



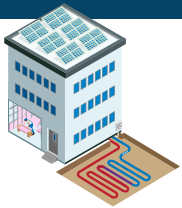
Six resource options available for development plans to 2035



Efficiency Manitoba base plan:

In Manitoba, Efficiency Manitoba is a Crown corporation tasked with providing energy efficiency programs. Their base plan is based on legislated targets and includes projected energy savings from Efficiency Manitoba's 2025–28 planning analysis extended out to 2050. Energy efficiency means using less energy to lower consumption, which reduces or delays the need for new resources. It helps lower electricity and/or natural gas usage, which is especially important during winter months when demand for electricity is at its highest.

Additional energy efficiency programs:



There are three categories included in this section:

- 1. Additional programs** - above and beyond the Base Efficiency Manitoba plan. Examples include programs for commercial ground source heat pumps, or installation of an electric furnace with thermal energy storage.
- 2. Demand Response** - is a portfolio of programs and technologies that encourage a shift in energy use away from times of high demand to times of lower demand. Manitoba Hydro is currently exploring opt-in Demand Response options in partnership with Efficiency Manitoba.
- 3. Curtailable Rate Program** - The Curtailable Rate Program (CRP) provides Manitoba Hydro with curtailable load as a resource to meet energy and reliability requirements. The CRP provides participating customers, typically large industrial companies, with a bill discount in exchange for agreeing to reduce their electricity demand when requested by the utility.



Wind generation:



Wind generation is a renewable energy resource that relies on wind to generate electricity. The force of wind rotates large blades connected to a generator, spinning the generator and producing electricity. The larger the blades and the higher the wind speeds, the more wind energy is produced. The amount of wind

varies throughout the province making some locations better suited for wind generation than others. Wind is a variable resource that cannot be solely relied upon to meet peak demand.



Utility scale battery storage (short-term):

Utility scale battery storage is a resource that uses lithium-ion technology to store energy to use when needed. Battery storage can quickly respond to electricity needs but typically has limited storage capacity—around 4 to 6 hours of electricity before needing to be recharged. Batteries can have a smaller footprint compared to other alternatives, which means they can be developed at a range of locations. In comparison to other resource options, batteries have relatively short asset lives of approximately 15 years.



Enhancements to existing hydropower:

Hydropower generation uses the flow of water down an elevation to spin a turbine and generator to produce electricity. Nearly all the electricity we produce is generated at 16 hydroelectric generating stations on the Nelson, Winnipeg, Saskatchewan, Burntwood and Laurie Rivers. Upgrades and enhancements to existing generating stations primarily result in additional capacity to help meet demand, but also provide limited energy in some cases. For example, Manitoba Hydro's Pointe du Bois Renewable Energy Project involves replacing the original generating units at the over 100-year-old station with larger generating units to restore its capacity to rated levels and increase its overall generation output. There is potential for enhancements at other stations in Manitoba Hydro's portfolio.



Natural gas/biomethane fuelled combustion turbines:

Combustion turbines (CTs) use an internal combustion engine to generate electricity. These internal combustion engines involve compressing air into a combustion chamber, where the air is mixed with a fuel source (like natural gas, hydrogen, or alternative fuels) and ignited. The ignition expands the air, which is then forced onto turbine blades, causing the turbine to rotate, which in turn rotates a shaft connected to a generator. This spinning motion generates electricity. Combustion turbines are a flexible, dispatchable resource that provides both capacity and energy when needed and are able to meet a wide variety of system needs. Combustion turbines are typically used as a backstop for other generation resources, such as complementing variable resources like wind. In Manitoba Hydro's modelling, they are most often selected with natural gas as a fuel source—but many CTs can be adapted to use alternative or emerging fuel sources should those sources become advantageous. Combustion turbines fuelled by natural gas emit greenhouse gasses only when they are operating.