

Manitoba Hydro's Integrated Resource Plan

Round 3 What We Heard



In fall 2022, we shared our initial modelling results and asked for feedback on what other analysis may be needed as part of the 2023 Integrated Resource Plan (IRP). Here is what we heard and how we used it.

Suggestions for Additional Sensitivity Analysis

We conducted five workshop sessions with interested parties where we shared the initial modelling results for the four IRP scenarios and select sensitivities.

Throughout the session, participants were given opportunities to ask questions and provide feedback. During the modelling sensitivities section, participants were encouraged to suggest additional sensitivity analysis that the IRP modelling should consider. Below is a summary of the sensitivities suggested, and how we are incorporating them in the IRP modelling and analysis.

Customer self-generation – Different sensitivities were suggested for greater uptake of customer self-generation through solar generation.

- **Action Taken:** We will include a sensitivity for a greater uptake of customer self-generation. The IRP model already assumes specific levels of customer self-generation for each IRP scenario. For a sensitivity analysis, we will assume that customer self-generation will double from the scenario 4 assumptions. This provides an efficient way to assess the impacts of increased solar generation on the initial modelling results.

Demand Side Management (DSM), fully selectable –

A sensitivity was suggested to remove all assumptions around Efficiency Manitoba programming and allow the model to optimize to the maximum possible amount of DSM.

- **Action Taken:** A sensitivity will be included to allow the model to optimize the amount of DSM selected, against other resources.

Demand response – Several suggested sensitivities were to consider demand response in the model. It was suggested demand response could have a significant positive impact on peak demand, particularly for large customers that may have flexibility in their electricity usage (i.e., running in off-peak). It was also suggested that any demand response analysis would need to take into account neighbouring Mid-continent Independent System Operator (MISO) profiles.

- **Action Taken:** We will include a sensitivity analysis on demand response to investigate the potential impacts to the initial modelling results. Modelling of the MISO system is complex and out of scope of this IRP analysis.

Dual fuel – It was suggested that further analysis was needed to adjust the assumed -10C temperature of when a dual fuel system cut-over from the air source heat pump to natural gas space heating, given there

are air source heat pumps currently available with lower temperature cut over points.

- **Action Taken:** We have added the sensitivity of -20C cut over temperature to our modelling analysis. This sensitivity will help us understand potential benefits for Manitoba's cold climate with a lower cut over temperature.

Fully renewable energy – A sensitivity was suggested where only non-emitting generation would be allowed and no natural gas could be used for space heating.

- **Action Taken:** A sensitivity will be included to constrain the model from picking any emitting thermal generation, as well as restricting the use of natural gas for space heating.

Ground source heat pumps – There were several suggestions to consider further modelling of ground source heat pumps. This included significant adoption of this technology, as well district heating via ground source heat pumps. A district heating system provides heat generation from a central location to a network of connected buildings and homes through a grid of insulated pipelines. Benefits cited included reducing Greenhouse Gas (GHG) emissions, without the significant increase in electricity demand and corresponding capacity impacts as seen in scenario 4 initial modelling results.

- **Action Taken:** We added a sensitivity analysis to better understand the potential of ground source heat pumps in this IRP. Using Efficiency Manitoba's market potential studies, we will investigate a sensitivity which looks at achieving the maximum market potential of ground source heat pumps. At this time, we do not yet have the proper data to accurately model district geothermal heating, so this analysis will be deferred to future planning.

Hydrogen production for vehicle use – Another sensitivity suggested for consideration is to increase the production of hydrogen to account for vehicles that will not be easily electrified, such as heavy-duty

vehicles, aviation, and rail. It was suggested the high-level assumption in the IRP that electricity assumed to charge EVs that may otherwise be fueled by hydrogen was not adequate.

- **Action Taken:** Further work is needed to understand the potential of the hydrogen economy in the future. Future planning will work to better understand this topic and its potential in Manitoba.

Import/exports – It was suggested that there may be material changes for future import and export prices, so sensitivity analysis around those assumptions would be needed to understand the impact to the initial modelling results.

- **Action Taken:** We have added sensitivity analysis around future market price changes of energy.

Industrial fuel switching – It was suggested that sensitivities include large industrial customers switching from natural gas to electric energy, not because of economics but because of other drivers like environmental, social responsibility and governance (ESG) goals.

- **Action Taken:** The IRP conducted research with many of Manitoba Hydro's large energy users to understand where their future energy choices may result in future fuel switching. Results of this research is included in the IRP model. The model also has assumptions on other industrial fuel switching. Research with customers will continue to support future energy planning.

Infrastructure cost – It was suggested the IRP should consider infrastructure cost sensitivities, especially considering possible new technologies impacting the overall general power market.

- **Action Taken:** We will include sensitivities analysis related to different technology costs. Emerging technology has less certain costs at this time, so analysis will focus on resource costs that have come to the forefront through the initial modelling results, such as wind, solar, and hydrogeneration.

More aggressive building codes – It was suggested sensitivities should be examining ways to reduce energy demand by adopting stricter codes for new and existing buildings.

- **Action Taken:** The IRP modelling and analysis looked at various changes in energy use, which could be accomplished through policy or codes and standards. Investigation of potential building code changes is outside the scope of the IRP.

Storage – Other sensitivities suggested for consideration were for greater battery storage capabilities. One was vehicle-to-grid as a storage method, where during peak demand, energy stored in EV batteries would flow into the grid. Other energy storage technologies, such as home battery systems, were also suggested.

- **Action Taken:** We need further data to properly investigate this proposed sensitivity. The model does include battery systems as a selectable resource, but the current costs make them less of an economic choice as compared to other resources. The proposed sensitivity will be deferred to future planning.

Time varying rates for heavy duty EV charging – Given the impact that heavy duty charging could have on the grid, a sensitivity with time varying rates should be explored to encourage this large charging load to be at a specific time of day.

- **Action Taken:** Analysis of different rate structures is out of scope for this IRP. Sensitivities around demand response in this IRP can inform on the potential value of shifting load, which will be further evaluated in future planning.

Total Customer Costs – A suggested sensitivity was for the model to include the cost implication on rates and the direct costs to customer of making upgrades (e.g., heat pumps) based on the initial modelling results.

- **Action Taken:** Understanding impact to rates and costs incurred by customers is a complex analysis

that needs to happen outside of the IRP modelling process. At this time, we need further data to do the proposed analysis properly, so it will be deferred to future planning.

Western Canadian grid – This new interconnection was mentioned as a sensitivity to help western provinces support non-coincident peak demand and offset some of the resource outputs in the initial modelling results that are needed only to address peak demand.

- **Action Taken:** Incorporating analysis to understand the impacts of a western Canadian grid is complex and outside the scope of this IRP. Future planning may consider expanding to include this analysis.

What was Shared and Discussed

As part of our conversations in Round 3, we shared information on the modelling process used in the IRP. We also shared initial modelling results for both the four IRP scenarios and select sensitivities.

The material presented was complex. We received requests for additional details and clarification. While we did respond to these in the sessions, we summarized all of the questions and answers into the [Round 3 Q&A document](#). As well, we've compiled a more detailed summary of the [Key Input Assumptions](#) for the modelling process.

Modelling Process

Details about the IRP modelling process were shared to help inform on how we do our long-term energy planning and some of what needs to be considered within that process. A better understanding of this process would help understand the initial results that are outputs of the modelling process.

What was shared:

- Background on the current use of energy in the province
- Key terminology

- Explanation of Manitoba Hydro's planning criteria
- Available supply resources and their characteristics

Most questions asked were to: clarify the information provided, better understand assumptions, and better understand the details presented. Links above to the [Round 3 Q&A](#) and the [Key Input Assumptions](#) document summarize and address the questions raised about the modelling process.

Initial Modelling Results – Four IRP Scenarios & Sensitivities

The initial modelling results were shared for the four IRP scenarios previously discussed during Round 2 of the IRP engagement. Initial modelling results of select sensitivities were also shared; these sensitivities were selected as they centered around costs and GHG emissions – key themes of feedback from previous rounds of our engagement.

What was shared – initial results showing:

- Electric energy and peak demand
- Electric peak demand impacts
- Natural gas usage
- Energy and capacity supply mix
- Provincial energy related emissions, including broken down by emission type
- Net system portfolio costs
- Comparison between annual cost, unit cost, capacity, and energy
- Comparison between annual net system cost and emissions
- Energy and capacity supply need
- Initial modelling results summary

Many participants asked for clarification on how the model handles various components and what assumptions were made in the model. Additional questions were asked about assumptions of the key inputs and other inputs that may have driven the initial modeling results. There were questions and discussion on why certain resources were selected or not selected by the model.

Links above to the [Round 3 Q&A](#) and the [Key Input Assumptions](#) document summarize and address the questions raised about the initial modelling results.