2025 Integrated Resource Plan

Round 1 Engagement

Fall 2024

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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, Cree, Anishininew, Dakota, and Dene peoples and the homeland of the Red River Métis.

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.

Agenda

Purpose:
Understand what matters to you as we plan for Manitoba's energy future.

Topics:

1. Introduction
2. Share and seek feedback on the 2025 IRP key inputs and scenarios
3. Share and seek feedback on the 2025 IRP evaluation metrics
4. Next steps

What is an Integrated Resource Plan?

- A utility best practice used across North America to understand and prepare for future energy needs.
- A repeatable process that plans for long-term needs and will be updated as future conditions evolve.
- One output of the ongoing planning cycle at Manitoba Hydro.
- Includes engagement to incorporate feedback from customers and interested parties.

An IRP is a utility best practice. If you google, Integrated Resource Plan, you will find many examples from utilities across North America. Every IRP is unique to a utility's needs or legislative requirements, but they do have some comment elements. An IRP typically has a long-term outlook, usually 20 years out; however, looking out to 2050 is becoming more common at present due to net zero policies. An IRP examines customers' future needs and aims to answer how those needs might be met. An IRP is a repeatable process; typically repeated about every 2 to 3 years. And, a key component of developing an IRP is engagement – bringing customers and interested parties along in the journey to develop the IRP. A IRP usually results in a road map – often with specific actions or commitments that the utility makes to ensure future customer needs are met.

The 2023 Integrated Resource Plan

- Primary objective was to plan for safe, reliable energy that meets the evolving needs of Manitobans at the lowest cost possible.
- Studied how the energy transition could impact our natural gas and electricity systems including generation, transmission and distribution.
- Resulted in a road map that included signposts and near-term actions
- Notable learnings from the 2023 IRP:
  - The energy transition is already underway in Manitoba
  - Investment is required in all scenarios
  - Natural gas will play a role in getting to a low carbon future

2025 IRP Round 1 Engagement 5

Manitoba Hydro has been planning for decades; however, the 2023 IRP was our first Integrated Resource Plan. This provided an opportunity to establish an IRP process in Manitoba and include customers and interested parties in the energy planning process. The 2023 IRP took over 2 years to develop and in 2021, the concept of the energy transition was still forming, and there was question of if or when the transition would come to Manitoba. Through engagement and analysis, we confirmed that the energy transition is already happening in Manitoba. The 2023 IRP focused on answering what the future could look like and what we should do now to be prepared for the future.

Why we need the 2025 IRP now

We need a development plan approved as soon as possible

- We need new resources as early as 2029/30.
- The Manitoba Hydro Act requires Manitoba Hydro to recommend a development plan for approval, prepared as part of an Integrated Resource Plan that is informed by engagement.

What is a development plan?

It outlines the steps Manitoba Hydro will take to meet future energy needs.

It may include building new energy sources, infrastructure, and programs to manage energy use during peak demand.

Energy planning is ongoing at Manitoba Hydro and since the 2023 IRP, we have already seen changes in the energy landscape. Updated analysis shows that new capacity supply could be needed as early as fiscal year 2029/30 and new dependable energy could be needed in 2031/32. It takes time to implement supply solutions and the pathway to approving and implementing those solutions is through an approved development plan. Therefore, the 2025 IRP is required now and will result in a recommended development plan.

The 2025 Integrated Resource Plan will…

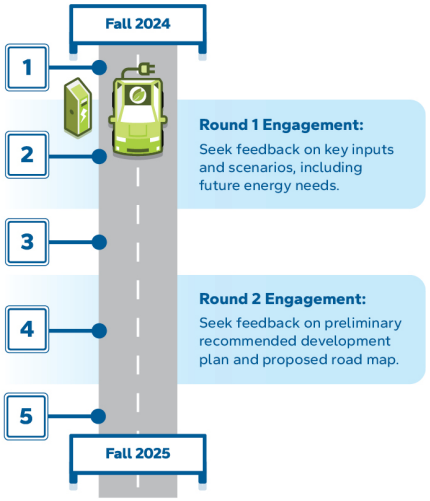
- Result in a road map that will include a recommended development plan of ~10 years.
- Include analysis that extends to 2050.
- Include all energy infrastructure, non-MH owned assets, and investments to defer need for new infrastructure.
- Consider policy from all levels of government, such as federal, provincial, and municipal.

The recommended development plan for the 2025 IRP is intended to capture investment decisions required now. As you will see later in our key inputs discussion today, there is a significant increase in uncertainty after approximately 10 years into the future, from today. Given that decisions must be made now to ensure capacity and energy needs are met in the late 2020s and early 2030s, the recommended development plan for the 2025 IRP will focus on approximately the next 10 years. Analysis for the IRP, however, will go to 2050 so that we can still identify if there are actions to be taken now to prepare for the long-term future, including 15, 20 and 25 years into the future.

As an integrated utility with both electricity and natural gas systems, Manitoba Hydro will undertake an integrated resource plan that includes both our electric and gas systems including all energy infrastructure including, generation, transmission, distribution and non-wires solutions such as energy efficiency. And as always, this IRP will consider existing and highly anticipated energy-related policy from municipal, federal, and our provincial governments.

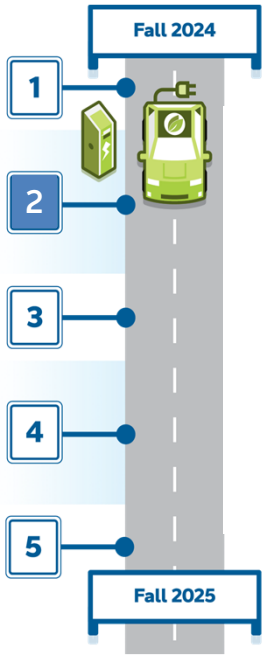
2025 IRP process overview

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



The development process for the 2025 IRP consists of five steps. Setting direction was completed in advance of today and resulted in this process you see here. We also determined what the outputs of the 2025 IRP will be – a 10-year development plan, and a longer-term road map based on analysis out to 2050. We are now in the second development step, and today you will see proposed key inputs and scenarios that we are seeking your feedback on. We will also be seeking your feedback on our proposed analysis approach and evaluation metrics so that after this round of engagement, we can complete the third step, modelling and analysis. We will then prepare a preliminary recommendation. In Round 2 Engagement, planned for Spring 2025, we will be seeking your feedback on a draft recommended development plan and alternative development plans. Over Summer 2025 we will be reviewing the feedback from Round 2 engagement and preparing the final Integrated Resource Plan report and engagement report, which we anticipate will be published in Fall 2025. This concludes an introduction to the 2025 IRP.

Step 2. Develop Key Inputs and Scenarios



9

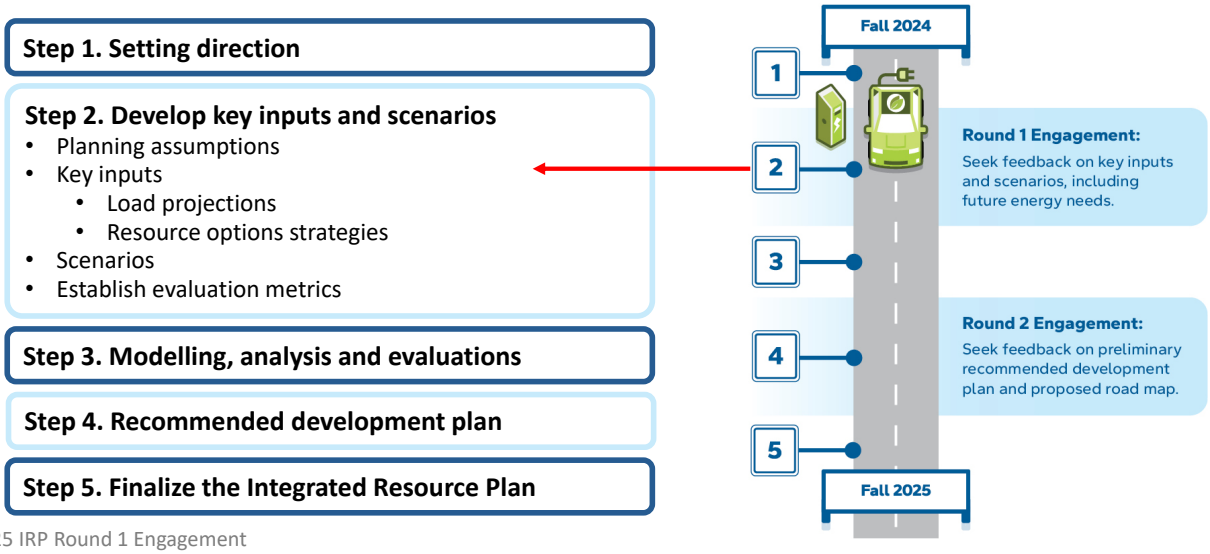
As mentioned, we are now in our second step in our process, develop key inputs and scenarios.

We will spend the rest of this session discussion this step, where there is a significant amount of work done to prepare for the 2025 IRP analysis, which is done is step 3.

We will now introduce what is included in this step.

Step 2. Develop key inputs and scenarios

What is included in this step of the 2025 IRP development process



2025 IRP Round 1 Engagement 10

Step 2 really sets the foundation for the IRP. The work completed in this step will be carried throughout the 2025 IRP analysis – it will directly impact the recommended development plan that will be created as part of this IRP. This is why it is so important to speak to you now, so your feedback can be incorporated.

To quickly set the stage of what we will be discussing, we will give you an overview of everything that is done in Step 2.

We first start with establishing our planning assumptions. We gather information and data from a wide variety of sources to inform the planning assumptions. Planning assumptions are the basis for which the key inputs are established.

For the 2025 IRP, the key inputs include the load projections and resource options strategies.

Resource options strategies are something new proposed for the 2025 IRP and we will discuss these further.

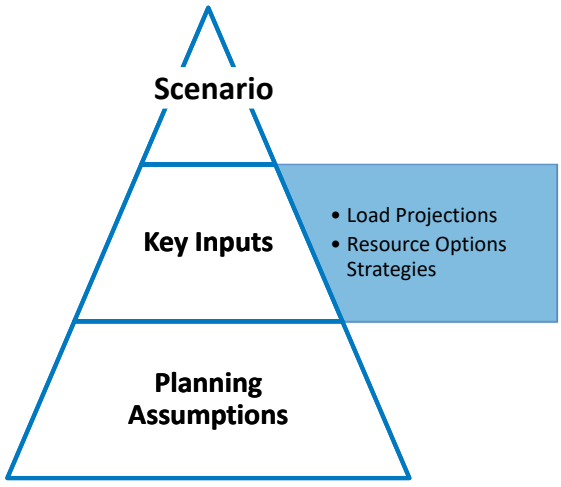
Scenarios are established to reflect various energy futures.

Also in Step 2, we prepare for our evaluations that will be done in Step 3 (modelling, analysis and evaluations). We establish what the evaluation metrics will be, so we can make sure the modelling and analysis is designed to output the necessary information.

Developing key inputs and scenarios

Underpinned by planning assumptions

- The **planning assumptions** underpin the key inputs.
- **Key inputs** for the 2025 IRP include:
  - **Load projections**
  - **Resource options strategies**
- A **load projection** and a **resource option strategy** are combined to create an energy future **scenario**.



2025 IRP Round 1 Engagement 11

We mentioned a few terms on the last slide: planning assumptions, key inputs, and scenarios.

There is a specific relationship between these items and it starts with the planning assumptions.

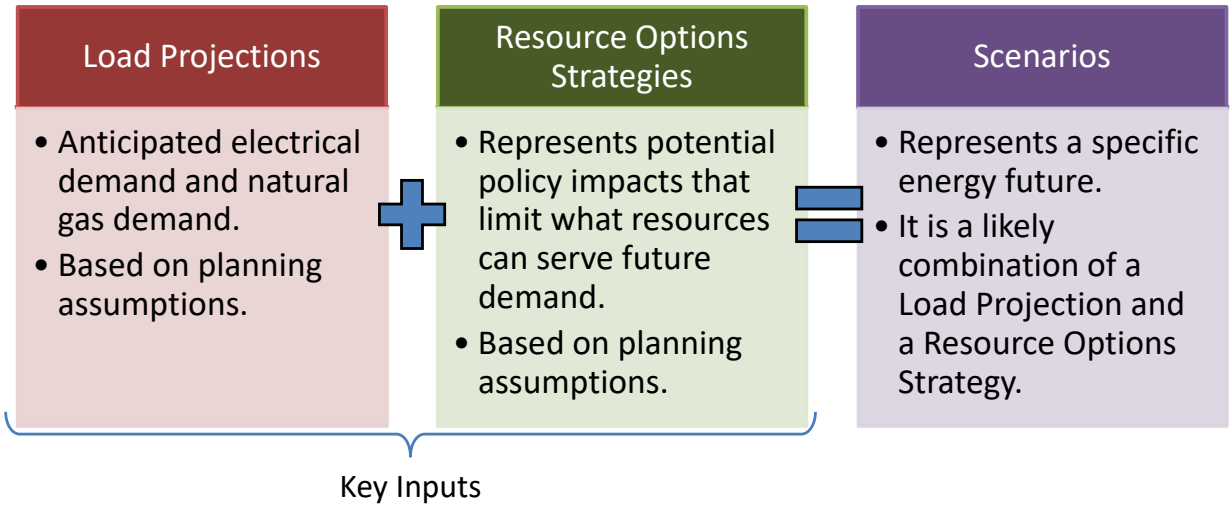
The planning assumptions underpin the development of the key inputs and the scenarios. Planning assumptions are set to represent many different things, like how fast EV uptake will be in Manitoba, or what building codes are assumed, or what will be the price of imports in the future. As we speak to the key inputs and scenarios further, we will share some of the planning assumptions that are proposed.

For the 2025 IRP, the key inputs will include the load projections (for both electricity and natural gas) and the resource options strategies. These are key inputs into the 2025 IRP because they have significant uncertainty and how they are set will impact the analysis.

When we combine a load projection with a resource option strategy, we end up with a scenario.

As we move up the hierarchy from the planning assumption to the scenarios, we move from individual assumptions into the representation of a specific energy future.

Key inputs and scenarios



Another way to visualize the key inputs and scenarios is shown on this slide.

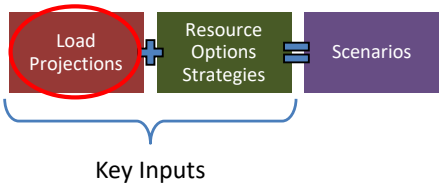
Load projections are the electric and natural gas demand in the IRP analysis. The planning assumptions underpinning the load projections are those that will influence energy use.

For the resource options strategies, the planning assumptions are those that will influence how energy is served, and we know form past work, that this is often done through policy. So for the 2025 IRP, the resource options strategies were brought in to represent potential policy that influences what resources are available to serve future demand.

Scenarios represent a specific energy future. By combining a load projection and a resource options strategy, we have full representation of a specific energy future based on the combined planning assumptions.

Load Projections

Key Inputs



We will be walking through the development process of the Load Projections, which is the first key input in the development of scenarios that will be evaluated as part of our 2025 Integrated Resource Plan.

Load projections

Overview

- Load projections show the energy demand Manitoba Hydro might be required to serve.
- Planning assumptions are common between electricity and natural gas.
- The net-zero economy by 2050 future is uncertain and could result in a range of electricity and natural gas demand that needs to be served by Manitoba Hydro.
- Three proposed load projections:

Load Project	Assumes…
1 - Baseline	Minimal changes from current policies and customer decisions.
2 - Medium	Moderate impact from government actions and customer decisions.
3 - High	Significant impact from government actions and customer decisions.

Load projections are the energy demand that Manitoba Hydro **might be required to serve** for both electricity and natural gas.

Planning Assumptions **that underpin each load projection** ensure they **are common across both electric and natural gas** (i.e. customer choosing to electrify a natural gas process would see an increase in electric consumption and a decrease in natural gas usage.)

A net zero economy brings into consideration **greenhouse gas emissions** and the concept of **net-zero economy by 2050 is becoming more prevalent for Manitobans**

- Included in Manitoba Hydro's mandate
- Introduced in Manitoba's Affordable Energy Plan
- Within Federal policy

There is **significant uncertainty about how Manitobans** achieve a net-zero economy by 2050 and different customer actions (whether its residential, commercial or industrial) may affect the amount and pace of change to both the electric and natural gas consumption.

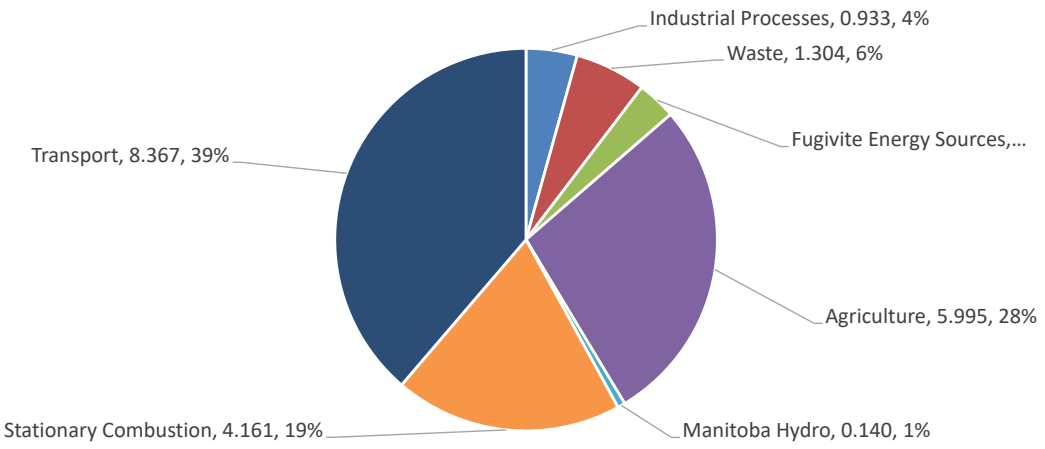
It is important as part of the 2025 IRP to **evaluate a broad range of potential load projections** for electricity and natural gas required to be served by Manitoba Hydro.

Manitoba Hydro are **proposing 3 load projections** recognizing different combinations of policy actions and customer decisions which will drive different electrical and natural gas

energy demand.

Manitoba Greenhouse Gas Emissions

Average Manitoban GHG Emissions Between 2018 - 2022 (21.6 Mt per year)



2025 IRP Round 1 Engagement

Further descriptions of the categories and subcategories found in Table A9-1 in the NIR Part 3
https://publications.gc.ca/collections/collection_2024/eccc/En81-4-2022-3-eng.pdf

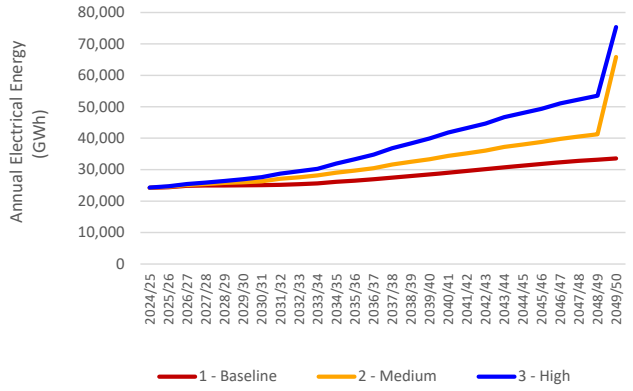
15

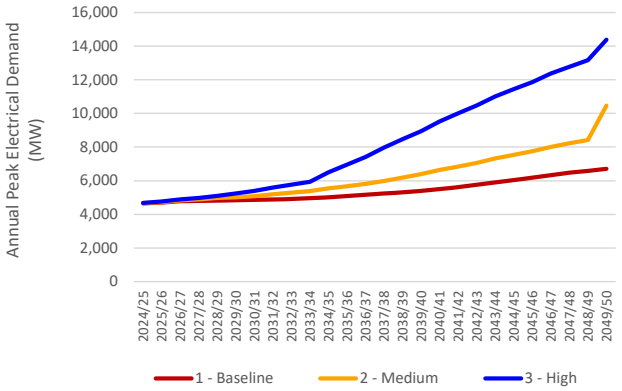
As we further discuss about a net zero economy, we thought it would be important to understand the greenhouse gas emissions in Manitoba. While this is a very brief overview of the emissions in Manitoba, We currently have just under 22 Megatonnes of carbon emission in Manitoba and the pie chart shows the breakdown of emissions which is led by the transportation sector, agriculture and stationary combustion (mostly identified as burning fossil fuel for heating).

Ultimately moving forward towards a net zero economy will be looking to remove as many of these emissions such that we can attempt to **reduce the negative emission technology, like direct air carbon capture** required to offset any remaining emissions by 2050.

Proposed load projections

Electric energy and demand (net of Efficiency Manitoba Plan)





2025 IRP Round 1 Engagement 16

This slide provides the preliminary estimates for each of the three load projections which are each based on a theme in the planning assumptions.

The **Baseline load projection** depicted in red assumes lower economic growth and that there is little change from what Manitobans are currently doing today, where customers continue to select the most economic decisions when it comes to their energy needs.

The **High load projection** depicted in blue represents accelerated actions towards a net-zero economy and assumes that much of the electric demand will need to be served by Manitoba Hydro

- This will include planning assumptions that skew toward electrification as a means of decarbonization
- Includes policy assumptions to phase out natural gas leveraging an approach to electrify as existing systems reach end of life
- As shown on the energy and demand charts, Load Projection 3 includes assumptions on carbon capture technology to offset any remaining emissions by 2050.
- Conversely the higher focus on electrification leads to the largest reduction from the natural gas system

The **Medium load projection,** depicted in yellow assumes actions towards a net-zero economy by 2050 and recognizes this demand is not fully served by Manitoba Hydro

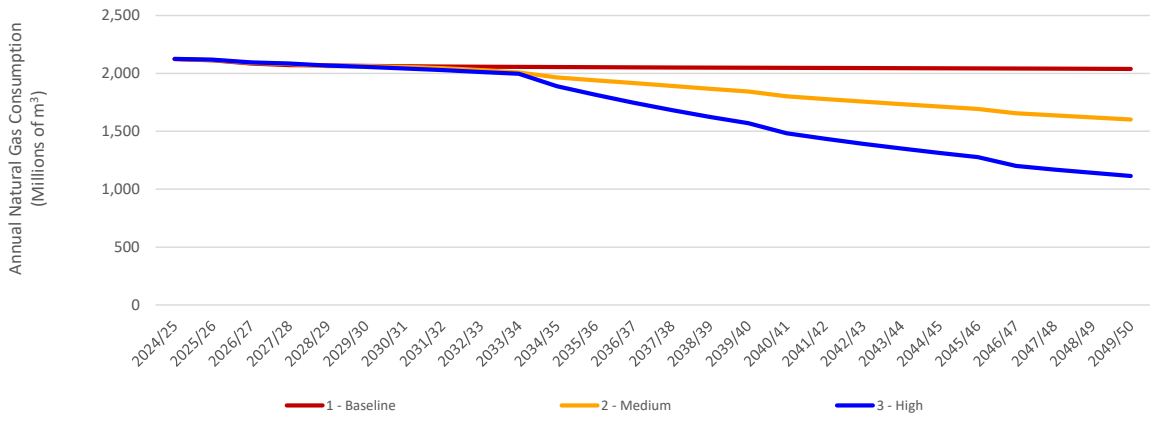
- This will include decisions on planning assumptions where alternative to full electrification are

explored, such as self-generation, dual fuel heating and carbon capture technology etc.

- Recognizing lower electrification, we'll see the corresponding natural gas volume being higher than Load Projection 3 that will be displayed on the next slide

Proposed load projections

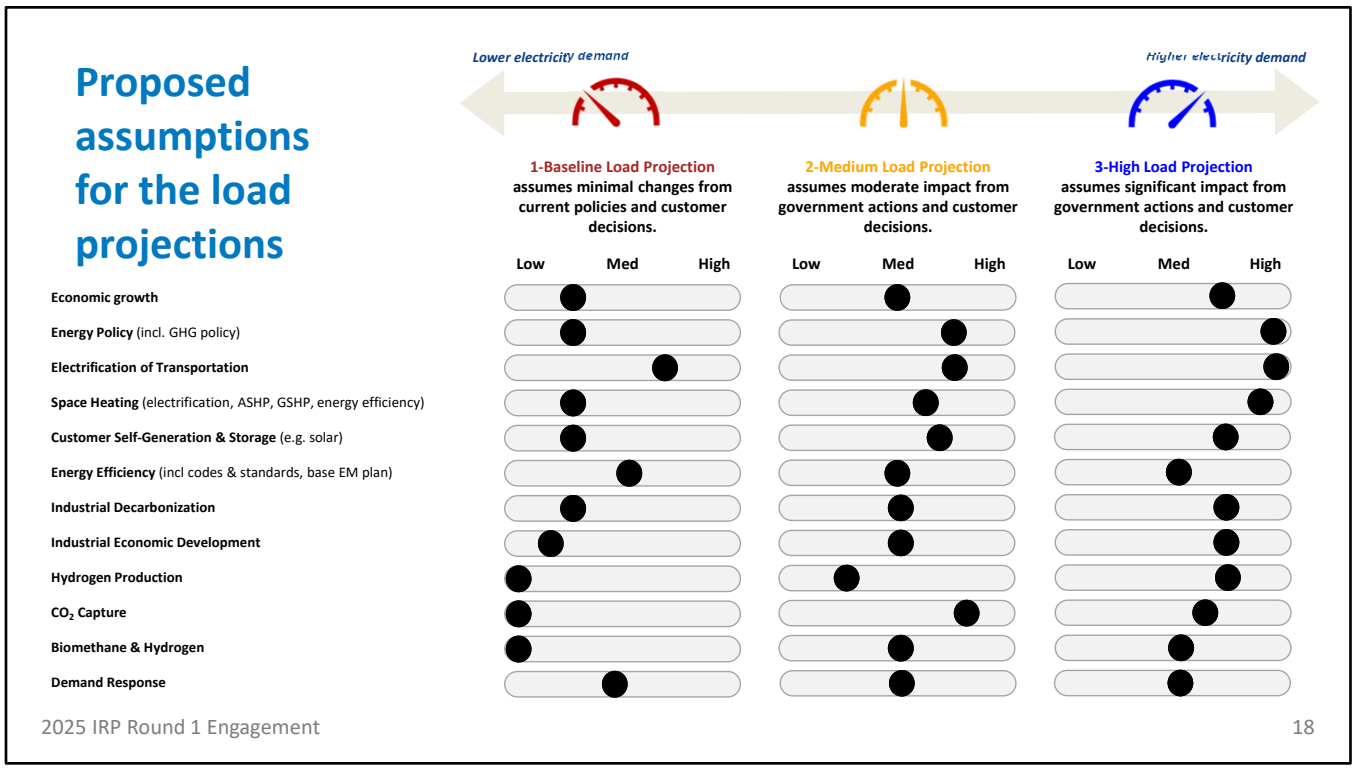
Natural gas (net of Efficiency Manitoba Plan)



2025 IRP Round 1 Engagement 17

This chart displays the natural gas volumes associated with each of the three electric load projections depicted on the previous slide highlighting the importance of natural gas across all three load projections prepared.

It is important to note that a net-zero 2050 in Manitoba may **still** result greenhouse gas emissions within Manitoba and **assume that are negative emission technologies** in place to offset the emissions like a **Direct Air Carbon Capture system** as highlighted in Load Projection 3 shown on the previous slide.



Included in this slide are the planning assumptions with the greatest potential impact in each of the load projections. To familiarize yourself with the slide, you will notice the three load projections across the top, along with the key planning assumptions on the left-hand side.

This slide is illustrating the range of decisions for each of the different planning assumptions across each of the load projections. A few key points to identify:

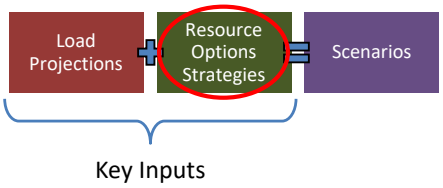
- There are numerous assumptions that are included
- Some have greater level of uncertainty
- All the inputs are independent, though there are some correlations → energy policy and electrification of transportation as an example

It is important as part of the process of re-examining the assumptions → the decisions made here have big influence on the outcomes of the IRP

As we leave this slide, please recognize that the amount and pace of change in the energy landscape is very difficult to predict. The purpose of the three load projections is to develop a broad range of potential energy futures recognizing that the future that will unfold may end up weaving through all three of the potential load projections and while we do create each load projection with a set of assumptions, we do recognize that some of these assumptions can easily offset each other and end up producing the same line you saw on the electric and natural gas charts in the previous slides.

Resource Options Strategies

Key Inputs



The second key input to the 2025 IRP is the resource options strategies.

The load projections reflect planning assumptions that influence potential energy demand.

The resource options strategies reflect planning assumptions that influence resources that are available to meet energy demand.

Resource options strategies

Overview

- Resource options strategies reflect the potential ways Manitoba Hydro may be required to meet electricity and natural gas demand.
- Policy is a key driver that influences what resources may be allowed to serve energy needs.
- The strategies are based on the full inventory of resource options available to meet future energy needs in Manitoba.
- The different strategies reflect a range of potential policies that could influence the resource options.

As noted before, it is policy is the likely the avenue to influence resources available to serve demand and we build in assumptions on policy into the resource options strategies.

We start our modelling and analysis with a full inventory of available resources, and then assume various potential policies that would narrow down that list.

In this way, we make sure that the analysis and its outputs can be robust to a range of future potential policies.

Proposed resource options strategies

Four proposed strategies and their assumptions

Resource Options Strategies		Assumptions
A	Technology Neutral	Compliant with federal Clean Electricity Regulations.
B	Net-Zero Grid 2035	Strategy A, plus requirement that electricity grid is net-zero by 2035.
C	Near Term Wind Generation Projects	Strategy B, plus up to 600 MW of Indigenous majority owned wind with dispatchable resources for reliability.
D	No Fuel-Based Resources	Strategy B, plus requirement of no fuel-based combustion turbines post 2035 (i.e. no natural gas, hydrogen, biomethane, or biomass generation).

For the 2025 IRP, there are four proposed resource options strategies. As just noted, we start with a full inventory of resource options and then as we move down this table, we are narrowing what resources options are available for the modelling and analysis.

- Strategy A (Technology Neutral) is our starting point and reflects current policy. It is compliant with the draft federal Clean Electricity Regulations. This means that the operation of any emitting resource will be compliant with the drafted emission limits. As drafted, the draft Clean Electricity Regulations will have minimal impact on how Manitoba Hydro operates our system.
- Strategy B (net-zero grid 2035) builds on Strategy A to include an additional requirement to ensure the grid is net-zero by 2035. This reflects the Manitoba Hydro mandate letter from 2023. Net-zero grid means that generation emissions are allowed, but these emissions must be balanced by removing the same amount from the air through other means (such as RNG offsets, credits, etc.).
- Strategy C (near term wind generation projects) builds on Strategy B, to ensure wind generation is in alignment with Manitoba's Affordable Energy Plan. There is also a need to ensure dispatchable resources are in place to ensure the reliability of our current electricity system along with any other resources that are added – the exact dispatchable resource will be identified through the modelling and analysis.
- Strategy D (no fuel-based resources) also builds on Strategy B, but increases the

influence of the restriction by not allowing any fuel based combustion.

Resource options strategies

Examples common planning assumptions

Electricity and natural gas system characteristics
- System hydrologic inflows
- Current power generation supply mix
- Interconnections with neighbouring markets

Modelling and analysis parameters
- Transmission planning criteria
- Generation planning criteria for dependable energy and capacity
- Fuel availability and cost (e.g. natural gas, biomethane)
- Demand driven natural gas and electric delivery system costs
- Firm export contracts are not renewed
- Demand side resources (e.g. Efficiency Manitoba plan, demand response)

Resource options inventory

The policy influences on the previous slide are the planning assumptions that change between the resource options strategies.

There are also many other planning assumptions that do not change, or are common between the resource options strategies.

On example is the representation of our electricity and natural gas systems. There are many different characteristics that are included in the modelling and analysis, including what water inflows are assumed, current generation resources on the system, and how we are connected to our neighbours (like Saskatchewan and the United States).

The modelling parameters reflect key assumptions that are built into the model. The transmission and generation planning criteria are fundamental criteria that we need to meet. These ensure that planning results in the reliability of our systems in all conditions. There are also assumptions set on how much fuel is available and its costs. How we reflect our current export contracts is another parameter – in the case of the 2025 IRP, we are assuming that existing firm contracts are not renewed when they expire, so that energy can be used for Manitoba needs. There is still assumed to be opportunities to continue interactions with short-term markets as operating conditions allow.

The last example of the common planning assumptions is the resource options inventory. Let’s go to the next slide to explore the inventory further.

Resource options inventory

A common planning assumption

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.

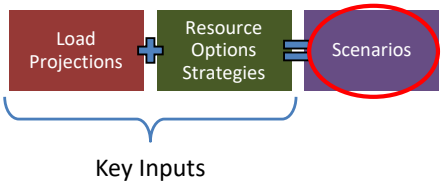
This slide shows the resources options inventory and some of the more common resource options. These are resources that we know to be high potential solutions to serve load.

Each resource option has specific characteristics that that together, reflect the resource options' capability to potentially serve future demand. Examples of such criteria include:

- If the resource is best to serve electrical energy needs or is dispatchable and better serves capacity needs
- The cost to build and operate the resources
- The time it will take to properly plan, design, construct and put into service
- If the resource is a mature, proven resource, or if it is emerging

Scenarios

Including Sensitivities



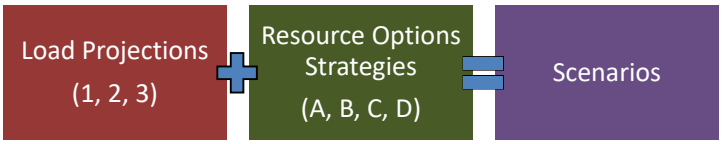
We have just heard about our key inputs, specifically Load Projections and Resource Options Strategies.

Now, we will pull this together and walk through how these elements combine to create the scenarios which will be used in this IRP.

Scenarios

Overview

- Scenarios are a likely combination of a Load Projection and Resource Options Strategy.
- Scenarios represent the energy futures.
- Aiming to have a group of scenarios that together, represent a reasonable range of what the energy future might look like in Manitoba.



Let's explore scenarios.

Scenarios are a likely combination of Load Projections and Resource Options Strategies which will represent potential energy futures.

Our goal here is not to identify and analyze every possible combination of inputs but instead to develop a group of scenarios that together, represent a reasonable range of what the energy future might look like in Manitoba.

Proposed scenarios

Eight proposed scenarios represent different energy futures

Resource Options Strategies	Load Projections		
	1 - Baseline	2 - Medium	3 - High
A - Technology Neutral	S1A	-	-
B - Net-Zero Grid 2035	S1B	S2B	S3B
C - Near Term Wind Generation Projects	S1C	S2C	S3C
D - No Fuel-Based Resources	-	-	S3D

S = Scenario
Scenarios range from **1A to 3D**, where the number represents a **Load Projection** and the letter represents the **Resource Options Strategy**.

Only likely combinations of load projections and resource options strategies will be studied.

- Those proposed not to be studied are noted by (-).

Scenarios for this IRP are shown here. There are eight proposed scenarios which come from pairing logical combinations of a Load Projection and the Resource Options Strategy. A common link between the Load Projection and the Resource Options Strategy is their underpinning planning assumptions, particularly energy policy. Therefore, if there is a strong energy policy restriction on a resource option and the operation of our electricity and natural gas systems there would be similar government action impacting energy consumption.

During this IRP we will not study unlikely combinations of Load Projection and Resource Options Strategies shown by the dashes. By not running every Load Projection with every Resource Option Strategy, we can save significant computing and analysis time and focus our analysis on scenarios that will have the most influence on our recommended development plan.

For this IRP, Scenarios 1A and 3D are bookends. In Scenario 3D we have the most restrictive energy policy and on the opposite end with Scenario 1A we have the least restrictive energy policy.

Modelling and analysis approach

Potential development plans

- In the modelling and analysis, scenarios produce potential development plans.
- A development plan outlines the required steps to meet future energy needs.
  - It may include building new energy sources, infrastructure or programs to manage energy use during peak demand.
- Sensitivity analysis will test the robustness of the potential development plans against different risks.

These scenarios will be used in modeling and analysis to produce potential development plans.

A development plan will outline the steps required to meet future energy needs. This may include building new energy sources, infrastructure or programs to manage energy use during peak demand.

Recognizing there is uncertainty in the assumptions that form our scenarios, we will undertake a sensitivity analysis as part of our modeling and analysis.

Sensitivity analysis

Test key planning assumptions that have a high potential to impact results

Proposed sensitivities:

- Higher or lower market prices
- Increased capital costs for new resources
- Delays in new resource construction
- Lower or higher water inflow conditions (climate change)
- New hydrogeneration and capacity enhancements at existing hydro stations

Not all sensitivities will be run on every scenario.

Sensitivity analysis, or what-if analysis, helps us to understand how individual inputs or constraints change a development plan.

This means we can test the robustness of the outcomes against different risks and understand if that will change the outcomes.

Sensitivities are a great way to test how changes in one assumption in our scenarios may impact our potential development plans.

Some typical sensitivities we will study include energy market prices, capital costs, project lead times, and further resource option restrictions.

The sensitivities listed here are examples of what may considered in this IRP. The full list of sensitivities will evolve as modeling results become available ensuring we address the relevant questions that arise.

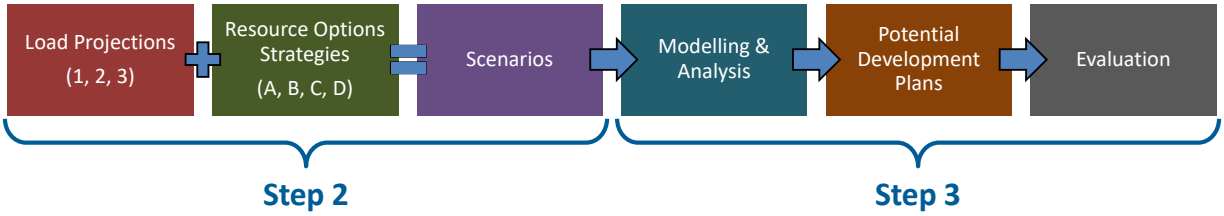
We are prioritizing sensitivities that will have the greatest impact in the next 10 years and could influence our recommended development plan.

Next steps towards evaluation

In Step 3 – Modelling, analysis and evaluations:

- Approximately 50+ scenarios and sensitivities will be analyzed.
- Result will be a series of potential development plans for evaluation.
- Evaluation includes applying evaluation metrics to these potential development plans.

In Step 2 – develop key inputs and scenarios, we establish the evaluation metrics to prepare for Step 3.



Step 2 **Step 3**

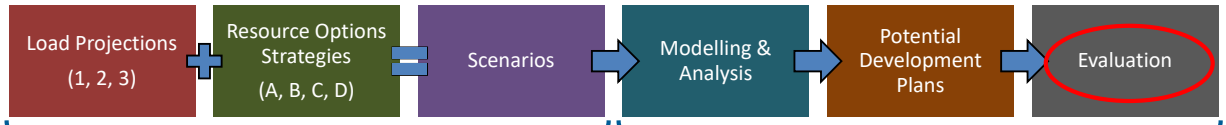
2025 IRP Round 1 Engagement 29

At the end of our modeling and analysis process, we anticipate studying approximately 50+ sensitivities.

And through this analysis, we will identify a series of potential development plans that will need further evaluation, through our evaluation metrics.

This leads us to preparing the evaluation metrics, which we walk through next.

Evaluation Metrics



Step 2

Step 3

As introduced, we are currently establishing evaluation metrics to be used in Step 3.

We will briefly explain what are evaluation metrics, and how they will be used to arrive at a recommended development plan.

Following that, we will present the proposed evaluation metrics for your feedback.

Evaluation metrics

What are evaluation metrics and how will they be used?

- **Modelling & Analysis** identifies cost-effective potential development plans that meet reliability planning criteria, mandates and regulations.
- **Evaluation** narrows the list of potential development plans towards a recommended development plan using evaluation metrics.
- **Evaluation Metrics:**
  - reflect what Manitobans have shared are important factors for them.
  - are used to compare and assess trade-offs between potential development plans.
  - can be numbers-based (quantitative) or descriptions (qualitative).
  - need to be established early in the process ahead of evaluation taking place.

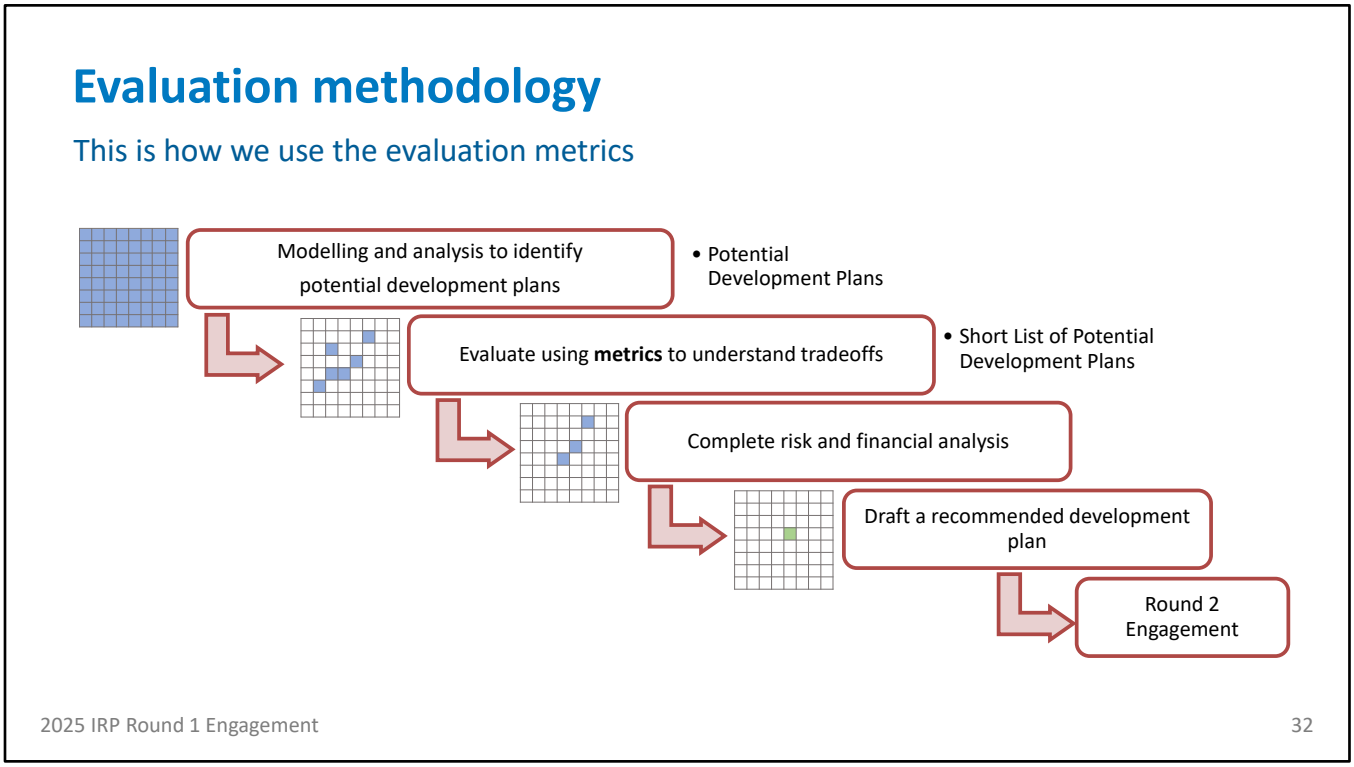
Modelling and analysis is used to identify cost-effective potential development plans that meet established reliability planning criteria, mandates and regulations. As just explained, this work will identify **a number of robust potential development plans.**

We want to go further and **evaluate** these plans from a broader perspective based on what we understand is important to Manitobans. Using metrics, we will evaluate potential development plans to narrow the list of options and ultimately arrive at a draft recommended development plan.

What are metrics?

- They are measures meant to reflect what we understand Manitobans value in energy planning, based on previous customer research and engagement.
- Metrics will assist in comparing plans in terms of their relative impacts across the metrics, also referred to as trade-offs.
- Metrics are quantitative such as costs or GHG emissions, but they can also be qualitative.

As we've stated earlier, given **Evaluation** is based on metrics, it is important to establish metrics at this stage.



So how will evaluation metrics be used? This slide shows is a high-level overview of the steps to arriving at a **recommended development plan**. The steps are shown in the red boxes. The grid graphic depicts how we start with dozens of development plans (represented by the small blue squares) and end up with a single recommended development plan (the lone green square in the rightmost graphic).

At the top, the first step covers the **modelling and sensitivity analysis**, where we expect to reduce the list of plans down to **handful of Potential development plans.**

The second red box is the **Evaluation** step. This involves broad assessment of strengths and weaknesses of the Potential development plans based on Manitobans' energy needs and priorities. In this step, potential development plans are evaluated and compared by assessing the trade-offs between metrics. This approach is an **engagement-informed assessment** that we will use to **short list** the potential development plans.

By way of example, suppose two plans – Option A and Option B, are very similar in terms of their level of reliability benefits and that Option A is modestly more costly than Option B, yet it has a lot more to offer in terms of environmental value. In this instance, Option A may be favoured over Option B, despite being modestly more costly.

Now we are at the middle red box, this is a deeper dive look at the short list of potential development plans using a comprehensive risk assessment, including identification of risk mitigations. This step will also include a conventional financial analysis to estimate what customer energy rates may be required

to pay for the resources in the potential development plan.

The second last step involves **drafting the recommendation** to proceed with a **single Recommended Development plan**, represented by the green square.

Shown as the last step, we anticipate bringing a recommended development plan, along with other short list alternatives, to Round 2 Engagement in Spring 2025. We will also be coming back to you with **a long-term road map based on analysis out to 2050.**

By applying this methodology, we will arrive at a draft recommended development plan and roadmap that **integrates analysis and evaluation that is shaped by your input.**

Proposed evaluation metrics

Four themes that reflect previous research and engagement

Reliability

Adequate Supply

Resource Diversity

Technology Maturity

Costs

Net System Costs

Customer Direct Costs

Environmental

GHG Emissions

Environmental Considerations

Social

Economic Reconciliation

Socio-Economic Benefits

2025 IRP Round 1 Engagement 33

We've reviewed what metrics are and how they will be applied. This slides highlights the proposed metrics, organized by value Theme.

We know from prior engagement that reliability and energy costs and are among the top concerns of most customers. Accordingly, we have proposed metrics grouped under these Themes.

Reliability refers to how to ensure the energy is available when you need it. We propose to assess this based on 3 metrics listed here and we will provide descriptions in the next slide.

Cost is another theme typically found in IRPs which addresses that our customers are impacted by costs including through rates and potentially through other direct costs to the customer.

We also understand that environmental, and social impacts are important to Manitobans, and they would like to see these values included in our energy planning.

Metrics under the **Environment** theme are intended to demonstrate how plans differ by GHG Emissions, as well as other environmental considerations.

Metrics under the **Social** theme will enable assessment of how plans may differ in terms of potential economic reconciliation opportunities and socio-economic benefits.

Proposed reliability evaluation metrics

Proposed descriptions

Adequate Supply: Ability for energy supply to meet future demand

- This metric will consider the ability to meet future energy needs at time of peak demand, and to ensure reliable operations during drought.

Resource Diversity: Potential to diversify resources in our existing systems

- This metric will compare how new resources can mitigate exposure related to any one specific resource (e.g., regulatory change, fuel supply risk, water supply variability)

Technology Maturity: Consideration of the risks and opportunities of various technologies

- This metric will compare the maturity, and consider the risks, of established technologies and emerging technologies.

Qualitative metric Quantitative metric

We have proposed three metrics under the reliability Theme.

Just before we describe them, you will note the icons on the left indicate if we expect that the metric will be qualitative (i.e. a description) or quantitative (i.e. measurable using numbers).

Adequate supply refers to Manitoba Hydro's well established planning criteria where we will ensure there is sufficient supply to **meet peak demand typically during an extremely cold period in winter**, and enough energy to **maintain reliable operations even under severe drought conditions**.

Resource Diversity aims to measure how the Potential development plan **impacts the diversity of the resource mix**. This is intended to highlight where a diverse potential development plan may be **more robust to changes** that can affect the viability of any one type of resource.

Technology Maturity is another qualitative metric intended to address the fact that some resources are **well established and proven in commercial operation**, where there may be other resources that are **newer and may have greater uncertainty** related to construction cost or performance.

Proposed cost evaluation metrics

Proposed descriptions

Net System Costs: An estimate of the total costs to supply electricity and natural gas.

- This metric will be used to compare the need for revenue to cover total costs.
- This will be expressed as both a cumulative net present value and as an annual value.

Customer Direct Costs: An estimate of direct customer cost impacts.

- This metric will be used to compare the potential direct energy related incremental costs to customers as a result of a development plan, such as new appliances or heating systems needed.

There are two proposed metrics in the Cost theme

Net System Costs is a metric that was used in the 2023 IRP and reflects capital and operating costs for new and existing resources (i.e., generation, supply, transmission, and distribution costs for both electricity and natural gas). This includes operating costs such as fuel costs for generation; water rentals; import costs; and customer natural gas costs. Export revenues are also accounted for, which is why this is called ***Net*** system costs.

This metric will be used to **compare the revenue needed to cover total costs** of a Potential Development plan.

Customer Direct Costs metric will be used to compare the potential direct energy costs to customers, such as new appliances or heating systems needed that are not apparent when presenting only Net System Costs.

Proposed environmental evaluation metrics

Proposed descriptions

GHG Emissions: An estimation of future greenhouse gas emissions

- This metric will be used to compare incremental emissions impacts between potential development plans.

Environmental Considerations: The potential effects on the environment

- This metric will help understand differences from a broad perspective and will include potential effects on the air, land, water, and people.

There are two proposed metrics under the Environmental theme

GHG Emissions is an estimation of the greenhouse gas emissions that will be produced in the future and will be used to **compare incremental emissions impacts** between potential development plans.

The Environmental Considerations metric is intended to highlight differences from a wider environmental view to compare potential effects on **the land, air, water, and people**. For example, what are potential changes to the land that can impact wildlife, or impacts on water that can affect fish. Development plans may also differ in their **potential affect on people's ability to exercise traditional and cultural practices**.

Proposed social evaluation metrics

Proposed descriptions

Economic Reconciliation: Potential for future partnerships and other opportunities that benefit Indigenous communities, peoples, and businesses

- This metric will be used to compare the potential to support job creation, advance training opportunities, support business development, and ownership of new generation projects.

Socio-Economic Benefits: Future potential benefits to the Manitoba economy and community well-being

- This metric will be used to compare potential benefits such as economic development and job creation associated with the construction and operation of new resources in the development plan.

Social is the fourth theme, and here we are proposing two metrics.

Economic Reconciliation will be used to assess the **potential for future partnerships and other opportunities that benefit Indigenous communities and peoples**. That is, how would a potential development plan support job creation, training opportunities, business development, or Indigenous ownership of new generation projects.

Socio-Economic Benefits refers to potential future **benefits to the Manitoba economy and community well-being**. This metric will be used to compare potential benefits such as **new jobs created to construct and operate resources** associated in a Potential development plan.

We look forward to hearing your **feedback on these proposed Themes and evaluation metrics**.

Next Steps

Next Steps: shaping our energy future together

What's next?

We'll begin modelling, analysis, and evaluation soon.
Stay tuned for Round 2 Engagement in Spring 2025, where we'll seek your feedback on the preliminary development plan.

Let's talk about the future

Complete our survey by December 19, 2024: www.hydro.mb.ca/future
Questions or comments? Email us at: IRP@hydro.mb.ca

Thank you!

www.hydro.mb.ca/future

Email us at: IRP@hydro.mb.ca

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

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