Canada Energy Regulator | Régie de l'énergie du Canada

Discussion Paper and Survey - Canada's Energy Future 2025

Canada Energy Regulator

The Canada Energy Regulator (CER) regulates infrastructure, ensuring the safe and efficient delivery of energy to Canada and the world, protecting the environment, recognizing, and respecting the rights of the Indigenous Peoples of Canada, and providing timely and relevant energy information and analysis. The CER produces relevant, accessible, and fact-based publications, data, tools, and expert advice on Canada's energy system and CER-regulated facilities.

Canada's Energy Future

The CER has an extensive history of producing long-term energy supply and demand outlooks, the first published in 1967. One of the CER's key energy information publication series is Canada's Energy Future; the latest in this series is Canada's Energy Future 2023 (EF2023), which included economy-wide net-zero scenarios for the first time. These outlooks explore how possible energy futures might unfold for Canadians over the long term. Our scenarios cover all energy commodities and all Canadian provinces and territories. We use economic and energy models to do this analysis.

Our outlooks are the product of scenarios based on a specific premise and set of assumptions. They are not predictions about the future and nor are they policy recommendations. Relying on just one scenario to understand the energy outlook implies too much certainty about what could happen in the future.

Early on in EF2023's development we engaged with Canadians through another Discussion Paper and survey, which resulted in valuable insights about what energy experts and other Canadians are looking for. We also engaged with many interested Canadians after the release of EF2023, and the comments and questions received helped shape the upcoming version's study design.

Purpose

The CER will release the next version of Canada's Energy Future early in 2025. This Discussion Paper outlines and seeks feedback on the overall approach for the next version of the report, Canada's Energy Future 2025 (EF2025). A survey following this Discussion Paper will help improve the Energy Futures series' relevance and accessibility.

The CER wants to know:

- ✓ How the EF2025 study design can be improved to better assess Canada's energy future, including pathways to net-zero emissions by 2050.
- ✓ Your thoughts on the proposed approach to preliminary assumptions of EF2025.
- ✓ Suggestions, or feedback that could enhance the report.

Note that the CER's Canada's Energy Futures series and broader energy information work are separate from the CER's role in regulating energy infrastructure in Canada. As such, this engagement is an avenue to inform Canadians and gather feedback to improve the next version of Canada's Energy Future, and not a regulatory proceeding or inquiry.

Overview of EF2025

EF2023 and its net-zero scenarios received significant interest from governments, institutions, industry, and interested citizens. EF2025 is building on the work and significant interest received from EF2023 and its net-zero scenarios. Specific enhancements include:

- Updated Net-zero scenarios: "Global Net-zero" and "Canada Net-zero", exploring what reaching a pre-determined emission level of net-zero by 2050 means for Canadian energy supply and demand trends.

- Updated "Current Measures" scenario, including new policy measures currently in place.
- New "*What If*" sensitivity analyses that explore the impact of changing key assumptions within the scenarios. Preliminary assumptions that we are exploring as part of this sensitivity analysis include: crude oil and natural gas prices, low carbon technology costs, and consumer behaviour and energy preferences.
- Enhanced scope of analysis and data including considerations around energy security, Indigenous perspectives, impacts on households and businesses, and investment requirements.
- Improved energy models and datasets.

As part of the enhanced scope of EF2025, the CER is planning deliberate engagement initiatives with Indigenous Peoples. These engagement sessions will focus on understanding First Nation, Métis and Inuit interests and perspectives regarding Canada's energy transition. The insights and feedback gathered from these sessions will inform the content of the EF2025 report.

Preliminary Assumptions for the EF2025 scenarios

Like EF2023, EF2025 will analyze three scenarios: the Global Net-zero Scenario, the Canada Net-zero Scenario, and the Current Measures Scenario. The premise of each scenario differs based on:

- The pace of climate action in Canada, including whether Canada must achieve net-zero emissions by 2050; and,
- The pace of climate action in the rest of the world.

Both the Global and Canada Net-zero scenarios share the premise that the future pace of climate action in Canada is consistent with Canada reaching net-zero greenhouse gas (GHG) emissions in 2050. Simply put, a key outcome of these scenarios is predetermined: the level of GHG emissions in 2050 is net zero. We then rely on our energy and economy models to project a pathway for the energy system that is consistent with this outcome.

To analyze scenarios, we make assumptions on key variables. These assumptions are key inputs into our energy models, and each scenario includes a set of assumptions that are internally consistent with the premise of a given scenario. Typically, assumptions are made about important variables for Canadian energy that we do not model ourselves. These include: international energy markets, technology cost and performance trends, and included policies.

The assumptions for EF2025 are under development. This section describes the preliminary approach to assumptions for several important areas. The approach to assumptions may change for the final report, and we welcome feedback in the attached Survey.

International energy market assumptions

Net-zero scenarios: We are currently planning to rely on the International Energy Agency World Energy Outlook for international crude oil and natural gas assumptions, as in EF2023. That said, we welcome suggestions of other global energy supply and demand outlooks in a net-zero or carbon-constrained world, including projected energy prices, to consider when shaping our assumptions. The Global Net-zero Scenario aligns to the IEA's Net-Zero Emissions by 2050 Scenario, whereas the Canada Net-zero Scenario aligns to the IEA's Announced Pledges Scenario. World Energy Outlook 2023 is currently available, and we expect EF2025 will reflect updated analysis from WEO 2024 this autumn. The IEA World Energy Outlook is a publicly available and transparent global energy outlook, based on internally consistent scenarios. At the same time, global oil and natural gas prices could take different paths than shown by the IEA. To further explore uncertainty in this area, we are planning to include What If sensitivity analysis around alternative global oil and natural gas prices.

Current Measures scenario: For this scenario, where neither Canada nor the globe is constrained to reach net-zero emissions by 2050, assumptions will be drawn from a range of sources, ensuring our assumptions reflect the latest views of experts. This includes the IEA, U.S. EIA, and various other institutions and analytical services. Based on this analysis, we are preliminarily assuming global crude oil prices in the US$80-90 per barrel range, and that the Henry Hub North American natural gas price ranges between US$3.50-4.50, in the long-term for the Current Measures scenario.

Electrification and other Low-Carbon Technology assumptions

Low carbon technology costs and performance, especially related to electricity generation and end-use electrification technologies, were shown to play an important role in future trends in EF2023. We draw assumptions about future trends for low carbon technology cost and performance from a variety of publicly available sources, including Natural Resources Canada, provincial and territorial governments and utilities, and international sources such as the International Energy Agency, U.S. Energy Information Administration, U.S. National Renewable Energy Laboratory, Electric Power Research Institute, and National Energy Technology Laboratory.

Generally, we assume fastest technological improvement for low carbon technologies in the Global Net-zero scenario, as higher global research and development and widespread deployment of these technologies implies accelerated learning-by-doing and economies of scale in production. The Canada Net-zero scenario will include slightly slower improvements in technology trends. The Current Measures scenario, which reflects the lowest level of global climate action, will see the lowest improvement in low carbon technologies. Given that future technology development is uncertain, we are planning to include *What If* sensitivity analysis around alternative cost and performance trends for low carbon technologies.

Policy assumptions

Canadian climate policy assumptions are different between the scenarios:

- Current Measures: this scenario will include federal, provincial, and territorial policies and measures currently in place by the time the modeling concludes.
- Net-zero scenarios: these scenarios will include policies included in Current Measures, as well as policies that are announced but not yet implemented, and, if needed, hypothetical future policies to reach net-zero.

Canadian Infrastructure, Markets, and Supply Chains

Generally, we assume markets, infrastructure, and supply chains operate effectively and efficiently to deploy new technologies and projects, based on other assumptions (such as technology costs, market prices, and policies). We do not assume any institutional barriers for any technology development.

In the case of Canadian crude oil and natural gas prices, we assume key Canadian benchmark price differentials (i.e. WTI-WCS price differential for heavy oil, or Henry Hub-AECO price differential for natural gas) are at relatively 'normal' levels that reflect adequate transportation capacity. These assumptions may change based on projected market conditions; for example, in the case that projected crude available for export exceeds, or is well below, available export infrastructure.

Canadian LNG export assumptions are preliminarily kept at the same levels as in EF2023, with all scenarios reflecting the first phase of the LNG Canada project and Woodfibre. The Canada Net-zero and Current Measures scenarios reflect additional exports coming online before 2035.