



A Pivotal Moment

A net-zero 2050 can deliver 700,000 more Canadian energy jobs than exist today, but rolling back climate action would severely threaten this clean energy future

March 2023

CONTENTS

- 3 The opportunity of the century
- 5 Why net zero?
- 7 The job generator
- 9 Breaking down Canada's clean energy sector
- 11 Success is a choice
- 16 Methodology
- 17 Net zero near you
- 27 Planning for the inevitable future
- 29 Endnotes

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CENTRE FOR DIALOGUE





Photo credit:
General Motors of Canada

The opportunity of the century

The world's biggest race is well underway, and there is no stopping it.

The U.S. recently made the single largest investment in climate and energy in American history in the form of the Inflation Reduction Act,¹ only to be matched by the EU announcing its own multi-billion-euro Green Deal Industrial Plan.² Meanwhile, China is dominating supply chains with 60% of the world's clean energy technology manufacturing.³

Put simply, the energy transition is an impending reality, with 92% of global GDP now covered by net-zero commitments. Accordingly, decisions made today will shape the success of Canada's own energy sector in the years ahead.

But while emissions will plunge in a net-zero Canada, energy jobs certainly will not. **Canadian jobs in clean energy are set to grow 7% a year, from 509,000 in 2025 to 2.7 million in a net-zero 2050.** That's according to new modelling by Clean Energy Canada and Navius Research, which investigated different Canadian energy scenarios out to 2050.

While there will be a 1.5-million job decline in fossil fuels in a net-zero scenario (the world will want a lot less oil and gas), this is far exceeded by the 2.2-million job increase in the clean energy sector.

Canada's clean energy sector is made up of companies and workers that help reduce carbon pollution, whether by generating clean energy, helping move it, reducing energy consumption, or developing low-carbon technologies. It is a truly pan-Canadian sector, from the assembler producing electric vehicles in Windsor, to the construction worker building energy-efficient housing in Yellowknife, to the drill operator on a geothermal plant near Saskatoon.

The inflation-adjusted GDP of the clean energy sector would increase to become six times larger in a net-zero 2050 compared to 2025, while the GDP of fossil fuels would halve. The result is that Canada's clean energy sector in 2050 would be worth 63% more than Canada's fossil fuel sector in 2025, even after inflation.

It's a prosperous picture, and yet it is not an inevitable one.

A number of key climate policies implemented in the last few years help drive clean energy job growth, namely Canada's carbon price and the federal government's 2030 Emissions Reduction Plan. In a scenario based on current climate policy (reaching net zero would require additional action), there would be 3.6 million energy jobs in 2050 in both clean energy and fossil fuels.

This is Canada's current trajectory.

We also investigated what would happen if a future government chose to roll back Canada's key climate measures. In this scenario, there would be 100,000 fewer total energy jobs by 2050.

The reality is that, no matter what policy choices Canada makes domestically, a decarbonizing world wants more clean energy and fewer fossil fuels. Indeed, jobs in the oil sands and oil production are set to decline by at least 93% between 2025 and 2050, regardless of what policies are in place. Already, the number of people working in clean energy jobs globally recently overtook fossil fuels for the first time.⁴ Denying the inevitable doesn't prevent it, but it does risk Canadian energy jobs.

While the sun may be setting for some sectors, a new dawn of energy opportunity is shining brightly even on Canada's fossil-fuel-producing regions. In our net-zero scenario, jobs in Alberta's clean energy sector will grow 10% a year out to 2050—the fastest of any province or territory. Between 2025 and 2050, there would be 419,000 clean energy jobs added in the province, significantly more than the 324,000 job decline expected in fossil fuels.



There are set to be **1.3 million Canadians employed in EV-related jobs in 2050—60 times more than in 2025.**

Canada-wide, perhaps the biggest clean energy success story on the net-zero journey is the electric vehicle industry. There are set to be 1.3 million Canadians employed in EV-related jobs in 2050—60 times more than in 2025. Indeed, Canada is already a world leader in clean transportation, whether it's startups like B.C.-based Loop Energy, which makes hydrogen fuel cells, or big global manufacturers like Ontario-based Magna International, which makes parts for new EVs.

Meanwhile, almost half a million people will be employed to supply clean energy in Canada in 2050. From the technician on an Indigenous-owned wind farm in Nova Scotia to the engineer at a clean hydrogen facility in Alberta, there will be almost 60% more workers supplying clean energy in 2050 than in 2025.

Put simply, the future is bright for a Canadian energy sector that plans for this new reality. Rejecting net zero, on the other hand, is betting against the world's biggest economies and banking on climate failure. Canada has a simple choice to make: to sail with the wind or stubbornly against it.

What was modelled?

NET-ZERO

A scenario where Canada reaches net-zero emissions (in other words, where any remaining emissions are balanced by equivalent removals). This scenario is policy agnostic and delivers emissions reductions in the most cost-efficient way.

CURRENT POLICY

A scenario that assumes only current and recently announced policies are fully implemented (see table on page 13). These policies are mostly aimed at achieving Canada's 2030 emissions reduction target of 40% to 45% below 2005 levels. As a result, this is not a net-zero scenario, and additional actions are required to meet Canada's 2050 net-zero target.

ROLLBACK

A scenario that assumes a future government rolls back the federal carbon price (for both consumers and industry), the federal 2030 Emissions Reduction Plan, and the federal Clean Fuel Regulations.

Why net zero?

Net zero by 2050 is arguably the world's biggest deadline. It's the year by which most countries agree we must stop adding carbon to the atmosphere if we wish to avoid the most devastating impacts of climate change.

To date, 88% of global emissions, 92% of global GDP, and 85% of the world's population exists in jurisdictions with some kind of net-zero commitment.⁵ Whether the commitment comes from a small Indigenous community near the Arctic Circle or a huge multinational conglomerate, net zero is changing the world.

While the necessity to halt climate change is the linchpin of the 2050 timeline, decarbonization is also driven by simple economic and geopolitical realities. Already, the world's biggest economies are investing billions in the energy transition, and the US\$369 billion Inflation Reduction Act has massively raised the global bar.

What's more, countries are turning to clean energy as a way out of reliance on imported Russian oil and gas. Germany, for instance, has plans to double its wind and almost quadruple its solar capacity by 2030.⁶ Meanwhile, clean energy is simply cheaper than fossil fuels in many situations. The cost of new solar projects declined globally by 88% between 2010 and 2021, while onshore wind fell by 68%.⁷

In fact, for the first time ever, the International Energy Agency forecasts a peak or plateau for all fossil fuels under current policies (a scenario that assumes no future policies are introduced to accelerate the energy transition) in the next few years.⁷

Put simply, net zero isn't just the pipedream of an ESG-hungry era—it's an inevitable macroeconomic trend.

Germany has plans to double its wind and almost quadruple its solar capacity by 2030.⁶



ON THE ROAD TO NET-ZERO

133 countries, 246 cities, and 826 companies have adopted or are considering net-zero targets

● Target declared or achieved ● Proposed or under discussion ● No target

Old Crow, one of the most remote communities in the Yukon. **Net zero by 2030.**^{8,9}

Siemens, global tech firm headquartered in Munich, Germany. **Net zero by 2030.**¹¹

Coca-Cola, headquartered in Atlanta, Georgia. **Net zero by 2050.**¹⁰

KCB Group, a bank based in Nairobi, Kenya. **Net zero by 2050.**¹⁴

The City of Sydney, Australia. **Net zero by 2035.**¹²



The U.S., the world's largest economy. **Net zero by 2050.**¹⁶



The EU, made up of 27 countries. **Net zero by 2050.**¹⁵



China, the world's most populous country. **Net zero by 2060.**¹³

The job generator

A net-zero 2050 is good news for the climate and Canadian energy jobs alike. In a net-zero scenario, **jobs in clean energy are set to grow from 508,800 in 2025 to 2.68 million—an increase of 7% a year.**

Jobs in the fossil fuel sector are set to decrease from 2.25 million in 2025 to 776,000 in 2050. **While the future sees almost 1.5 million fewer jobs in fossil fuels, there will be well over 2 million added to the clean energy sector.**

The GDP of the clean energy sector would increase to become six times larger in a net-zero 2050 compared to 2025, while the GDP of fossil fuels would halve. Canada's clean energy sector is set to be worth 63% more than Canada's fossil fuel sector in 2025.

In short, while fossil fuels will be contributing less to the Canadian economy in the future, the clean energy sector more than makes up for it.

The clean energy opportunity is also a pan-Canadian one, with every single province and territory seeing significant clean energy sector growth. What's more, a U.S. study found that clean energy jobs offer higher wages than the national average, with jobs in hydropower paying 41% better than the median wage, while jobs in wind and solar offer 37% and 28% more, respectively.¹⁷

In a net-zero 2050, clean energy jobs are set to grow from 508,800 in 2025 to 2.68 million.



IN A NET-ZERO 2050:

2.2 Million

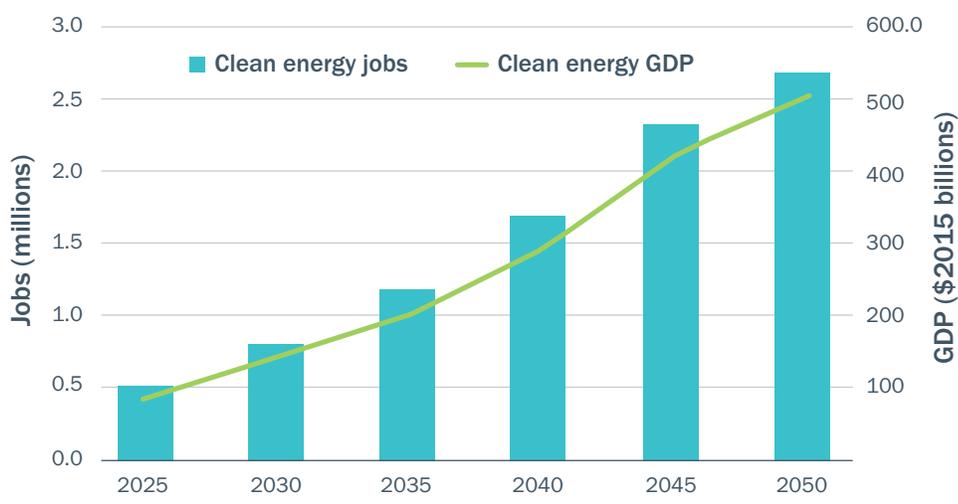
MORE CLEAN ENERGY JOBS

1.5 Million

FEWER FOSSIL FUEL JOBS

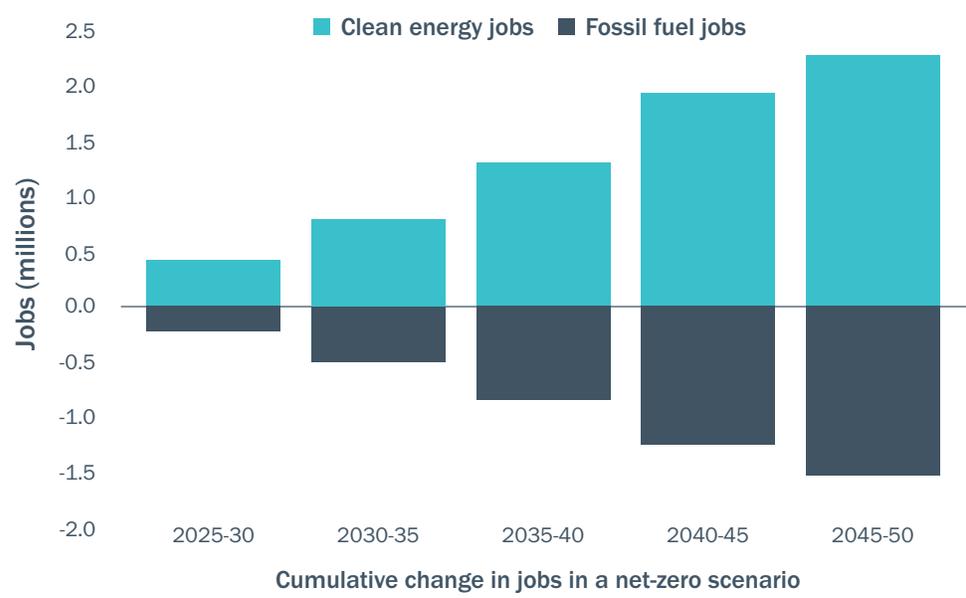
+700,000

TOTAL CANADIAN ENERGY JOBS



The clean energy sector is **growing**

Jobs in clean energy make up for declines in fossil fuels



Breaking down Canada's clean energy sector

Of the 2.68 million jobs in the clean energy sector in a net-zero 2050, 1.63 million will be in clean transportation, from the assembly worker making a new passenger sedan, to the driver behind the wheel of an electric delivery truck, to the lab technician designing a new hydrogen fuel cell. In fact, the number of people employed in the electric vehicle industry in 2050 is set to be 60 times greater than in 2025—with an 18% increase each year.

The second-biggest job generator is clean energy supply, which will support 478,700 workers in a net-zero 2050. Whether it's on a wind farm in Nova Scotia or a clean hydrogen facility in Alberta, there will be almost 60% more Canadians working to supply clean energy in 2050 than in 2025. Clean hydrogen production is one of the fastest growing industries within clean energy supply, with jobs growing 30% a year between 2025 and 2050, eventually employing 13,400 Canadians.

There will also be 391,000 Canadians working in clean buildings. Jobs in clean heating, ventilation, and air conditioning, like installing heat pumps, will grow especially fast, with 105,300 Canadians employed in the sector in 2050, more than eight times the number employed in 2025.

Penticton-based Structurlam makes products
for modern mass timber buildings.

Photo credit: Structurlam



Canadian clean energy jobs IN A NET-ZERO 2050



What's in the clean energy sector?



CLEAN ENERGY SUPPLY

- Wind
- Solar
- Hydro
- Nuclear
- Geothermal
- Tidal
- Electricity grid infrastructure
- Biofuels
- Waste to energy
- Carbon capture and storage for clean energy supply
- Clean hydrogen production and pipelines
- Small modular reactors



CLEAN TRANSPORTATION

- Electric vehicles and charging infrastructure
- Hydrogen fuel cell vehicles and fuelling infrastructure
- Zero-emissions public transit



CLEAN INDUSTRY

- Low-carbon machinery
- Greenhouse gas control in industry
- Carbon capture and storage in industry
- Clean hydrogen consumption in industry
- Direct air capture (in the direct air capture inclusive scenario)



CLEAN BUILDINGS

- Energy-efficient building envelopes
- High-efficiency HVAC and building control systems
- High-efficiency appliances and lighting

Electric vehicles and charging infrastructure

In line with our broader definition of the energy sector, this includes professional electric vehicle operators (operators of fossil-fuel-powered vehicles are similarly included in the fossil fuel sector). See methodology for more information.



Photo credit: Lion Electric

Success is a choice

A global decline in oil and gas demand is inevitable, but Canada's energy success in the face of this changing reality is a choice.

Canada has a number of key climate policies that are set to take the country some of the way to net zero, although additional action will still be needed in the future to reach our 2050 target. In a scenario that includes just current policy, there are set to be **3.56 million total energy jobs in Canada in 2050, in both clean energy and fossil fuels**. Clean energy jobs are set to grow from 484,000 in 2025 to 2.44 million in 2050—a gain of 1.96 million or more than 400%.

But if a new government chose to roll back these key climate policies, there would be 3.46 million energy jobs in 2050—100,000 fewer total energy jobs than under current policies.

Put simply, cutting climate policy doesn't save Canadian energy jobs.

A number of politicians and decision makers have made it clear they would like to roll back key climate measures—most notably carbon pricing—often citing concern for fossil fuel jobs. **But the reality is that jobs in the oil sands and oil production in Canada are set to decline by at least 93% between 2025 and 2050, regardless of whether these policies are in place or not.**

It comes down to one simple factor: the oil price. In a net-zero world, there is a lot less global demand for fossil fuels. According to the International Energy Agency, in a net-zero 2050, the price of oil would drop to below US\$30 a barrel. With the breakeven price of the oil sands well above this, many Canadian fossil fuels are simply too expensive to be economical in a world that requires a lot less carbon.¹⁸

Scrapping climate policies will not protect oil and gas workers from the global reality of decarbonization, but keeping these measures and building on them will support Canadian clean energy jobs in a world of growing low-carbon demand.



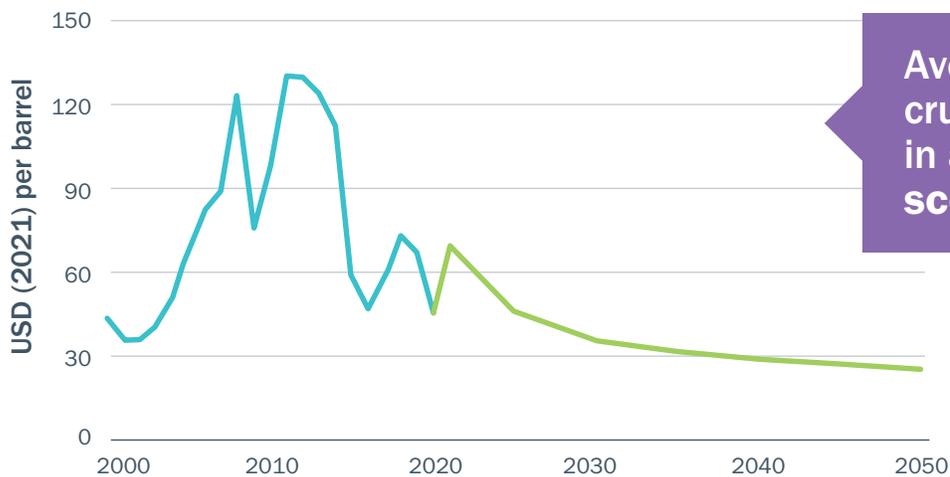
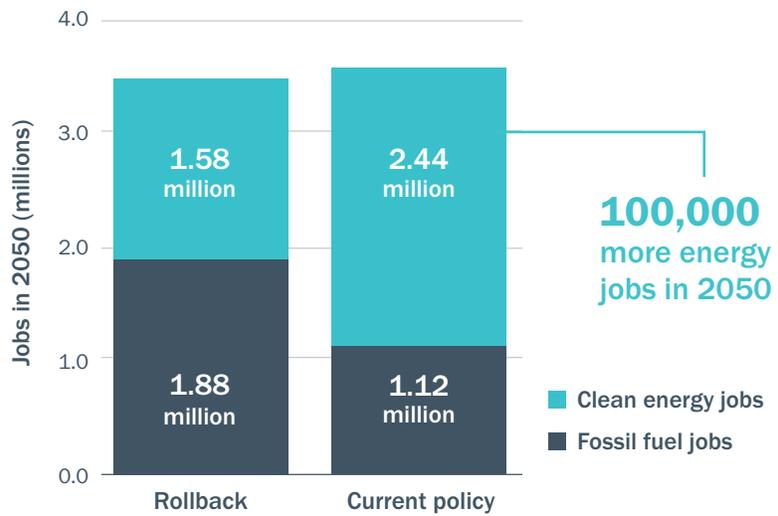
The oil sands and oil production in Canada are set to decline by at least 93% between 2025 and 2050.



HELP WANTED

Perhaps the biggest challenge is not a lack of jobs but finding enough skilled workers to fill them. It's one of the reasons the federal government recently rolled out an interim framework for a Sustainable Jobs Plan, to be updated every five years as Canada readies itself for a changing workforce on the road to net zero.¹⁹ The Canadian government also recently introduced a \$250 million training program, the Upskilling for Industry Initiative, to develop and deliver skills needed for high-growth sectors like cleantech.²⁰

Policy decisions today have implications for Canada's energy sector in the future



Average IEA crude oil price in a net-zero scenario

International Energy Agency's World Energy Outlook 2022

What's at stake today?

CURRENT POLICY SCENARIO*

DETAILS

IN ROLLBACK SCENARIO?†

Federal price on carbon pollution	A carbon price rising from \$65 in 2023 to \$170 in 2030.	No
Federal output-based pricing system	A carbon pricing system for large industrial emitters.	No
2030 Emissions Reduction Plan	Canada's latest climate plan to reach its emissions reduction target of 40% to 45% below 2005 levels by 2030.	No
Clean Fuel Regulations	Requirements for gasoline and diesel suppliers to reduce the carbon intensity of the fuels they produce by 15% below 2016 levels by 2030.	No

* See the corresponding technical report for a full list of policies included in the modelling scenarios.

† Rollback scenario assumes that B.C. and Quebec retain their carbon pricing systems (which existed prior to the federal carbon price).

THE PRICE OF POLLUTION

Canada's carbon price has been making headlines since its inception in 2018. But there's another kind of price that we are (often unconsciously) paying with every tonne of carbon emitted, known as the social cost of carbon. Whether it's damage to infrastructure from climate-induced extreme weather or the impacts of crop failures from unseasonal or prolonged droughts, the world is racking up a huge climate bill.

A recent study found that every tonne of carbon emitted in 2020 costs society as much as \$443.^{21,22} Meanwhile, a Canada-specific study found that, by 2025, climate impacts will be slowing Canada's economic growth by \$25 billion annually—equal to 50% of projected GDP growth.²³ Because these costs are indirect (the biggest polluters do not necessarily pay the most in climate damages), the economic impacts of continuing to emit are not always weighed up against the potential costs of decarbonization.

Canada's carbon price is one way to ensure that some of the economic impacts of the status quo are incorporated into decision-making. Canada has two carbon pricing systems: consumer carbon pricing and the industrial carbon price (known as the output-based pricing system).

The former is revenue neutral in most provinces, meaning households get money back in the form of a quarterly climate action incentive payment.



Perhaps most crucially, our modelling shows that carbon pricing is a key cornerstone of Canada's clean energy future—and the hundreds of thousands of jobs it will bring.

THE FUTURE IS STILL UNCERTAIN

On the road to net zero, there are a number of technologies whose impact is uncertain and will be defined by potential cost declines. For example, if hydrogen costs are lower than expected, hydrogen fuel cell vehicles will likely play a bigger role in the decarbonization of transportation.

Perhaps the biggest wildcard is direct air capture. This technology literally sucks carbon from the air for subsequent reuse or storage. If the captured carbon is turned into a synthetic fuel, it also introduces the possibility of carbon-neutral fuel for hard-to-decarbonize sectors like aviation. However, direct air capture uses more energy to operate than point source capture (where emissions are captured directly from the emitter rather than from the air). The International Energy Agency's net-zero scenario notes that 980 megatonnes of carbon emissions could be captured by the technology in a net-zero 2050.²⁴ But because the technology is comparatively new, the role it will play is still highly uncertain. As a result, we excluded it from our primary net-zero scenario and explored this technology in a sensitivity analysis.

In a scenario where direct air capture is available, our model projects it could create between 125,800 and 177,300 jobs in a net-zero 2050 while providing up to 259 megatonnes of emissions reductions in Canada alone—an optimistic forecast compared to the International Energy Agency's, although scenarios assessed by the Intergovernmental Panel on Climate Change show a larger range of potential uptake.²⁵

While impossible to know what Canada's uncertain carbon-capturing future has in store, in its most recent technology “deep dive,” the International Energy Agency notes Canada as one of the countries spearheading the development and deployment of the technology.²⁵ With the right geology for subterranean carbon storage and a strong cleantech pedigree, Canada has plenty of air capture potential.^{24,26}

Indeed, B.C.-based **Carbon Engineering** is already an international leader in direct air capture technology, with a pilot capture site in Squamish, B.C., and a second one in development in Texas. The company has partnered with a number of large Canadian companies including Air Canada and Shopify and has previously received financial backing from Bill Gates.^{27,28}

“ I’m energized by tackling challenging technical problems and finding new ways to innovate that directly impact Carbon Engineering’s technology. Working in the clean technology sector brings additional meaning to my day-to-day work that I have not felt in other industries.”

—**Megan O’Brieni**, lead engineer, technology development at Carbon Engineering

B.C.-based **Carbon Engineering** is an international leader in direct air capture technology.





Photo credit: CarbiCrete

Montreal-based **CarbiCrete** is creating “carbon negative” concrete.

THE CLEAN INDUSTRIAL OPPORTUNITY

A seventh of the world’s carbon emissions are associated with building materials like steel, cement, and aluminum.²⁹ And globally, most companies that make these products are not on track to hit net-zero emissions by 2050.³⁰

Fortunately, solutions exist. Steel can be made without coal in an electric-arc furnace. Cement and concrete can be made with lower-carbon fuels. And carbon pollution in these and other industries, like chemicals, can be captured. As the world moves closer to its net-zero goals, these products and technologies are going to be in increasing demand.

In a net-zero scenario, jobs in Canadian clean industry are set to grow 7% a year in the second quarter of the century, from 31,800 to 172,400. **There could be 9,800 Canadians employed in clean steel production in a net-zero 2050.**



This growth is driven, in part, by Canada’s plethora of clean industrial advantages. The country’s electricity grid is among the cleanest in the world, meaning that products made using that electricity are accordingly low-carbon. As a result, Canada produces some of the world’s cleanest aluminum and steel.^{31,32}

Canada’s cement and concrete industry has also made commitments to reduce emissions to net zero.³³ For instance, **Lafarge’s** Bath Cement Plant, near Kingston in Ontario, has fully converted to Portland Limestone Cement production (which is 10% less carbon-intensive than traditional cement).³⁴

Meanwhile, Canadian cleantech companies are investigating ways to reduce cement emissions to zero. Montreal-based **CarbiCrete** is creating “carbon negative” concrete, while Alberta-based **Carbon Upcycling** is using waste glass to make cleaner cement.

Provinces like B.C. and Ontario also have enormous potential for a mass timber construction industry, where sustainably sourced wood products can be used to build bigger, taller, and better wood towers than previously possible. There are already a number of successful Canadian companies in this space, like Ontario-based **Element5** or B.C.-based **Kalesnikoff Mass Timber**.

A 2022 Clean Energy Canada report, *Money Talks*, explored how Canadian governments can use their purchasing power to accelerate the shift to cleaner construction materials. **Governments are among the largest buyers of building materials, making up around a fifth of all infrastructure spending in the country.**^{33,35} **By procuring construction products with a lower-carbon footprint, governments can effectively support a sizable market for clean building products. This approach is referred to as “Buy Clean.”**

A national Buy Clean policy that spans all levels of government could avoid up to four million tonnes of emissions in Canada by 2030. And because the public sector has such significant buying power, Buy Clean would likely have spillover effects into the rest of the market. Indeed, the more governments demand low-carbon products through their purchasing, the more incentive the private sector has to channel resources into developing and producing them. That, in turn, helps lower costs while making cleaner products more competitive with their dirtier counterparts.

Methodology

For this report, we commissioned Navius Research to model three scenarios:

1

A cost-efficient pathway to net-zero emissions in 2050.

2

A scenario that relies on current policy plus the federal government's 2030 climate plan without additional policy action until 2050.³⁶

3

A scenario in which the 2030 climate plan is not implemented and two major existing climate policies are undone: the clean fuel regulations and carbon pricing for consumers and industry.

Clean energy and fossil fuel sectors are defined broadly in this study and include more than just jobs in oil and gas production or renewable power. Both direct and indirect energy jobs are included. Economic activity in each sector includes three categories of jobs: (1) direct (e.g. generating electricity from a wind turbine), (2) construction and services (e.g. building a wind farm), and (3) manufacturing (e.g. components for wind turbines).

This study assumes oil prices aligned with the International Energy Agency's net-zero scenario from its most recent World Energy Outlook.⁷ Another key factor is the level of abatement from other countries, including the U.S., which is assumed to be in line with the world achieving global net-zero emissions by 2050. The modelling also anticipates emissions reductions from land use, land-use change and forestry (LULUCF), amounting to 30 and 105 Mt CO₂e in 2030 and 2050, respectively, based on the federal government's 2030 climate plan and a study estimating the mitigation potential from natural climate solutions for Canada.^{36,37} Note that energy storage is not included in the scope of the modelling. The results are shown in full-time-equivalent jobs and 2015 dollars. For further detail on the methodology, see the corresponding technical report.

Differences from previous Clean Energy Canada jobs reports

This study is part of a series of reports modelling Canada's energy sectors. This latest work is based on an updated methodology.

The most important updates compared to our previous 2021 report, *The New Reality*, include the following:

- New technologies have been added to the model, including small modular nuclear reactors, second-generation biofuels, carbon capture and storage, CO₂ pipelines and storage, hydrogen pipelines, and direct air capture. Note that our clean energy sector definition continues to exclude enhanced oil recovery.
- Contributions to abatement from LULUCF as described above.
- Rail using internal combustion engines is no longer included as part of the clean energy sector.
- More recent data for calibrating the model and general updates to the model, including on the cost and performance of technologies.

Defining the fossil fuel sector

The values for both the economic size and number of people employed in the fossil fuel sector are greater than the oil and gas numbers reported by Statistics Canada. This is because our definition of the fossil fuel sector is broader and includes fossil fuel production, electricity generation using fossil fuels, and value added (e.g. trucking companies that rely on fossil fuels or construction activity associated with building a natural gas-fired power plant) in line with our clean energy sector definition.

NET ZERO

near you



NET-ZERO 2050

CLEAN ENERGY JOBS OVERVIEW



REGION



TOTAL CLEAN ENERGY JOBS



GROWTH RATE

BRITISH COLUMBIA

400,800 jobs
up from 83,100 in 2025

6%
growth per year

ALBERTA

460,400 jobs
up from 41,500 in 2025

10%
growth per year

SASKATCHEWAN

146,000 jobs
up from 15,200 in 2025

9%
growth per year

MANITOBA

119,400 jobs
up from 21,300 in 2025

7%
growth per year

ONTARIO

903,200 jobs
up from 171,600 in 2025

7%
growth per year

QUEBEC

507,000 jobs
up from 140,400 in 2025

5%
growth per year

NORTHERN CANADA

Nunavut, Yukon, and
the Northwest Territories

9,300 jobs
up from 2,500 in 2025

5%
growth per year

ATLANTIC CANADA

New Brunswick, Newfoundland and
Labrador, Nova Scotia, and Prince
Edward Island

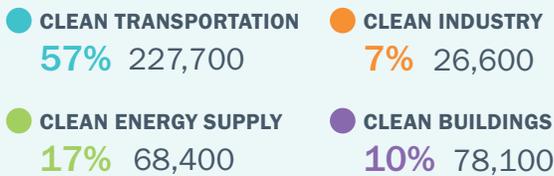
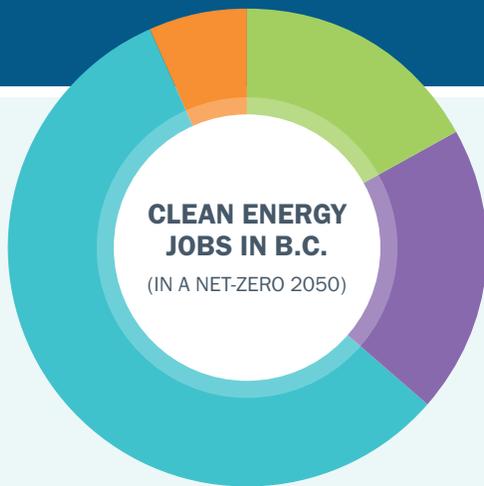
132,100 jobs
up from 33,100 in 2025

6%
growth per year

British Columbia

IN A NET-ZERO 2050

There are set to be **400,800 jobs** in B.C.'s clean energy sector, up from 83,100 in 2025—a growth of **6% per year**.



“Whether conducting experiments, gathering data, analyzing results, or having discussions with my peers, I’m inspired by the positive, real-world change better-performing batteries will have.”

—**Dr. Shabnam Pournazari**, research scientist at Nano One Materials

Nano One Materials is a B.C.-based company that is developing low-cost, high-performance cathode powders used in lithium-ion batteries. Nano One is just one B.C.-based company in a growing clean transportation sector.



Photo credit: Nano One Materials

Clean transportation is the biggest employer in the province’s net-zero clean energy sector. Jobs in the electric vehicle industry are on track to grow 16% a year, eventually employing 205,800 people in 2050, up from around 5,100 in 2025.

By far the fastest growing industry is hydrogen fuel cell production, which is set to grow 25% a year and employ 9,600 people in 2050.

The province is already home to several world-leading fuel cell manufacturers, including **Ballard Power**, **Loop Energy**, and Volvo-Daimler coalition **Cellcentric**. It’s perhaps not surprising that the city of Burnaby in B.C. (where these companies are housed) has been dubbed the “Silicon Valley of the hydrogen fuel cell.”³⁸

Jobs in renewable power generation—like new wind, solar, and hydropower—are set to more than quadruple, with 27,800 British Columbians employed in the industry in 2050, up from 6,100 in 2025. Indeed, B.C. has always punched above its weight on clean electricity with its 98% non-emitting power grid, one of the cleanest in North America, largely thanks to its abundance of hydropower.³⁹

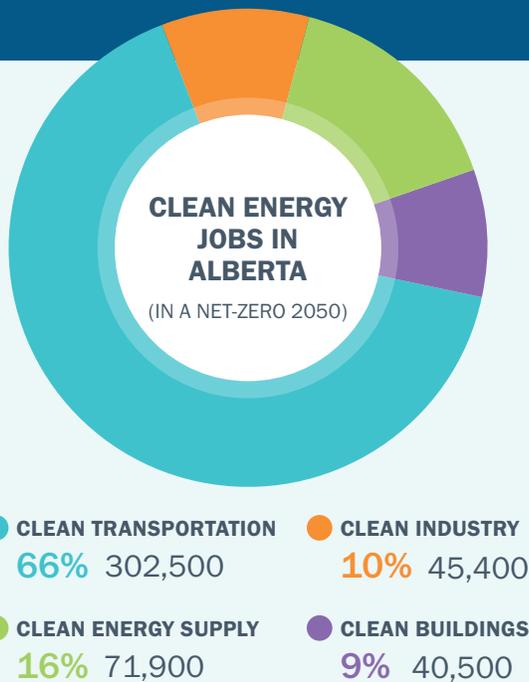
Clean buildings will also be a big B.C. employer in a net-zero world, with jobs in low-carbon buildings and high-efficiency heating, ventilation, and air conditioning growing 6% a year in the second quarter of the century to eventually employ 78,000 people. B.C. boasts a number of clean construction companies, including Penticton-based **Structurlam**, which makes products for modern mass timber buildings.

Alberta



IN A NET-ZERO 2050

Alberta’s clean energy sector is set to grow **10% per year**, from 41,500 jobs in 2025 to **460,400** in 2050—the fastest growth rate of any province in Canada.



There will be 418,900 Albertan clean energy jobs added between 2025 and 2050, almost 100,000 more than the 324,300 decline expected in fossil fuels. In fact, there will be more jobs in the clean energy sector in 2050 than in fossil fuels in 2025.

The vast majority of jobs are in clean transportation, with the electric vehicle industry on track to grow 24% a year and employ 240,600 Albertans in 2050.

Jobs in carbon capture and storage for industry are set to grow almost 900% between 2025 and 2050, with 38,300 Albertans employed in 2050. Indeed, the natural resources and know-how that built Alberta’s successful

oil and gas industry also give it significant carbon capture and storage potential. Accordingly, the Canada Energy Regulator has reported “a new wave” of carbon storage projects proposed in the province.⁴⁰

This carbon storage potential also offers options for the production of blue hydrogen (hydrogen made from natural gas but with carbon capture and storage). Clean hydrogen production in Alberta has some of the most impressive growth of any clean industry in the country, set to grow 39% a year between 2025 and 2050 to eventually employ 8,900 workers—two thirds of the Canadian clean hydrogen production total.

Jobs in new renewable power generation in Alberta would increase by 70% between 2025 and 2050. Indeed, the province is already a leader in wind and solar power, boasting some of the best renewable natural resources in the country.⁴¹ Current projects range from big grid-scale power plants like the new 3,000-acre solar farm in Vulcan County to residential solar installations by Alberta-based companies like **SkyFire Energy** and **EVOLV solar**.⁴²



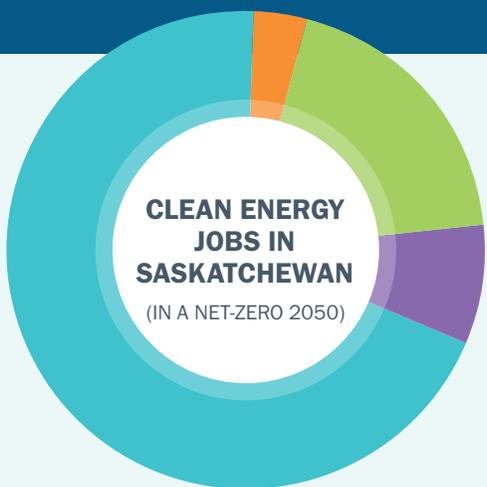
SkyFire Energy installs solar energy projects across Northern and Western Canada, as well as EV charge points and battery power banks.

A recent Clean Energy Canada report, *A Renewables Powerhouse*, found that solar is already able to produce cheaper power than natural gas in Alberta and is on track to be 16% less expensive by the end of the decade. What’s more, wind and solar costs are expected to decline by as much as 40% by 2035, compared to relatively flat costs for new gas deployments.⁴³

Saskatchewan

IN A NET-ZERO 2050

There are set to be **146,000 jobs** in Saskatchewan’s clean energy sector, up from 15,200 in 2025—a growth of **9% per year**.



- **CLEAN TRANSPORTATION**
69% 101,100
- **CLEAN INDUSTRY**
4% 5,100
- **CLEAN ENERGY SUPPLY**
19% 28,300
- **CLEAN BUILDINGS**
8% 11,500

Given the province’s agricultural advantages, it’s probably not surprising that jobs in advanced biofuels in 2050 would be sixfold those in 2025, providing 12,700 jobs by mid-century. Meanwhile, jobs in carbon capture and storage for industry are also set to see a huge 2,600% gain, employing 3,300 workers in 2050.

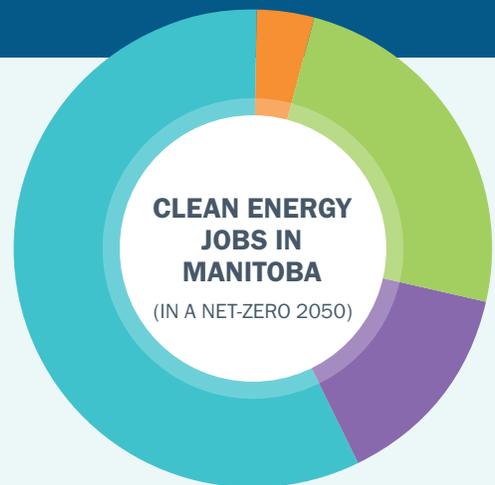
DEEP Earth Energy Production is a Saskatoon-based geothermal company that has just begun construction on a 25-megawatt geothermal power facility in southeast Saskatchewan.⁴⁶ The project, which will be Canada’s first large-scale geothermal plant, is using workers and skill sets from Canada’s oil and gas industry to drill for the renewable power source.⁴⁷



Manitoba

IN A NET-ZERO 2050

There are set to be **119,400 jobs** in Manitoba’s clean energy sector, up from 21,300 in 2025—a growth of **7% per year**.



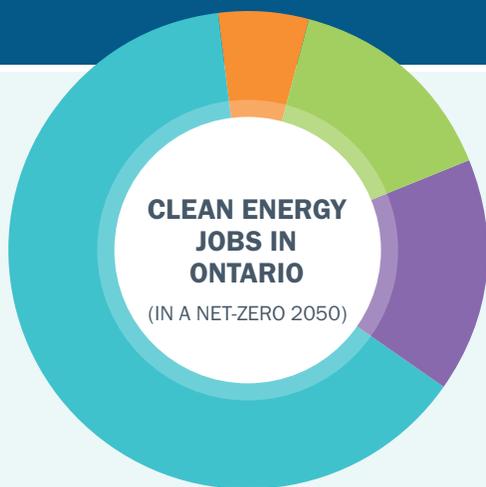
- **CLEAN TRANSPORTATION**
58% 68,800
- **CLEAN INDUSTRY**
4% 4,400
- **CLEAN ENERGY SUPPLY**
24% 29,200
- **CLEAN BUILDINGS**
14% 17,000

Like Saskatchewan, Manitoba’s jobs in second-generation biofuels are on track to grow 8% annually, employing 10,100 workers by 2050. Jobs in new renewable generation will grow 584%, employing 3,500 people by mid-century. Manitoba’s grid is almost 100% non-emitting—one of the cleanest in North America, largely thanks to its hydropower resources.⁴⁴ The province has been using this clean power advantage for years, exporting its electricity to the U.S. and neighbouring provinces.⁴⁵

Ontario

IN A NET-ZERO 2050

There are set to be **903,200 jobs** in Ontario's clean energy sector, up from 171,600 in 2025—a growth of **7% per year**.



- CLEAN TRANSPORTATION** 63% 570,900
- CLEAN INDUSTRY** 6% 54,000
- CLEAN ENERGY SUPPLY** 15% 133,300
- CLEAN BUILDINGS** 16% 144,900



Photo credit: ArcelorMittal Dofasco

Unsurprisingly, the electric vehicle industry will be a huge employer in 2050. Jobs in EVs are on track to grow 17% a year, employing 447,200 people in a net-zero 2050, up from 8,400 in 2025 (see more on Ontario's EV opportunity on the next page).

Low-carbon steel is also set to be a much bigger employer in a net-zero world, with jobs growing by a huge 12,400% to 7,300 jobs in 2050. Already, the province has seen clean steel developments in the last year, including investments in new lower-carbon furnaces at the ArcelorMittal Dofasco steel plant in Hamilton.

Jobs in carbon capture and storage for industry are set to see similar rapid growth, with the number of workers increasing 29% a year to 31,300 people by mid-century.

ArcelorMittal Dofasco, a Hamilton-based steelmaker, has a \$1.8 billion project (including up to \$900 million from the federal and provincial governments) to replace existing coal-fired production at Canada's largest steel mill with production that uses natural gas and electric arc furnaces that can later be transitioned to using clean hydrogen.⁴⁸ The investment in cleaner steel is expected to create decades of employment certainty for the plant's 4,600 workers.⁴⁹



The new economic engine

While jobs in electric vehicles are set to grow significantly in almost every province and territory, Ontario is the undisputed heartland of Canada's auto industry.

Many of the major automakers with operations in Canada have announced plans to build EVs in Ontario. And as of December 2022, the first made-in-Canada battery electric vehicles are rolling off the line at General Motors' CAMI plant in Ingersoll, in the form of the BrightDrop electric delivery van.⁵⁰

But electric vehicle assembly is just one component of the EV battery supply chain. Ontario's—and Canada's—EV opportunity is so much bigger. A 2022 Clean Energy Canada report, *Canada's New Economic Engine*, found that, if Canada plays its cards right, it has the potential to build a domestic EV battery supply chain that could support up to 250,000 jobs by 2030 and add \$48 billion to the Canadian economy annually.⁵¹

While the battery opportunity is a pan-Canadian one, Ontario's auto heritage and manufacturing prowess has landed it a number of big battery projects. **Magna International** recently announced it's investing \$471 million into new EV supply chain facilities in Ontario, including an EV battery enclosure facility in Brampton, creating more than 1,000 jobs.^{52,53} And German automaker **Volkswagen** recently chose St. Thomas in Ontario for the site of its first North American battery cell factory, meaning the province isn't just retaining existing automakers for its EV operations, but is actively attracting new investment from big international companies.⁵⁴



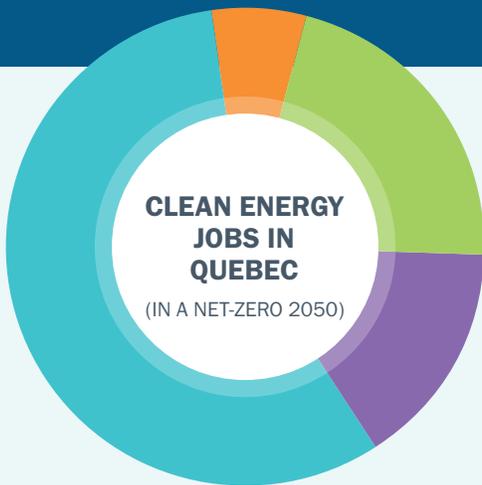
General Motors' CAMI plant
in Ingersoll, Ontario

Photo credit: General Motors of Canada

Quebec

IN A NET-ZERO 2050

There are set to be **507,000 jobs** in Quebec’s clean energy sector, up from 140,400 in 2025—a growth of **5% per year**.



- CLEAN TRANSPORTATION**
57% 288,100
- CLEAN ENERGY SUPPLY**
22% 109,300
- CLEAN INDUSTRY**
6% 31,800
- CLEAN BUILDINGS**
15% 77,800



Photo credit: Innergex Renewable Energy

Jobs in the electric vehicle industry in Quebec are forecast to grow 16% annually out to 2050, eventually employing 236,300 workers. The province is home to a big chunk of Canada’s EV supply chain. Saint-Jérôme-based **Lion Electric** makes electric buses and trucks that are on roads across North America. Meanwhile, the port city of **Bécancour** is emerging as a hub for EV battery material manufacturing, with **General Motors** and **BASF** both announcing plans for new facilities.⁵⁵

Clean buildings are also set to see significant growth. Specifically, jobs related to high-efficiency heating, ventilation, and air conditioning would grow 8% a year in the province, employing 22,100 people by mid-century, while there would be 55,500 workers in the construction of energy-efficient building shells.



As a technical project manager, I use my background as an electrical engineer to optimize the operations of Innergex’s solar energy assets. I am proud to work for a company partnering with Indigenous communities in Canada.

I see parallels between the pollution and unsustainable fuel usage in Northern and Inuit communities and what I experienced in my native country of Pakistan. Switching from fossils to renewables—like the Innavik run-of-river hydro project in Inukjuak will enable—really makes me proud to contribute to a cleaner world. Clean energy development is a local solution with global benefits, and thanks to companies like Innergex, it also helps people share prosperity while doing the right thing for a healthy planet.”

—**Razwan Saeed**, technical project manager at Innergex Renewable Energy

Innergex Renewable Energy is a renewable energy developer and operator headquartered in Longueuil, Quebec. The company has 40 hydroelectric facilities, 35 wind farms, a battery energy storage facility, and eight solar farms throughout Canada, the United States, France, and Chile.

Northern Canada

IN A NET-ZERO 2050

There are set to be **9,300 jobs** in Northern Canada’s clean energy sector, up from 2,500 in 2025—a growth of **5% per year**.



- **CLEAN TRANSPORTATION**
40% 3,700
- **CLEAN INDUSTRY**
6% 100
- **CLEAN ENERGY SUPPLY**
51% 4,800
- **CLEAN BUILDINGS**
1% 800



Unlike in the rest of Canada, the majority of clean energy jobs in Northern Canada are forecast to be in clean energy supply.

Renewable power generation is the second-biggest industry in Northern Canada’s clean energy sector in 2050, after electric vehicles, employing 3,100 people—almost triple the 1,100 people employed in 2025. Because many communities in Northern Canada are remote or off-grid, the region faces unique challenges on the road to net zero.⁵⁶ Renewable power can offer opportunities to reduce reliance on diesel, cutting costs and improving local air quality.

The remote Yukon community of **Old Crow**, home of the Vuntut Gwitchin First Nation, has set a target of achieving net-zero emissions by 2030. The community, which has historically been reliant on diesel to produce electricity, is now home to a solar farm that can supply a quarter of its power needs. Over the summer of 2022, the solar power plant and associated batteries produced enough electricity for Old Crow to completely switch off its diesel generators—something that hasn’t happened in decades.⁵⁷



“Transitioning away from fossil fuels and towards clean energy solutions will allow for future generations of Inuit, who are already feeling the greatest impacts of climate change, to continue our traditions while on the land for many decades to come.”

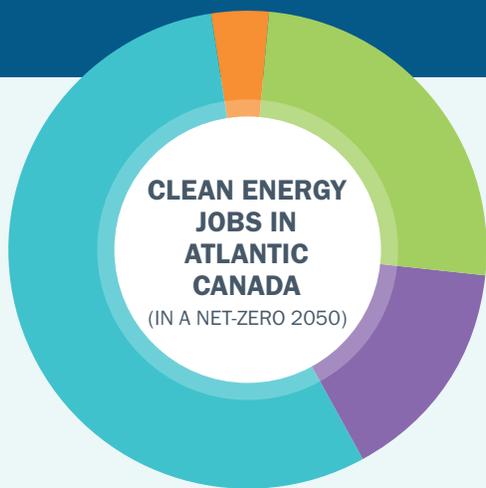
—**Jordan Okalik-Musgrove**, junior project manager at the Nunavut Nukkiqsautiit Corporation

The Nunavut Nukkiqsautiit Corporation is Nunavut’s first 100% Inuit-owned renewable energy developer.

Atlantic Canada

IN A NET-ZERO 2050

There are set to be **132,100 jobs** in Atlantic Canada’s clean energy sector, up from 33,100 in 2025—a growth of **6% per year**.



- **CLEAN TRANSPORTATION**
55% 73,300
- **CLEAN INDUSTRY**
4% 5,000
- **CLEAN ENERGY SUPPLY**
25% 33,500
- **CLEAN BUILDINGS**
15% 20,300



The vast majority of jobs are in clean transportation, with the electric vehicle industry on track to grow 19% a year to employ 65,900 Atlantic Canadians in 2050. Atlantic Canada is already a leader in EV-related cleantech, with **Tesla** funding battery research at a Halifax-based lab.⁵⁸

Atlantic Canada is also set to see significant jobs growth in low-carbon machinery, with jobs increasing 187% between 2025 and 2050, eventually employing 3,800 workers.

People employed in clean buildings are also set to increase significantly. Jobs in energy-efficient building shells will more than double, increasing from 6,000 to 13,300. While Atlantic Canadians employed in high-efficiency heating, ventilation, and air conditioning will grow 8% a year out to 2050, with 7,000 people working in the industry by mid-century.

East Coast energy exports

A green hydrogen project in Nova Scotia has become the first in North America to secure permits for a commercial-scale facility.^{59,60}



EverWind plans to convert a former oil storage facility into a massive green hydrogen plant in which it intends to produce a million tonnes of the emissions-free fuel annually by 2026. And because green hydrogen requires clean electricity for electrolysis, the company also recently leased a 137,000-acre site where it plans to build two gigawatts of wind power generation. The permit approval is a step toward actioning a transatlantic agreement to supply Germany with clean hydrogen.⁶¹

Planning for the inevitable future

The world has already started down the road to net zero. Putting jobs and economics aside for a moment, to plan for any other future is to plan for climate failure. There is no economic prosperity in a world repeatedly ravaged by uncontained climate change.

Though the route comes with some uncertainty, net zero is a road the world must navigate. Fortunately, the subsequent global race to decarbonize will create abundant economic opportunities. The winners will be countries and companies that embraced reality, rather than those that tried to slow it down. While the oil and gas boom may have dominated the energy narrative in the first decade of the century, it will be a clean energy boom that defines the next decades.

General Fusion, established in 2002 in B.C., is hoping to transform the way the world is energized with a practical path to commercial fusion energy.

Photo credit: General Fusion



Broadly speaking, federal and provincial governments should pursue four avenues to ensure Canada makes the most of the net-zero opportunity:

1 **Implement policy to rapidly drive forward the clean energy transition of Canada's economy**, retaining and expanding Canada's competitive advantages in a world that is moving toward a net-zero future.

- This means implementing Canada's 2030 Emissions Reduction Plan, but governments at all levels should also be looking beyond the quickly approaching end of this decade and toward 2040, with a view to achieving a net-zero economy by 2050.

2 **Prepare Canada's workforce** for the high-skilled opportunities of a promising new energy economy.

- The federal Sustainable Jobs Action Plans, to be released every five years starting in 2025, will help guide and organize efforts to ensure Canadian workers thrive in the economy of the future. The government's recently produced interim plan is a commendable first step to kick off a larger initiative, which must be backed by legislation and appropriate funding.

3 **Identify and support the growth of key emerging sectors in the clean economy** with a focus on areas where Canada can leverage its unique resources and competitive advantages, including its clean, affordable electricity supply.

- This should include leveraging governments' ongoing efforts in the Regional Energy and Resource Tables to work with provinces to advance these emerging sectors of the economy.

4 **Promote a fair, inclusive and sustainable future for all workers** as part of the energy transition.

- Support Indigenous-led clean energy solutions to accelerate Canada's net-zero transition.
- Empower workers and their communities on decisions affecting their future through relevant initiatives to ensure they are not left behind in the energy transition.



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 CLEAN ENERGY CANADA

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