MANITOBA HYDRO'S
2025 INTEGRATED RESOURCE PLAN

Mid-Project Information Sessions **Questions and Answers**

The following are responses to questions received through the mid-project information sessions held in July 2025 as part of our 2025 Integrated Resource Planning Process.

Climate Risk

How are projected climate change impacts considered in the IRP?

Climate change has the potential to impact Manitoba Hydro through its effect on the water supply used for generating hydropower and through its effect on demand for capacity and energy.

The 2023 Integrated Resource Plan included a sensitivity analysis that explored a range of potential impacts of climate change on the selection of resources, greenhouse gas emissions, and costs (See page 68 2023 IRP Appendix 5 – Analysis Results).

The 2023 IRP findings showed that climate change impacts on the load projections are expected to be modest and therefore this analysis was not repeated for the 2025 IRP.

However, the 2025 IRP will include a climate change sensitivity as it relates to water flow conditions.

Greenhouse Gas Emissions & Net-Zero

How are greenhouse gas emissions predicted to change between now and 2050? What is the status of the assumption to use direct air capture to reduce overall emissions?

The IRP considers the Government of Manitoba's Affordable Energy Plan, which targets a path to net-zero emissions for the Manitoba economy by 2050. All scenarios and sensitivities studied in the 2025 IRP were based on assumptions that resulted in a decrease in Manitoba's economy-wide emissions by 2050. Where the analysis was focused on a net-zero economy by 2050, remaining emissions are assumed to be netted to zero through negative emissions activities, of which direct air capture serves as a proxy that represents one possible option to net emissions to zero. This is done because not all of Manitoba's emissions can be reduced through different energy choices, and thus are beyond Manitoba Hydro's scope or ability to influence.

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Electric Vehicles (EVs)

How is the IRP addressing the expected growth in electric vehicle (EV) adoption and its impact on peak demand?

For each of the load projections in the IRP, we have a base set of assumptions on EV adoption rates and the associated energy use projection. We consider equipment peak and federal mandates for EV adoption, including Canada's Electric Vehicle Availability Standard. From a peak demand perspective, because the use of EVs is distributed throughout the year, there is no concentrated impact on the peak demand. See slides 34 and 35 of the Technical Advisory Committee Fall 2024 – Meeting 2 presentation for more information.

Integrated Resource Plan Engagement

Did the Round 1 residential survey track responses from rural versus urban respondents?

The residential survey included an optional question asking respondents to provide their postal code. The postal codes were mapped back to Manitoba Hydro customer service districts to better understand the distribution of survey responses throughout the province. This analysis demonstrated that survey responses were received from all service districts with the following distribution Winnipeg, 62%, South Central 13%, Eastman 14%, Parkland West 5%, and Interlake North 7%. The survey was intended to be a broad public engagement with the goal of hearing from as wide an audience as possible, and reporting of the results from the residential survey was not weighted to reflect the specific regional characteristics of our customer base.

Evaluation Metrics

This section focuses on questions related to the evaluation process within the IRP.

Does the IRP include a cost breakdown of environmental and social impacts?

Environmental and socio-economic impacts are not quantitatively considered in modelling, therefore we do not include a detailed cost breakdown. Environmental and socio-economic impacts are included in the evaluation metrics which are used during analysis of potential development plans that is done after modelling.

Imports & Exports

Is the IRP sensitive to recent trade conversations with the United States, in particular Canada's desire to connect power grids east/west across provinces?

The IRP does not go into this detail; however, it provides the planning context, including opportunities and challenges, that will support further discussions that explore trade with utilities in other jurisdictions.

Load Projections

This section focuses on questions related to the proposed load projections which were developed to evaluate a broad range of future electricity and natural gas demand up to the year 2050.

What are primary drivers of electrical load growth?

The primary drivers of electrical load growth are the assumptions around decarbonization of space heating, transportation, and other

sectors by switching to electricity fueled technologies. These assumptions align with the goal of achieving a net-zero economy by 2050.

When will the load/demand exceed the current supply?

Manitoba will need new capacity resources in 2029/30. New dependable energy resources will be needed in 2030/31.

Did the load projections consider differences between rural and urban centres?

The load projections were considered on a regional level, then incorporated into a provincial level analysis.

Reconciliation

How do you plan to address socio and economic reconciliation in the North while looking toward enhancing capacity on the Nelson River?

Reconciliation is a foundational value at Manitoba Hydro and Manitoba Hydro is committed to respecting and supporting Indigenous peoples in all aspects of our business. This includes working collaboratively with Indigenous communities to address the adverse impacts of our existing projects and operations, as well as working together and providing timely and meaningful engagement and communications on future projects as they are identified.

Resource Options

This section focuses on questions related to the resource options used by Manitoba Hydro to meet future energy needs.

How are resources that take longer than 10 years to develop being considered for selection after 2035, beyond the 10-year scope of the recommended development plan? Are there any resources that look promising after 2035?

Six resource options were identified as viable to be considered in potential development plans for the 2025 IRP. The IRP's near-term actions will likely include the need to further investigate and consider resources with development timelines longer than 10 years. These resources will be further considered in the next IRP, and it is then we will gain more information about which resources best address Manitoba's energy needs after 2035.

Does the IRP consider how the resource projects will be sited regionally?

No, decisions about project location will happen during the planning process for each individual project.

Is it preferable to overbuild, or underbuild resources?

The risk of underbuilding is greater than the risk of overbuilding. There are many steps to developing a resource that take a significant amount of time, including planning, regulatory approvals, design, procurement, and construction. It's easier to slow down the project development process than to speed it up. We heard through engagement that reliability is important to Manitobans; it is important to be a step ahead of when resources are needed to maintain system reliability.

Efficiency Manitoba Plan Projection

How are building codes that improve energy efficiency being considered in the

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IRP? And how will changes to the building code be considered into the future?

Efficiency Manitoba provided Manitoba Hydro with a long-term projection of electric and natural gas savings, based on its current Efficiency Plan Projection to achieve their legislated targets. This long-term projection considered energy efficiency from codes and standards assumed to reduce demand for electricity and natural gas, including building codes. The Efficiency Manitoba forecast of electric and natural gas savings was subtracted from the load forecasts for all scenarios considered in the IRP.

Looking into the future, the IRP roadmap will include signposts, which are external influences that we monitor for changes that may impact our energy planning. One of the signposts is government actions, which includes energy policy and standards, like changes to building codes.

Additional Energy Efficiency Programs

Who is responsible for advancing demand response programs?

The development of demand response programs is a joint effort between Manitoba Hydro and Efficiency Manitoba.

How have the impacts of demand response been modelled?

The IRP considers target energy savings that could be achieved from demand response that were provided by a third-party consultant who completed market potential studies.

If an industrial customer is interested in learning more about demand response programs, who should they contact?

If your organization has a customer service representative from Manitoba Hydro, that's the first point of contact. If you don't, please send a message to IRP@hydro.mb.ca and we'll put you in touch with the right team.

Have you modelled the 100% conversion of electrical resistance heating to geothermal/ground source heat pumps to reduce electrical load?

We analyzed the conversion of electric resistance heating to geothermal/ground source heat pumps and found it's not an economically viable choice in the near term, but may be viable in the future. It will continue to be evaluated in subsequent IRPs along with other potential resources.

Is district heating cost effective for new/greenfield communities, particularly when compared to switching from gas to electric resistance space heating?

Installing district heating in new/greenfield communities is typically more cost-effective than installing in existing (brownfield) communities with established gas infrastructure due to the costs of stranded assets and complexity of constructing around established infrastructure.

Manitoba Hydro has limited data to assess the performance, costs, and implications of installing district heating systems in brownfield versus greenfield installations. We are working with third-party consultants to better understand the implications of district heating systems and how we could support both individual and large-scale district systems in the future. This includes exploring the potential for smaller pilot

opportunities for district ground-source heat pumps, including through existing energy efficiency programs.

Utility Scale Battery Storage (Short-Term)

Can batteries improve the effectiveness and viability of solar and wind generation?

While other utilities have success using batteries to store energy so it can be used later during peak demand, it is a less viable option on the Manitoba Hydro system for a few reasons.

The first consideration is that batteries can effectively provide shorter term energy storage that can be used a few hours or days later; they cannot effectively store energy in one season to be used in a different season. When considering the Manitoba context, the energy produced in the summer, when it is most plentiful, cannot be stored for use in the winter, when it is most needed.

Another consideration is that our system is limited in how much energy storage can be added. Manitoba Hydro already benefits from significant energy storage through its water reservoirs. This existing capability influences how compatible, or beneficial battery storage is within our system. Planned improvements to large hydrogeneration stations will further reduce the capacity to effectively add battery storage. Battery storage may also compete with other peak demand reduction strategies, such as demand response and curtailable rates programs, which could limit it how much battery storage can be effectively added to our system.

There is limited effectiveness of batteries combined with wind and solar on a winter peaking system. Modelling showed that energy is most needed in the winter during cold snaps and peak demand. Solar energy generation is lower during these times. For wind energy, there can be multiday periods with not enough wind to recharge the batteries. Batteries are most effective when providing a few hours of energy storage to be used a few hours or days later; and the potential reductions in energy production mentioned above impact the ability to charge batteries.

Enhancements to Existing Hydropower

What enhancements to existing hydrogeneration are being considered?

A detailed summary of the options for enhancing existing hydrogeneration stations will be included in the IRP. Potential enhancements that have been identified include the replacement of outdated generating units at Pointe du Bois Generating Station and the uprating of existing generating units along the lower Nelson River, namely the Long Spruce and Kettle Generating Stations.

Combustion Turbines

How much greenhouse gas emissions do you estimate being released from operation of natural gas fuelled combustion turbines?

Greenhouse gas emissions from the operation of natural gas combustion turbines will depend on specifications of the turbines that are installed and will vary

from year to year depending on when and how often peak demand conditions occur. At this time, we estimate that, on average, 20,000 to 40,000 tonnes of CO^2e will be released per year, which is not much more than we are currently releasing. Beyond 2035, all combustion turbines GHG emissions are assumed to be netted to zero.

What are the potential regulatory risks associated with natural gas fuelled combustion turbines?

Natural gas fuelled combustion turbines will be operated on an as needed basis, during times of peak demand as a dispatchable capacity resource, which is within the requirements of current Clean Electricity Regulations. There is little regulatory risk associated with natural gas fuelled combustion turbines.

How is biomethane/renewable natural gas (RNG) considered in the IRP?

Biomethane, also known as renewable natural gas, is an alternative fuel that can be burned in combustion turbines instead of conventional natural gas. We consider a wide range of biomethane fuel sources, including from producers in Manitoba, however there is currently insufficient local supply to fuel a large generating unit. We do not assume that 100% RNG would be burned directly in a combustion turbine because that would require a separate transmission and storage system. Instead, we assume RNG will be blended in the existing natural gas distribution system and the environmental benefits will be accounted for with credits.

How are hydrogen combustion turbines considered in the IRP, including the potential of Manitoba Hydro producing hydrogen?

While turbines that are 100% fuelled by hydrogen are currently not available in the market for purchase, the IRP analysis considered the concept of hydrogen combustion turbines operating solely on hydrogen fuel with an in-service date after 2035. The concept includes generating hydrogen using electricity during times of surplus, which is then stored and used later in times of peak demand.

Solar

Can solar energy generated during low flow/drought conditions reduce demand on large hydrogeneration and support recharge of the reservoirs?

Having resources other than hydrogeneration, like solar, producing energy when we are experiencing low flow or drought conditions can be valuable; however, we must also consider that we will not always be experiencing low flow conditions. During high flow conditions, these other sources of energy would be in surplus which could lead to curtailing (turning off the generators) or exporting the energy produced on the spot market. Exported energy on the spot market is of less value than energy used in Manitoba, so we must consider the return on investment of all resources and how the energy produced is used.

How is energy produced by private residential and commercial, behind the meter solar installations considered in the IRP?

The energy generated by private, behind the meter solar is considered in Efficiency Manitoba's forecast of electric savings, which are then subtracted from Manitoba Hydro's load projections used in the IRP analysis.

Small Modular Nuclear Reactors

How do you consider the regulatory environment when considering small modular nuclear reactors?

There are no operational small modular nuclear reactors in Canada, so there is significant uncertainty about the regulatory environment and what will be required to get the necessary approvals to build and operate this resource type. This uncertainty translates to an assumed development timeline that is greater than 10 years.

Changes in the regulatory environment for small modular nuclear reactors will continue to be monitored as part of the IRP's signposts.

Biomass Fuelled Steam Turbine with Carbon Capture

How is biomass generation with carbon capture and storage (BECCS), and the associated carbon credits, considered in the IRP?

Bioenergy with carbon capture and storage was considered in the modelling with an earliest in-service date of 2035. It was not deemed a feasible resource to be included in the 10-year recommended development plan, but it will continue to be considered as part of the near-term actions and in the next IRP. Carbon credits from the operation of BECCS can offset emissions from natural gas combustion turbines and support a net-zero grid.

Transmission And Distribution

How are upgrades to the transmission and distribution system considered in the IRP?

The IRP process focuses on demand growth and the required resources to serve it. It assumes that the transmission and distribution system is maintained and expanded to serve the actions in the recommended development plan. Required maintenance and expansion of the transmission and distribution system is accomplished through existing processes outside of the IRP.

Links

- 2023 IRP Appendix 5 – Analysis Results (climate risk – page 68): https://www.hydro.mb.ca/docs/corporate/irp/irp-2023-a5-analysis-results.pdf#page=68
- Slides 34 and 35 of the Technical Advisory Committee Fall 2024 – Meeting 2 presentation: https://www.hydro.mb.ca/docs/corporate/irp/2025-irp-tac-meeting-2-deck-for-web-v0525.pdf#page=34
- Six resource options: https://www.hydro.mb.ca/docs/corporate/irp/6-irp-resource-options-v0725.pdf