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Federal energy projections must align with limiting global warming to 1.5 degrees

Policy brief

by Nichole Dusyk | November 2021

Summary

- Energy production and consumption modelling is a foundational tool, which ensures that policies and investment strategies achieve the government's commitment to reduce greenhouse gas emissions, and set a course for a thriving clean energy economy.
- Despite progress on implementing climate policies, to date Canada has a poor track record on bringing down emissions.
- Current energy scenarios, which are produced by the Canada Energy Regulator (CER), do not support the forward-looking planning that is needed.
- Failure to model a net-zero energy transition comes with significant risk of missed climate targets, poor investment and spending decisions, and the increased likelihood that Canadians will be unprepared for shifting global markets.
- Climate and energy transition policies will only be effective if they are grounded in credible and transparent scenarios that model the energy future we want to achieve.

Recommendations

Starting in 2022, the Canada Energy Regulator should:

1. Publish and update annually energy modelling that:
   - Is consistent with limiting warming to no more than 1.5 degrees above pre-industrial levels, and uses an oil price that is in line with the International Energy Agency's Net-Zero by 2050 report or most recent net-zero scenario
   - Shows net-zero emissions by 2050 in the energy sector
2. Make the 1.5 degree scenario central to the Canada's Energy Future report.
3. Publish the level of greenhouse gas emissions associated with each of the scenarios presented in the Canada's Energy Future report.

Canada is not on track to meet its climate commitments

Canada is a signatory of the Paris Agreement on Climate Change which commits to "holding the increase in global average temperature to well below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees" (UNFCC 2015, Article 2.1).

Since signing the Paris Agreement, Canada has implemented a comprehensive suite of climate policies at the federal level. The Liberal government has an election mandate to implement new climate policies and strengthen existing ones. This includes implementing emissions targets for the oil and gas sector; creating a "climate lens" to assess all government policies, programs, and plans; and implementing the Net-Zero Emissions Accountability Act.

Despite this notable progress in federal climate policy, Canada still has a poor track record of reducing emissions in line with its climate commitments. Emissions decreased by only 1% between 2005 and 2019.[1] The federal government's commitment to reduce emissions by 40 to 45% from 2005 levels by 2030 requires a focus on reductions across all sectors. This means it is critically important to produce carbon budgets and emissions trajectories that clearly articulate what changes are required to limit warming to 1.5 degrees for sectors where emissions are tied to energy production and use: oil and gas, electricity, transportation, heavy and light industry, and buildings.

A number of government commitments are poised to set the stage for Canada's necessary emissions reduction targets.[2] To ensure these policies are effectively implemented, the first step is to develop robust and transparent scenarios that model how energy production and use can align with our commitments under the Paris Agreement. Doing so provides certainty that targets are grounded in science[3], that decision-making and investments align with targets, and that Canada is working toward and positioned for success in a decarbonizing global economy.

Canada's Energy Future

The Canada Energy Regulator — formerly the National Energy Board — has a mandate that includes "advising and reporting on energy matters."[4] As part of these responsibilities, CER

[1] Government of Canada, *2021 National Inventory Report* (2021). https://unfccc.int/documents/271493

[2] Michael Bernstein, Dave Sawyer, Seton Siebert, Jake Wadland, and Jason Clark, *Assessing the 2021 Federal Liberal Climate Plan* (Clean Prosperity, 2021). https://cleanprosperity.ca/wp-content/uploads/2021/10/Clean_Prosperity_LPC_Climate_Policy_Report_2021.pdf

[3] Katie Mulvaney, *Using Climate and Energy Scenarios to Inform Strategy and Policy* (Rocky Mountain Institute, 2020). https://rmi.org/wp-content/uploads/dlm_uploads/2020/12/rmi_using_climate_energy_scenarios.pdf

[4] Government of Canada, *Canadian Energy Regulator Act,* SC 2019, c. 28, s.11 (e). https://laws-lois.justice.gc.ca/eng/acts/C-15.1/

collects and publishes data and analysis on a range of energy-related activities in Canada. This includes data related to its regulatory mandate (e.g. pipelines and energy exports) as well as data and analysis on Canadian energy production and use more broadly.

The CER's flagship publication, released annually since 2016, is the Canada's Energy Future report (Energy Futures), a domestic energy supply and demand scenario that projects the production and use of coal, petroleum, natural gas, and electricity in Canada. Energy Futures 2020 provided projections to 2050.[5]

Energy Futures typically contains multiple scenarios. In the past, the central scenario has been the Reference Scenario. This scenario limits climate actions to policies that have been announced or implemented and presents modest estimates in the uptake of clean energy technology. The Reference Scenario is inherently pessimistic about domestic and international climate action and therefore it is not representative of either national or global trends.

What is an energy scenario?

The terms scenario, pathway, and roadmap are often used interchangeably but they have different meanings.[6]

A **scenario** describes a possible future but does not provide detail on the policies or decisions required to realize that future. Rather, the scenario highlights important uncertainties by illustrating the range in outcomes depending on key variables.

A **pathway** provides more detail and direction than a scenario and may include specific decision points or critical junctions. Amidst uncertainty, a pathway can provide guidance on how to advance toward a specific outcome.

A **roadmap** provides the most detailed, step-by-step approach to realizing an end goal. A roadmap is ideal for medium or near-term goals where uncertainty can be managed.

The 2020 Energy Futures report included an Evolving Energy System Scenario (Evolving Scenario) that anticipates a steady rate for the implementation of climate policy, cost reductions, and the uptake of new technology. This scenario can be understood as a "business-as-usual" scenario in that it projects the rate of climate action and the increased supply of clean energy will continue at approximately the same pace as in recent years.

[5] Canada Energy Regulator, *Canada's Energy Future 2020* (2020). https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2020/index.html

[6] Adapted from Bill Sharpe, Anthony Hodgson, Graham Leicester, Andrew Lyon, and Ioan Fazey, "Three horizons: a pathways practice for transformation," *Ecology and Society* 21 no.2 (2016). http://dx.doi.org/10.5751/ES-08388-210247

The development of the Evolving Scenario was an important step forward, reflecting widespread acknowledgement of the impact of climate change and the expectation that future governments will continue to move forward with climate action. Yet, as the most ambitious scenario produced by the CER, it presents modelling in which Canada fails to meet its climate obligations and the world fails to limit global climate change to 1.5 degrees.

In 2020, the CER began exploring a decarbonized energy system in Canada. For the first time, Energy Futures included a qualitative discussion of achieving net-zero emissions in three sectors: oilsands production, personal passenger transportation, and remote and northern communities. Energy Futures 2021 is expected to take this a step further and include modelled net-zero scenarios for the electricity sector. It will not, however, offer a net-zero scenario that includes all sectors of the economy. In short, the CER offers no scenario that shows how Canada can successfully achieve its climate commitments and transition to a zero-carbon economy.

Moreover, no scenario produced by the CER includes the amount of greenhouse gas emissions associated with the projected energy production and consumption. This is a key point of disconnect between the federal government's energy scenarios and its climate policy and commitments.

The consequence is that CER's scenarios do not support the planning needed in the era of climate change and may lead to misinformed decision-making. Yet they are the only energy scenarios published by the Canadian government and thus, despite qualifiers these are only scenarios, they are frequently mispresented and cited as a definitive forecast of future supply and demand.[7]

Lack of alignment with the International Energy Agency

With increasing commitments to climate action and growing global markets for clean energy, the need for credible net-zero pathways has come to the fore. In 2020, the International Energy Agency (IEA) — the world's leading energy information body — published a net-zero roadmap for the global energy system.[8] This year, the IEA has also integrated its net-zero modelling into its annual flagship publication, the World Energy Outlook.[9]

[7] Tsvetana Paraskova, "Can Canada Boost Oil Production while Reducing Emissions?" *Oilprice.com,* May 13, 2021 https://oilprice.com/Energy/Crude-Oil/Can-Canada-Boost-Oil-Production-While-Reducing-Emissions.html

[8] International Energy Agency, *Net Zero by 2050: A Roadmap for the Global Energy Sector* (2021). https://www.iea.org/reports/net-zero-by-2050

[9] International Energy Agency, *World Energy Outlook 2021* (2021). https://iea.blob.core.windows.net/assets/888004cf-1a38-4716-9e0c-3b0e3fdbf609/WorldEnergyOutlook2021.pdf

By comparison, the CER's approach is increasingly out of step. The figure below illustrates how the CER's Evolving Scenario (2020) projects growth in Canadian oil production outpacing the growth of global oil demand in all IEA scenarios presented in the World Energy Outlook 2021. In contrast to the CER projection, the IEA's net-zero scenario shows how limiting warming to 1.5 degrees will require a steep and immediate drop in global oil demand.

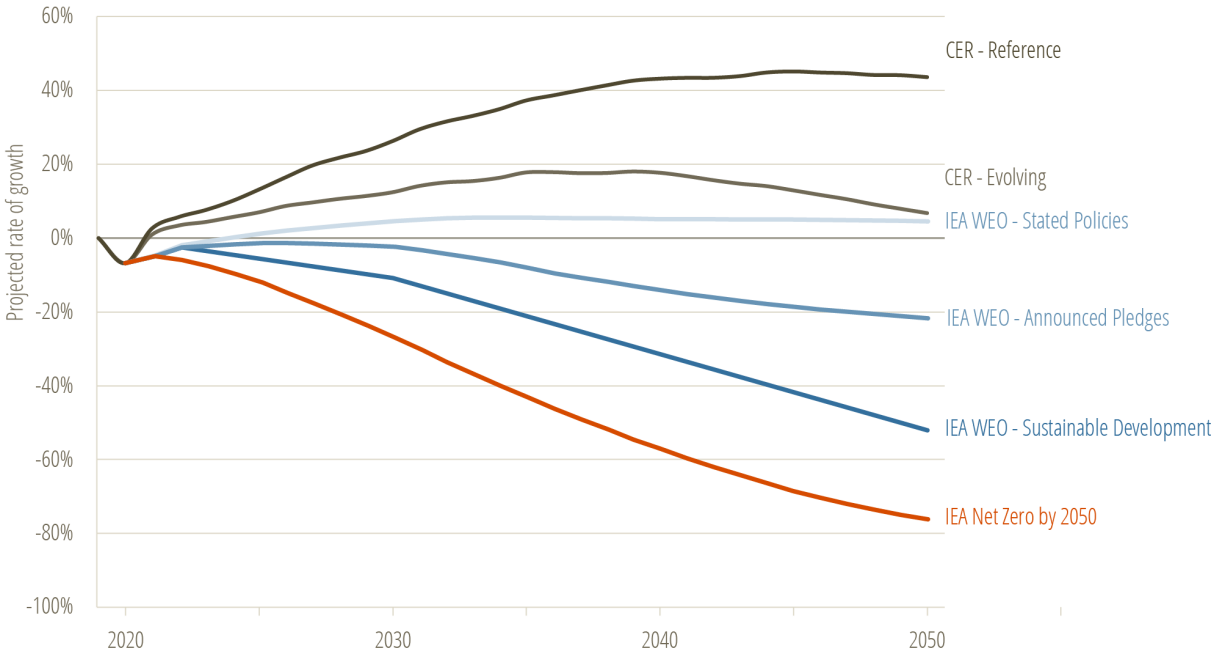

Figure 1. Projected rate of change for global oil demand (IEA) and Canadian oil production (CER)

Data sources: Canada Energy Regulator, International Energy Agency[10]

As they project significant growth in oil and gas production in Canada, the CER scenarios have been used by industry, investors, and governments to justify continued expansion of fossil fuel infrastructure.[11]

The continued failure to map a net-zero scenario creates risks for Canadians. This includes investment and public policy decisions that lock in high-carbon infrastructure and underestimate the need for clean energy technologies. Setting Canada up for success in the clean energy transition requires reliable information on how to align energy production and use with the Paris Agreement.

[10] *Canada's Energy Future 2020,* Data appendix, Crude Oil Production. https://apps.cer-rec.gc.ca/ftrppndc/dflt.aspx?GoCTemplateCulture=en-CA; *World Energy Outlook 2021,* 211, Fig. 5-1, Oil use to 2050 (curves).

[11] Deborah Jaremko, "A Matter of Fact: Canada needs Line 3, TMX and Keystone XL," *Canadian Energy Centre*, November 25, 2020. https://www.canadianenergycentre.ca/a-matter-of-fact-canada-needs-line-3-tmx-and-keystone-xl/

What is a Paris-compliant energy scenario?

Aligning with the Paris Agreement requires the CER scenario to address two key parameters. The first is achieving net-zero emissions by 2050 or earlier. The Intergovernmental Panel on Climate Change estimates that global emissions must reach net-zero by 2050 to have a reasonable chance of limiting global climate change to 1.5 degrees.[12]

However, it is not just the destination that matters. If emissions do not drop quickly and steeply, the chances of limiting global warming to 1.5 degrees could be lost — even if global emissions reach net-zero by mid-century. Thus, the second key parameter is that global emissions drop, on average, 45% from 2010 levels by 2030.[13] This can only happen if global demand for fossil fuels is immediately reduced. In Canada, this would require a rapid decline in both domestic consumption of fossil fuels and exports to international markets.

At the same time, limiting global warming to 1.5C will require global energy systems to rapidly scale up energy efficiency measures, the decarbonization of electricity grids, and widespread electrification. Technological advances would be accelerated and cost reductions resulting from economies of scale would further support a successful and affordable energy transition.

Why does Canada need a 1.5 degree scenario?

A Paris-compliant energy scenario for Canada will serve a number of important purposes.

First, it will **provide a foundational tool that can be used to assess government spending, policies and programs** along with proposed infrastructure projects to ensure that the decisions being made today are consistent with a climate-safe world. A 1.5 degree scenario will also provide a credible basis for developing sector-specific targets and net-zero pathways.

Similarly, a Paris-compliant energy scenario will **provide essential data for Canadian businesses and investors** seeking to assess climate risk. As financial risk disclosures become mainstream, a 1.5 degree scenario will provide an objective basis to determine whether business models are compatible with Canada's net-zero goal — and, if not, how to adapt accordingly. This will apply equally to government financial risk disclosures, as mandated in the Net-Zero Emissions Accountability Act.[14]

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[12] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C: Summary for Policymakers* (2018), 12. https://www.ipcc.ch/sr15/

[13] *Global Warming of 1.5°C: Summary for Policymakers,* 12.

[14] Government of Canada, *Canadian Net-Zero Emissions Accountability Act,* S.C. 2021, c. 22. https://laws-lois.justice.gc.ca/eng/acts/C-19.3/

Third, it will **help plan for a just energy transition**. By showing the trajectory of the energy sector, a net-zero scenario will provide information for individuals, communities, and governments which they can use to plan for the transition and ensure that necessary support systems are in place, including the creation of new industries that will thrive in a low-carbon economy.

Finally, a Paris-compliant energy scenario can be **an educational tool for Canadians**. Canadians do not currently have adequate information on the scale and nature of the energy transition that is needed. The CER has created data visualization tools to increase the accessibility of the Canada's Energy Futures report for civil society. This platform could be used to also provide information on how the government can ensure energy use in Canada is aligned with our climate obligations.