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IMPLICATIONS FOR ATLANTIC CANADA'S ECONOMY IN THE PURSUIT OF NET-ZERO EMISSIONS

What is the Future of Oil Refining in Atlantic Canada?

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Highlights

- > The Atlantic economy depends on gasoline and diesel fuel for heat, industrial production and transportation. Our region needs to shift to producing and using cleaner fuels to meet the 2050 net-zero target, including the refined oil industry.
- > The refined oil industry in New Brunswick has been an important driver of economic activity for decades. The industry's total economic impact in the Atlantic region was \$1.5 billion in Gross Domestic Product and 4,300 jobs in 2019.
- > The Irving Oil refinery in New Brunswick is the largest refinery in Canada, with an estimated capacity of 318,000 barrels of refined petroleum per day. It accounted for 50% of the value of Canada's international refined oil exports in 2021. The Irving Oil refinery's emissions were in line with average Canadian refinery emissions in 2019.
- > The refined oil industry faces several challenges during the net-zero transition. The Clean Fuel Regulations do not allow companies to earn emissions reductions credits for export sales. Government financial support for reducing refined oil emissions in our region is limited.
- > Delays in implementing clean economy investment tax credit regulations may impede the transition by contributing to investment uncertainty. For example, the clean hydrogen investment tax credit legislation will be introduced in early 2024.
- > Several emerging technologies are creating opportunities for cleaner refined oil production in the region. Some examples are hydrogen production, fuel blending with ethanol and biofuels, biofuel production and renewable natural gas.

CONTENTS

Introduction	1
Economic importance	3
Industry emissions	6
Production of refined oil products	9
Security of refined oil supply	12
Emerging innovations for the industry	15
Conclusion	17
Key takeaways	19

The Atlantic Economic Council is the source for independent research, providing the insights and ideas that are vital to supporting a healthy, inclusive and sustainable Atlantic Canadian economy.

Introduction

The Canadian government and all four Atlantic provinces committed to achieve net-zero emissions by 2050. Many policy measures are required to achieve this target, including measures that apply to petroleum refining. The measures that affect the refined oil industry include carbon pricing and the Clean Fuel Regulations. We provide overviews of these climate actions in our report on government net-zero climate plans.

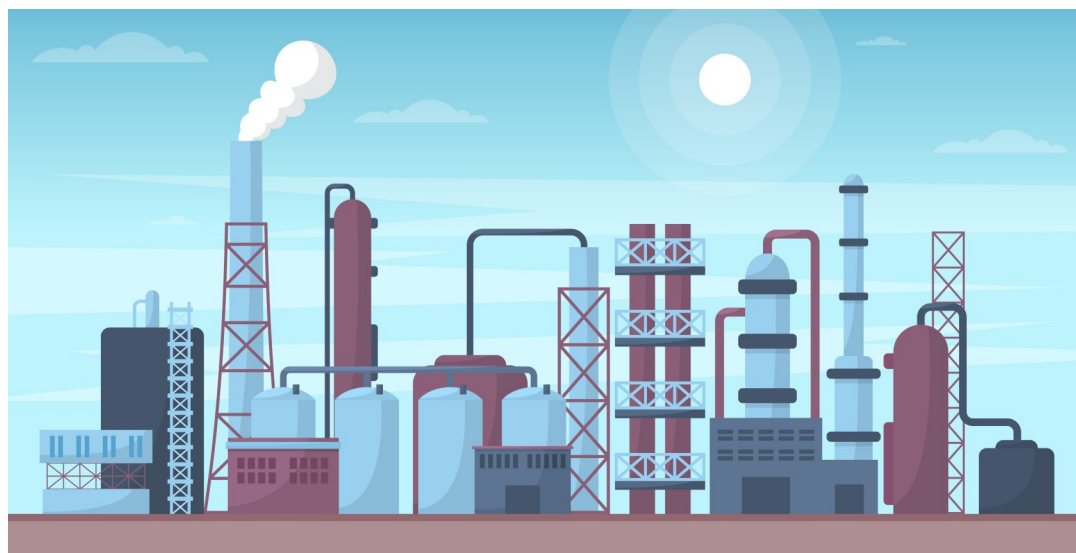
Atlantic Canada's refined oil industry is already transitioning. Imperial Oil converted its refinery in Dartmouth to a marine terminal in 2013 prior to the introduction of net-zero emissions policies. The Come-by-Chance refinery in Newfoundland and Labrador closed in 2020 and is reopening under new ownership to produce renewable diesel and potentially sustainable aviation fuel, depending on market signals. Irving Oil is the region's remaining refinery and is undergoing a strategic review. This report mainly focuses on New Brunswick, with some emphasis on Newfoundland and Labrador due to the ongoing refinery conversion. Fuel suppliers are required to reduce the carbon intensity of gasoline and diesel sold in Canada due to the Clean Fuel Regulations.

We rely on liquid fuels for daily living and running our businesses. For instance, gasoline and diesel fuel are used for personal and commercial transportation. Liquid fuels are also used for heat and power in industrial plants and homes. Petrochemical feedstock from refining can be used for fuel blending, chemical products and plastics.

Canadian fuel demand is projected to decline over time, despite current widespread applications. The federal government will no longer allow the sale of new motor vehicles with fossil-fuel engines beginning in 2035, Plug-in hybrid electric vehicles can burn fossil fuel. Policy measures to reduce emissions from large emitters will also impact the economics of the oil refining business model.

Global demand for road transport fuel is forecast to decline from 41 million barrels per day in 2022 to less than 2 million barrels per day by 2050 under the International Energy Agency's net-zero emissions scenario. Maintaining energy security beyond 2050 is important to reduce the risk of fuel supply disruptions. Otherwise, significant investments in infrastructure to import fuel products will be required, including rail, port and truck terminals. The delay in implementing the clean economy tax credits may contribute to investment uncertainty. For example, the clean hydrogen investment tax credit legislation is delayed until early 2024.

The goal of this report is to help Atlantic Canadian businesses and governments understand how the net-zero transition could impact the oil refining industry. This includes the risk that the remaining refinery in the region could close, impacting energy security. Otherwise, the Irving Oil refinery will need to make significant investments to comply with net-zero policies, including investing in low-carbon fuels, energy efficiency and renewables. This report highlights the future of oil refining in the region on the path to net-zero.



Economic importance

The refined oil industry in New Brunswick and Newfoundland and Labrador has been an important driver of economic activity for decades. The industry accounted for 1% of New Brunswick real Gross Domestic Product (GDP) in 2019. The value-added (GDP) gains do not tell the full story because they exclude the indirect and induced impacts. Irving Oil's supply chain was valued at \$250 million in New Brunswick, plus another \$150 million in the rest of Canada in 2022. Irving Oil's latest turnaround project investment of \$190 million created more than 2,300 jobs in the fall of 2023.

The refined oil industry is an important contributor to the New Brunswick and Newfoundland and Labrador economies

Economic and labour market indicators for the refined oil industry, 2019

	CA	CA (% of total)	NL	NB	NB (% of total)
Refined oil real GDP (\$ millions)	11,944	0.6	437	322	1.0
Exports of refined oil (\$ billions)	16.2	2.7	3.1	6.4	49
Value-added exports (\$ billions)	7.3	1.5	0.7	0.7	11.4
Refined oil employment (# jobs)	8,160	<0.1	675	950	0.3
Wages & salaries (\$ millions)	1,499	0.1	93	123	0.6
Average annual wages (\$ thousands)	184		138	129	
Total economic impact, 2019					
Nominal GDP (\$ millions)			888	615	
Labour income (\$ millions)			194	208	
Jobs (#)			1,860	2,440	

Note: The total economic impact in 2019 is based on application of within province multipliers for 2019, including the direct, indirect and induced impacts. Nova Scotia and Prince Edward Island are excluded because they do not have any oil refineries. The economic impact in Newfoundland and Labrador will decline after the conversion is complete and the facility will no longer be an oil refinery.

Sources: Statistics Canada, Atlantic Economic Council

The transition to low-carbon fuels will reduce the economic impact of the refined oil industry. Braya Renewable Fuels' Come-by-Chance refinery is in the midst of a [\\$428 million investment](#) to convert the plant to produce renewable diesel from used cooking oil, corn oil and animal fat. The Come-by-Chance refinery conversion to low-carbon fuels will be a smaller operation resulting in a lower economic impact. The refinery's capacity was 130,000 barrels per day and it employed 675 people, prior to its closure in 2020. The Come-by-Chance chemical refinery's capacity will decline to [18,000 barrels per day](#) and employment to about 200 jobs after [phase 1](#) of the conversion. Phase 2 includes sustainable aviation fuel. The Atlantic Economic Council estimates this investment will generate over 2,000 jobs during the construction phase, including spin-offs.

The refined oil industry has a small impact on jobs, but it is a high-wage, capital-intensive industry with a large impact on exports. The refined oil industry employed over 1,600 Atlantic Canadians as of 2019 or about 0.3% of all jobs. Almost 60% of those workers were in New Brunswick. Oil refining paid high-wages, which averaged \$63/hour and contributed \$123 million to wages and salaries in New Brunswick in 2019. Average compensation per job in oil refining was over double the all industry average.

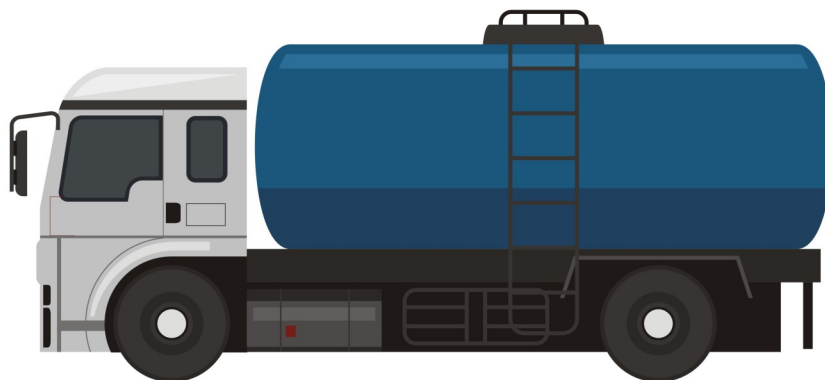
The refined oil net-zero transition may result in a clean technology labour market transition. If refineries incorporate more renewables such as production of low-carbon fuels or hydrogen, then some workers may have to transition to new occupations that require different skills and training. For example, [chemical engineers](#) at refineries can assist with hydrogen production. Irving Oil continues to invest for the long-term, suggesting its business model has factored in the transition.

The refined oil industry is a significant contributor to international merchandise goods and value-added exports. New Brunswick's refined oil exports were over \$6 billion in 2019 or almost 50% of the province's total international merchandise goods exports. For more details see the appendix in our net-zero [energy report](#).

The refined oil industry has a large economic impact, including spin-offs. We estimate the total economic impact of oil refining in New Brunswick and Newfoundland and Labrador created about \$1.5 billion in nominal GDP and over 4,300 jobs in 2019. Newfoundland and Labrador comprised over 40% of total employment and wages and salaries created by the oil refining industry in the Atlantic region in 2019. The closure of the Imperial Oil refinery in Nova Scotia in 2013 removed about \$140 million in direct GDP and 265 direct jobs. The Nova Scotia economy rebounded from the refinery closure, as non-energy GDP and total population continued to expand. Irving Oil reactivated its [Woodside marine terminal](#) in 2015.

Clean fuel investments are transforming the energy mix in Atlantic Canada. The federal government announced a potential \$86 million investment in Braya Renewable Fuels' Come-by-Chance refinery under the Clean Fuels Fund and the Strategic Innovation Fund in 2023. The Canadian Fuels Association estimates Canadian fuel suppliers will spend about \$8 billion on low-carbon solutions. Irving Oil's latest sustainability report highlights investments in a five megawatt hydrogen electrolyzer, renewable natural gas and renewable energy certificates from Saint John Energy.

Federal support programs are available for oil refineries to assist with the transition to net-zero. For instance, a refinery could apply for the Smart Renewables and Electrification Pathways program to invest in a wind farm to supply renewable energy to its operations to earn credits under the Clean Fuel Regulations or Output-Based Pricing System. Federal clean investment tax credits for electricity, hydrogen and clean technology are in the early stages of development. The Canada Infrastructure Bank provides financing for clean power, trade and transportation, and green infrastructure. For instance, the Canada Infrastructure Bank provided a \$277 million loan for construction of a \$1.2 billion biofuel facility in Quebec.



Industry emissions

Oil and gas, including upstream (production) and downstream (refining and distribution) emissions, accounted for about 25% of total emissions in both New Brunswick and Newfoundland and Labrador in 2019 versus about 28% in Canada. Most upstream oil and gas activity takes place in Alberta, Saskatchewan, and Newfoundland and Labrador.

Irving Oil accounts for over 17% of refining capacity in Canada. Irving Oil wants to reduce its Scope 1 and 2 emissions by 30% below 2005 levels by 2030. Scope 1 emissions include direct emissions, for example, from boilers, process equipment and vehicles. Scope 2 emissions include indirect emissions from purchased electricity generation.

The Government of Canada is proposing a framework to reduce oil and gas sector emissions by 35-38% below 2019 levels by 2030. Irving Oil imports most of its crude oil feedstock from other countries. The refinery imports modest volumes of oil from other provinces. The price of Canadian crude oil will likely increase because the proposed framework will encourage Canadian oil and gas producers to invest to reduce emissions.

Refined oil industry accounts for a large share of New Brunswick's emissions

Emissions from the oil and gas sector, 2019 (megatonnes of CO₂e and % of emissions of CO₂e)

	CA	ATL	NL	NB
Oil and gas				
Megatonnes of CO ₂ e	201.3	5.9	2.8	3.2
% of total emissions of CO ₂ e	28	14	25	25
Upstream oil and gas (% of total emissions of CO ₂ e)	25	4	16	0.4
Downstream (refining) oil and gas (% of total emissions of CO ₂ e)	3	10	9	24

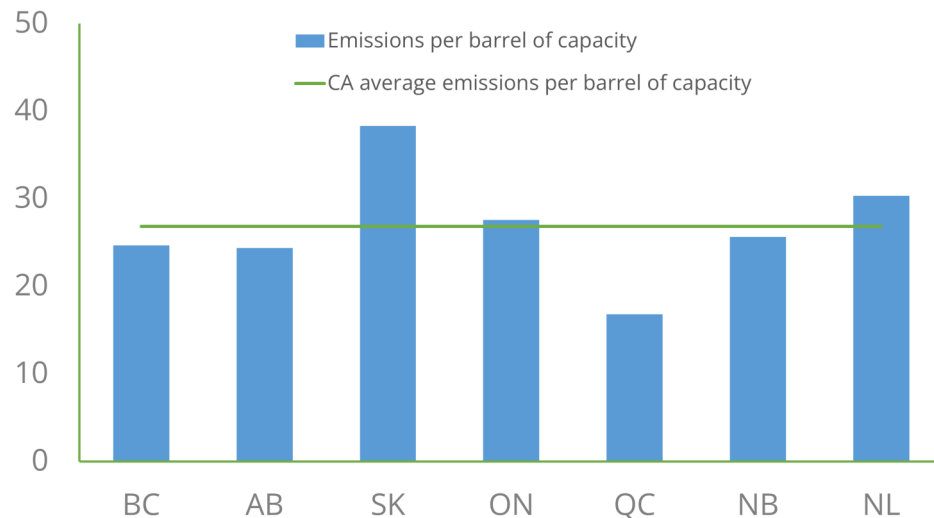
Source: Environment and Climate Change Canada, [National Inventory Report](#)

Petroleum refineries have made progress towards the net-zero transition, as Canadian oil refining emissions in 2021 have declined by 26% since 2005. For instance, Irving Oil’s 90 megawatt Grandview cogeneration plant came online in 2005, which contributed to the decline in emissions. There have also been refinery closures, such as Imperial Oil in Dartmouth in 2013 and North Atlantic in Come-by-Chance in 2020. Other [refinery closures](#) include Suncor in Oakville (2005), Shell Canada in Montreal (2010), and Parkland in Bowden (2012). The remaining refineries in Eastern Canada benefitted from higher fuel demand because four of the five refineries that closed since 2010 were in Eastern Canada. A new refinery opened in Alberta in 2017.

National refined oil emissions were 16 megatonnes in 2021 as compared to 22 megatonnes of emissions in 2005. The closure of the Come by Chance refinery in 2020 reduced refined oil emissions in Newfoundland and Labrador by 1.4 megatonnes. New Brunswick’s refined oil emissions declined by 1.2 megatonnes or 28%, since the peak in 2010. The Irving Oil refinery represented 16% of the nation’s refined oil emissions in 2019, but only 0.4% of Canada’s total emissions from all sectors. The refinery’s emissions per barrel of capacity were 4% below the national refining average in 2019 at 27 kilograms.

New Brunswick refinery emissions are marginally below the average Canadian refinery

Emissions per barrel of capacity, select provinces, 2019 (kg CO₂e per barrel)

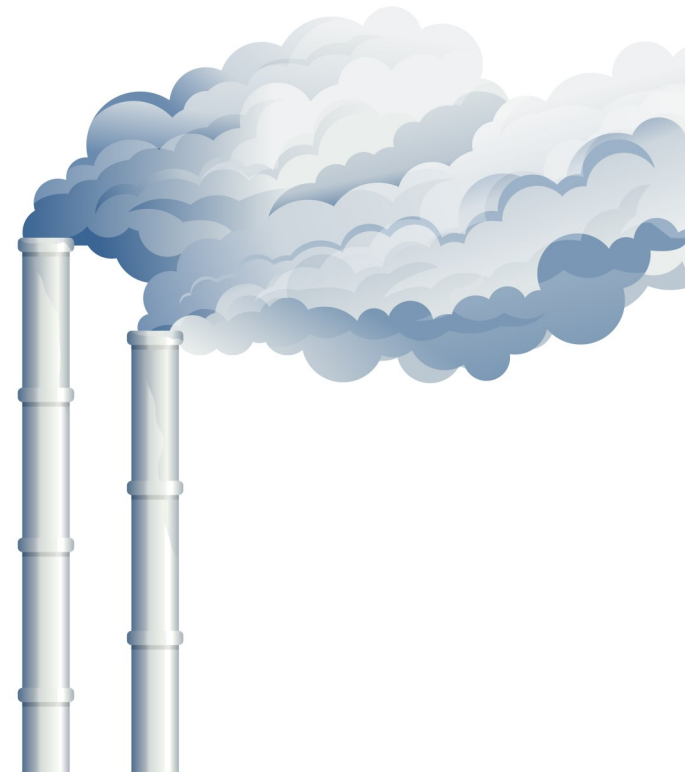


Note: Refined oil emissions excludes upstream and downstream emissions. Provinces selected had oil refining capacity during this period.

Sources: Environment and Climate Change Canada ([National Inventory Report](#)), [Canadian Fuels Association](#), Atlantic Economic Council

Canada's clean economy policy framework is quite different when compared to the US. Canada relies on carbon pricing, clean fuel and other regulatory measures, and investment incentives to help reduce emissions. The US relies more on incentives to support decarbonization, since it depends less on a regulatory framework to reduce emissions. For example, the US Inflation Reduction Act includes a clean fuel production tax credit and a clean hydrogen production tax credit, which provide a direct payment option to help reduce US emissions. Canada's clean economy tax credits are refundable and provide support for heat and electricity generated from waste biomass, but do not refer to inclusion of specific biofuels. This may reduce the economic benefits of biofuel production within Canada in favour of other countries.

TD Bank reported Canada's climate change framework helped generate clean energy investments valued at \$139 billion since federal budget 2021 or 5% of national nominal GDP as compared to 1.5% of US GDP in investments from US policy measures. Canada's net-zero policy approach is consistent with how it applies other policies, using a mix of regulations and supports. However, Canada must continue to monitor the competitiveness of its net-zero supports or risk firms relocating to other countries.



Production of refined oil products

Oil refinery production has changed over time mainly due to feedstock availability and factors that influence profitability. Factors impacting profitability include crude oil and fuel prices due to their influence on refiner margins. Older refineries face significant investments necessary to upgrade aging infrastructure to today's regulatory standards. The 128 year old [Phillips 66 Rodeo refinery](#) recently invested US\$850 million to convert the refinery to renewable fuels. Irving Oil's refinery opened in 1960, which suggests a net-zero transition is viable but at a significant cost. For instance, turnaround projects cost an average \$200 million per year, as previously noted.

[Fuel charges](#), the federal [Clean Fuel Regulations](#) and other government net-zero measures will increasingly influence the refined oil production mix, including the switch to low-carbon fuels. Irving Oil has been upgrading refining processes to reduce its [environmental impact](#) and is examining lower emission inputs and the production of lower carbon fuels.

The Irving Oil refinery is the largest in Canada with a capacity of about [318,000 barrels per day](#). This facility is important for Atlantic Canada's energy security. The Atlantic region may have to import more refined petroleum products if the refinery partially or fully converted to renewable fuels.

Some of the refined oil is consumed locally while the rest of it is exported. The volume of [exports](#) of refined oil from New Brunswick to other countries exceeded 100 million hectolitres in 2022. The value of international exports of refined oil represented about 78% of New Brunswick's and Newfoundland and Labrador 's combined [refined oil exports](#) in 2020, including international and interprovincial exports.

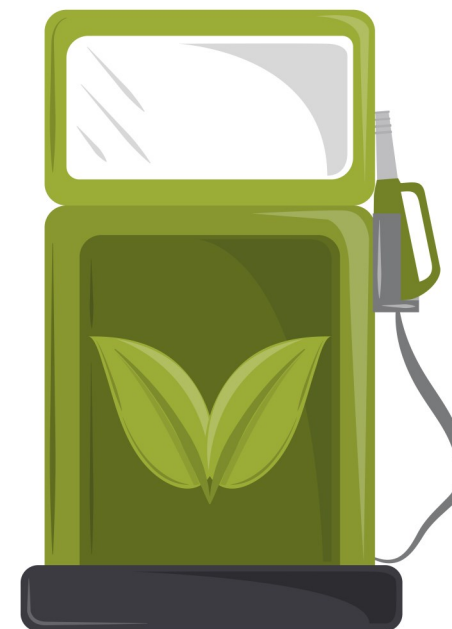
The number of refineries in Canada declined from [40 in the 1970s](#) to [15 in 2023](#). There will be fewer global oil refineries in 2050. Global oil demand for road transport is forecast to decline 96% by 2050 relative to 2022 levels under the net-zero scenario, according to the [International Energy Agency](#). Global emissions from the energy sector are expected to peak within the [next decade](#) due to the rapid pace of investments in clean energy technology and eventual decline in global oil demand. This may slow the rate of investment in new oil supply. However, ongoing demand for refined petroleum will continue beyond 2050, including low-carbon fuels.

The federal government has enacted several net-zero policies affecting refined oil production. Navigating compliance with these policies can be complicated and time consuming, potentially leading to increased expenses, particularly in administrative costs. Vague rules and ineligibility for certain clean energy investments can act as net-zero transition deterrent. For instance, New Brunswick's [Output-Based Pricing System](#) is based on a performance standard tied to total production, including domestic and export sales. The Clean Fuel Regulations are based on a performance standard tied to fuels used in Canada.

Net-zero regulations impacting refined oil

Federal and provincial regulations on refined oil will result in clean fuel investments and more fuel blending. However, production costs will rise due to investments in energy efficiency and renewables. The risk of refinery closure is lower under certain scenarios. Global oil demand for road transport declines 14% by 2050 relative to 2022 levels under the International Energy Agency's [stated policies scenario](#).

New Brunswick's Output-Based Pricing System, which was assessed by the federal government as meeting the minimum national stringency standards or benchmark criteria, replaced the federal Output-Based Pricing System. Emissions reduction factors are applied to the emissions intensities to establish output-based standards. The New Brunswick [performance standard reduction factor](#) starts at 99% in 2021 and falls to 82% by 2030. A lower emissions reduction factor results in a more stringent output-based standard. The federal [Clean Fuel Regulations](#) maintain blending requirements under the federal [Renewable Fuel Regulations](#). The Renewable Fuel Regulations required fuel producers and importers to have a national minimum blend rate of 5% and 2% renewable fuel content in gasoline and diesel, respectively, but provinces have the ability to set higher blend rates.



The Clean Fuel Regulations lead to a risk that refined oil production will leave New Brunswick for a country with less net-zero restrictions. This outcome is known as carbon leakage because refineries are trade-exposed and emissions intensive. Carbon leakage occurs when production moves from a jurisdiction with stringent climate policies to a jurisdiction with no or lower cost climate policies. We provided a more complete overview of the Clean Fuel Regulations in a previous net-zero report. The federal government estimates the Clean Fuel Regulations will reduce real GDP in the Atlantic provinces by 0.6% to 1% in 2030, as higher gas and diesel prices reduce real output for sectors using these fuels in production processes.

The Clean Fuel Regulations only provide credits for fuel used in Canada. Fuel that is exported is not eligible for credit creation. About 20% of Irving Oil's sales are for domestic fuel use. As such they create proportional credits for their investments under Compliance Category 1 of the Clean Fuel Regulations. This financial restriction may impact decarbonization because the national policy does not factor in regional differences. Carbon intensity is the grams of CO₂e per megajoule of energy contained in fuel that is released over the lifecycle of the fuel. The Clean Fuel Regulations do not apply to international exports of gasoline and diesel fuel. International exports of refined oil accounted for 71% of the value of refined oil output in 2020 in this region versus 22% in the rest of Canada.

The \$1.5 billion federal Clean Fuels Fund will help de-risk capital investment in clean fuel production. The limited availability of locally-produced ethanol and biofuels requires most fuel for blending to be imported into Atlantic Canada. For instance, this region is estimated to have less than 5% of Canada's renewable natural gas feedstock potential. Most blending requirements in this region will initially be met via imports, until investments in low-carbon solutions take place. Braya Renewable Fuels is investing in low-carbon solutions, as previously noted. However, Braya Renewable Fuels will not initially have access to local feedstock for blending purposes.

Security of refined oil supply

Maintaining energy security and fighting climate change are interconnected global objectives to help ensure socio-economic stability. Canada has a decent ranking versus its OECD peers in terms of energy security. The nation's ranking in the 2018 International Energy Security Index is five percentage points below the OECD average. However, Canada's ranking would be better if not for its high energy consumption per capita, high transport energy per capita and poor environmental performance.

The global transition to net-zero emissions is expected to reduce refining margins as carbon pricing schemes increase costs, putting some refineries at risk of closure. Irving Oil invested an average \$200 million per year in turnaround projects and sustainability over the last two decades, suggesting it is a profitable refinery that should be able to navigate the net-zero transition. These Irving Oil investments helped maintain energy security. These investments also supported domestic and export sales, as well as the local supply chain and job market.

World oil demand forecast to fall almost 80% by 2050 relative to 2022 levels, based on net-zero scenario

Global oil demand by sector, stated policies (STEPS) and net-zero emissions (NZE) scenarios (millions of barrels per day)

	2010	2022	2030 - STEPS	2030 - NZE	2050 - STEPS	2050 - NZE
Road transport	36	41	41	29	36	2
Aviation and shipping	10	11	14	10	17	2
Industry	17	21	23	20	26	14
Buildings and power	12	11	10	6	7	<1
Other sectors	11	13	14	11	12	6
Total oil demand	87	96	102	78	97	24
Biofuels	1	2	3	6	4	5
Hydrogen-based fuels			0	<1	<1	6

Note: Global oil demand total may not add due to rounding. The stated policies scenario (STEPS) provides an outlook based on the latest policy settings, including energy, climate and related industrial policies. The net-zero emissions (NZE) scenario limits global warming to 1.5°C by 2050.

Source: International Energy Agency, World Energy Outlook 2023

The Atlantic region's fossil fuel use would be limited beyond 2050 under the International Energy Agency's net-zero scenario. Maintaining a local supply of refined oil will limit additional costs due to imports. For example, significant infrastructure investments may be required to import more fuel products if Irving Oil were to partially or fully convert to renewable fuels. Those investments would add to the cost of imported fuel, including the cost of local infrastructure, transportation costs and fuel premiums to meet domestic product specifications.

Global oil demand remains static under the International Energy Agency's stated policies scenario. The path to net-zero is uncertain given there are many scenarios on future energy demand and policy frameworks. This region cannot afford to lose its last remaining refinery due to competitive issues and a lack of provincial supports. This region has higher per capita fuel use relative to the rest of Canada. Imported fuel would be costlier. Imported fuel has additional transportation costs, whether it is sourced domestically outside the region or from other countries. There are limited provincial supports in this region to support oil refining's net-zero transition, unlike in Alberta, British Columbia and Saskatchewan.

One option to put domestic oil refineries on a level competitive playing field with foreign refineries is to consider implementing a carbon border adjustment. There are differences in net-zero policy commitments across countries and the timing of implementation of these policies. A carbon border adjustment mechanism can help address these disparities in a coordinated way. Canada is considering adopting such a mechanism and engaging with other countries on this option. It is unclear how it would interact with existing net-zero policies.

Some countries with oil refineries may not have as stringent net-zero policies, placing our refineries at a carbon cost disadvantage. A carbon border adjustment is a tariff on international imports of emissions intensive products. A carbon border adjustment could apply to a broad range of emissions-intensive products that are traded. The Clean Fuel Regulations only apply to liquid fuels sold in Canada that are produced domestically or abroad. The carbon border adjustment takes into account different carbon costs when producing and trading goods across countries. A carbon border adjustment can improve competitiveness and achieve the following objectives:

- > Reduce the risk of carbon leakage for trade-exposed, emissions intensive industries
- > Increase competitiveness by creating a level-playing field between countries in terms of carbon costs
- > Support domestic policy development to achieve net-zero emissions by levelling the playing field
- > Support international policy development to achieve net-zero emissions by minimizing the carbon tariff and gaining market access

Canada is exploring carbon border adjustment options, which could put oil refineries on a level-playing field. The European Union is the only jurisdiction with a carbon border adjustment, but other countries are examining this option. The European Union carbon border adjustment does not include oil refineries. It's unclear why the European Union carbon border adjustment excludes oil refineries. However, the European Parliament is examining inclusion of refined petroleum. Wood MacKenzie predicts the European Union will eventually add refined petroleum to the carbon border adjustment mechanism.

The proposed Market Choice Act in the US includes a carbon border adjustment tax on imported refined petroleum and other emissions intensive products, starting in 2025. This proposed Act is one of several pieces of legislation introduced to the US Congress that includes refined petroleum carbon border adjustment taxes or fees. The proposed US legislation may not have wide support and not every bill tabled in the US Congress becomes law.



Emerging innovations for the industry

Significant investment in oil refining innovation is required to meet net-zero goals while existing refineries remain operational, as explained in our report on [assessing the net-zero plan](#). Below are some examples of clean energy technologies that refined oil companies are exploring. The timing and magnitude of their potential to reduce overall emissions are uncertain.

- > **Hydrogen** is anticipated to [contribute](#) to the net-zero energy transition. Refineries use hydrogen to remove pollutants and convert gasoil into gasoline and diesel. [Irving Oil](#) is investing in hydrogen solutions, including production and fueling for transportation. [Valero](#), which operates a refinery in Quebec, plans to create low-carbon hydrogen from propane to reduce hydrogen from fossil-fuel. The US federal government recently announced [US\\$7 billion](#) in support for development of seven regional hydrogen hubs.
- > **Renewable natural gas** projects that convert waste to energy can be used to create low-carbon fuels and, in some cases, create compliance credits under the Clean Fuel Regulations. [Irving Oil](#) and [Valero](#) are investing in renewable natural gas. This includes Irving Oil accessing renewable natural gas from [Anaergia Inc.](#) Renewable natural gas used in hydrogen production is eligible for the [clean hydrogen tax credit](#) under certain conditions.
- > **Biofuels** help reduce emissions from transportation fuels. [Irving Oil](#) invested \$5 million in its Woodside marine terminal so it can blend up to 15% ethanol with gasoline. Irving Oil can blend up to 10% ethanol with gasoline at its Saint John refinery. [Imperial Oil](#) has five biofuel blending and distribution initiatives underway, including ethanol and biodiesel. Imperial Oil is developing a \$720 million [renewable diesel complex](#) at its Strathcona refinery that will have a capacity of 20,000 barrels per day by the end of 2024. Braya Renewable Fuels is investing in biofuels, as previously noted. [Parkland Corporation](#) is investing in a renewable diesel complex. The [Clean Fuels Fund](#) provides federal government support for biofuels and hydrogen projects, including feasibility studies. However, ethanol blending is ineligible under the Clean Fuels Fund. The federal clean economy tax credits do not directly include biofuels.

- > **Carbon capture** could play a role in reducing oil refining emissions. Valero is researching a carbon capture membrane technology for use in vehicles. An early pilot shows it removes over 90% of emissions. The Horton region in southeastern New Brunswick and offshore Nova Scotia oil and gas wells have carbon capture and storage potential, according to Dalhousie University. Irving Oil's partnership with TC Energy provides opportunities for carbon capture. The Canada Growth Fund recently invested in a carbon capture project.
- > **Renewable power** investments can help reduce emissions from electricity used in refining operations, which are part of Scope 2 emissions. Irving Oil's purchase of renewable energy certificates from Saint John Energy's Burchill wind farm is a step in the right direction. In addition, the 2023 federal Fall Economic Statement recently proposed the expansion of the Clean Electricity and Clean Technology Investment Tax Credits to include technologies that generate electricity and/or heat from waste biomass.
- > **Improving efficiency** can reduce Scope 2 emissions. Irving Oil and TC Energy developed a cogeneration facility to reduce emissions.
- > **Electric vehicles** (EVs) provide opportunities for oil refineries to invest in electric vehicle fleets and charging stations at branded service stations. Irving Oil is a leading EV-charging host through partnerships with Tesla, NB Power, Newfoundland Hydro and others, at fuelling stations across Atlantic Canada, New England and Quebec.



Conclusion

The oil refining industry and the fuel distribution supply chain are a significant contributor to the Atlantic Canadian economy. However, the industry's regional presence is shrinking due to the closure of the Imperial Oil refinery in Nova Scotia and North Atlantic refinery in Newfoundland and Labrador. Refined oil remains an important part of the New Brunswick economy, while the refinery in Newfoundland and Labrador is converting to a smaller biofuel facility. The industry's jobs and exports create significant incomes for many in the region.

The net-zero energy transition may result in the partial or full conversion of the Irving Oil refinery to renewable fuels, due to declining global demand for gasoline, diesel and other fossil-based fuels. Irving Oil will likely remain operational during the transition, since it continues to invest and global fuel demand will exist beyond 2050. Fuel users may have to rely on more expensive imports. The refinery will need to invest to reduce emissions to comply with the Clean Fuel Regulations, Output-Based Pricing System and other net-zero policies.

Increased biofuel blending and production provide an opportunity for the refining sector to be a leading contributor towards meeting transportation climate goals. However, fuel prices would increase and energy security of supply would be at risk if the Irving Oil refinery partially or fully converts to renewable fuels. Imported fuels will likely boost global emissions because of transport emissions and less stringent net-zero policies in other countries producing refined oil. Some global oil refineries will close due to competitive factors. Government net-zero policies can impact competitiveness, For instance, rising costs due to carbon pricing schemes result in unprofitability.

Some global oil refineries will convert to low-carbon fuels, This appears feasible for Irving Oil. The limited feedstock available in this region and low global demand for biofuel signal there may be challenges for Irving Oil to make the conversion. For instance, Braya Renewable Fuels capacity will be lower than North Atlantic's oil refinery capacity. Global demand for biofuels and hydrogen-based fuels will not replace reduced demand for fossil fuels, due to greater electrification as we move towards net-zero.

The Irving Oil refinery will need to make clean energy investments to meet net-zero regulations, while it operates. Canadian oil refineries will need to significantly invest in clean technologies, improve energy efficiency and utilize more renewables to achieve net-zero emissions. These changes will lead to higher fuel prices in the interim, as refineries seek a return on their investments while they are transitioning. There are many opportunities to invest in emerging innovations to produce cleaner fuels, including hydrogen, renewable natural gas and biofuels. Having access to clean economy investment tax credits should help promote investments and the energy transition.

Having a coherent and stable Canadian regulatory framework helps maintain industry competitiveness during the net-zero transition. Recent regulatory changes will require clean economy investments. However, the Clean Fuel Regulations are expected to have a negative impact on the only remaining oil refinery in Atlantic Canada. These potential impacts are complicated by uncertainty over the availability and cost of new technologies (i.e., hydrogen, electric vehicles) and overall demand for transportation fuels.





IMPLICATIONS FOR ATLANTIC CANADA'S ECONOMY IN THE PURSUIT OF NET-ZERO EMISSIONS

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- > [Overcoming Obstacles to a Cleaner and Bigger Electricity System](#)
- > [Economic Opportunities with Existing Clean Energy Technologies](#)

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- > Industry Dive: Agriculture

Key takeaways

Refineries

- > Continue to examine ways to reduce carbon intensity and use energy more efficiently. This could include use of hydrogen, blending fuels, biofuel production, renewable natural gas and generating your own renewable power.

Supply chain for refined oil industry

- > Service stations: Continue to invest in electric vehicle charging networks and hydrogen vehicles to provide opportunities to reduce emissions and earn credits by switching to low-carbon fuels. Also, continue to invest in renewables, such as [solar panels](#).
- > Refinery supply chain: Diversify your revenue base to reduce any risk associated with the remaining refinery in the region partially or fully converting to low-carbon fuels.



Governments

- > Ensure the Output-Based Pricing System performance standards for oil refineries help reduce emissions, but not at the expense of competitiveness.
- > Ensure the Clean Fuel Regulations complements the Output-Based Pricing System and limits the compliance burden for oil refineries. Governments should look for opportunities to streamline policies, rather than have different sets of rules aimed at achieving the same net-zero outcome.
- > Apply an energy security lens when designing policies and regulations to avoid energy shortages as we decarbonize the economy.
- > Consider expanding clean economy tax credits to include biofuels. The clean technology and electricity tax credits were expanded to include biomass in the [2023 Fall Economic Statement](#). The implementation of the US clean fuel production tax credit and the extension of [second-generation biofuels incentives](#) pose a risk to our competitiveness.
- > Update the Regulatory Impact Analysis Statement as part of the planned review of the Clean Fuel Regulations. Determine if the policy is meeting its stated goals within the cost-benefit analysis framework.
- > Consider providing provincial supports for hydrogen, biofuels and carbon capture and storage, like [Alberta](#), [British Columbia](#) and [Saskatchewan](#).

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