Ontario

RISKS AND OPPORTUNITIES IN THE GLOBAL LOW-CARBON TRANSITION

Home to Canada's largest domestic market and financial nerve centre, **Ontario** is well positioned to thrive in the global low-carbon transition. Ontario has the highest number of companies in transition-opportunity markets in the country, attracting significant investments in clean electricity, energy storage and battery recycling, and bioproducts and bioenergy. The province has also made significant progress in decoupling economy and jobs growth from greenhouse gas emissions, based largely on phasing out coal-fired electricity and transitioning to a service-based economy.

Risks remain, however. Ontario has the highest number of workers in transition-vulnerable sectors, heavily concentrated in manufacturing. And while many companies in these sectors have clearer transition pathways and are making large investments to decarbonize and transform into new business lines (for example, shifting from traditional vehicle manufacturing to electric vehicles), much more investment is needed to create a smooth transition for workers across the economy more broadly. At the same time, transition-opportunity companies across multiple markets have yet to reach their full potential, held back by a lack of domestic demand and large capital investments needed to scale adoption. Ontario could make greater strides with a more consistent, comprehensive, and long-term approach to its low-carbon transition.

About this series of provincial profiles

The Canadian Climate Institute's 2021 Sink or Swim report assessed Canada's readiness for the wave of economic change being driven by the global net zero transition. The report stress-tested publicly traded companies under different global low-carbon scenarios to better understand the risks to Canada's economy and, more specifically, the risks to workers, communities, Indigenous Peoples, and the financial sector. The report also used new data from PitchBook Data Inc. to gain insights on the opportunities created by the transition, identifying significant potential sources of new growth for the country across several sectors.

Building on that research, the Climate Institute has now done a deeper analysis of the transition risks and opportunities facing specific provinces and regions. In addition to assessing risks, these province-by-province profiles provide in-depth analysis and insight on where provinces and regions can generate new sources of growth, the barriers that may be holding them back, and how to address those barriers. An overview report, Net Zero Opportunities: A province-by-province comparison, provides detailed analysis of how provinces and regions across Canada can navigate the net zero transition.

Risks-and-opportunities profile

Workforce and communities

- The proportion of workers in transition-vulnerable sectors is high, at 5% (Samson et al. 2021).
- Communities with the highest workforce concentration in transition-vulnerable sectors are in traditional auto manufacturing: Tillsonburg (14%), Ingersoll (13%), and Woodstock (12%).
- Several other communities have high concentrations of their workforce in emissions-intensive manufacturing.[1]
- Roughly 27% of transition-vulnerable workers are visible minorities, while 3% are Indigenous.[2]

Economic and fiscal risks

- Relative to its economy, Ontario has one of the highest public debt levels in Canada (44% debt-to-GDP in 2020–21) (RBC Economics Research 2021). High debt levels could increase fiscal vulnerability to market change and constrain public investment capacity for enhancing transition readiness.
- An increasing reliance on unabated natural-gas-fired electricity (Independent Electricity System Operator 2021a) runs counter to Canada's net zero goals and reduces the attractiveness for industries looking to shift to low-carbon electricity.[3]
- Nearly half of Ontario goods exports are from transition-vulnerable sectors (transport equipment, 31% and primary metals manufacturing, 13%), which could be disrupted as global demand shifts and the United States moves toward protectionist policies (Statistics Canada 2022h, Turnbull 2021).
- These same sectors are major employers: manufacturing employed 10.5% of Ontario's workforce in 2020, which represents half of the manufacturing jobs in Canada (Statistics Canada 2022b, Moffatt, Coutinho, and McNally 2021).

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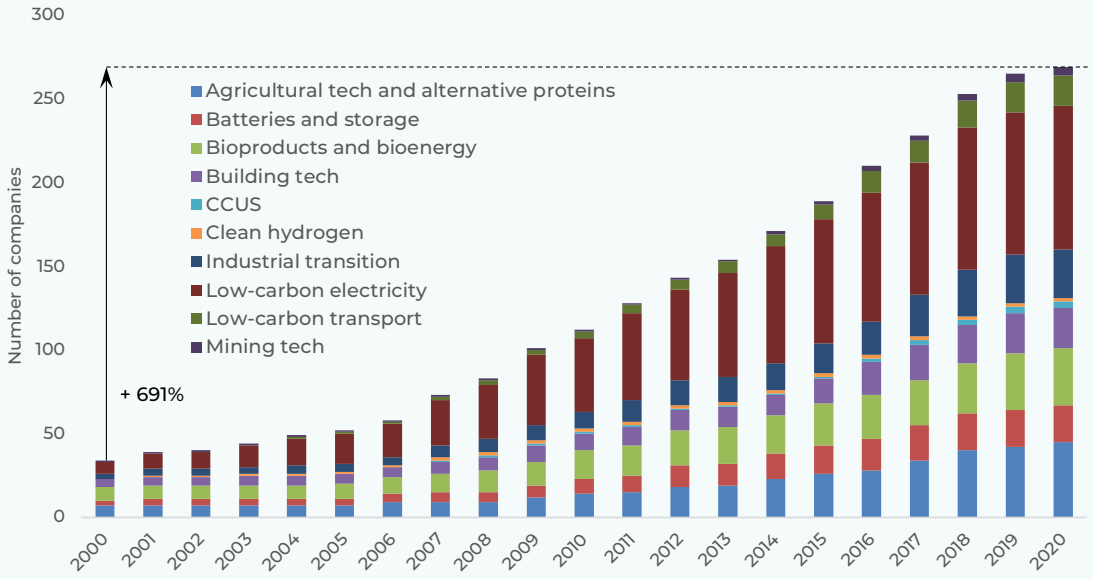
Growth in transition-opportunity companies headquartered in the province

- Ontario has 276 companies active across all 10 transition-opportunity markets (see Figure below). Companies are highly concentrated in low-carbon electricity (32%), agricultural technology and alternative proteins (16%), and bioenergy and bioproducts (13%) (PitchBook Data Inc. 2022).
- Areas of weaker representation include: CCUS (1%), clean hydrogen (1%), and mining technology (2%).
- While 58% of companies are headquartered in the Greater Toronto Area, the remaining 42% are spread across 56 different communities.

Competitive strengths

- Canada's largest provincial economy (consumer market) and financial centre.
- Longstanding manufacturing and automotive expertise and the largest concentration of automotive assembly plants and research and development facilities in North America.
- Clearer transition pathways for certain sectors (automotive manufacturing).
- Top-tier academic and research institutions, with strong academic clusters in Waterloo, the Vector Institute, Cleantech Commons, EaRTH District, Brilliant Energy Institute, and others.
- A mature mining industry with known deposits of critical minerals (chromite, cobalt, nickel, copper, platinum) (Ontario Mining Association 2021, Government of Ontario 2022b, Crawley 2022a).
- A telecom history that has generated a strong base of skills and strengths in artificial intelligence, data, and digitization with spillover into several clean technology areas (smart grids, agricultural tech, building tech) (Government of Ontario 2022a).

Growth in transition-opportunity companies in Ontario



Source: PitchBook Data Inc. (2022). Notes: This figure shows the number of companies headquartered in Ontario operating in each of our 10 transition-opportunity markets in each year between 2000 and 2020. This analysis only counts "pureplay" companies whose primary business line involves a product, technology, or service that falls into one (or more) of our 10 transition-opportunity markets (see our overview report for a full description). Thus, large multinationals and conglomerates with only a portion of sales in these markets are excluded. The analysis also only counts companies that are currently active (i.e. excludes bankrupt companies) and still operate as a subsidiary in cases when the company has been acquired.

Trends in Ontario's transition readiness

Demand-creation companies in Ontario are primarily concentrated in low-carbon electricity and batteries and energy storage.[4]

- The top 20 companies in Ontario by total investment raised are concentrated in five areas: low-carbon electricity (11), bioproducts and bioenergy (4), batteries and storage (3), industrial transition (1), and building tech (1) (see Figure below).
- Major deals include:
  - **Li-Cycle** had the largest recorded deal among all companies in transition-opportunity markets in Canada, with an initial public offering in 2021 that raised US$1.3B (McCarthy Tétrault LLP 2021, Willis 2021).
  - In 2021, **Amp Solar Group** raised a combined US$674M in private equity.
  - **GaN Systems**, producer of high-performing and energy-efficient power semiconductors, raised US$150M in 2021 to increase its penetration in electric vehicle markets and industrial sectors (Mandel 2021a).
  - **Hydrostor**, an energy storage company, raised US$250M in development capital from **Goldman Sachs** in early 2022.
  - In 2021, **NRStor** and **Six Nations of the Grand River** committed to build one of the world's largest clean energy storage projects (250MW) (including $170M from the Canada Infrastructure Bank).
  - In 2021, **McCain Foods** (Ontario) invested US$30M in **GoodLeaf** (Ontario) to help create a national network of vertical farms.
  - In 2019, operations began at the US$795M **Henvey Inlet Wind Power Project**, which is the largest wind farm built in partnership with a First Nation (Pattern Energy Group LP 2022).

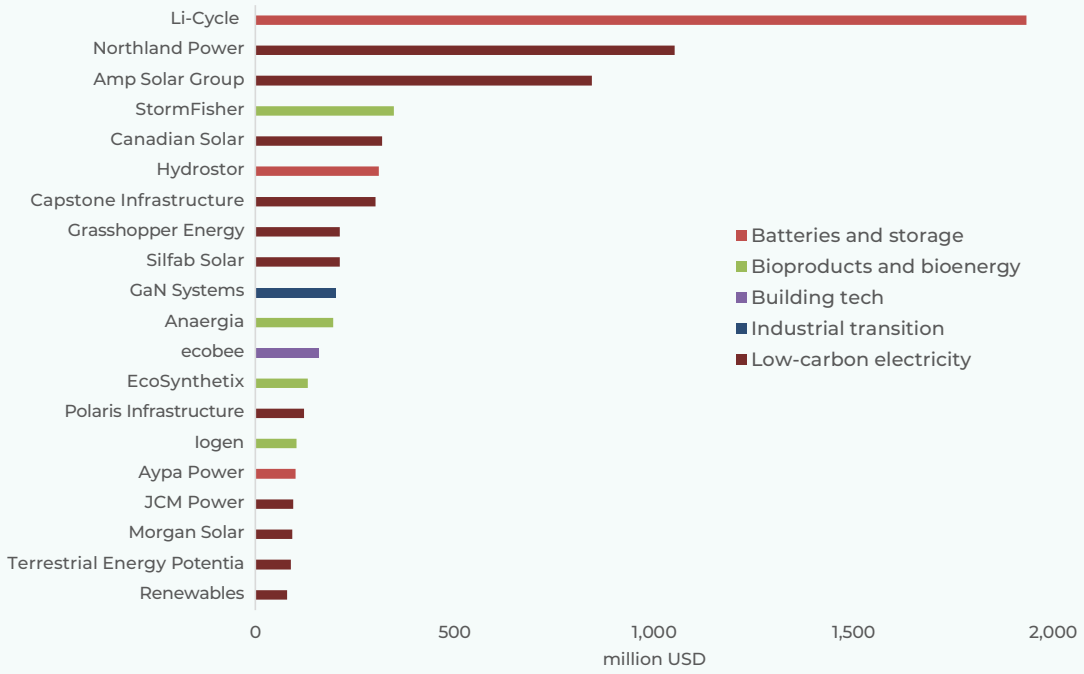
Some of Ontario's largest-emitting carbon-cost sectors, such as steelmaking and mining, are investing in electrification and decarbonization.

- **ArcelorMittal Dofasco** in Hamilton and **Algoma Steel** in Sault Ste. Marie are making large investments to electrify, reducing annual greenhouse gas emissions by approximately 6 Mt by 2028 (Algoma Steel Group Inc. 2021, CBC News 2021, Crawley 2022b).
- Steel-maker **Stelco** plans to secure end-of-life electric vehicles for scrap steel and lithium-ion batteries at its Lake Erie Works facility (Stelco 2021).
- In 2019, operations began at **Newmont's** $250M Borden gold mine in Northern Ontario, which is on track to become the world's first all-electric gold mine (85% electrified as of June 2021) (Government of Ontario 2021b).

In Ontario's demand-decline sectors, traditional automobile companies are shifting into the growing low-carbon transport market, while some fossil-fuel energy companies are diversifying into biofuels.

- Ontario automakers (**General Motors, Fiat**, **Ford**, **Honda**) plan to collectively invest over $5B to enable electric vehicle manufacturing at their facilities. Federal and provincial governments have committed more than $2B in additional financing (Government of Ontario 2020a, Government of Ontario 2022c).
- A new joint venture between **Stellantis NV** and **LG Energy Solution** is investing in a $5.1B lithium-ion electric vehicle battery manufacturing plant in Windsor, the first in Canada (Fraser 2022).
- **Enbridge** and **Walker Industries** (owner of the Niagara RNG facility) announced a $42M investment to build Ontario's largest renewable gas plant, to be fuelled by landfill gas (Government of Ontario 2020b, King et al. 2021).
- **FORGE Hydrocarbons Corp.**, a Canadian biofuel start-up, announced an equity investment from **Shell Ventures** and **Valent Low-Carbon Technologies** to help build a first-of-its-kind $30M commercial-scale biofuel production plant in Sombra, Ontario.

Top 20 Ontario transition-opportunity companies by total investment raised



Source: PitchBook Data Inc. (2022). Notes: This figure shows the top transition-opportunity companies headquartered in Ontario by total capital raised, which is the net of all capital injected into a company to date. It excludes certain deal types, such as buyouts, corporate asset purchases, debt repayments, and merger/acquisitions. Note that not all identified transition-opportunity companies in our analysis have capital raised data in PitchBook, as not all company deals are disclosed and available.

Potential barriers to scaling up growth opportunities

Abrupt changes and inconsistencies in provincial policies have increased market uncertainty for companies and investors.

- Significant policy reversals have weakened the business case for making large, transformative investments in demand-creation, carbon-cost, and demand-decline companies.
  - In 2018, Ontario ended the Feed-In Tariff (FIT) policy, including the cancellation of around 750 related renewable energy contracts.[5]
  - The cancellation of the cap-and-trade system in 2018 ushered in a period of policy uncertainty and eliminated an important source of government revenue.[6]
  - Since cancelling the Electric Vehicle Incentive Program in 2018 and building code requirements for EV charging infrastructure in 2019, there has been renewed support for electric vehicles (Syed 2021a, Government of Ontario 2021a, CBC News 2018).
- Support for consumption of fossil fuels in some sectors, including construction, farming, and forestry, blunts market incentives from the (federal) carbon price.[7]

The absence of long-term, sector-specific policy could hold back tech adoption in demand-creation markets important to Ontario and, in some cases, result in some investments becoming uneconomic.

- On the supply side, Ontario recently released a Critical Minerals Strategy in early 2022 but lags other leading provinces in adopting regulations and incentives to help bolster domestic demand in key areas (e.g. low-carbon transport, building tech, energy efficiency).
  - For example, British Columbia's and Quebec's zero-emission-vehicle mandates and consumer incentives for charging infrastructure have helped produce the highest rates of EV sales in Canada (Statistics Canada 2022g).
  - Ontario continues to require high efficiency standards for appliances and equipment but has lagged leading jurisdictions such as British Columbia in the stringency of its building code (Gaede et al. 2021).
- The absence of a net zero emissions strategy for Ontario's electricity grid could result in missed growth opportunities in promising new markets (renewables, smart grids, batteries/ storage) (Dessanti 2021, Felder et al. 2022).
  - While Ontario has the largest installed wind and solar capacity in Canada, it is unclear how much new capacity growth in the future will be met through renewables and storage (Independent Electricity System Operator 2022a).

In addition to the need to decarbonize, Ontario's manufacturing sector faces a range of competitiveness challenges that will have significant implications for jobs and economic growth.

- While some sectors have started making major investments to decarbonize (e.g. steel, auto manufacturing), the scale and pace of transition requires significantly more capital investment.[8]
- At the same time, other manufacturing industries (e.g. chemicals) have been slower to make large investments to reduce emissions and could face growing competitiveness pressure.[9]
- Shifts in global demand in the low-carbon transition could have major implications for Ontario's workforce, compounding existing challenges.
  - Between 2005 and 2021, jobs in Ontario's manufacturing sector declined by 27%, largely as a result of changing market conditions (Statistics Canada 2020c).
  - Ontario's vehicle manufacturing industry employs over 100,000 people, over 700 parts suppliers, and over 500 tool, die, and mold companies, often in mid-sized cities.
- Shortages of skilled labour could hold companies back from making large-scale, transformative investments.[10]

Conclusion

Looking across the full set of provincial profiles, we see strong signs of progress in transition readiness, although provinces are at different stages in terms of developing and capturing these opportunities.

Government policy can—and must—play a major role in accelerating this momentum. In addition to the broad recommendations laid out in the *Sink or Swim* report, we recommend five specific policy actions in *Net Zero Opportunities: A province-by-province comparison* that can help each province position its economy for success in the net zero transition.

Disclaimer

This analysis is provided by the Canadian Climate Institute for informational purposes only. None of the information in this analysis is intended to provide, nor should it be construed as, investment, financial, legal, or other advice. The Institute is not an investment adviser and makes no representations regarding any investment strategy or the suitability of investing in any particular company, investment fund, or other vehicle. For our full disclaimer, see page 122 of the full Sink or Swim report.

The information and data contained in this analysis have been obtained or prepared from publicly available documents and other sources prepared by third parties, some of which may be proprietary and used under license. In particular, the company and investment trends included in the two figures are obtained from PitchBook Data Inc., drawn from customized searches that have not been reviewed by PitchBook analysts. These data and trends also underestimate total market activity. The PitchBook database contains information on over three million companies globally, but it is not exhaustive. Within this database, not all deals are included and not all deals have a disclosed value. Total investment raised includes company-level data through March 2022. All dollar values included in this document are expressed in Canadian dollars unless otherwise stated.

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ENDNOTES

[1] Many other communities in Ontario have a high concentrations of their workforce in transition-vulnerable sectors: transportation equipment manufacturing (Windsor (9%), Stratford (9%), Guelph (7%), Norfolk (5%), Centre Wellington (5%), Leamington (5%), Kitchener-Cambridge-Waterloo (4%), Chatham-Kent (4%), London (4%), Wasaga Beach (3%), Barrie (3%), Arnprior (3%), Midland (3%)); mining and quarrying (Timmins (11%), Sudbury (6%), Elliot Lake (4%)); primary metal manufacturing (Sault Ste. Marie (7%), Hawkesbury (4%)); and chemicals manufacturing (Sarnia (4%), Brockville (3%)).

[2] The share of visible minorities and Indigenous Peoples employed in transition-vulnerable sectors in 2016 was below the total share of visible minorities and Indigenous Peoples in the total population (Statistics Canada 2020a, Samson et al. 2021).

[3] At the same time, however, the IESO is studying the potential impacts from imposing a moratorium on new natural-gas-fired generating stations within the next decade and what it would take to develop an achievable pathway to phase out natural-gas-fired generation and achieve zero emissions in the electricity sector (Independent Electricity System Operator 2022b, Independent Electricity System Operator 2021b).

[4] All statistics within the demand-creation section are from PitchBook Data Inc. (2022) unless otherwise stated.

[5] The Feed-In-Tariff program guaranteed rates for new renewable electricity generation, and its cancellation resulted in legal action from developers. For example, cancellation of the 9MW White Pines Wind Project in Prince Edward County triggered a breach-of-contract claim of $100M (The Canadian Press 2018, Mazur 2019).

[6] Ontario launched a cap-and-trade program in 2017, which linked to Quebec and California in 2018. It was then repealed by summer 2018. Large emitters in Ontario subsequently shifted to the federal pricing system in 2019 and then a new provincial system based on performance standards in 2022. In 2018, the Financial Accountability Office of Ontario (2018) estimated the program's cancellation would cost Ontario $3B in lost revenue over the next four fiscal years, in addition to millions of dollars in compensation from various lawsuits (Syed 2022b).

[7] Ontario provided an estimated $398M in consumer support, mainly through fuel tax reductions for construction, farming, and forestry (Samson, Drummond, and Phillips 2022).

[8] Recent RBC Economics analysis estimates that heavy industry in Canada, like steel, cement, and mining, will require $4.4B annually to abate the needed 35 Mt to achieve net zero in Canada (RBC 2021).

[9] With the exception of recent investments from NOVA Chemicals (which invested $2.5B in new plastics technology that will help reduce the company's emissions intensity), Ontario's $26B chemicals industry has been slow to recapitalize and upgrade its facilities (NOVA Chemicals 2021, Morden 2021, Jeffrey 2021).

[10] Labour shortages across Ontario (expected at 350,000 by 2025) already threaten to constrain growth (ReNew Canada 2022, Moffatt, Coutinho, and McNally 2021). In a 2021 BDC study, approximately 56% of manufacturing firms report hiring difficulties (Cocolakis-Wormstall 2018).

See our webpage for our Master Reference List.