



QUEBEC
ONTARIO
ALBERTA
ATLANTIC
MANITOBA
SASKATCHEWAN
BRITISH COLUMBIA

NET ZERO OPPORTUNITIES

A province-by-province comparison

May 2022

NET ZERO OPPORTUNITIES:

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Provinces' preparation for the global low-carbon transition will determine whether they sink or swim

Canada is facing a global wave of market change in the coming decades as countries accelerate efforts to reduce greenhouse gas emissions, which will drive structural changes in Canada's economy. Provinces that get ahead of those changes will thrive, while those that fall behind could face significant upheaval.

Our 2021 report *Sink or Swim: Transforming Canada's economy for a global low-carbon future* highlighted the risks and opportunities Canada faces. The report called for governments to shift their focus away from near-term competitive risks and toward positioning Canada's economy to capture growing global market opportunities. Nine transition-opportunity profiles accompanied the report, which analyzed markets with significant growth potential for Canada.

Since the report's publication, we heard from governments, industry, and investors that they wanted more detail on the markets where Canada has a chance to be globally competitive and how these opportunities differ across provinces. In response, we developed seven provincial profiles that outline region-specific risks and opportunities, highlight trends in transition-opportunity sectors, and identify barriers to accelerating progress. Unfortunately—as is too often the case—we were unable to include Canada's territories due to a lack of data.

This 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.

In addition, there are seven individual profiles that provide in-depth analysis and insight on specific provinces and regions and how they can generate new sources of growth, the barriers that may be holding them back, and how to address those barriers.

While all provinces have competitive strengths that they could leverage, some have made more progress than others in capturing transition opportunities.

The profiles show that while all provinces have competitive strengths that they could leverage, some have made more progress than others in capturing transition opportunities. The four largest provinces are gaining momentum, others are showing signs of progress, and several are just getting started. Accelerated efforts are needed across all provinces, but the target of those efforts may differ depending on the stage they are at today.

In this overview report, we highlight key findings from the provincial profiles, compare performance on several indicators that relate to capturing transition opportunities, and make recommendations for both provincial and federal governments.



Achieving clean growth, and a just transition, is a multifaceted endeavour

In our 2020 report, *11 Ways to Measure Clean Growth*, we defined clean growth broadly.

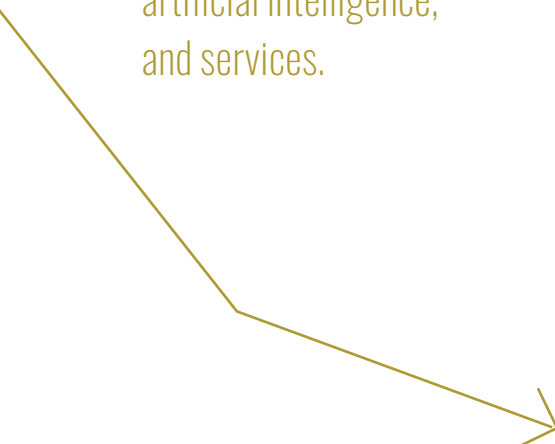
We included economic goals such as decoupling greenhouse gas emissions from GDP, accelerating technology development and adoption, expanding low-carbon trade and financial flows, and investing in low-carbon and climate-resilient infrastructure.

But we also included societal goals that relate to just transition, such as job creation, affordable energy, protecting vulnerable people from a changing climate, improving air quality, and sustaining irreplaceable ecosystems.

Truly achieving clean growth and just transition objectives ultimately requires a broader lens that looks across the whole economy and workforce. For example, the best economic strategy for a province is likely to involve both taking advantage of transition opportunities and expanding other low-carbon sectors not directly related to transition, such as biotech, artificial intelligence, and services. Building a resilient workforce will require a broader set of policy tools that address gaps in education, training, skills, social safety nets, and Indigenous economic empowerment.

For the purposes of the provincial profiles, however, we focus on the sectors and markets most directly affected by global low-carbon transition. These are the sectors that could see the biggest losses and gains of profits and jobs. Our data analysis and provincial

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comparators focus on the opportunity side of the equation—which has received less attention than the risks to date.

It is important to acknowledge that these risks and opportunities exist in a world of incredible uncertainty and upheaval. The war in Ukraine has led to a dramatic rethinking of energy policy in Europe and the United States, with important implications for Canada. The ultimate impact on energy markets is uncertain but is likely to be characterized by increased oil and gas demand from non-Russian sources in the near term and an accelerated transition to clean energy sources in the medium to long term.

Regardless of near-term fluctuations and uncertainty, the long-term outlook—in a world where countries representing 90 per cent of global GDP have committed to net zero emissions—includes declining demand for fossil fuels and emissions-intensive products and growing demand for clean energy and technology. Provinces on the wrong side of global market shifts will face an uphill battle to achieve clean growth—especially if these shifts come faster than expected.

Provinces positioned to capture transition opportunities will reap benefits from global market change

Capturing transition opportunities is important for Canada, and essential for provinces reliant on fossil fuel and traditional vehicle exports. Transition opportunities act in tandem with risks: as demand for fossil fuels and traditional vehicles declines, demand for clean energy and technologies simultaneously rises. Economies positioned to capture the upside of transition will be more resilient to the downsides of global market change.

Capturing opportunities is also critical to a just transition. There are over 800,000 workers in transition-vulnerable sectors and dozens of transition-vulnerable communities, depending on businesses and governments to limit job loss and accelerate job creation. Small, rural, and remote communities are particularly exposed, along with Indigenous Peoples and visible minorities.

Strategies for minimizing risk and capturing opportunity through transition vary by sector. The *Sink or Swim* report identified three

categories of sectors based on the main driver of change in company profitability through low-carbon transition:

- **Demand-creation sectors:** low-carbon transition increases demand for their product (e.g. renewable energy, electric vehicle batteries).
- **Carbon-cost sectors:** these are vulnerable to rising costs from carbon pricing and regulation, but enjoy stable global demand for their product is stable (e.g. steel, aluminum).
- **Demand-decline sectors:** these are vulnerable to shrinking global demand for their product (e.g. oil and gas, traditional vehicle manufacturing).

The companies analyzed are “pureplay” in the sense that their primary business line includes a product, technology, or service that falls into our definition of transition-opportunity markets.

To improve the resiliency of their economies, provinces will need to create and scale more demand-creation companies, decarbonize carbon-cost companies, and pivot demand-decline companies into new, transition-consistent business lines such as hydrogen or electric vehicles. Some sectors in Canada’s economy fall in between the demand-creation and carbon-cost sectors, requiring a focus on both scaling up and decarbonizing. Mining companies that produce minerals needed to support electric vehicle battery production, for example, will simultaneously see increased global demand and pressure to reduce their emissions.

While the profiles highlight a number of important investments taking place in carbon-cost and demand-decline markets, this overview report focuses on the first group of markets: demand-creation. Using private market data drawn from PitchBook Data Inc., we compare provincial progress in creating and scaling demand-creation companies. The analysis divides companies according to the [nine transition-opportunity markets identified in our *Sink or Swim* report](#), as well as a tenth market that captures companies supporting industrial transition (Table 1).

The companies analyzed are “pureplay” in the sense that their primary business line includes a product, technology, or service that falls into our definition of transition-opportunity markets. Companies that have a portion of sales in these markets are excluded to avoid skewing the results. The use of private market data also comes with the caveat that not all investment deals are publicly disclosed, meaning that our analysis likely underestimates the true level of investment activity taking place in Canada. The investment landscape is also constantly changing.

Nevertheless, the analysis provides a useful “snapshot” in time using information that is not publicly available.

The following sections compare provinces across three performance metrics:

1. generating transition-opportunity companies;
2. mobilizing transition-opportunity investment; and
3. scaling transition-opportunity companies to be globally competitive.

Table 1

Canadian companies are active in 10 key transition-opportunity markets

Transition-opportunity market	Examples of products, technologies, and services
Low-carbon electricity	Wind, solar, tidal, geothermal, and nuclear generation and distribution and associated technology or software, such as smart grid technologies
Batteries and storage	Vehicle and grid-scale batteries and thermal, mechanical, or pumped hydro storage, as well as lithium battery recycling
Low-carbon transport	Zero-emission cars, buses, trucks, bikes, boats, planes, trains, trams, and snowmobiles, charging infrastructure and car/ride/bike/scooter-sharing and related technology
Building tech	Software and technology to reduce building energy use, and sustainable building materials
Carbon capture, utilization, and storage	Technologies that capture CO ₂ emissions from industrial facilities, biomass combustion, or directly from the atmosphere, and use or store these emissions permanently
Clean hydrogen and technology	Blue hydrogen produced from natural gas with CCS, green hydrogen produced by electrolysis from clean electricity; fuel cells; and associated technologies
Mining tech	Technologies or processes that improve the environmental performance of mining, including extraction of minerals and metals from tailings, recycling, underground mining, and electric or efficient mining vehicles/equipment
Agricultural technology and alternative proteins	Alternative proteins from insects, plants, and lab-grown meat/seafood, sustainable fertilizers/pesticides, and technology or software that reduces fertilizer and/or energy use
Bioproducts and bioenergy	Biofuels, biodiesel, biogas, biochemicals, biochar, bioplastics, synthetic renewable fuels, sustainable feedstocks, and related technologies
Industrial transition	Sensors to improve pipeline leak detection, processes that turn non-organic waste (e.g. plastic, tires, waste oil) into products, energy-efficient semiconductors and transistors, solar thermal collectors for industrial heating/cooling, bitumen-to-carbon fibre products, and membranes for less energy-intensive separation and purification

PERFORMANCE METRIC 1

Generating transition-opportunity companies

One of the foundations of clean growth success is generating innovative transition-opportunity companies. This requires innovators and entrepreneurs to take the leap and turn their ideas into ventures. The generation of new companies is a signal that entrepreneurs are confident that they have a viable product or service and optimistic about consumer demand.

Governments play a role in creating the conditions for the generation of new companies, through education systems, investment in research and development, and the overall tax and regulatory environment. For transition-opportunity companies, climate policy signals such as long-term pathways for carbon pricing or regulations are critical, as they contribute to entrepreneurial optimism about future demand.

Figure 1 below shows the growth in transition-opportunity companies by province, based on the location of company headquarters. And while the location of company headquarters may not always be where all economic activity is generated, it is often linked to the home base of the entrepreneur or the area where the entrepreneur sees the greatest potential opportunity.

In 2020, Ontario, British Columbia, Quebec, and Alberta each had over one hundred transition-opportunity companies headquartered in their province, which is significantly higher than the number of companies they had in 2000. These four provinces also show significant diversity, with companies generated across all 10 transition-opportunity markets.

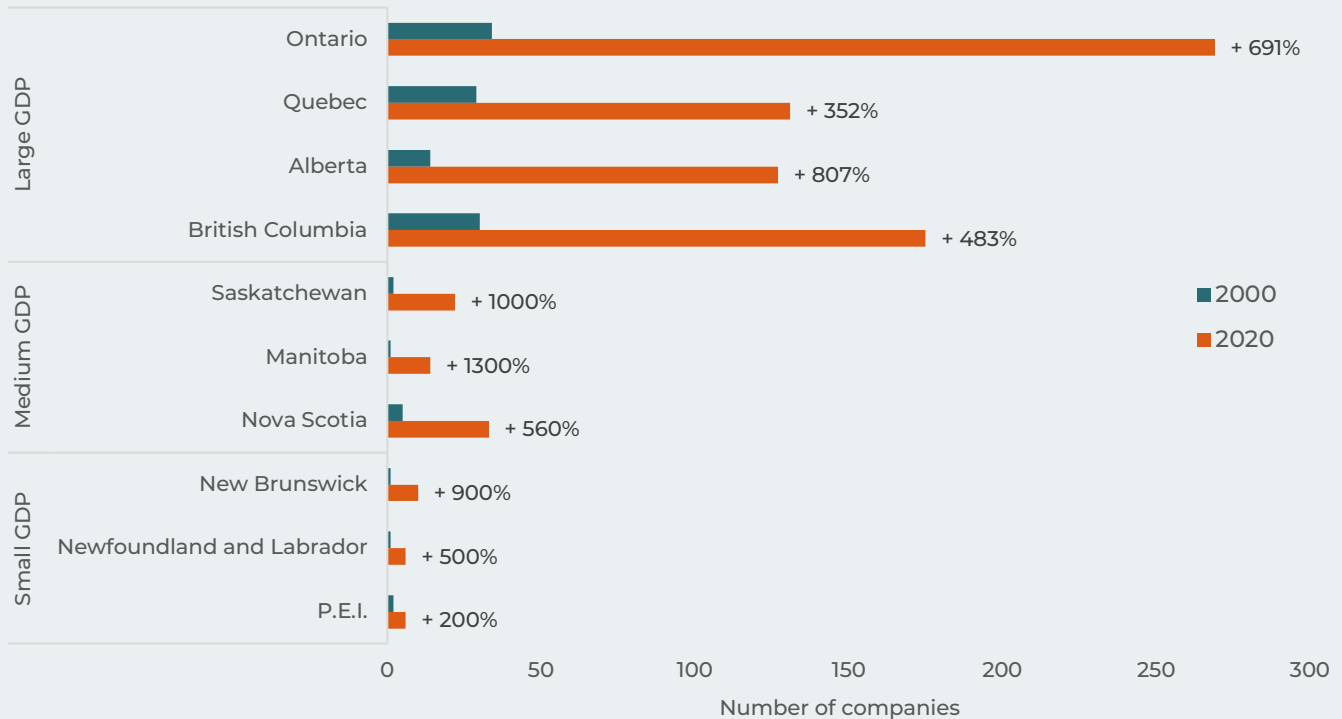
Saskatchewan, Manitoba, and Nova Scotia have made progress since 2000, each growing to more than 10 transition-opportunity companies by 2020. However, they do not have as much diversity as the top-tier provinces. Nova Scotia has companies in eight of the 10 sectors, Saskatchewan has seven, and Manitoba has only five. Roughly half of Saskatchewan and Manitoba companies are in alternative proteins and agricultural tech.

New Brunswick, Newfoundland and Labrador, and Prince Edward Island are still struggling to generate new companies. They each had only six transition-opportunity companies headquartered in their province in 2020. For Newfoundland and Labrador, there is a greater need to generate new sources of growth and job creation,

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Figure 1

Canada's four largest provinces have generated the most transition-opportunity companies, but others show signs of growth



Source: PitchBook Data Inc. (2022). This figure shows companies headquartered in each province within the 10 transition-opportunity markets identified. The database includes only “pureplay” companies with their primary business line in the transition-opportunity markets. Bankrupt and merged/acquired companies are excluded, unless they continued operating as a subsidiary. Provinces are sorted into three groups based on the relative size of their economies and listed, from top to bottom, by decreasing GDP.

given its reliance on oil production for employment and government revenues, whereas six companies are relatively substantial for Prince Edward Island’s small economy.

Burgeoning growth in new transition-opportunity companies is also not equally distributed across regions within provinces. In Saskatchewan, for example, nearly three-quarters of companies are headquartered in Saskatoon or Regina, while the most transition-exposed workers are in rural communities. This doesn’t mean that all jobs and economic activity are taking place in urban areas; larger companies in particular may have operations in other locations as well. But it indicates that early gains in transition-opportunity markets may be mostly found in the city centres.

PERFORMANCE METRIC 2

Mobilizing transition-opportunity investment

For transition-opportunity companies to develop into a successful business, they need financing to improve their technology or product and scale up. To drive clean growth, that financing will ideally flow in ways that allow economic activity and jobs to stay in Canada. While public funding—from entities such as Sustainable Development Technology Canada—tends to dominate early-stage financing, companies need greater amounts of private venture capital as they near commercialization. The *Sink or Swim* report highlights the challenge of foreign acquisition of Canadian transition-opportunity companies, particularly if they struggle to obtain investment at the pre-commercialization stage.

For transition-opportunity companies to develop into a successful business, they need financing to improve their technology or product and scale up.

There is a significant risk of missed opportunities if financial flows do not accelerate. For example, promising transition-opportunity companies will be acquired by foreign firms or fail to get off the ground (leading to bankruptcy). Establishing the foundation for future clean growth success means not only generating transition-opportunity companies but *keeping* them active in Canada.

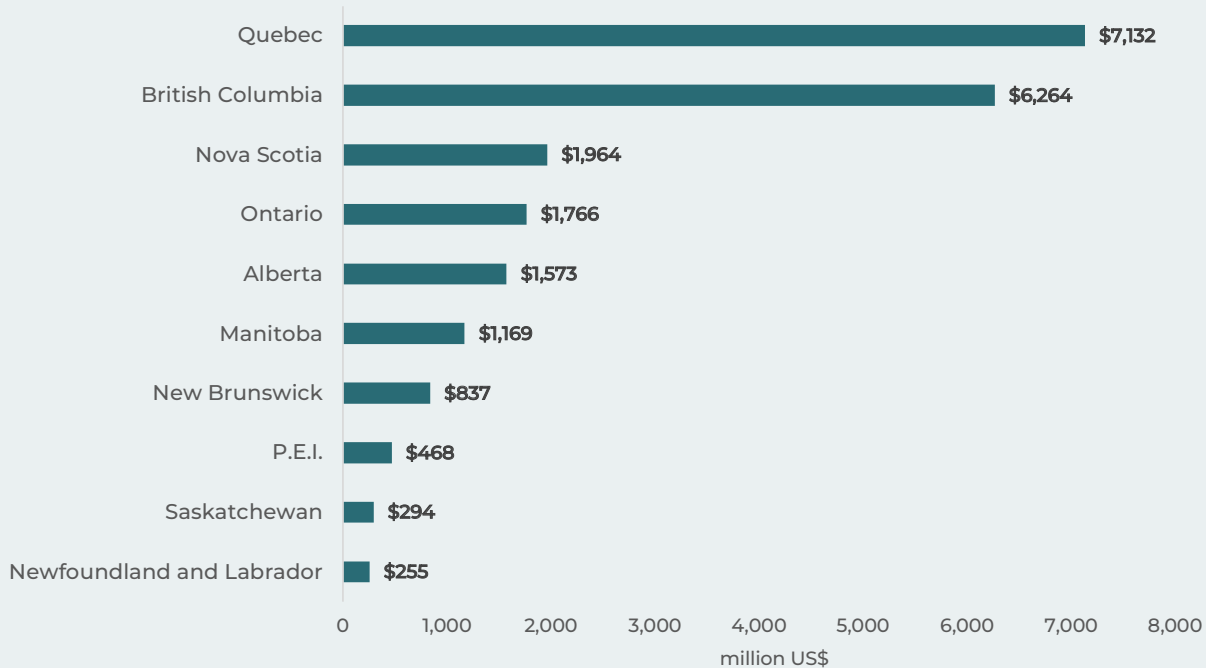
Financial flows toward transition-opportunity companies are increasing, but they are uneven across provinces. Figure 2 below uses investment data within transition-opportunity companies to estimate aggregate financial flows between 2015 and 2020 (PitchBook Data Inc. 2022). The estimates include several types of investment deals, including private equity, venture capital, initial public offerings, and government grants. Provincial estimates are adjusted according to provincial shares of national GDP to allow for fair comparison.

Quebec and British Columbia stand out on this metric, punching above their weight in raising capital that supports growth in transition-opportunity companies. Nova Scotia also shows significant signs of progress, exceeding Ontario on the performance metric. Saskatchewan, Newfoundland and Labrador, and Prince Edward Island lag behind.

Figure 2

Quebec and British Columbia are punching above their weight in mobilizing finance

Total raised by transition-opportunity companies between 2015 and 2020, adjusted for provincial share of GDP



Source: PitchBook Data Inc. (2022). This figure shows the total amount of capital raised between 2015 and 2020 by transition-opportunity companies headquartered in each province. To adjust for differences in the size of provinces' economies, the total raised is multiplied by the ratio of the province's share of national GDP relative to that from the province with the highest share of national GDP (Ontario). For example, shares of national GDP of 13.3% and 38.7% from British Columbia and Ontario, respectively, result in an adjustment by a factor of $38.7 / 13.3 = 2.91$ for British Columbia's total.

PERFORMANCE METRIC 3

Scaling transition-opportunity companies to be globally competitive

To generate meaningful growth and jobs, provinces need transition-opportunity companies that can compete on the world stage. That could be through exports, through attracting foreign direct investment to grow in Canada, or some combination of the two.

Many of Canada's transition-opportunity start-ups remain small, but there are now over 60 companies that have either already scaled to be globally competitive or show significant potential to do so in the coming years.

These high-potential companies include those that are well established, such as British Columbia's hydrogen fuel cell company Ballard Power Systems that has a US\$3.4 billion market cap (as of March 11, 2022). They also include Ontario's electric vehicle battery recycling company Li-Cycle, which raised US\$1.6 billion in its second initial public offering (IPO) on the New York Stock Exchange.

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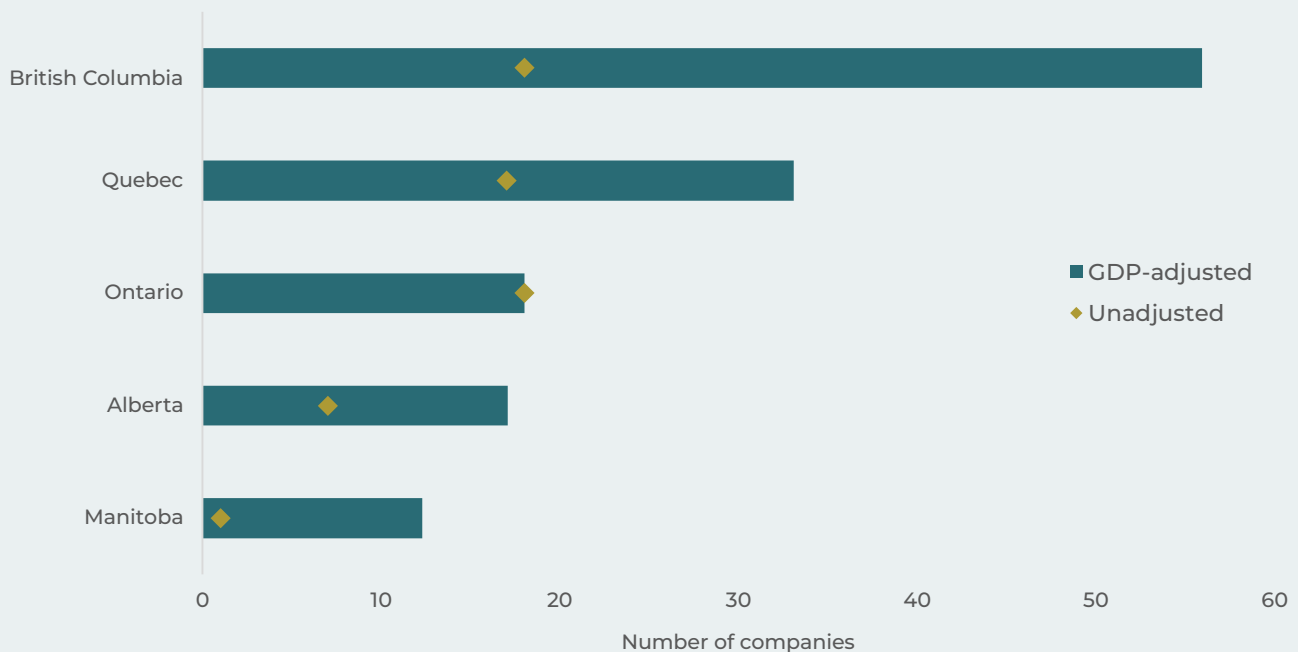
Some high-potential companies are still raising venture capital, but the pace at which they are growing shows they are poised to make a mark. British Columbia's green construction technology company Nexxi has a pre-money (before going public) valuation over US\$1 billion. Quebec's clean fuel and green chemical company Enerkem has raised over US\$700 million as of March 2022. Alberta's geothermal technology company Eavor has raised over US\$80 million since its first investment deal in 2019 (PitchBook Data Inc. 2022).

Not surprisingly, most of Canada's high-potential transition-opportunity companies are headquartered in the four largest provinces. Manitoba has one agricultural technology company, Farmers Edge, which makes the cut. The other provinces do not have companies that have raised more than US\$50 million within the last 10-year period (Figure 3a).

Figure 3a

British Columbia and Quebec perform best in generating globally competitive transition-opportunity companies

Number of companies that raised US\$50M between 2012 and 2021 adjusted for provincial share of national GDP



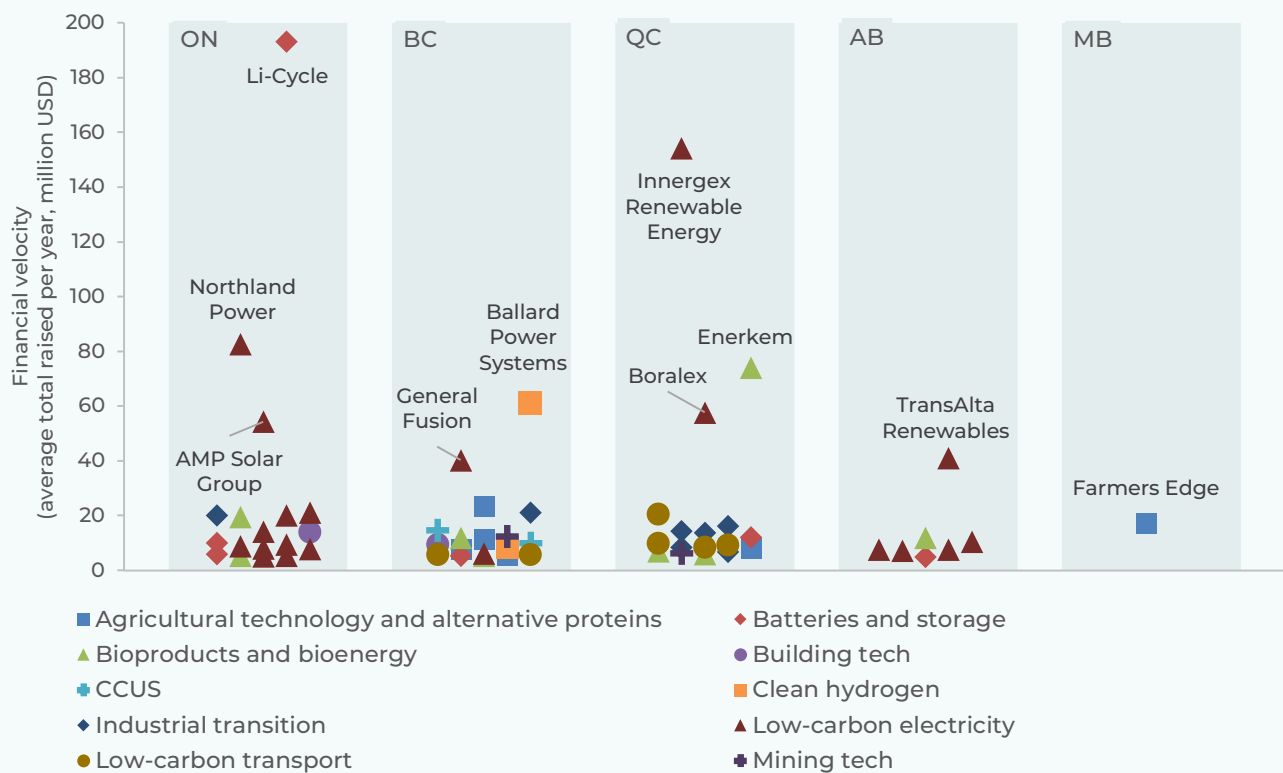
Source: PitchBook Data Inc. (2022). Notes: This figure shows the number of companies headquartered in each province that raised US\$50 million or above in capital in the most recent 10-year period (2012–2021). Capital raised by a company is obtained by summing the dollar value of its deals (deal size) available in PitchBook. Only deals with years between 2012 and 2021 are included. The following deal types are excluded from capital raised: buyout/lbo, corporate asset purchase, debt repayment, dividend recapitalization, investor buyout by management, leveraged recapitalization, merger/acquisition, product crowdfunding, reverse merger, secondary transaction—open market, secondary transaction—private, share repurchase, undetermined. The number of companies in each province is also adjusted according to their average provincial share of national GDP during 2012–2021 to allow for comparison.

Another way to assess the potential of transition-opportunity companies is to measure their “financial velocity,” or the amount of money they have raised since the company was founded. A similar metric is used in the annual *Canadian Narwhal List* (Plant 2022). Figure 3b below shows the financial velocity of companies in the provinces with companies that raised US\$50 million or more between 2012 and 2021. Ontario-based Li-Cycle stands out amongst other renewable energy companies in terms of financial velocity.

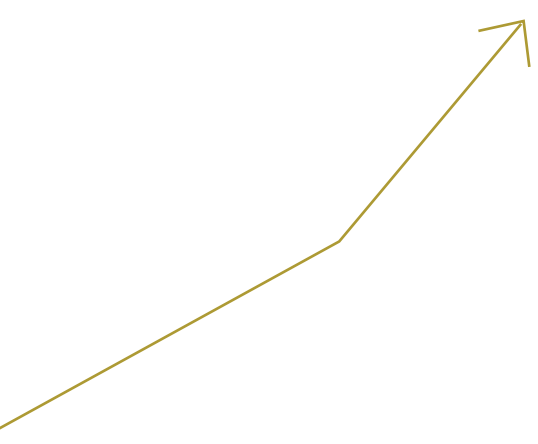
Figure 3b

There are 61 high-potential companies in Canada, concentrated in the four largest provinces

Companies that raised US\$50M+ between 2012 and 2021



Source: PitchBook Data Inc. (2022). This figure shows companies headquartered in each province that raised US\$50 million or above in capital in the most recent 10-year period (2012–2021). Capital raised by each company is shown as “financial velocity,” calculated as the amount of capital raised over a period divided by the number of years in the period. The financial velocity calculated here is a modified version from the original one in Plant (2022) in that only capital raised in the most recent 10-year period is considered. Capital raised is estimated from data on company deals available in PitchBook using the same methodology in the notes of Figure 3a.



The financial velocity metrics show that there are a range of companies with high potential for growth across all 10 transition-opportunity categories. In Ontario, there are multiple companies in batteries and storage, low-carbon electricity, and bioproducts and bioenergy. In British Columbia and Quebec, there are companies in almost every transition-opportunity category. Alberta's high-potential companies are in low-carbon electricity, bioproducts and bioenergy, and batteries and storage. As noted previously, Manitoba's one high-potential company—Farmers Edge—focuses on agricultural tech.

Provinces are at distinct stages of progress

The three comparative metrics illustrate that some provinces are far more advanced in their readiness to capture transition-related market opportunities. While new, pureplay transition-opportunity companies are only one piece of the puzzle in preparing economies for global market change, they are critical to creating new sources of jobs and growth. They are also at the cutting edge of developing the innovative products and technologies needed to achieve net zero targets in Canada and around the world. Regions and communities dependent on transition-vulnerable sectors for employment can leverage these companies to gain a foothold in global markets that will grow as others—such as oil and gas—shrink.

PROVINCES GAINING MOMENTUM

British Columbia, Quebec, Ontario, Alberta

The four largest provinces are leading Canada in generating new transition-opportunity companies, mobilizing private investment, and scaling companies to the level needed to compete in global markets.

This does not mean that they should be complacent. Their leading companies are still at risk of acquisition from foreign buyers and growing the job-creating portions of their operations in the United States or overseas instead of Canada. For example, the British Columbia-based low-carbon building materials company Nexxi reached unicorn status in fall 2021 (hitting a valuation milestone of US\$1 billion or more), but new factories are being built in the United States (Clancy 2021, Nexii 2022).

Foreign investment and expansion of operations in other countries are markers of success for individual companies, but generating

growth and jobs in Canada requires those investments to happen at home as well. In some cases, foreign acquisitions can result in greater growth and job creation, particularly if there is a strong base of Canadian private investors (McKenna 2021). Smart thermostat maker ecobee, for example, was recently acquired by the United States company Generac Holdings but plans to maintain and grow its Toronto office (Ali 2021).

PROVINCES SHOWING SIGNS OF PROGRESS

Nova Scotia, Manitoba, New Brunswick

The three provinces in the middle category are not quite at the level of the top four but are showing signs that they could be in the coming decade. In particular, Nova Scotia stands out as a leader in this middle category in terms of mobilizing finance towards transition-opportunity companies. Manitoba has one large transition-opportunity company that is globally competitive. New Brunswick squeaks into this category with a higher level of financing for transition-opportunity companies than the bottom three provinces.

In Nova Scotia, CarbonCure (low-carbon concrete tech), Liveable Cities (smart street lighting) and TruLeaf (vertical farming) have been active for over a decade, winning awards and attracting attention, but have not yet seen the same magnitude of investment as the fastest-growing companies in larger provinces. Resson (agricultural tech) in New Brunswick (founded in 2013) is also showing signs of momentum with US\$30 million raised to date.

The promising signs in these provinces will not translate into jobs and growth if they are not able to scale their companies to a globally competitive level. And scaling companies requires accelerating private financial flows.

PROVINCES JUST GETTING STARTED

Saskatchewan, Prince Edward Island, Newfoundland and Labrador

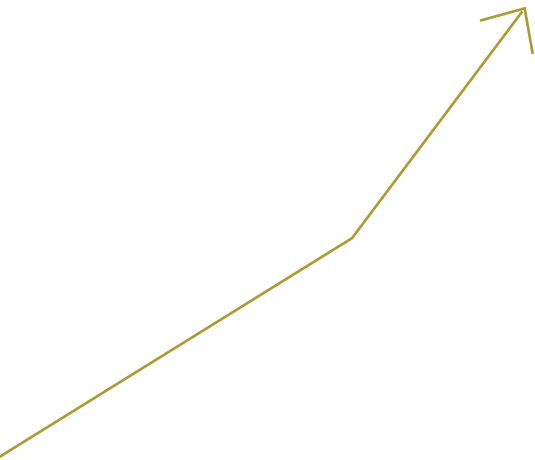
Provinces in the bottom grouping have made some positive gains. Saskatchewan now has 22 transition-opportunity companies included in our database, with 10 in the alternative proteins and agriculture technology space. Prince Edward Island and Newfoundland and Labrador each have six, which is not insignificant for the size of their economies. However, these three provinces trail the other provinces when it comes to mobilizing finance, and none of them have any companies that are attracting the level of investment needed to scale to a globally competitive level. To

succeed, they need more transition-opportunity companies and increased private financial flows.

Saskatchewan, for example, is seeing a relatively small amount of private investment flow to transition-opportunity companies, and most investment is concentrated in one geothermal company—Deep Earth Energy Production. It raised 81 per cent of the capital raised by all companies in Saskatchewan between 2015 and 2020. The province is seeing some growth in the numbers of companies in agricultural tech and alternative proteins, but they have yet to attract significant investment. In Newfoundland and Labrador, smart thermostat company Mysa in St. John's is showing promise, raising US\$30 million since being founded in 2014.

Saskatchewan and Newfoundland and Labrador also need to think about the regions and communities where investment goes, given the number of transition-vulnerable communities and higher proportion of transition-vulnerable workers.

FIVE WAYS FOR PROVINCES TO UP THEIR GAME



Based on our analysis of the PitchBook data on transition-opportunity companies and large private investments and on 45 interviews with experts across Canada, we identify five clear areas for action that would benefit all provinces.

Based on their progress to date, provinces may choose to emphasize some actions more than others. For example, British Columbia and Quebec are leading on mobilizing private investment overall and could place more emphasis on scaling the companies they have to be globally competitive through targeting specific barriers to investment. Newfoundland and Labrador and Prince Edward Island may wish to place greater emphasis on generating new transition-opportunity companies through research and development.

Federal policies and programs can also play an important role in supporting provincial progress. Canada's 2030 Emissions Reduction Plan (released in March 2022), for example, includes important elements of policy certainty, including an intention to lock in carbon pricing out to 2030 and ambitious targets and supporting measures for zero-emission vehicle adoption and low-carbon buildings. The federal government is also investing in innovation

There is a direct correlation between provincial climate policy certainty and ambition and the development and financing of transition-opportunity companies and projects.

and workforce transition and using tax incentives and project finance to accelerate large transition projects such as carbon capture, utilization and storage and electric vehicle battery manufacturing. The coming \$15-billion Canada Growth Fund announced in the 2022–23 federal budget, for example, could help mobilize more private finance towards transition opportunities. In some policy areas, strong federal action could mean that provincial governments, particularly in smaller jurisdictions, would be able to rely more heavily on federal policy to enable clean growth in their provinces rather than shouldering the lift alone.

The sections below provide many examples of policies and investments that are driving progress, but it is important to note that further analysis is needed to evaluate the effectiveness, cost-efficiency, and distributional outcomes of various policy approaches. In the coming year, the Canadian Climate Institute will be undertaking further research to assess policy options for mobilizing private investment.



1 BUILD INVESTOR CONFIDENCE AND INVESTMENT ATTRACTIVENESS WITH CLEAR, AMBITIOUS CLIMATE POLICY

There is a direct correlation between provincial climate policy certainty and ambition and the development and financing of transition-opportunity companies and projects. This is one of the strengths of British Columbia and Quebec, which were early leaders in developing carbon pricing systems, zero-emission-vehicle mandates, and low-carbon fuel standards. British Columbia's strict building codes have also helped develop a market for cutting-edge building technology companies.

Many transition-opportunity companies, across all provinces, still struggle to obtain the financing they need to grow because of continued policy and market uncertainty. Financial flows in low-carbon electricity are far larger than other areas where there is greater uncertainty on policy—and therefore market—trajectories. Clear policy signals can improve investor confidence and drive investment in transition-opportunity companies and projects.

Provincial backtracking on policies, such as the cancellation of Ontario's cap and trade or Alberta's closure of Energy Efficiency Alberta, have the opposite effect, leading investors to become wary of markets reliant on climate policy. Provinces also continue to provide significant support for fossil fuel production and consumption, sending conflicting policy and market signals (Samson, Drummond, and Phillips 2022).

Governments at all levels need to work in tandem to create an attractive investment environment by reassuring investors that policy coverage and ambition will continue to increase over time and by providing as much specificity as possible on long-term policy pathways. Federal regulatory backstops can play a role in filling gaps at the provincial level, but provincial governments can also reduce the impact of federal policy uncertainty within their jurisdiction by implementing their own ambitious policies.

Examples to build on:

Providing clear policy signals:

- The CleanBC plan includes best-in-Canada, progressively ambitious, long-term targets for low-carbon building performance and supporting policies, signalling to entrepreneurs and investors that there will be consistent demand for low-carbon building technologies and products in British Columbia.

Building private investor capacity through initial public investment:

- Quebec has used public funds and investment institutions such as Investissement Québec to build an active venture capital ecosystem of actors with experience and expertise in transition-opportunity financing. It recently attracted one of the offices of the International Sustainability Standards Board (IISB).

Signalling momentum through sector strategies:

- Several provinces, including British Columbia, Alberta, Ontario, and Quebec, have recently released strategies for developing transition minerals. Policy measures in these strategies include initiatives directed at addressing issues related to the availability of skilled labour, Indigenous and community consultation, and risks associated with resource assessments, research, and technology.



2

CONNECT TRANSITION-OPPORTUNITY COMPANIES WITH LARGE CANADIAN BUYERS FOR MUTUAL BENEFIT

One of the barriers to capturing transition opportunities consistently identified across provinces is the chicken-egg problem between producers of clean energy or technologies, who need demand certainty to attract financing, and large business consumers of clean energy and technology, who need supply certainty to attract internal or external financing.

Connecting large consumers in Canada with transition-opportunity companies would help reduce transition risk in the economy while also helping transition-opportunity companies prove their technology and scale their business. Analysis completed for Global Affairs Canada in 2020 found that 70 per cent of clean technology firms were ready for their technology's first major demonstration in an operational environment. Securing hosts for demonstrations, however, can be difficult and costly for smaller firms (Foresight Canada 2021).

International efforts are already underway to address this fundamental mismatch between demand and supply. The First Movers Coalition, for example, which was set up by the U.S. State Department and the World Economic Forum, is designed to secure purchasing commitments from companies in steel, trucking, shipping, and aviation that will help shore up demand and drive technology commercialization.

Canada has an opportunity to take a similar approach by matching promising transition-opportunity companies with buyers. The initiative could be managed within provinces but would ideally also be co-ordinated by the federal government at the national level.

In some markets where governments do direct procurement, such as public transit and building, governments themselves can act as the large customer needed to jumpstart wider demand for low-carbon products and technologies.

Many Canadian transition-opportunity companies are geared towards international exports and the United States market in particular. There are important opportunities in these markets, but

companies may be missing large market opportunities in other provinces. Support for interprovincial trade is far less developed than support for international trade.

Examples to build on:

Matching innovators with Canadian customers:

- Emissions Reduction Alberta supported Nova Scotia-based CarbonCure to deploy its concrete carbon-capture technology with Alberta customers, helping Alberta-based concrete producer BURNCO Rock Products and the Calgary International Airport reduce emissions while demonstrating the benefits of CarbonCure's technology.

Matching innovators with incumbent investors:

- Enerkem's new waste-to-biofuels facility in Quebec is enabled by major investments from Shell and Suncor, in addition to debt and equity financing from Investissement Québec and federal funding. The investment gives Shell and Suncor a stake in a growing transition-opportunity market while providing Enerkem with the financing it needed to scale.
- McCain Foods is investing in vertical farming technology companies, including Nova-Scotia-based TruLeaf and its Ontario-based subsidiary GoodLeaf Farms, which could provide a big payoff for the companies, and for job creation, as this market accelerates (Patil and Baul 2021).

Matching innovators with government buyers:

- Supported in part by federal infrastructure funding, municipalities are purchasing new electric buses for their transit fleets. For example, Ottawa purchased four e-buses from Manitoba-based New Flyer in December 2020, Vancouver ordered 15 e-buses from Quebec-based Nova Bus in February 2021, and Prince Edward Island has committed to switch all of its 332 school buses to electric, starting with 47 e-buses from Quebec-based Lion Electric Company.

Encouraging strategic partnerships between transition-opportunity companies and incumbents:

- Ballard Power Systems, the company with the highest financial velocity in British Columbia, announced a partnership with Linamar in 2021, working with Canada's second-largest automobile parts manufacturer to co-develop a fuel cell powertrain.



3

CHANNEL INVESTMENT TOWARD TRANSITION-OPPORTUNITY COMPANIES IN RURAL, REMOTE, AND INDIGENOUS COMMUNITIES TO IMPROVE COMMUNITY RESILIENCE

In every province except Ontario and Quebec, most transition-opportunity companies are headquartered in one or two of the provinces' large urban areas. While this doesn't mean that all business activities take place in urban areas, additional effort will be required to ensure that growth and job benefits extend into rural, remote, and Indigenous communities where they are needed most.

While some transition-opportunity markets are technology-focused and may remain in large urban centres, others have parts of their supply chain that are well suited to rural and remote areas. These include agricultural activities related to growing plant protein markets, feedstock production for bioenergy and bioproducts, mining activities associated with minerals critical to electric vehicle batteries, and renewable energy production (provided transmission lines are in close proximity).

At the same time, transition-opportunity companies have technologies that can help large incumbent industries located in small, rural, remote areas reduce emissions and thereby lessen their vulnerability to transition risks that could affect local employment. Provinces can also draw on their resource and skills advantages to attract investment. Transition-opportunity companies faced with labour shortage challenges could be supported to locate in non-urban areas through targeted efforts in jobs training and reskilling.

Examples to build on:

Leveraging private investment in rural areas and smaller urban centres:

- With financial commitments from federal and provincial governments, General Motors Canada and Posco Chemicals are building a \$500-million cathode active material facility (for electric vehicle batteries) in Bécancour, just outside of Trois-Rivières, Quebec. German multinational BASF is also planning a battery manufacturing and recycling plant in Bécancour.

- Sustainable Development Technology Canada funding is helping to build a new biofuels plant south of Sarnia in Sombra, Ontario, building on the region's experience in petroleum refining.
- Deep Earth Energy Production is developing a geothermal demonstration project in southeast Saskatchewan, with support from SaskPower and NRCan.

Facilitating Indigenous ownership and access to renewable energy investment:

- Financial incentives for Indigenous participation in renewable energy projects under Ontario's Feed-in Tariff program helped to drive private investment interest in building partnerships. For example, Henvey Inlet First Nation partnered with a private developer for a 50 per cent equity stake in a 300 MW wind farm, which is expected to earn \$100 million per year for the 900-member community.
- The Innu Nation and Quebec-based Boralex established a 50-50 partnership to build a 200 MW wind farm in the territory of the Innu of Uashat mak Mani-utenam, having secured a 30-year power purchase agreement with Hydro-Québec.
- British Columbia's Indigenous Clean Energy Initiative is helping to leverage funding in hydro, solar, geothermal, biomass, wind, and demand-side management projects by Indigenous proponents and their partners throughout British Columbia.

Capturing growth opportunities from transition minerals for Northern and remote regions:

- Formal agreements can help ensure project benefits for local communities and local priorities are protected in project planning. For example:
 - » The new Minago Project in northern Manitoba is aiming to be the lowest-environmental-impact nickel mine in the world and is going ahead based on a Memorandum of Understanding with Norway House First Nation that provides economic and employment benefits.
 - » The first primary cobalt mine in Canada is slated to be built near Whati in the Tłıchǫ region of the Northwest Territories, with a socio-economic agreement that provides targets for local employment, local business spending, and education and training.

4

ATTRACT AND LEVERAGE HIGH-POTENTIAL COMPANIES AND INVESTMENTS TO DRIVE PROVINCIAL GROWTH AND JOB CREATION

High-potential companies are those that have demonstrated their ability to attract private investment and are growing that investment, and creating jobs, rapidly. These companies have the potential to accelerate regional growth and job creation but are also at risk of being acquired by foreign companies that could move their operations elsewhere or grow their operations in the larger United States market.

Multinational companies are also evaluating where to invest and expand facilities and could be drawn to Canadian communities through local competitive advantages and favourable investment conditions. Provincial investments in low-carbon electricity and community and network infrastructure, as well as tax incentives for transition-opportunity investments and direct project financing, can help attract major projects and support domestic expansion of high-potential companies.

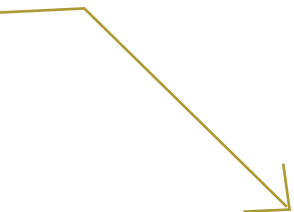
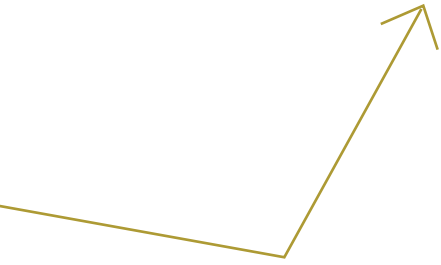
A shortage of skilled workers is a constraint on growth—a trend that emerged in every provincial profile. Public support for reskilling and training as well as skilled immigration could help grow, attract, and retain companies.

Provinces can identify the specific barriers companies face that are slowing their growth or impeding investment. For example, Ontario and Quebec both have high-potential companies with technology for electric vehicle battery recycling. Policies that increase demand for battery recycling could support additional growth and investment within the provinces.

Examples to build on:

Using public investment to secure anchor projects:

- In Ontario, the federal and provincial governments have invested significant amounts—covering as much as 30-50 per cent of project costs—to establish the province in the competitive electric vehicle manufacturing growth market. In 2022, Stellantis and LG Energy Solution announced a \$5 billion invest-



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Generating more transition-opportunity companies across a wider variety of markets opens up a broader range of possibilities for growth and job creation.

ment to build Canada's first electric vehicle battery cell manufacturing plant, including a large, undisclosed contribution of public funding. The project is projected to create 2,500 jobs for Windsor, Ontario, and create thousands of indirect jobs across the province through the battery supply chain.

Growing the pool of skilled workers:

- The University of Calgary is launching a new engineering program in Sustainable Systems Engineering, after suspending admission to its oil and gas engineering program in 2021. The program aims to train engineers with a broad set of skills ready to capture emerging opportunities. They also offer a Master's in Sustainable Energy Development, which can help mid-career professionals redirect their career into demand-growth markets.

Providing conditional financing to secure local benefits:

- In 2021, the federal and provincial governments committed \$50 million each in loans to Lion Electric for a new battery pack assembly plant in Saint-Jérôme, Quebec. To convert 30 per cent (\$15 million) of the Quebec portion of the loan into a grant, the company had to create the jobs locally, configure the plant to serve the Canadian market, maintain the head office in Saint-Jérôme, and establish a research and development centre.

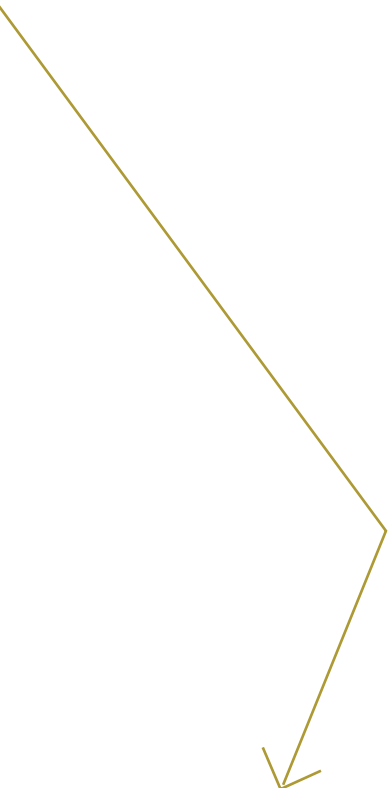


5

INCREASE INVESTMENT IN TRANSITION-RELATED PUBLIC RESEARCH AND DEVELOPMENT TO GENERATE MORE TRANSITION-OPPORTUNITY ENTREPRENEURS AND START-UPS

Generating more transition-opportunity companies across a wider variety of markets opens up a broader range of possibilities for growth and job creation.

There are various contributing factors to generating start-ups. The Conference Board of Canada's provincial comparison on innovation performance provides some clues. Ontario, Alberta, and British Columbia lead on entrepreneurial ambition (percentage of people engaged in early-stage entrepreneurial activity). And Nova Scotia, Quebec, and Ontario lead on spending on research and devel-



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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 licence. In particular, the company and investment trends included in the 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.

For a [Master Reference List](#) please see the [Net Zero: A province-by-province comparison](#) webpage.

opment as a share of GDP. Saskatchewan, Prince Edward Island, Manitoba, and Newfoundland and Labrador lag behind on these innovation criteria.

Provincial governments, potentially with federal support, could establish more transition-focused research institutes and foster academia-industry partnerships to generate the knowledge needed to establish start-ups.

Examples to build on:

Establishing research institutes to attract, develop, and support experts:

- Nova Scotia, for example, has several research institutes dedicated to transition opportunities, including the Verschuren Centre for Sustainability in Energy and the Environment in Cape Breton, Dalhousie University's Clean Technologies Research Institute, and Dalhousie's Jeff Dahn Research Group sponsored by Tesla.

Financing demonstration projects to de-risk innovative technologies:

- Alberta Innovates, Emissions Reduction Alberta, NRCan, and Sustainable Development Technology Canada partnered with private industry investors to finance Alberta-based geothermal technology company Eavor's first near-commercial demonstration project.



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