manitoba Hydro supplies electricity and natural gas, which contribute to 25% and 29% of the total provincial end-use energy respectively. Refined petroleum products, which are generally used to fuel vehicles, account for 40% of the energy used in the province. Estimates of end-use energy by fuel in Manitoba in 2022 is shown in Figure A3.1.

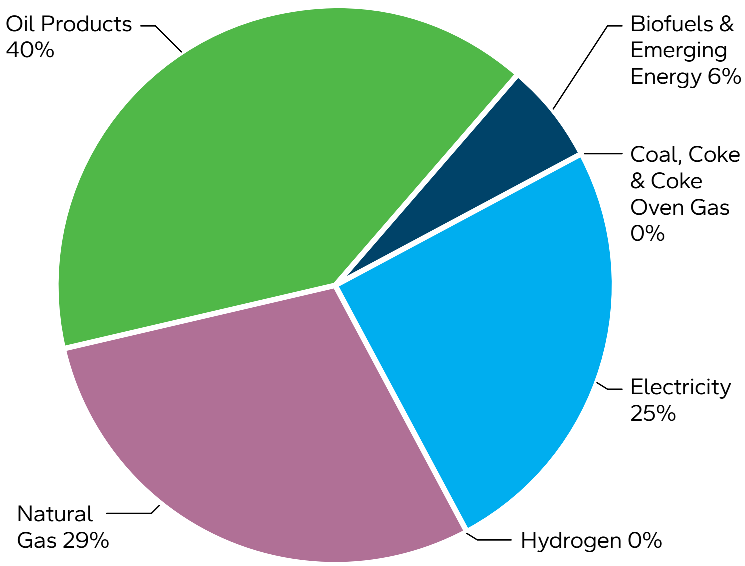



**Figure A3.1** - End-Use by Fuel in Manitoba[1]

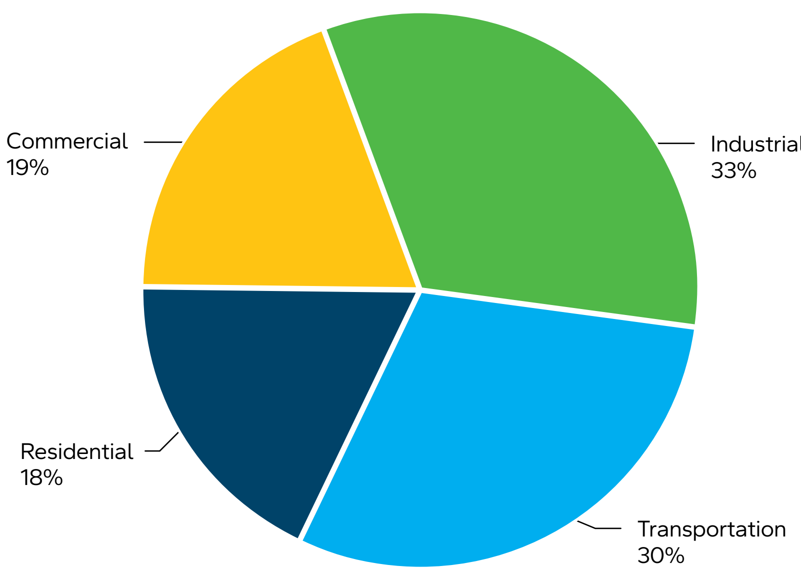



**Figure A3.2** - End-Use Energy by Sector[1]

[1] Canada Energy Regulator. Canada's 2023 Energy Future Data.

Figure A3.2 shows how energy use in Manitoba is spread across several sectors, each with their own unique characteristics based on their needs. Residential and commercial sectors primarily use a combination of electricity and natural gas, in large part for space heating, but also for space cooling, water heating, appliances, electrical equipment, and lighting among other needs. The transportation sector primarily uses refined petroleum products to fuel vehicles. The industrial sector, including agriculture, uses electricity, natural gas, and refined petroleum products to power their operations. In addition, all figures include non-energy uses such as petrochemical feedstock, lubricants, and asphalt.

## 2.2. Greenhouse Gas Emissions

In addition to understanding how energy is currently used in Manitoba, it is important to examine the sources of greenhouse gas (GHG) emissions in Manitoba. GHG emissions can occur from the combustion of fossil fuels as well as via both other chemical processes and direct emissions; and, while carbon dioxide ($CO_2$ or "carbon"), produced via combustion, is the main anthropogenic (human-caused) GHG by mass, there are hundreds of other GHGs in addition to $CO_2$.

Figure A3.3 shows Manitoba's average annual GHG emissions from 2018 and 2022, from both energy and non-energy categories, per the National Inventory Report (NIR)[2]. These average values are used as the starting point for 2025 IRP GHG emission analysis. Annual data is provided in Table A3.1 for information.

Figure A3.3 disaggregates all provincial GHG emissions into three distinct categories: transportation combustion GHG emissions, stationary combustion GHG emissions, and non-combustion GHG emissions. Both transportation and stationary combustion GHG emissions occur as the result of burning fossil fuels (e.g., gasoline, natural gas, diesel). "Non-Combustion" GHG emissions occur as the result of other causes, unrelated to combustion of fossil fuels and, typically, unrelated to energy use in Manitoba.

[2] https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html

In Manitoba, decarbonization efforts targeting energy use primarily reduce combustion related GHG emissions. Addressing non-combustion emissions often requires different types of action. Achieving a net-zero economy means eliminating or offsetting emissions from both sources. (More details are provided in Appendix 5)

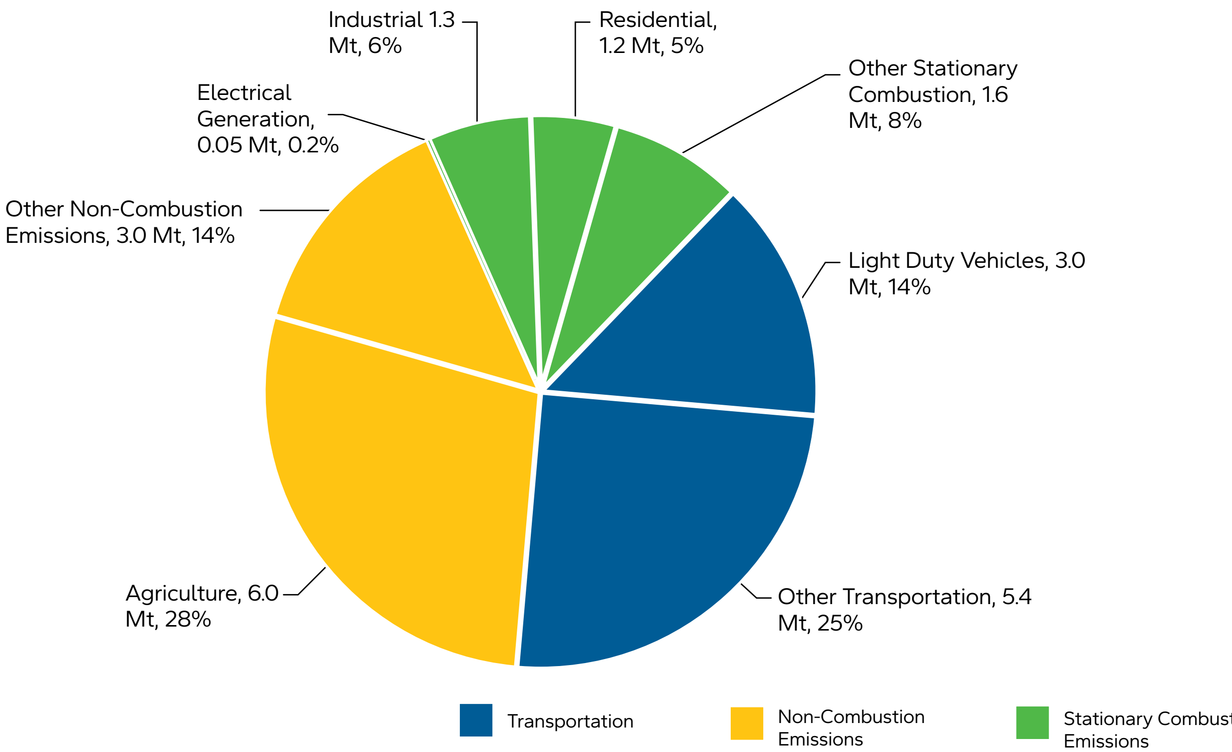



**Figure A3.3 - GHG Emissions by Category**

**Table A3.1 - Annual Manitoba GHG Emissions by Selected Category between 2018 and 2022 (Mt $CO_2e$)**

| Category | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| **Stationary Combustion** | 4.28 | 4.26 | 4.13 | 3.92 | 4.42 |
| **Transportation** | 9.04 | 8.79 | 7.87 | 8.02 | 8.26 |
| **Fugitive Energy Sources** | 0.77 | 0.78 | 0.72 | 0.72 | 0.74 |
| **Chemical Processes** | 0.97 | 0.94 | 0.94 | 0.88 | 0.94 |
| **Agriculture** | 5.96 | 5.97 | 6.24 | 5.88 | 5.89 |

The following provides descriptions of each GHG emissions category, some examples, and some further disaggregation. For more details on what is included in the various categories and the methodologies for estimating GHG emissions, please review Part 3 of the National Inventory Report.[3,4]

[3] https://publications.gc.ca/site/eng/9.506002/publication.html

[4] https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html

### 2.2.1. Transportation - Light Duty Vehicles and Other Transportation (39%)

These GHG emissions occur when fuel is combusted in vehicles (e.g., cars, trucks, planes, boats, trains, lawn mowers, bulldozers, ATVs, semi-trucks, combines, tractors, etc.). This category is referred to as "Transport" in the NIR. This is Manitoba's largest GHG emissions category – it also represents one of Manitoba's largest GHG emission reductions opportunities.

About 14% of provincial GHG emissions result from on-road light duty vehicles/trucks (e.g., SUVs and passenger vehicles). The remaining transportation GHG emissions are from heavy-duty vehicles, off-road vehicles (mostly heavy-duty), planes, and trains.

### 2.2.2. Combustion - Manitoba Hydro-Owned Electrical Generation (0.2%)

These GHG emissions include those from current fossil fuel-based electrical generation: including the Brandon generating station and off-grid diesel generation stations. In the NIR this is referred to as "Public Electricity and Heat Production" and is included in the Intergovernmental Panel on Climate Change (IPCC) category of "Stationary Combustion Sources".

### 2.2.3. Combustion – Industrial, Residential, and Other Stationary Combustion (19%)

These GHG emissions occur when fuel is combusted for purposes other than "Transport" and "Electrical Generation". This includes space heating, industrial heating (e.g., boilers, furnaces, and heaters), customer-owned electrical generation, some industrial fuel combustion processes, flaring, and miscellaneous equipment (e.g., pumps, air compressors).

Space heating accounts for approximately 13% of provincial GHG emissions, with nearly 90% of that resulting from natural gas heating. Space heating comprises, but is not limited to, residential, commercial and institutional space heating. Approximately 5% of provincial GHG emissions come from residential space heating using natural gas and an additional 8% result from other, mostly non-residential (e.g., commercial) forms of stationary combustion for heating purposes.

The remaining 6% of provincial GHG emissions from stationary combustion are from combustion of fossil fuels for industrial applications (e.g., manufacturing).

### 2.2.4. Non-Combustion - Agriculture (28%)

These GHG emissions include all agriculture GHG emissions that don't fall under "Transportation" or "Stationary Combustion". The largest contributors are methane emissions from ruminant livestock husbandry (e.g., "enteric fermentation" or ruminant livestock burps) and soil-related GHG emissions.

A large percentage of Manitoba's economy is agriculturally based compared to other provinces, and Manitoba has both an established ruminant livestock industry and crop production industry. These industries, along with lower GHG emissions in some energy sectors, results in Manitoba having a larger percentage of its GHG emissions from "Agriculture" than any other province.

### 2.2.5. Non-Combustion – Other (14%)

GHG emissions from the waste sector, which fall under non-combustion GHG emissions, are primarily methane ($CH_4$) emissions at waste management facilities resulting from the anaerobic decomposition of organic waste. These GHG emissions also include smaller amounts from wastewater treatment and similar sources. Methane is being captured and flared at some waste management facilities in Manitoba, which reduces the contribution of the waste category to overall provincial GHG emissions.

In addition to the waste sector, non-combustion GHG emissions resulting from chemical reactions that occur during manufacturing, but aren't "stationary combustion", are considered in this category. Portland cement production, and releases of electrically insulating gases like sulphur hexafluoride or carbon tetrafluoride, among other processes, can result in these GHG emissions. These GHG emissions are referred to as "Industrial Processes and Product Use" in the NIR.

Fugitive GHG emissions (typically methane) occur during the production, processing, and transportation of oil and natural gas. These are a smaller source in Manitoba than other provinces that produce more oil and natural gas (e.g., Alberta).

### Greenhouse Gases (GHGs) and Climate Change

To understand how GHGs influence the Earth's temperature, consider the Earth's energy balance – it is driven mainly by radiation from the sun. Approximately 30% of the sunlight (light energy) that reaches Earth's atmosphere is reflected back into space. The rest of this light energy, which is shortwave radiation, is absorbed and converted into thermal energy, causing a release of heat. Keeping the energy in balance, the Earth radiates this heat back to space as longwave (infrared) radiation.

GHGs (e.g., water vapor; carbon dioxide ($CO_2$); methane ($CH_4$); and nitrous oxide ($N_2O$)) in the atmosphere absorb the reflected infrared radiation, acting as a partial blanket. By trapping heat, these gasses act like the glass in a greenhouse, warming Earth's surface. This results in the common name "the greenhouse effect". This process is critical for maintaining a habitable planet. In the absence of any GHGs, the planet would be too cold to support many life forms. However, an excess of GHGs in the atmosphere presents problems.

Burning fossil fuels like coal, natural gas, and oil releases additional heat-trapping gases. Since the Industrial Revolution, humans have burned more fossil fuels with each passing decade. This action, along with other non-combustion human activities, intensifies the greenhouse effect, changing the Earth's climate. It is clear that our activities as humans are contributing to climate change.

Reducing GHG emissions and avoiding risks associated with climate change requires a variety of actions at a local and global level. International efforts to reduce GHG emissions will help limit the impacts of climate change, but warming due to historic GHG emissions will persist for centuries and will continue to cause long-term changes in the climate system (IPCC's[5] Special Report: Global Warming of 1.5 $^{o}$C).[6]

[5] https://www.ipcc.ch/

[6] https://www.ipcc.ch/sr15/

## 2.3. Electricity and Natural Gas Demand

Electricity and natural gas demand is an important factor in energy planning, impacting how Manitoba Hydro ensures adequate supply to customers.

Manitoba is a winter-peaking province, which means we see our highest electrical usage and peak load in cold months. Manitoba set a new record for electricity demand on January 20, 2025 when temperatures in Winnipeg dropped to -32.7C. At 8 a.m. that day, Manitoba Hydro's system demand peaked at 5,111.3 MW, breaking the previous record of 4,927.8 MW set only 1 month earlier on Dec 12, 2024 when the temperature was –31.0C. Manitoba's record peak summer load is 3,529.0 MW, set on Jun 6, 2023 at 5 p.m. when Winnipeg's temperature was 31.4C.

Figure A3.4 presents representative electricity demand and illustrates how usage varies throughout the year. Hourly demand, which fluctuates significantly, can vary by as much as 30% within a single 24-hour period. In contrast, the rolling average smooths out these fluctuations to highlight broader seasonal trends. On average, winter peak electricity demand is approximately 50% higher than in summer, largely due to increased heating needs. The figure also highlights the presence of a consistent minimum level of demand at all times, referred to as the baseload.

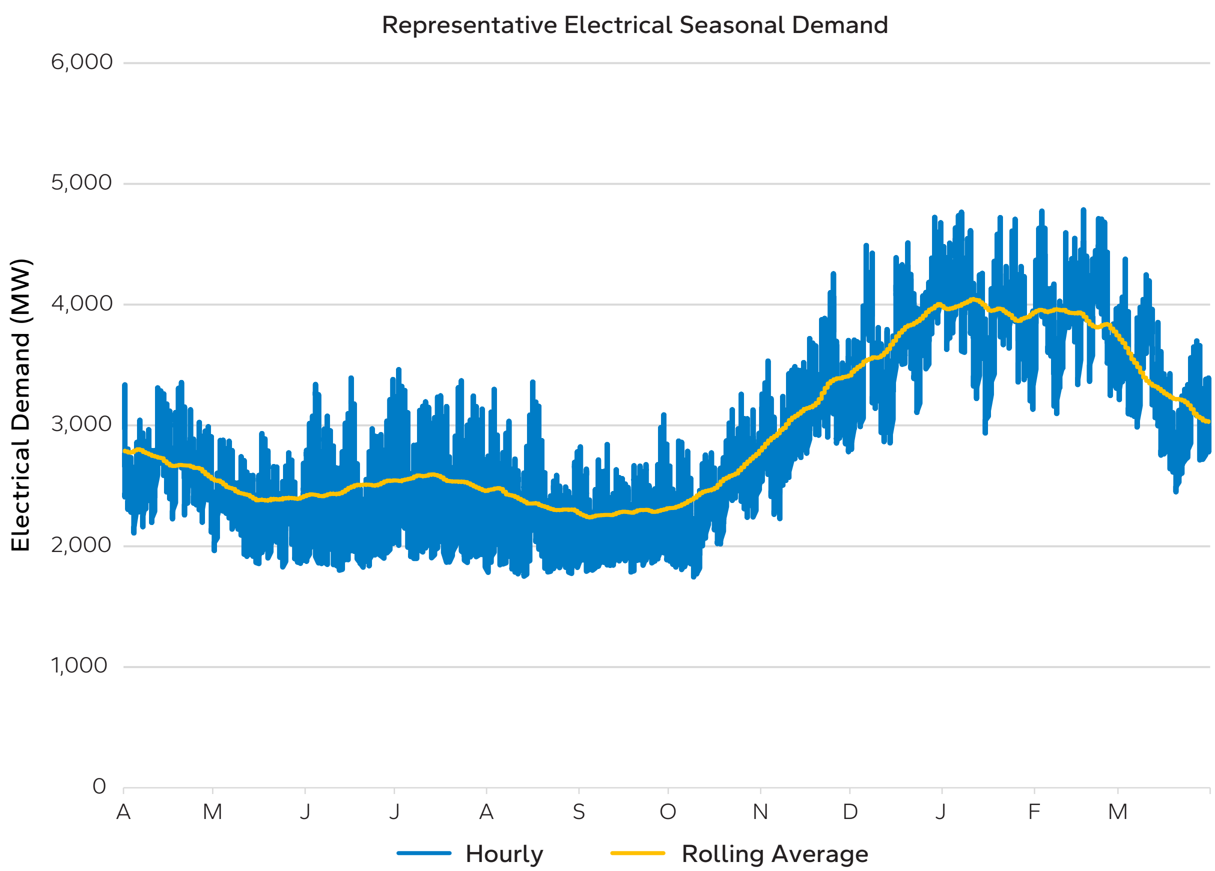



**Figure A3.4** - Representative Electrical Demand

Figure A3.5 illustrates representative natural gas demand in Manitoba and highlights its strong seasonal and weather-sensitive nature. Demand rises sharply during the winter months, primarily due to the province's reliance on natural gas for space heating. The gas distribution system delivers approximately 150% the capacity of the electric system on the coldest days. While industrial usage contributes to overall demand, it remains relatively steady throughout the year, establishing a consistent baseload level of demand, as reflected in the figure.

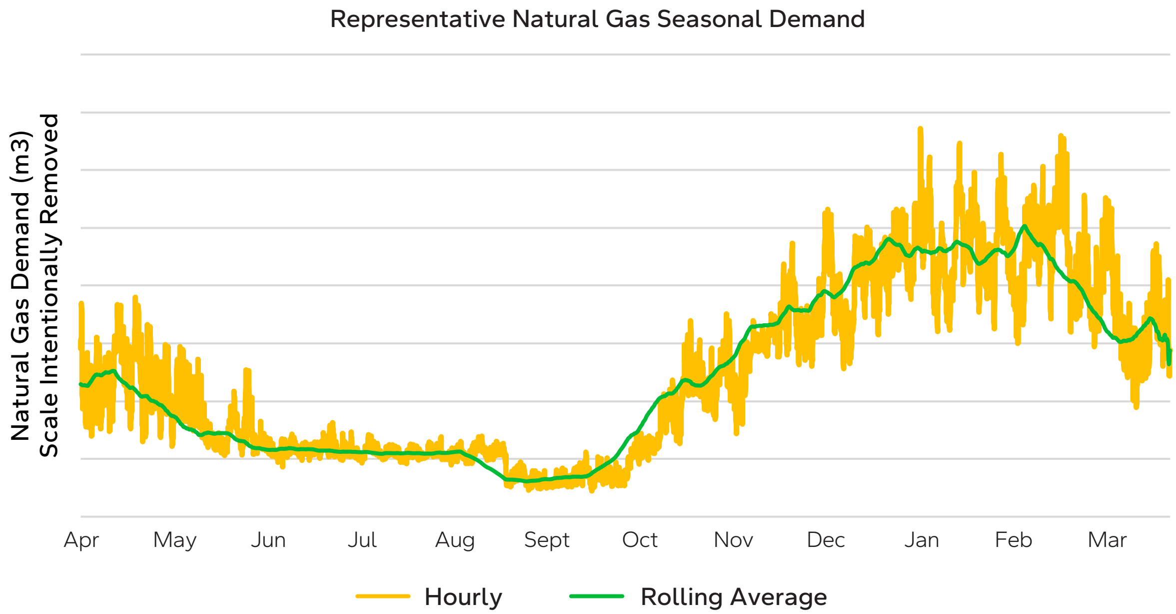



**Figure A3.5** - Representative Natural Gas Demand

# 3 Manitoba Hydro's Existing Energy Systems

Manitoba Hydro is a vertically integrated utility that provides both electricity and natural gas to customers. Centra Gas Manitoba Inc. ("Centra") is a wholly-owned subsidiary of Manitoba Hydro. The existing energy systems consist of electricity supply (generation, power purchase agreements, and imports from neighbouring markets), electricity delivery (transmission and distribution), and natural gas supply and delivery. Figure A3.6 provides an overview of Manitoba Hydro's major electricity and natural gas facilities.


**Figure A3.6** - Major Electric and Natural Gas Facilities

## 3.1. Energy Reliability Outlook

In general, energy reliability is the ability of Manitoba Hydro to consistently deliver the expected performance of its energy systems.

Manitoba Hydro's energy reliability is declining. While many Manitobans may have not experienced a notable decline in performance, the reliability in the overall electric energy value chain is declining, and the risk of significant and prolonged outages is growing each year. Historical performance metrics can provide insight into future system reliability; however, they are lagging metrics and have limitations.

Manitoba Hydro has identified future performance trends based on our historical performance which show a continuing decline for our electrical energy systems for the foreseeable future. Between the electrical energy systems, performance trends are declining at varying speeds. Specifically, performance trends indicate that Manitoba Hydro will have less hydroelectric capacity (MW) in the 2030s due to increased forced outage rates.

Manitoba Hydro's Strategic Asset Management Plan (SAMP) sets a vision to "stabilize energy reliability by 2032, and progress towards an optimal balance of cost, risk and performance."[7] Achieving this vision will require increases to resources, both human and financial. The Asset Management Plan (AMP),[8] lays out the work to be prioritized and the timelines to achieve SAMP objectives, and outlines the need to increase asset renewal and replacement, as well as increase maintenance to maximize the economic life of assets.

## 3.2. Electricity Supply

Manitoba Hydro supplies electricity from multiple resources including:

- 16 hydropower stations,
- 1 natural gas fueled combustion turbine station (Noted as "Thermal" on Figure A3.6),
- Power purchase agreements with non-utility generators in Manitoba
- Diesel generators serving four off-grid communities, and
- Imported electricity through interconnections to neighbouring markets.

Table A3.2 summarizes the installed capacity of the current resource mix and underlines the predominately hydropower system.

[7] https://www.hydro.mb.ca/docs/regulatory_affairs/pdf/electric/gra_2026_2028/06-1_appendix_6-1_strategic_asset_management_plan.pdf

[8] https://www.hydro.mb.ca/docs/regulatory_affairs/pdf/electric/gra_2026_2028/06-2_appendix_6-2_asset_management_plan.pdf

**Table A3.2** - Existing Generation Resource Nominal Capacities

| Resource | Capacity (MW) |
|---|---|
| Hydropower (16 stations) | 5,768 |
| Interconnections (Import) | 1,460 |
| Fuel Based Generation (1 Station) | 278 |
| Wind Turbines (3 Wind Farms) | 258 |
| Off-Grid Diesel Generation (4 locations) | 11 |
| Solar Photovoltaic (2 Solar Farms) | 1 |

### 3.2.1. Hydropower

Hydropower is the backbone of Manitoba Hydro's energy system, providing a reliable, dispatchable source of electricity. Manitoba Hydro operates 16 generating stations, located on the Winnipeg River, Saskatchewan River, Nelson River, Burntwood River, and Laurie River. In an average year, hydropower stations produce approximately 97% of the annual electrical energy generated in Manitoba.

In recent years, Manitoba Hydro's hydraulic weighted forced outage factor (HWFOF) has been increasing. This capacity weighted factor reflects the percent of time during a specific period where hydraulic units are out of service due to forced outages, including outages due to asset failure. As shown in Figure A3.7 below, the HWFOF has increased to 5% in fiscal year 2025 (FY25), as compared to the historical value of approximately 2% between FY12 and FY22. One percent HWFOF is approximately 60 to 70 MW of capacity.

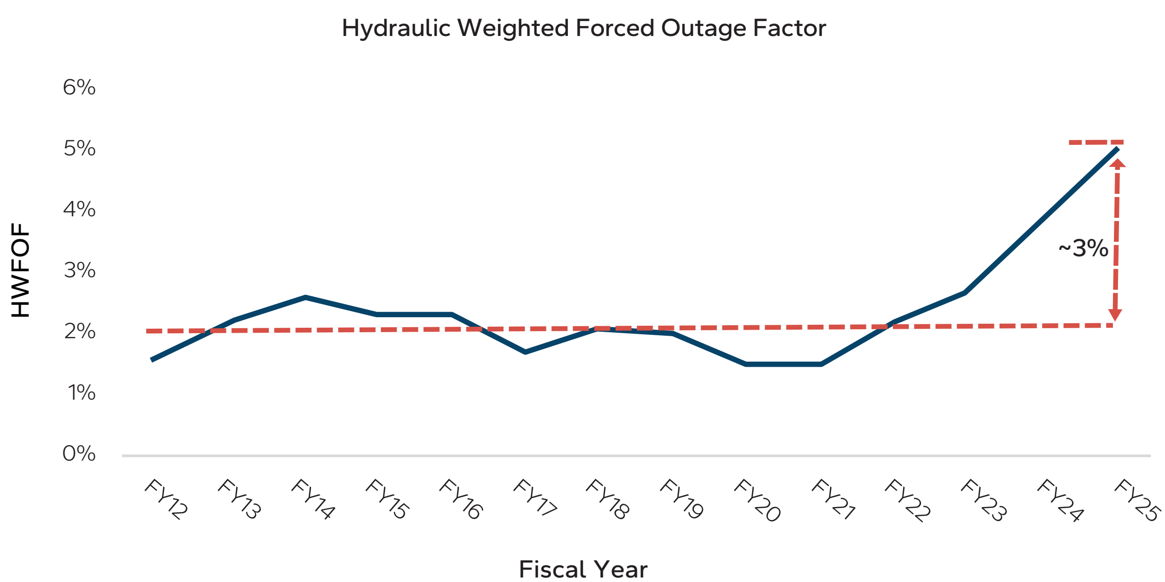



**Figure A3.7** - Hydraulic Weighted Forced Outage Factor

### 3.2.2. Fuel Based Generation

The Brandon Generating Station has two operational simple cycle turbines powered by natural gas with diesel fuel as a back-up. On average, this fuel based generating station produces less than 0.1% of the annual energy generated in Manitoba, recently operating at annual utilization factors of approximately 1.5%, which roughly equates to 34 GWh per year or 130 operating hours per year assuming that the units are operating at full output.

Although the Brandon Generating Station is infrequently used for energy generation it serves multiple crucial purposes, including the provision of:

- capacity when electrical demand is high, especially during the winter months,
- enhanced reliability of electricity supply during low water conditions,
- reliable year-round alternative supply during short-term emergencies that may occur either at the hydropower stations or on the electrical transmission system, and
- other benefits to the electrical transmission system.

### 3.2.3. Off-Grid Diesel Generation

Due to their locations, four northern communities are not connected to the Manitoba Hydro transmission grid and are reliant on diesel generated electricity supplied by Manitoba Hydro. The four communities are: Shamattawa (Shamattawa First Nation), Tadoule Lake (Sayisi Dene First Nation), Brochet (Barren Lands First Nation), and Lac Brochet (Northlands Denesuline First Nation).

### 3.2.4. Power Purchase Agreements

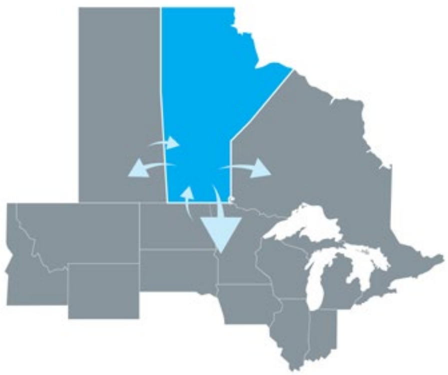
Manitoba Hydro purchases electricity from the independently owned St. Leon I, St. Leon II, and St. Joseph wind farms under long-term contracts. This wind energy helps to meet the energy requirements of Manitobans and dependable export contracts, particularly when water conditions are low. In an average year, wind generation provides approximately 3% of the annual energy generated in Manitoba.

In addition to wind, Manitoba Hydro purchases electricity from two independently owned solar farms in the province. Manitoba Hydro has a power purchase agreement with Fisher River Cree Nation for an 840-kW solar farm. The 3,000 solar panel system was the first Indigenous-owned, utility-scale solar farm in Canada and the largest solar project in Manitoba.[9] Manitoba Hydro also has a power purchase agreement with Northlands Denesuline First Nation for a 288-kW solar farm in Lac Brochet. This solar project helps reduce the communities' reliance on diesel fuel and is the first independent power generation project installed in a Manitoba off-grid community.

[9] https://frecdev.ca/fisher-river-solar-farm/

### 3.2.5. Interconnections

Manitoba Hydro exchanges electricity with neighboring utilities in Saskatchewan, Ontario, and the U.S. through interconnections, which consist of multiple transmission lines linking Manitoba Hydro's system to these neighbouring systems. Figure A3.8 lists the firm import and export capabilities for these interconnections.



| Region | Export | Import |
|---|---|---|
| **United States** | 2,833 MW | 1,400 MW |
| **Ontario** | 100 MW | 0 MW |
| **Saskatchewan – North** | 25 MW | 60 MW |
| **Saskatchewan – South** | 290 MW | 0 MW |

**Figure A3.8 - Interconnection Firm Export and Import Capability**

Interconnections serve a major role in complementing Manitoba Hydro's predominately hydropower system. Interconnections allow longer-term seasonal diversity exchanges with our neighbours in the United States, which currently represent approximately 10% of Manitoba's winter capacity. Seasonal diversity exchanges are capacity-sharing arrangements between regions with different peak demand seasons, allowing them to exchange surplus generating capacity with each other during their respective off-peak seasons. However, as the energy landscape evolves in neighbouring markets, the future availability of seasonal diversity exchanges is uncertain.

Interconnections also facilitate the sale of excess electricity to outside markets when Manitoba generation exceeds Manitoba customers' needs. These export sales, through both firm and opportunity exports, provide an important source of revenue and help to keep rates low for customers in Manitoba. A complete listing of long-term contracts can be found in Manitoba Hydro's Fiscal 2026 to 2028 General Rate Application (See Figure 4.12).[10]

In addition, interconnections help ensure reliability of electricity supply both for Manitoba Hydro and neighbouring utilities. Interconnections allow electricity to be imported during low water conditions in Manitoba and provide a means of managing short term reliability issues when dealing with system outages.

Finally, interconnections play a role in optimizing the day-to-day operation of the electrical system. Often Manitoba Hydro can import electricity from neighbouring markets when market prices are low, preserving water to produce electricity when prices are higher. Manitoba Hydro can optimize its market interactions in part because of the flexibility offered by the hydraulic system described in the next section.

[10] https://www.hydro.mb.ca/docs/regulatory_affairs/pdf/electric/gra_2026_2028/04-0_tab_4_energy_demand_supply_assumptions.pdf

## 3.3. Hydraulic System

Manitoba Hydro's hydraulic system comprises several major rivers, reservoirs, and hydropower stations. Manitoba is located at the downstream end of two vast drainage basins, shown in Figure A1.1. The Nelson River drainage basin drains a large area from Alberta, Saskatchewan, Manitoba, Northwestern Ontario, and a portion of Northern United States. Rivers from these areas flow into Lake Winnipeg before that water flows out to the Nelson River and into Hudson Bay. The Churchill River basin lies to the north and a large proportion of water from that basin is diverted at Southern Indian Lake along the Burntwood River into the Nelson River. Together the Nelson and Churchill River basins have a total area of 1.4 million km2 that supplies water used at Manitoba Hydro's hydropower stations.

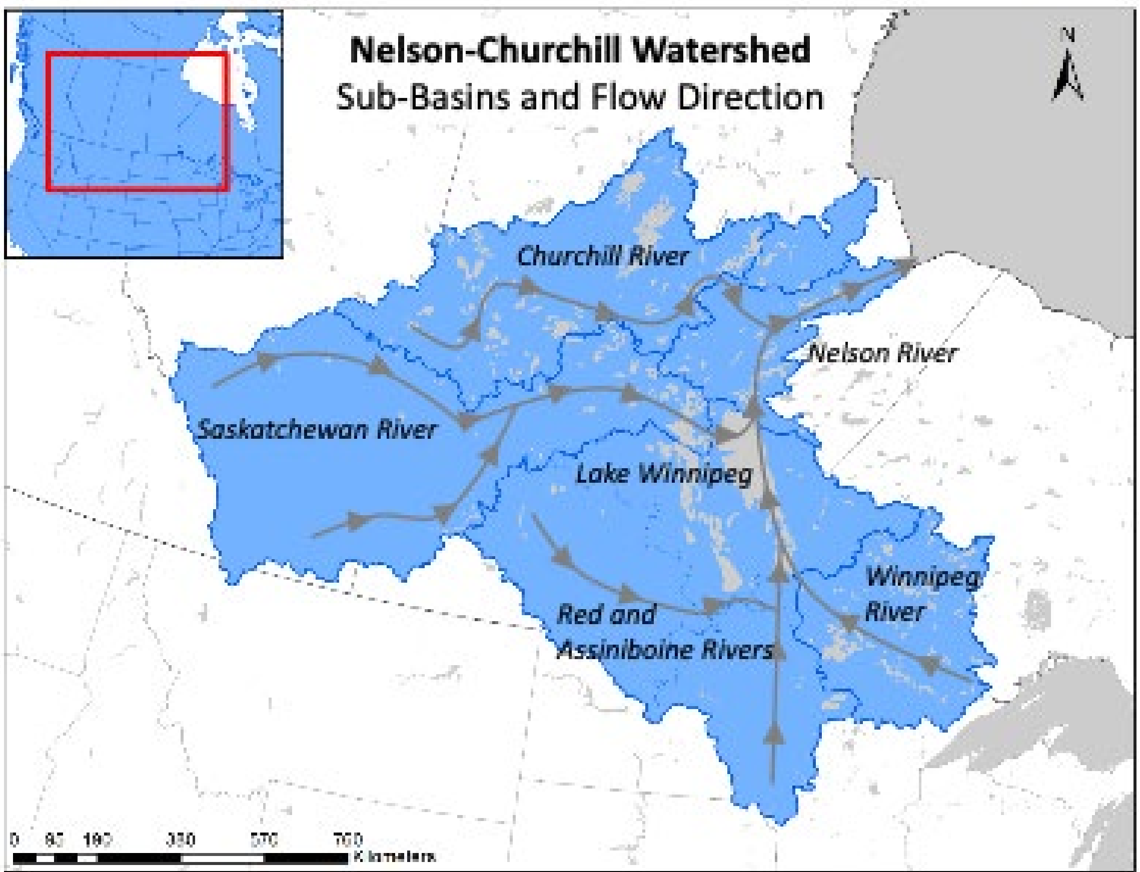



**Figure A3.9** - Drainage Basin Map

Inflows to the hydraulic system can vary considerably from year to year. As depicted in Figure 3.10, there is a wide range between flood and drought conditions – for example, inflows in 2005/06 were approximately three times greater than those in 1940/41, which is considered the dependable flow year.

While Manitoba Hydro's larger reservoirs are used to help temper these year-to-year fluctuations, the reservoirs are limited in size relative to the variability of inflows. Simulated hydroelectric generation based on the dependable flow year (1940/41, noted by the red arrow) is only about one half of what the system can produce in a favourable water year.

The reservoirs also provide flexibility to shift energy within the year, for example from when most inflows occur in the spring and summer to when electrical demand is higher in the winter. In addition, reservoirs can be used to store energy on a shorter-term basis, for example to balance supply and demand as the load changes throughout the day.

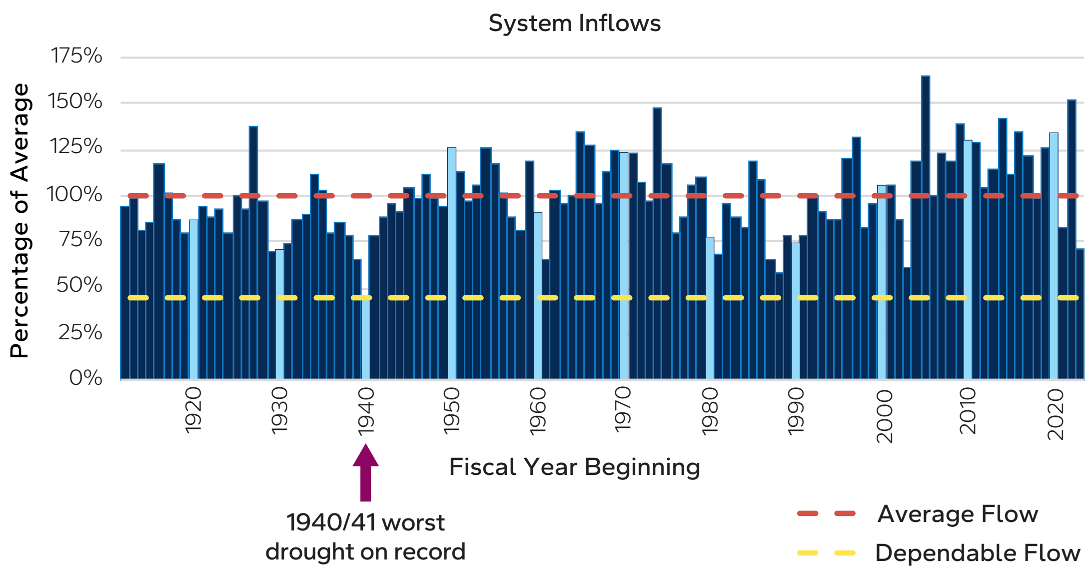



**Figure A3.10** - System Inflows from 1912 to 2023

Lake Winnipeg is the largest reservoir in Manitoba and provides about half of the storage on the hydraulic system. Cedar Lake and Southern Indian Lake are the two other seasonal reservoirs in Manitoba.

Given Manitoba Hydro's electric system is predominantly hydroelectric, waterflow conditions are a central consideration in both operational and long-term resource planning. Manitoba Hydro's energy planning criteria ensures that firm load can be supplied even under conditions similar to the worst drought on record. Manitoba Hydro's planning criteria are discussed further in Appendix 7.1.

All projects that use water to produce power are subject to the Manitoba Water Power Act (WPA) and its Regulations. Manitoba Hydro's operations and long-term planning adheres to existing constraints on reservoir storage levels and limits on river flows, as defined in its WPA and other operating licenses.

## 3.4. Electricity Delivery

Transmission and distribution systems deliver electricity to customers. Manitoba Hydro delivers electricity to more than 633,000 customers over 11,045 km of transmission lines and 75,320 km of distribution lines. The transmission system moves electricity from generating stations around the province, as well as from/to interconnections with neighbouring power systems, ranging from 25 to 500 kilovolts (kV). The voltage is then reduced by large transformers at electrical stations, where it is moved through the distribution network to customers. The transmission and distribution systems are described in more detail in the following sections.

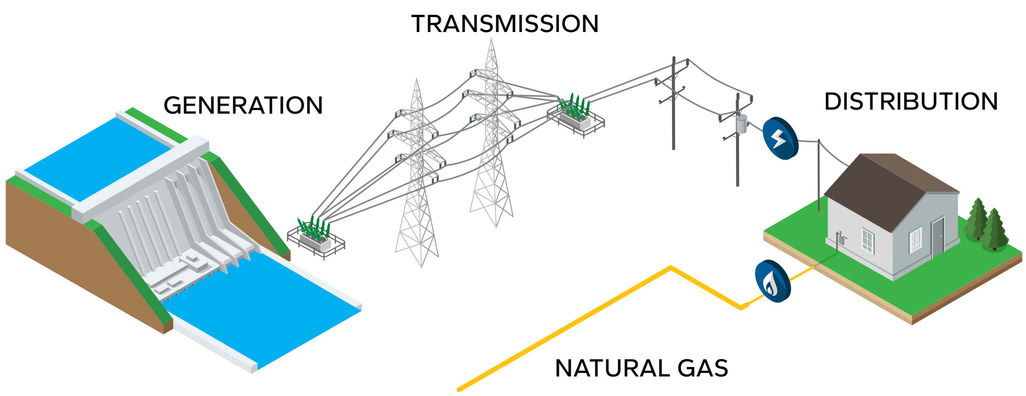



**Figure A3.11** - Energy Delivery System

### 3.4.1. Transmission System

The Manitoba Hydro electrical transmission system has two major components, the high voltage direct current (HVDC) and alternating current (AC) systems.

The HVDC transmission system moves electricity generated at Manitoba Hydro's largest generating stations on the Lower Nelson River located in northern Manitoba to southern Manitoba where the majority of electric load is located. The HVDC system allows electricity to be transmitted efficiently over long distances with less loss of energy than AC transmission.

The Nelson River HVDC transmission system includes three subsystems called Bipole I, Bipole II, and Bipole III. Bipoles I and II provide 1,854 MW and 2,000 MW of transmission capacity, respectively. Bipole III, completed in 2018, provides 2,000 MW of additional transmission capacity, and is an independent and physically separate HVDC system from Bipoles I and II. This alternative route significantly reduces the potential impact of severe weather events on the HVDC system and increases the reliability of electricity delivery to customers.

The AC transmission system moves electricity from northern generators to the HVDC transmission system, from the HVDC system to the southern AC system, and from other generators throughout the province that are not connected to the HVDC transmission system to transmission stations and load points. The AC transmission system is connected to transmission and distribution stations where power is delivered to end-use customers. Most customers receive their electricity through the distribution system, though some larger industrial loads will have their electricity delivered at a high voltage directly from the transmission system. There are also transmission interconnections that allow power exchanges with neighbouring power systems.

### 3.4.2. Distribution System

Manitoba Hydro's distribution system serves more than 633,000 customers across the province.

Many critical components of the electrical distribution system were installed during urban and rural electrical expansion that occurred between 1945 to 1960 and much of that infrastructure is still in service today.

Manitoba Hydro is continuously adding new distribution system capacity to accommodate population and economic growth. This includes constructing and upgrading distribution stations and distribution supply centres (DSC), upgrading existing distribution lines, and constructing new circuits.

**Distribution Critical Components:**

**Underground Cables: 10,000 km**

**Subsurface Utility Chambers: 2,200**

**Duct Lines: 240 km**

**Pad Mount Transformers: 23,500**

**Wood Poles: 1.1 Million**

**Overhead Conductors: 75,000**

**Stations/DSC: ~450**

## 3.5. Natural Gas Supply & Delivery

Natural gas is an essential source of energy in Manitoba. It is an economic, reliable, and safe energy solution, and a key source of firm dispatchable energy backed by long duration storage for serving Manitoba Hydro customers' energy needs. The Manitoba Hydro natural gas system consists of over 10,900 km of main and 7,500 km of service pipeline and approximately 409 pressure regulating facilities. These assets supply approximately 300,000 customers throughout 132 Manitoba communities. Manitoba Hydro connects approximately 2,400 to 3,100 new customers annually.

Manitoba Hydro's natural gas distribution system consists of several discrete systems, developed to the specific needs of the communities they serve. These systems are operated independently based on local demand and are designed to deliver peak hourly demand on a day with the highest coincident system peak conditions that the system is designed to meet under extreme weather conditions.

Most of the natural gas used in Manitoba comes from Western Canada by way of a large capacity gas pipeline system owned and operated by TransCanada PipeLines Limited (TCPL). The TCPL system is also interconnected with and provides access to the U.S. natural gas market. Access to the integrated North American natural gas market facilitates adapting to changes in Manitoba natural gas demand.

Manitoba Hydro conducts ongoing work needed to maintain safe and reliable operation, preserve regulatory compliance, and meet customers' needs. System betterment projects are performed to maintain system reliability and safety, as well as to support the continued operation of the existing system. System betterment projects include plant relocates, integrity work, capacity upgrades, measuring and regulating stations, and inline inspections. System expansion projects are driven by market demand for natural gas service.

# 4 | Customer Side-Solutions

Manitoba Hydro has been involved in energy efficiency for over 30 years. In 2019, Efficiency Manitoba assumed responsibility for delivering energy efficiency programming in the province. Manitoba Hydro continues to offer financing and loan programs for home energy upgrades, as well as curtailment programs.

## 4.1. Energy Efficiency – Efficiency Manitoba

Efficiency Manitoba is Manitoba's Crown corporation committed to reaching long-term energy savings targets by offering cost-effective programs and services to Manitobans. Their legislated mandate is to develop and support energy efficiency initiatives that will reduce provincial consumption of electricity by 1.5% and natural gas by 0.75% annually. More information can be found at Efficiency Manitoba's website.[11]

## 4.2. Manitoba Hydro Programs

### 4.2.1. Home Energy Efficiency Loan Program

The Home Energy Efficiency Loan program helps homeowners finance energy efficiency upgrades with manageable monthly payments added to their energy bill, and no down payment required.

The program covers upgrades like insulation, heat pumps, solar panels, and electric vehicle chargers. Homeowners need to work with a contractor, complete the project, and repay the loan through their energy bill. This initiative aims to make energy efficiency improvements more accessible and affordable.

More information on the home energy efficiency loan program can be found on Manitoba Hydro's website.[12]

[11] https://efficiencymb.ca/

[12] https://www.hydro.mb.ca/account/loans/home-energy-efficiency-loan/#sts=Ineligible%20homes%20and%20materials

### 4.2.2. Demand Response

Demand Response (DR) is a portfolio of programs that encourage customers to reduce or shift their electricity usage during peak demand periods, typically through incentives of various types. By adjusting consumption patterns, DR can help Manitoba Hydro balance supply and demand on the grid, enhancing reliability and reducing the need for additional power generation.

Demand response provides a flexible, cost-effective way to serve Manitoba's electricity needs during peak-time periods. DR aims to provide a dispatchable resource to enhance grid stability and reduce reliance on existing generation, transmission, and distribution infrastructure. For customers, DR can mean more control over energy use and greater bill affordability.

Aligning with Manitoba's Affordable Energy Plan, released in September 2024 by the Government of Manitoba, Manitoba Hydro is collaborating with Efficiency Manitoba to explore opt-in Demand Response programs for residential, commercial, and industrial customers. Demand Response is not a new concept in Canada; provinces across the country have implemented DR programs with measurable success. In fact, Manitoba Hydro has an existing industrial DR program called the Curtailable Rate Program (CRP). These programs have provided valuable insights into program design and participation.

### 4.2.3. Curtailable Rate Program

The CRP provides Manitoba Hydro with curtailable load as a resource to meet planning and operating reserve and energy supply requirements. The use of curtailable load reduces the risk of disruption to firm customers in the event of loss of generation or transmission and enhances system resilience and energy security. Curtailable load provides year-round reliability benefits to Manitoba Hydro as system emergencies can occur at any time. Depending on the curtailment option, Manitoba Hydro will curtail customers in response to system emergencies and to maintain operating reserves.

Manitoba Hydro is continuing to review the existing suite of options in the CRP in order to identify any other potential improvements to the Terms and Conditions or additional offerings that could provide further value to customers and Manitoba Hydro in the evolving energy landscape.