

Getting to Net-Zero in Canada

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Contributed by Ian Cameron, Director for Friends of Science Society ©2024

The **Canadian Net-Zero Emissions Accountability Act**, which became law on June 29, 2021, “enshrines in legislation” Canada’s commitment to achieve net-zero emissions by 2050.” To date most of the federal government’s focus has been on its 2030 Paris Agreement target of reaching CO₂eq emission reductions 40-45% below the 2005 level of 741 Mt (i.e., 2030 net emissions of 445-408 Mt).

The government’s first attempt to determine what it would take to reach net-zero was a **report** released in December 2021 by the **Canadian Energy Regulator** (CER) called *Canada’s Energy Future 2021: Energy Supply and Demand Projections to 2050* (EF2021). EF2021 did not explicitly model a net-zero future, which **drew criticism** and resulted in a directive from the Minister of Natural Resources to the CER to “provide even more data in line with Canada achieving net-zero emissions by 2050.”

Thus, **Canada’s Energy Future 2023** (EF2023), published in June 2023, became the CER’s “**first long-term outlook** on modeling net-zero by 2050.” The results of EF2023 are not future predictions or policy recommendations, but rather the product of **three scenarios**:

- Global Net-zero – Canada achieves net-zero by 2050, and the rest of the world reduces emissions enough to limit global warming to 1.5°C.
- Canada Net-zero – Canada achieves net-zero by 2050, and the rest of the world reduces emissions, but not enough to limit global warming to 1.5°C. This affects some of the international factors that are inputs to the CER's models.
- Current measures – No net-zero as there is limited action in Canada beyond current measures and also limited future global climate action.

Figure 1 (**Fig. A.2** of EF2023) illustrates the iterative approach for the Global Net-zero and Canada Net-zero scenarios, which used the CER's **Energy Futures Modeling System**. The main input driver for the modeling is what the CER **refers to** as the “aggregate cost of carbon,” which represents a hypothetical suite of policies, regulations and programs assumed for the 2030-2050 period. In the Global Net-zero scenario this means an inflation-adjusted (i.e., 2022\$) \$330/t of CO₂eq in 2050, and \$380/t for the Canada Net-zero scenario (**Table A1.1**).

Fig. 1

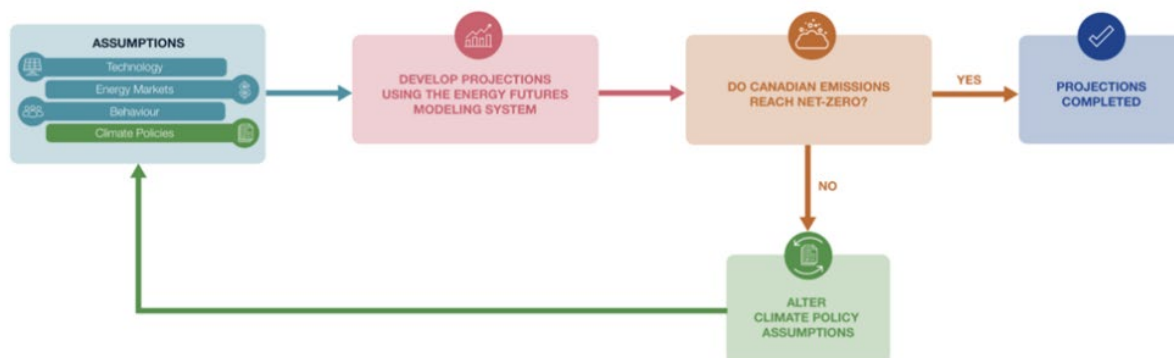


Figure 2, copied from Fig. ES.2 of EF2023's **Executive Summary**, shows one of the modeling results (end-use energy use by fuel type.) As explained in the **Energy Demand** section total end-use energy demand for the two Net-zero scenarios declines by 22% and 12%, from 2021 to 2050, despite continuing economic and population growth. This decline is largely due to “switching to different technologies and fuels, more efficient use of energy, and lower activity levels in some sectors.” The CER assumed real annual GDP growth of 1.4% for the Global Net-zero scenario and slightly higher in the other two scenarios; see p.112 of the **full report**.

Fig. 2

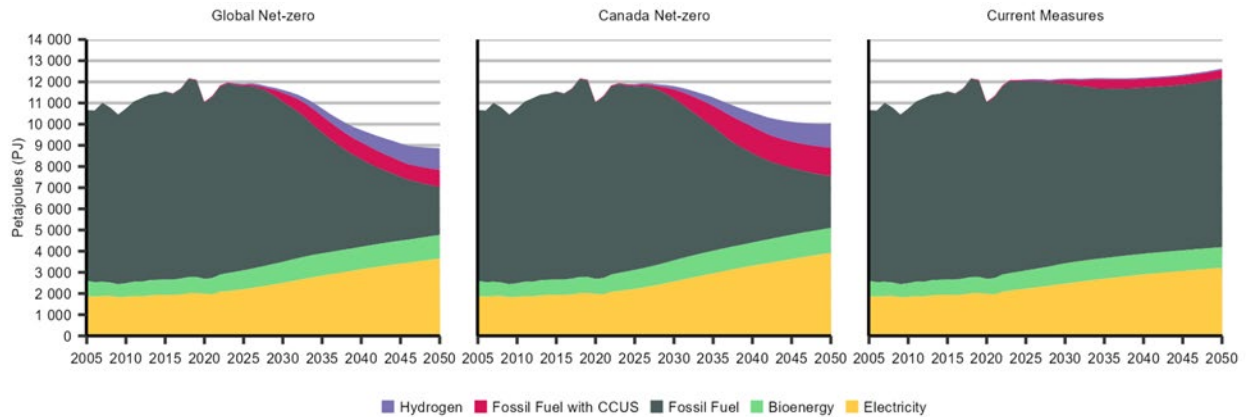
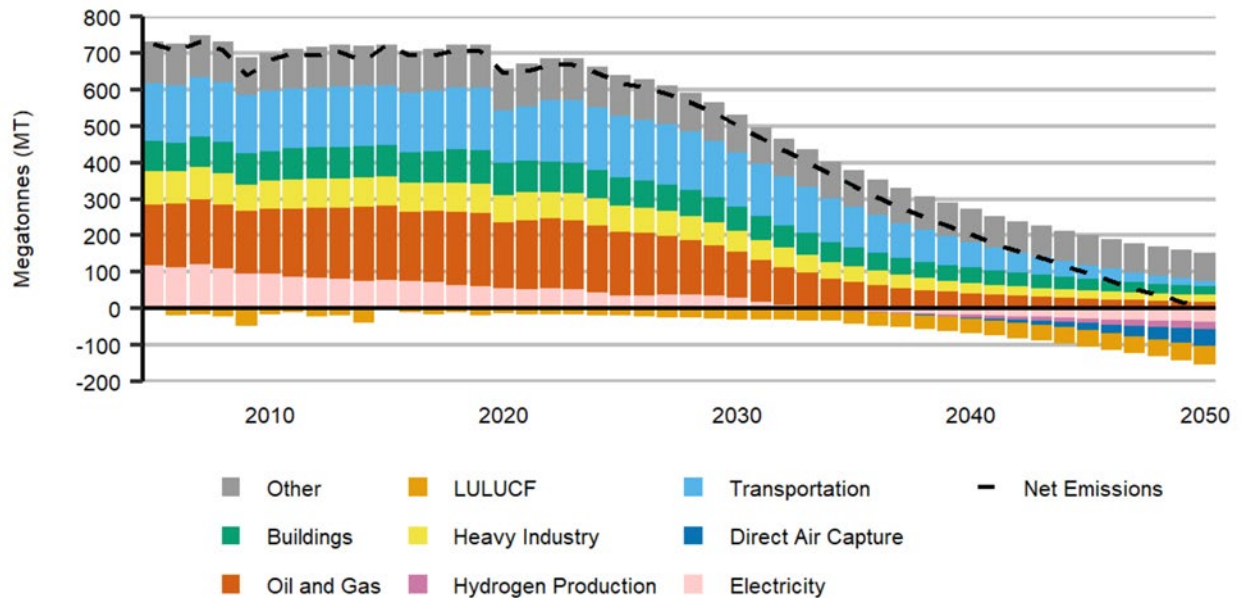


Figure 3 (Fig. R.4 of EF2023) depicts the emissions modeled in the Global Net-zero scenario. Offsetting the positive emissions in 2050 requires “negative emissions” from electricity (-37 Mt); hydrogen production (-21 Mt); direct air capture (-46 Mt); and land use, land-use change, and forestry (-50 Mt). Table R.1 of EF2023 provides explanations for each of the nine economic sectors modeled.

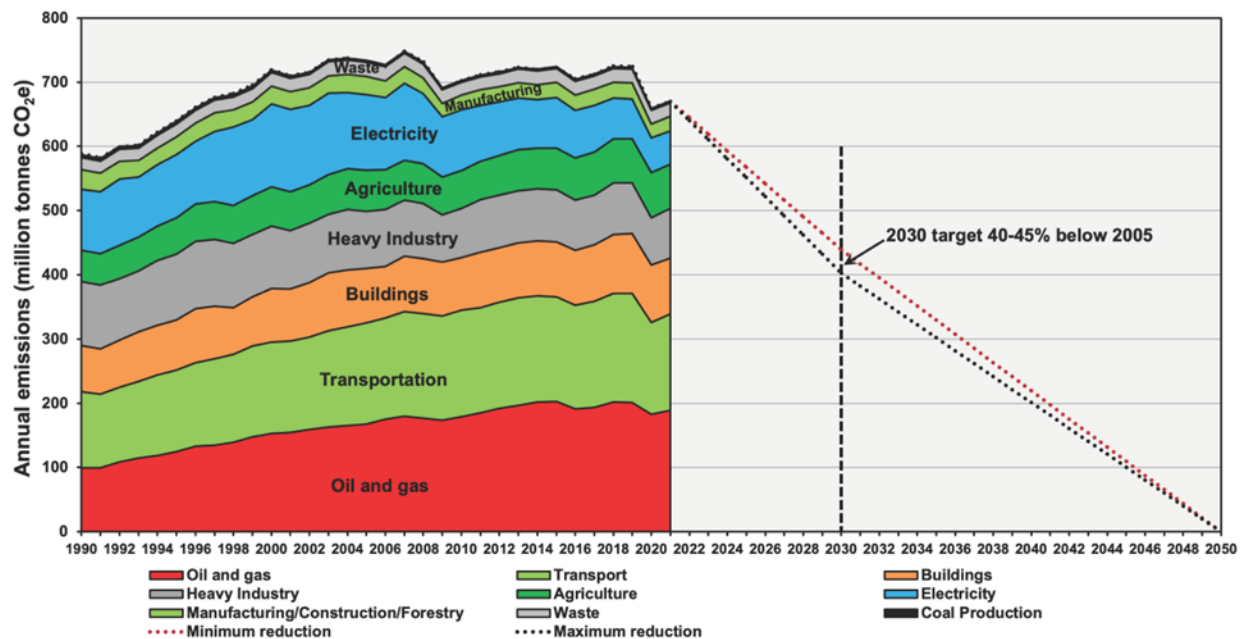
Fig. 3



The [Canadian Centre for Policy Alternatives](#), “one of Canada’s leading progressive voices in public policy debates,” took note of EF2023 and [commissioned David Hughes](#) to use it as the basis for a report, released on February 8, 2024 and called *Getting to Net-Zero in Canada – Scale of the*

problem, government projections and daunting challenges (full 64-page report and 6-page summary). This article in *The Tyee* quotes Mr. Hughes' reason for writing *Getting to Net-Zero*: "My objective is to provide policymakers and the public with an understanding of the scale of the problem so they can appreciate the scale that any solution is going to have to take. Only with understanding and buy-in can the necessary changes be implemented." Figure 4, taken from Mr. Hughes' report, illustrates the "scale of the problem."

Fig. 4



The Discussion and Implications chapter of the full *Getting to Net-Zero* report (pp.56-61) states that, in the CER's Net-zero scenarios, per capita end use of energy must be reduced 33-41% and lists a number of unrealistic outcomes (e.g., wind and solar generation must increase 10-12 times and direct air capture 4,600-5,500 times current world capacity), together with optimistic assumptions about future cost reductions in carbon capture, use and storage (CCUS), direct air capture, wind and solar capital costs, hydrogen production, battery storage, and others (see [Table A2.1](#) of EF2023). As *The Tyee* [article](#) puts it, the CER "largely assumes in its successful scenarios that the cost of renewables, hydrogen, batteries, CCS and nuclear power will magically go down," while in reality inflationary pressure is increasing these costs.

The key conclusions from *Getting to Net-Zero* (pp.62-63):

- Canada's March 2023 policies would see only a 16% reduction in emissions below 2022 levels by 2050 and must be greatly strengthened.
- To offset the relatively large proportion of fossil fuels in 2050 end-use energy demand, the CER over-relied on CCUS (33 to 38-fold increase), and a thousand-fold increase in direct air capture. This is a high-risk strategy. Instead, Mr. Hughes recommends reducing end-use demand for fossil fuels.
- The CER's Canada net-zero scenario assumed maintaining high levels of fossil fuel production for export in 2050, along with carbon capture and direct air capture to offset emissions from producing oil and gas for export.
- The CER over-optimistically assumed that hydrogen can grow from almost nothing to 11-12% of end-use energy by 2050.
- Electricity generation will have to increase from the CER's 39-41% share of end-use energy to a "more realistic" 55%.
- Tripling the sequestration capacity of Canada's forests, as assumed in the CER's two Net-zero scenarios, will require major improvements in forest management practices.

Given his above-mentioned issues with the CER's modeling, Mr. Hughes concludes that the government's major priority for net-zero should be reducing energy demand, as he states on page 6 of *Getting to Net-Zero*:

"Reducing energy consumption is the low-hanging fruit, as it eliminates the cost of new energy production and emissions reduction infrastructure. Prioritizing conservation, efficiency and behavioral change must become a major government policy priority."

Mr. Hughes' report doesn't provide any figures for how much to reduce energy consumption (or what the whole net-zero effort will cost), only that the CER's per capita energy reduction of 33-41% won't be enough. As he **told** *The Tyee*: "We are going to have to accept contraction, unfortunately. It has been a slice. But the math does not work for continuous growth." In other words, getting to net-zero means an **end to economic growth**, let alone the 1.4%/year real GDP increase assumed in EF2023.

The Minister of Natural Resources' **statement** acknowledging EF2023 ends with: "I would like to thank the CER for its thoughtful report, and I look forward to continuing my work with partners across the country in **growing our economy** and reducing emissions." Among the partners working with the minister is the **Pathways Alliance**, a group of oilsands producers proposing to build a \$16.5 billion CCUS network in northern Alberta. To date,

no construction start and the minister **is growing weary of waiting**. So he recently told the alliance that he wants to see “progress on the ground,” but alliance members are holding back as they await details on a needed federal investment tax credit, which is yet to be passed. As well, the producers are concerned about a proposed federal initiative to **impose an emissions cap** on the oil and gas sector.

To burnish their climate credentials the minister and his colleagues desperately want to issue press releases and pose for photo-ops showing tangible progress for the commercially useless Pathways Alliance project. What the ministers desperately **don't want** is to tell the public that fulfilling their government's net-zero agenda will entail a quarter century of increasing energy and economic deprivation.

This article will also appear in our March quarterly newsletter.

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