



Natural Resources
Canada

Ressources naturelles
Canada

Session 3: Long-Term Energy Scenarios as an exploratory tool for policymaking in Canada

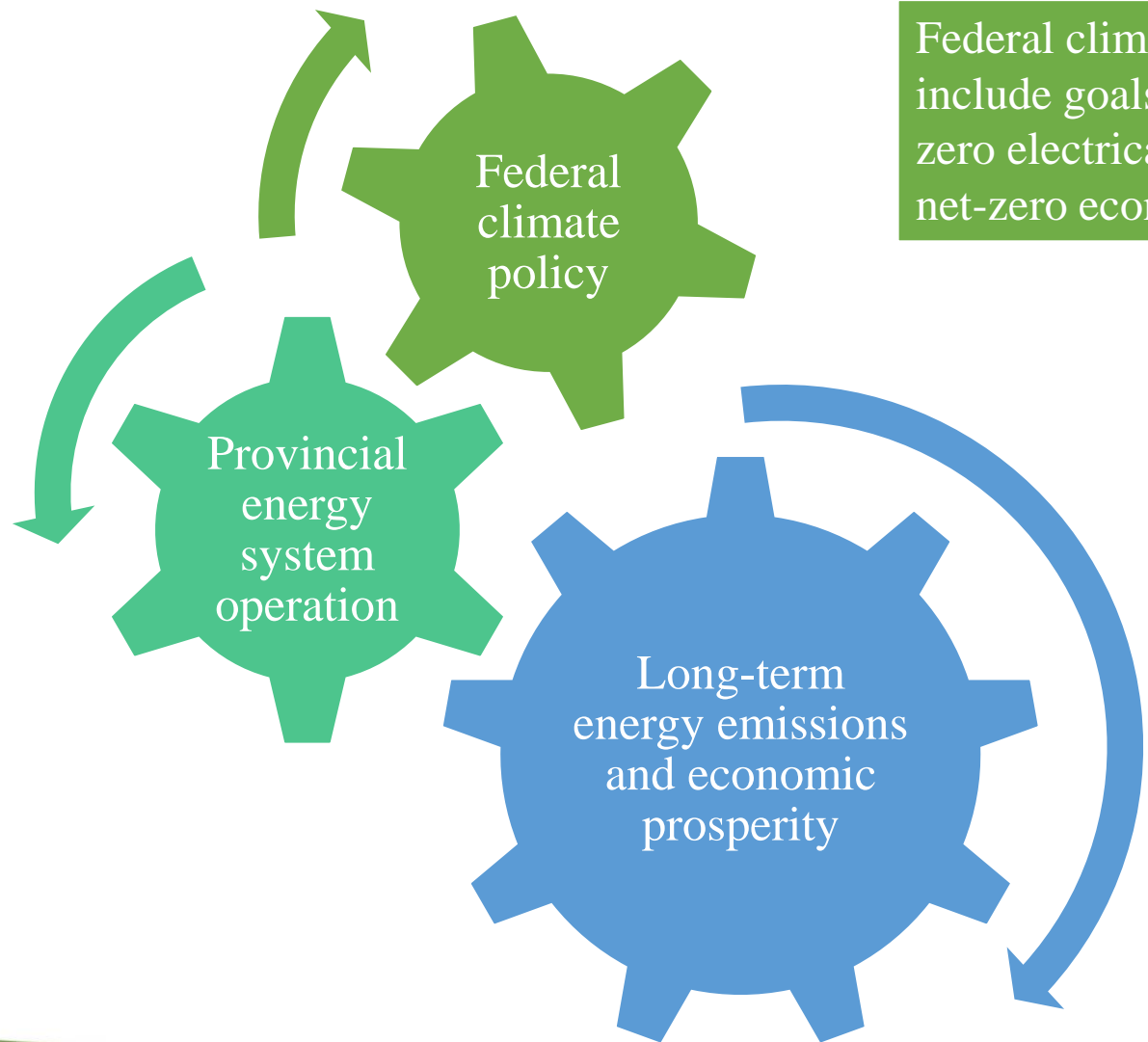
IRENA LTES Network

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Canada

ENERGY SYSTEM SHARED RESPONSIBILITIES

Provincial jurisdiction to manage their respective energy systems.



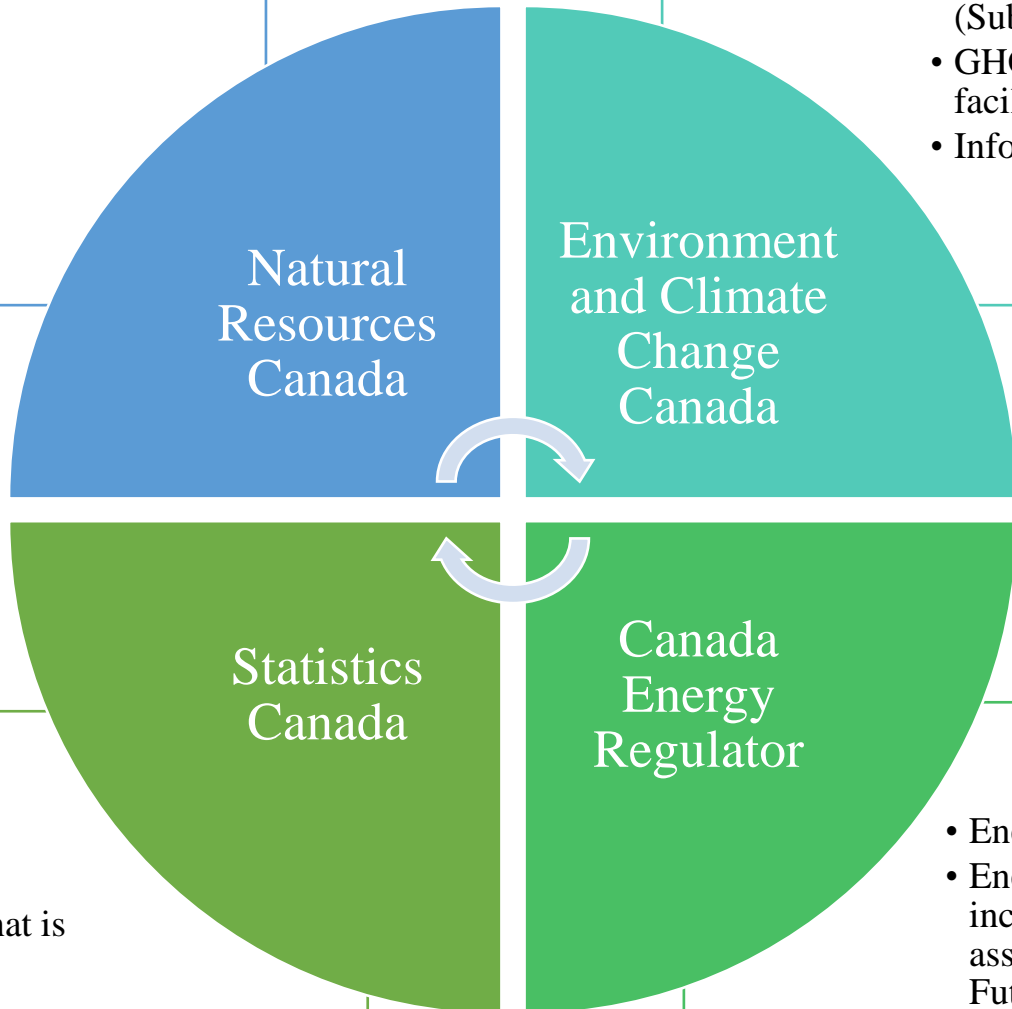
Federal climate objectives include goals to achieve a net-zero electrical grid by 2035 and net-zero economy by 2050.

Long-term economic prosperity remains priority for governments.

Federal Energy Information Framework

- National End-Use database
- Energy efficiency and deployment programs
- Energy Fact Book

- Emission trends and projections (Submitted to UNFCCC)
- GHG and air pollutant emissions facility reporting
- Informs regulatory development



Provincial efforts to collect data and produce future looking policy documents

- National statistics agency
- Canada Centre for Energy Information provides data that is the basis for energy policy development

- Energy regulator
- Energy Information Program including trade data and market assessments and the Energy Futures Report

LTES: Environment and Climate Change

- To satisfy G7 commitment, Environment Canada submitted a Long-Term Strategy (LTS) to the UNFCCC that is aligned to a net-zero emission future – *Exploring Approaches for Canada’s Transition to Net-Zero Emissions*
- Canada’s LTS explores different approaches to Canada’s transition to net-zero emissions by 2050. It is NOT a climate plan – it is a means to communicate various pathways and serves as an evidence base for future emission reduction plans.

| Scenario | Possible Emissions Reduction Pathways | | | Description |
|---|---------------------------------------|------------------------------|--------------------------------------|---|
| | Electrification | H ₂ and Bioenergy | CO ₂ Removal Technologies | |
| Current Assumptions | Model Determined | Model Determined | Model Determined | The modelled pathway given assumptions based on today’s understanding of the costs and constraints of achieving net-zero emissions. Meets Canada’s commitments to reach net-zero emissions related to: <ul style="list-style-type: none"> Zero-emitting new vehicle sales Net-zero electricity by 2035 |
| High Electrification | High | Low | Low | Electrify energy transformation and end-use sectors: <ul style="list-style-type: none"> Building heating and other uses Battery electric vehicle transport Heavy industries Electrolysis in hydrogen |
| High Use of Renewable and Alternative Fuels | Medium to High | Medium | Low | Use of hydrogen and alternative fuels in: <ul style="list-style-type: none"> Heavy vehicles, aviation, maritime, and rail Building heating with blending and new technologies Heavy industries Hydrogen with SMR/electrolysis |
| High Use of Engineered CO ₂ Removal Technologies | Medium | Low | Medium to High | Cost-effectiveness of CO ₂ technologies: <ul style="list-style-type: none"> Direct Air Capture (DAC) Carbon Capture and Storage (CCS)⁶ |

LTES: Canada Energy Regulator

- As part of their Energy Information Program, the Canada Energy Regulator produces an annual *Energy Future* reports on possible energy pathways in Canada.
- The *2021 Energy Future* report was the first of its kind to include net-zero emissions in the electricity sector by 2050.
- The *2022 Energy Future* report will be the first report to explore net-zero emissions in all sectors by 2050. Scenarios will include assumptions on global efforts to meet Paris Accord goals.

| KEY DIFFERENCES BETWEEN SCENARIOS | | |
|--|--|--|
| | EVOLVING POLICIES | CURRENT POLICIES |
| SCENARIO PREMISE | PREMISE: Continually increasing global and Canadian action to reduce GHG emissions. The pace of increase in future action continues the historical trend. | PREMISE: Global and Canadian action to reduce GHG emissions generally stops at current levels. |
| INTERNATIONAL CRUDE OIL MARKETS | <p>GENERAL IMPLICATION: Due to increasing policy action, global crude oil demand is lower than the Current Policies Scenario.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Lower demand implies lower crude oil prices compared to the Current Policies Scenario. Brent crude oil trends gradually downward, reaching \$40/bbl 2020USD in 2050.</p> | <p>GENERAL IMPLICATION: Less policy action leads to higher global crude oil demand compared to the Evolving Policies Scenario.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Stronger demand implies stronger crude oil prices compared to the Evolving Policies Scenario. Brent crude oil averages \$70/bbl 2020USD through most of the projection period.</p> |
| INTERNATIONAL NATURAL GAS MARKETS | <p>GENERAL IMPLICATION: Due to increasing policy action, global natural gas demand is lower than the Current Policies Scenario.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Henry Hub natural gas prices rise from \$3.00/MMbtu 2020 USD in 2021, but at a slower pace than the Current Policies Scenario, reaching \$3.64/MMbtu 2020USD in 2050. Canadian liquefied natural gas (LNG) exports increase to 4.9 bcf/d by 2050.</p> | <p>GENERAL IMPLICATION: Less policy action leads to higher global natural gas demand compared to the Evolving Policies Scenario.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Henry Hub natural gas prices rise faster and higher than in the Evolving Policies Scenario, to \$4.40/MMbtu 2020USD in 2050. Canadian LNG exports increase to 7.1 bcf/d by 2050.</p> |
| LOW-CARBON TECHNOLOGIES | <p>GENERAL IMPLICATION: Increasing policy action drives increasing global adoption of low-carbon technologies, which leads to cost and efficiency improvements as technology advances.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Costs for technologies with a growing market share, such as wind and solar power, fall faster compared to the Current Policies Scenario. Emerging technologies are included on a larger scale. Performance of both technology categories improves as compared to the Current Policies Scenario.</p> | <p>GENERAL IMPLICATION: Limited policy action provides a weaker incentive for global technology adoption. Cost declines and performance of low-carbon technologies are weaker compared to the Evolving Policies Scenario.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Costs continue to improve for technologies where there is a clear trend, such as wind and solar power, but at a slower rate than the Evolving Policies Scenario. Limited inclusion of emerging technologies.</p> |
| DOMESTIC CLIMATE POLICIES | <p>GENERAL IMPLICATION: Policy action continues to increase at the pace of the historical trend.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: A hypothetical suite of future policy changes is assumed. This includes an increase in carbon pricing beyond 2030, tightening of standards for large emitters, a national ZEV mandate, and an increasingly strict emissions intensity mandate for fuels beyond 2030.</p> | <p>GENERAL IMPLICATION: Policy action is fixed to what is currently in place.</p> <p>EXPLICIT ASSUMPTION INCLUDED IN EF MODELING: Only policies that are law or near-law are included.</p> |



Questions?

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