

**REGIONAL
SPOTLIGHT**

Ontario





Close-up on the bio-economy

LABOUR MARKET
INTELLIGENCE

BioTalent Canada

BioTalent Canada supports the people behind life-changing science. Trusted as the go-to source for labour market intelligence, we guide bio-economy stakeholders with evidence-based data and industry-driven standards. We are focused on igniting the industry's brainpower, bridging the gap between job-ready talent and employers, and ensuring the long-term agility, resiliency and sustainability of one of Canada's most vital sectors.

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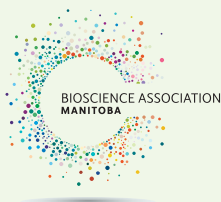


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About this report

BioTalent Canada's 2021 series of labour market intelligence (LMI) reports, *Close-up on the bio-economy*, aims to provide the perspective bio-economy organizations need to find, recruit, train and retain talented teams based on real, meaningful understanding of the labour market.

Building on the last national full LMI study conducted in 2013,¹ the new series gives a much-needed update on the complex, multi-dimensional bio-economy, the companies within it, and the skills and talent they require. Its insights are based on surveys, stakeholder roundtables and interviews, an environmental scan and extensive data analysis.

For the first time, the data offers deeper insights into the labour market conditions specific to individual regions within Canada. This report looks at **Ontario**,

including labour supply projections and labour market outlooks based on econometric models to estimate hiring requirements.

The study considered three time periods for its economic forecasts: immediate (to explore pandemic-related changes between 2019 and 2020), short term (2021 to 2024) and medium/longer term (2025 to 2029).

¹ *Sequencing the Data*, 2013. A previous LMI report, *Splicing the Data*, was published in 2008.

Other reports in the series

The *Close-up on the bio-economy* LMI series is published as part of BioTalent Canada's mission to provide bio-economy stakeholders with valuable, evidence-based labour market intelligence and job-ready human resources.

It includes:

- ▶ **National LMI report**
- ▶ **Demand and Supply Outlook**
- ▶ **Regional spotlights** (Atlantic Canada, Quebec, Ontario, Prairies, Western Canada)
- ▶ **Metro hub spotlights** (Greater Montreal, Greater Toronto Area, Metro Vancouver)
- ▶ Research briefs on topics such as bio-economy education and work-integrated learning

Visit biotalent.ca/LMIStudy to download these and other LMI reports, briefs and articles.



Research partners

The following researchers contributed to the development of this research and report:

- ▶ DPM Research Inc.
- ▶ Prism Economics & Analysis Inc.
- ▶ EKOS Research Associates Inc.
- ▶ Ipsos



Executive summary

Ontario will likely need **24,500 additional bio-economy workers by 2029**. Companies in the region will be challenged to fill positions due to a highly competitive labour market and an ongoing lack of capital to attract and retain candidates. Distribution, manufacturing and management capacity will be particularly urgent areas of need across all sub-sectors.

A reflection of Canada's overall bio-economy

Ontario's bio-economy consists of roughly **4,100 establishments** that collectively employed some **75,000 people** in 2019. Similar to most other regions, its companies are mainly **small or medium-sized businesses**: 71% have 20 employees or fewer, and 56% generate annual total gross revenues of less than \$1 million. **Bio-health companies** account for more than half (54%) of Ontario's bio-economy.

The Ontario bio-economy workforce covers a wide range of occupations, with **R&D and manufacturing** together accounting for nearly half of all jobs. The distribution of employees across sub-sectors mirrors the distribution of companies, with bio-health accounting for the largest proportion.

Modest growth with labour shortages expected

The Ontario bio-economy is **expected to grow modestly** during the 2021 to 2029 forecast period. Current estimates indicate there will not be enough workers to meet labour needs by 2029, with significant pressure existing now and mounting throughout the decade. Most new hires will be required by the bio-health sub-sector.

Some of the most severe shortages are expected in bio-manufacturing and processing. Forecasts suggest Ontario employers will be able to fill only 25% of job openings in these areas between now and 2029. The shortage is expected to intensify as Canada seeks to expand its manufacturing sector in response to the lack of capacity highlighted by the COVID-19 pandemic.

While **labour shortages are expected for all bio-economy job functions** throughout the forecast period, three areas stand out as likely to experience persistent, severe shortages until 2029 and beyond:

- ▶ Distribution and logistics jobs
- ▶ Manufacturing and production jobs
- ▶ Management, finance and administration jobs

How Ontario can address the shortfall

As domestic university degree completions are expected to decline throughout the forecast period, strategies other than recruiting new graduates will be needed to meet the demand for labour — such as recruiting skilled immigrants and looking beyond traditional talent pools.

Ontario has a tremendous **opportunity to seek bio-economy talent from under-represented groups**. Women make up an average of roughly one-third (35%) of Ontario bio-economy workers overall and visible minorities one-quarter (25%). Other equity-seeking groups have less representation: internationally educated professionals make up an average of 16% of the regional bio-economy workforce, recent immigrants represent 9% and workers with disabilities make up just 1% of the workforce, while representation of Indigenous workers is nearly non-existent.

As many employers also report that **candidates lack essential “soft skills”** such as problem-solving, collaboration and the business development skills that support commercialization, further **expansion of work-integrated learning may be an important lever** for strengthening the talent supply.



Who makes up the Ontario bio-economy?



THE COMPANIES

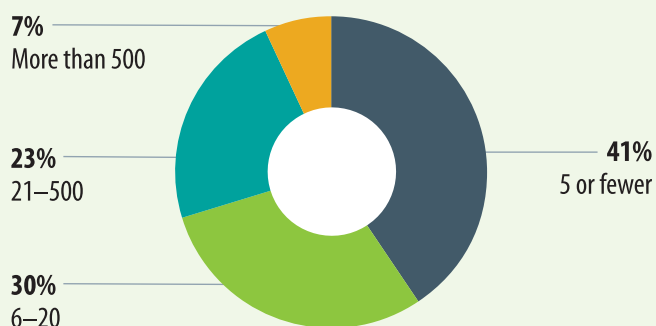
~4,100 bio-economy organizations



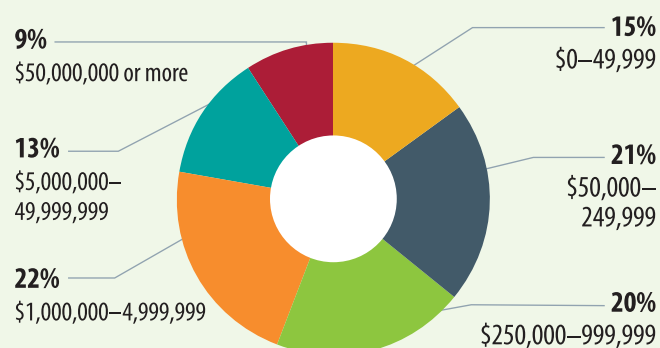
Most are small to medium-sized



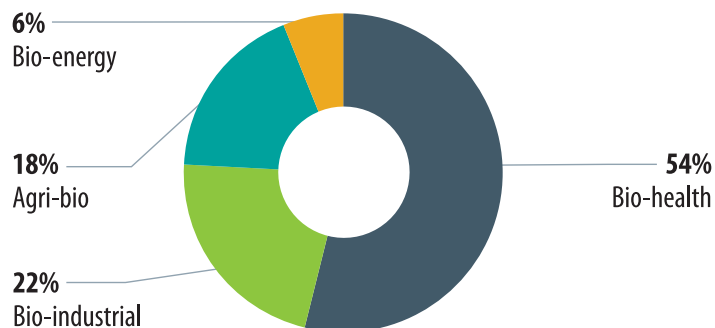
Number of employees*



Annual total gross revenue



Bio-health is the biggest sub-sector



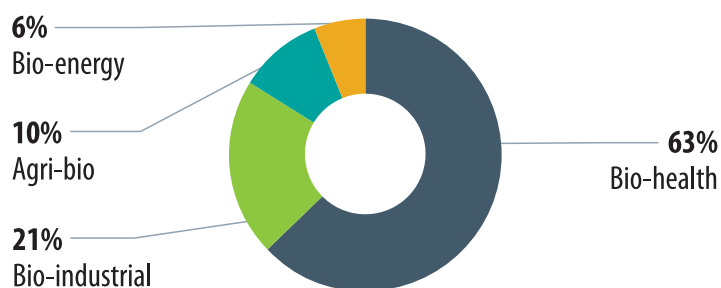
* Percentages may not add up to 100% due to rounding.



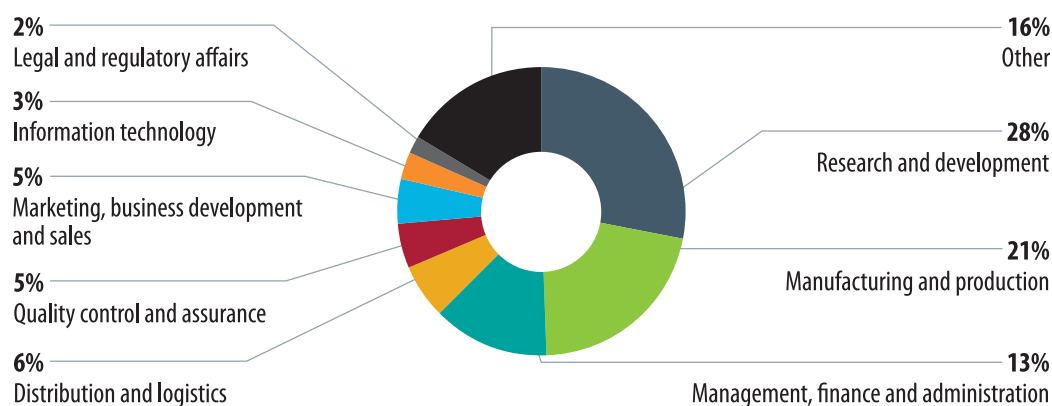
THE PEOPLE

~75,000 workers

Most work in bio-health



Jobs are concentrated in R&D and manufacturing[†]



The sector has an opportunity to improve diversity

Women: **35%**

Recent immigrants*: **9%**

Visible minorities: **25%**

People with disabilities: **1%**

Internationally trained professionals: **16%**

Indigenous people: **0%**

48% of undergraduate...

35% of master's...

36% of doctorate...

...students in Canadian bio-economy-related programs go to school in Ontario

[†] Percentages may not add up to 100% due to rounding.

* Recent immigrants are those who have been in Canada less than five years.

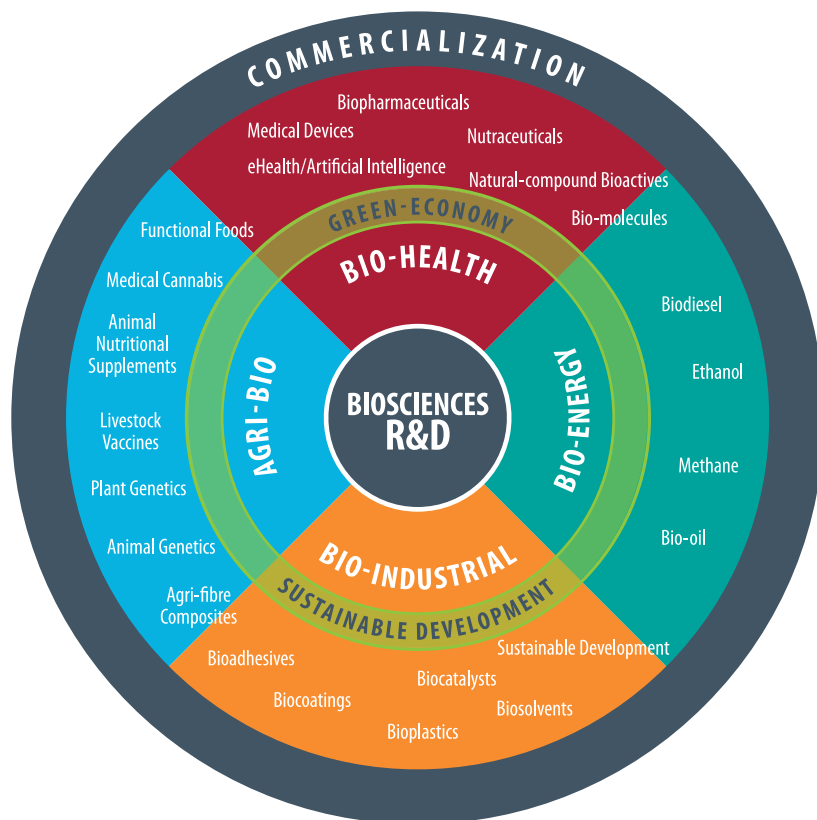


DEFINING THE BIO-ECONOMY

The bio-economy today

The bio-economy is defined as the economic activity associated with the invention, development, production and use of primarily bio-based products, bio-based production processes and/or biotechnology-based intellectual property. It includes the use of resources from agriculture, forestry, fisheries/aquaculture, organic waste and aquatic biomass.

The field is multidisciplinary in that it cuts across the bio-health, bio-energy, bio-agriculture (agri-bio) and bio-industrial (chemicals and materials) sub-sectors. These four are all rooted in their own foundations of research and development and all have products, processes or intellectual property that are involved in the “green” or sustainable development economy as well, to a greater or lesser extent. The bio-economy sub-sectors share a common objective: the commercialization of resultant bio-products, processes and/or intellectual property.



The **bio-health** sub-sector encompasses the invention, development, manufacturing, commercialization and use of products that improve therapeutics, diagnostics, prevention and health administration, as well as the development and production of nutraceuticals and applications of medical cannabis. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property related to the production of bio-health products and technologies.

The **bio-energy** sub-sector encompasses the invention, development, production, commercialization and use of renewable fuels through the conversion of organic material into heat or power. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property related to the production of bio-energy.

The **bio-industrial** sub-sector encompasses the invention, development, manufacturing, commercialization and use of goods for industrial use, such as bio-chemicals and bio-materials, through the conversion of organic material. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property related to the production of bio-industrial products. Among others, the development and production of biocatalysts are an integral part of this sub-sector.

The **agri-bio** sub-sector encompasses the invention, development, production, commercialization and use of new or modified products resulting from the manipulation, modification or alteration of the natural features of plants and crops, animals and/or other food sources. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property that support improved quality, yield and efficiency in the agricultural sector and food production.





Profile of the Ontario bio-economy

The bio-economy in Ontario contains some 4,100 organizations, accounting for 36% of Canada's bio-economy companies. These organizations collectively employed around 75,000 people in 2019. It includes commercial businesses as well as hospital and university research institutions.

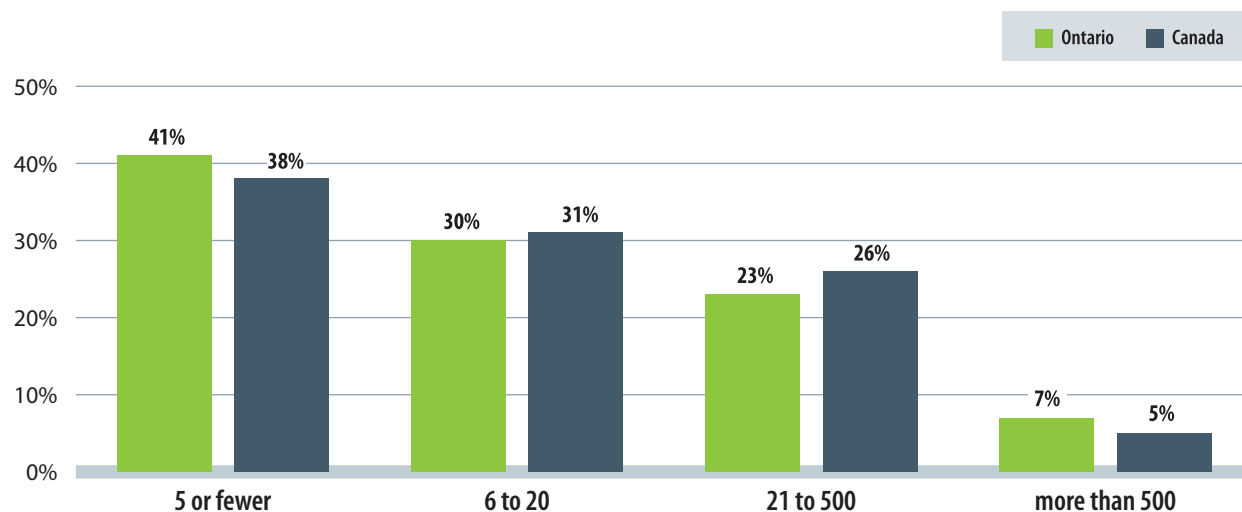
Employers

Small and medium-sized companies dominate the region's bio-economy. Of the organizations surveyed by BioTalent Canada, **nearly three-quarters (71%) had 20 or fewer full-time employees**. Just 7% had more than 500 full-time employees. These numbers line up fairly closely with those for Canada overall.

Revenue figures are mostly similar between Ontario and Canada as a whole. In 2020, **more than half of Ontario companies (56%) reported annual total gross revenues of less than \$1 million**. A few of the largest players (9%) reported total gross revenues of \$50 million or more.



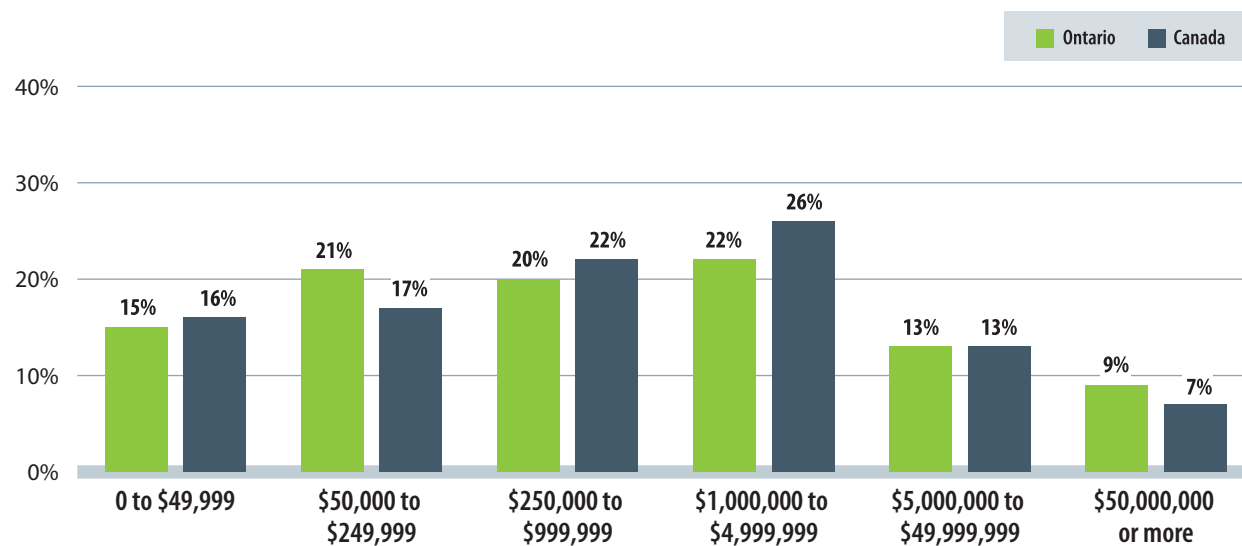
FIGURE 1. Bio-economy companies by number of full-time employees, Ontario vs. national



Source: BioTalent Canada, Survey of Employers 2020

The overwhelming majority of bio-economy companies are small or medium-sized businesses.

FIGURE 2. Bio-economy companies by annual total gross revenue, Ontario vs. national



Source: BioTalent Canada, Survey of Employers 2020

More than half of companies generate less than \$1 million in annual revenues.

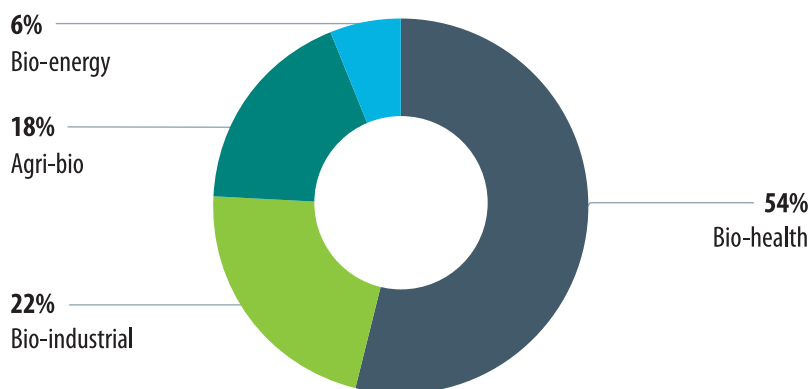


Two-thirds of Ontario companies are less than 15 years old.

Compared to the national profile, Ontario's bio-economy companies are slightly younger, with **nearly two-thirds (62%) being less than 15 years old**. Just 19% have been in business for more than 25 years, compared to 24% for Canada overall.

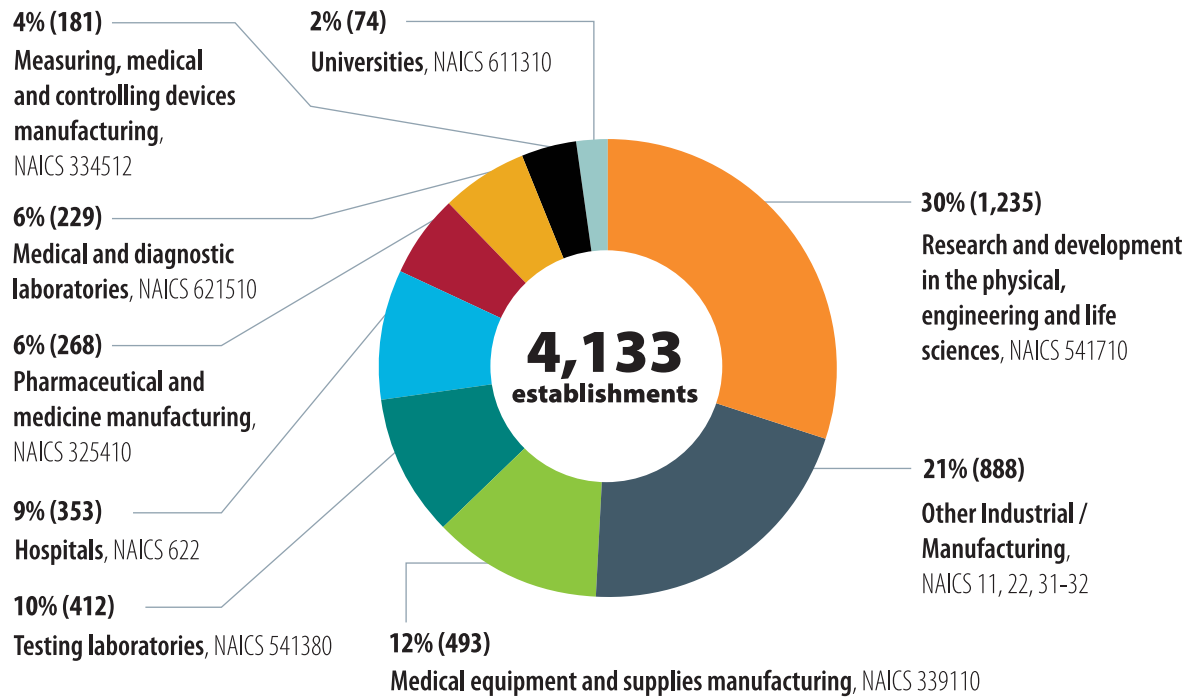
The distribution of Ontario bio-economy companies across the four primary sub-sectors is similar to the national profile. **Bio-health is by far the largest sub-sector** in the region, accounting for more than half (54%) of all companies in the Ontario bio-economy.

FIGURE 3. Companies by primary sub-sector, Ontario



Source: BioTalent Canada Survey of Employers (2020)

FIGURE 4. Ontario bio-economy establishments by NAICS industrial sector



Source: BioTalent Canada Modelling and Projections (2020)

The North American Industry Classification System (NAICS) gives a different and complementary view of the Ontario bio-economy and its areas of focus. NAICS 541710 refers to physical, engineering and life sciences

R&D — which makes up nearly one-third (30%) of bio-economy establishments. The next largest segment is other industrial/manufacturing (NAICS 11, 22, 31–33), at 21%.

Workers

R&D and manufacturing account for nearly half of Ontario bio-economy jobs overall (28% and 21%, respectively). In three of the four bio-economy sub-sectors, manufacturing and production account for the largest share of jobs.

Employment in the Ontario bio-economy is highly concentrated in bio-health. Nearly two-thirds (63%) of all employees work in this sub-sector, with almost another quarter (21%) in the bio-industrial sub-sector.

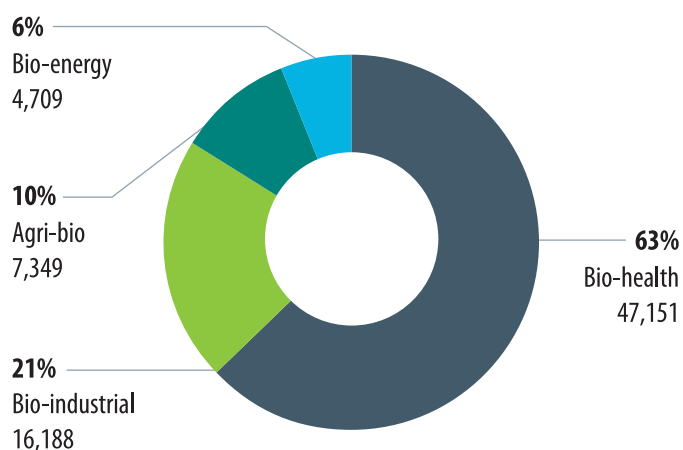
TABLE 1. Employment by job category and sub-sector, Ontario

Job category	Total	Agri-bio	Bio-energy	Bio-health	Bio-industrial
Research and development	28%	30%	33%	30%	20%
Manufacturing and production	21%	28%	31%	13%	36%
Management, finance and administration	13%	15%	13%	14%	12%
Distribution and logistics	6%	6%	5%	6%	6%
Quality control and quality assurance	5%	6%	3%	5%	5%
Marketing, business development and sales	5%	8%	3%	5%	4%
Information technology	3%	3%	1%	4%	2%
Legal and regulatory affairs	2%	1%	2%	3%	1%
Other	16%	4%	7%	20%	14%

Percentages may not add up to 100% due to rounding.

Source: BioTalent Canada Modelling and Projections (2020)

FIGURE 5. Bio-economy employment estimates by sub-sector, Ontario



Source: BioTalent Canada Modelling and Projections (2020)

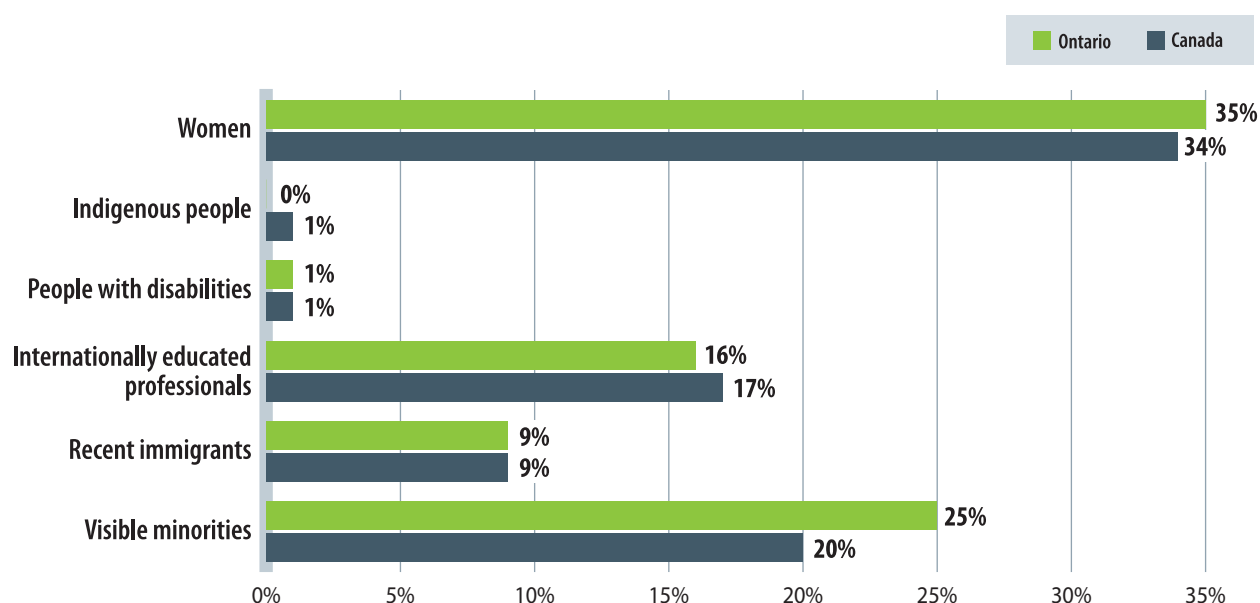
Equity and diversity in the workforce

Representation of equity-seeking groups in the Ontario bio-economy is similar to that of Canada overall, with the exception of visible minorities, who make up one-quarter of the Ontario bio-economy workforce (compared to 20% across Canada).

On average, **women account for an average of roughly one-third (35%) of Ontario bio-economy workers.** Other groups have less representation, with internationally

educated professionals (IEPs) making up 16% of the bio-economy workforce and recent immigrants (those who have been in Canada less than five years) 9%. **People with disabilities represent 1% of the workforce, and there is negligible representation of Indigenous workers.** These findings suggest under-represented populations could be important sources of new talent for the bio-economy going forward.

FIGURE 6. Average proportions of workers by equity-seeking group status, Ontario



Source: BioTalent Canada, Survey of Employers 2020

For deeper perspective on the bio-economy labour market in other regions across Canada, see our series of regional LMI spotlights at biotalent.ca/LMIStudy.

INDUSTRY VIEWPOINT

National Resilience, Inc. (Resilience)

Solving the specialization challenge

Since Resilience acquired its facility in Mississauga last year, the company has been busy expanding production and attracting new customers, including the Government of Canada. But the expansion has highlighted the need for more right-skilled talent to complete the work, an issue affecting all of Canada's bio-pharmaceutical industry.

Company profile: National Resilience, Inc.

Location: Mississauga, ON

Employees: Approximately 320 in Canada

Bio-economy sub-sector: Bio-health

Resilience offers innovative, customized manufacturing capacity to support biopharmaceutical partners at all stages of drug development, from pre-clinical trials to commercial supply.



Q: Can you tell us a little about Resilience?

KEITH TUCKER, SENIOR DIRECTOR OF HR: Resilience is a technology and manufacturing company that strives to democratize access to complex medicines. More specifically, we work with researchers, biotech and pharmaceutical companies, and governments to help develop and produce a range of experimental and commercialized therapies. We can support small, early-phase runs for clinical trials, as well as large-scale manufacturing once drugs are approved for commercial use in Canada.

Q: What does the expansion in Mississauga mean for Resilience?

KT: It means growth and everything that comes with that. It has to be managed thoughtfully because in our industry everything we do has to be flawless. Getting it wrong can have real consequences, so we need to adapt and scale up the right way and do things more effectively and efficiently. That demands the right people with the right skills and, even more importantly, the right mindset. Given the stakes, this work can't be "just another job". Leaders, manufacturing technicians, every other role — every employee has to have a real commitment to quality in everything they do.

“The biopharmaceutical manufacturing sector in Canada is so small that many students haven’t even heard of some of the jobs within it.”

Q: How easy is it to find the talent you need?

KT: It’s extremely difficult. Our work is highly technical, requiring some very tightly focused specializations. Only a few schools in Canada offer those programs, and the number of students who choose to take them is extremely small. Which I can understand. The biopharmaceutical manufacturing sector in Canada is so small that many students haven’t even heard of some of the jobs within it. Even if they have, they may not be too keen to go into a field with such a limited number of potential employers. But then it’s very difficult to build the industry without the people you need. On top of that, grads tend to stay close to where they went to school, so all the companies in the Toronto area end up competing for the same very small pool of talent, which makes it hard to recruit — and retain.

Q: How do you solve that issue?

KT: Compensation is obviously a part of it, but you can’t rely exclusively on salaries. There’s always someone willing and able to pay more. What we offer extends beyond competitive pay: We place value on owners and builders who are motivated to join our mission, and we want our employees to want to stay because of our culture, purposeful work and career growth opportunities. We focus on career development. We hire new grads with the right fundamentals and the right mindset and provide extensive training in the specialized skills we need.

Q: What does that training look like?

KT: Everyone who comes to work for us gets some. In certain cases, it lasts for months because, as I mentioned, there’s no room for error. We need to be absolutely sure employees are ready before we can let them work with our products. Related to our training programs, we work with every employee to understand their career goals and create a development plan that gives them a clear path forward with our company.

Q: Are there ways you’re able to grow the talent pool?

KT: Immigration is one solution right now. We can hire workers from other countries who are fully trained and have often been doing the job for years, so they’re able to come on board and get up to speed very quickly. We also want to support programs that encourage Canadian students to specialize in this highly competitive career. Partnering with universities and colleges to develop more STEM skills are key.

Q: What needs to happen to build up the local talent supply?

KT: We need to find ways of encouraging young people to get into this field. The kind of biopharmaceutical manufacturing we do is the way of the future, and there’s real interest and support from the government to expand it. Now we have to raise awareness among students of the great opportunities in this industry.



Ontario labour market outlook

Estimates suggest the Ontario bio-economy will need an additional 24,500 workers by 2029.² Based on anticipated conditions, labour supply will not be sufficient to meet that demand.

Following expansion in 2020 and a slight downturn in 2021, employment in the Ontario bio-economy is expected to grow by 1.3% annually in the short term and by 1.1% annually over the medium/longer term. By the end of the decade, the sector will **employ more than 85,000 people**.

Youth (those under 25 years old)³ have historically been critical to the labour supply, but the youth share of the population in Ontario has been declining steadily since 2000 and will likely continue to do so, while the share of individuals aged 55 years and older continues to rise. This combined trend is concerning for the future bio-economy because **a strong supply of youth is needed to age into the workforce and replace older workers**. This makes immigration key to meeting labour demand. Currently, only 9% of Ontario bio-economy workers are recent immigrants and 16% are IEPs, suggesting an opportunity to expand recruitment from these populations.

Although the COVID-19 pandemic led to a slight drop in immigration, with just 127,200 immigrants coming to Ontario in 2020, numbers are expected to increase to 140,000 annually by 2029. The number of immigrants arriving with post-secondary degrees has grown steadily since 2003 and is expected to rise to 45,900 by 2029.

The number of international students is also on the rise, particularly in architecture, engineering and related technologies.

For more detail on bio-economy labour needs in Canada, read our demand and supply outlook at biotalent.ca/LMIStudy.

² While this report focuses primarily on private sector employers, all forecasts and modelling include actual and potential workers from the public, education and private sectors.

³ The definition of “youth” varies depending on the source. While BioTalent Canada typically defines “youth” as under 30, the source data for this report defines youth as under 25.

Employment demand and skills requirements

While employment in the Ontario bio-economy is expected to grow over the forecast period, the individual sub-sectors will experience their own patterns of expansion and contraction.

TABLE 2. Employment outlooks by sub-sector, Ontario

Year	Overall	Bio-health	Bio-industrial	Agri-bio	Bio-energy
% change 2019 to 2020	+6.0%	+8.2%	+0.6%	+6.4%	+2.1%
Employment 2020	80,000	51,000	16,300	7,800	4,800
Employment 2024	81,000	51,400	17,400	7,800	4,500
Employment 2029	85,000	53,500	19,200	8,300	4,400

Source: BioTalent Canada Modeling and Projections (2020)

Bio-health

Bio-health grew more than any other Ontario sub-sector in 2020, largely due to increased pharmaceutical and medicine manufacturing. Employment is expected to remain above pre-pandemic levels throughout the forecast period despite a slight contraction (1.4%) in 2021. The bio-health sub-sector is expected to employ approximately 51,400 workers by 2024 and more than **53,500 workers by 2029**.

Agri-bio

Thanks to their status as essential businesses, Ontario's agri-bio companies avoided many of the pandemic-related shutdowns and saw robust employment growth in 2020. Levels are expected to decrease to pre-pandemic levels for 2021 and then grow by 2.4% in the short term, returning to 7,800 workers by 2024. Relatively low growth for the sub-sector is predicted for the rest of the forecast period, with total employment reaching **8,300 workers by 2029**.

Bio-industrial

Employment in Ontario's bio-industrial sub-sector grew just slightly in 2020, the result of decreased demand for some products (such as particle board and fibreboard manufacturing) and increased demand for others (such as personal care and cleaning products). Growth in this sub-sector is expected to start strong, increasing by 3.0% per year in the short term, then weakening slightly to 1.9% through the medium and long term, reaching around **19,200 workers by 2029**.

Bio-energy

Bio-energy employment in Ontario grew slightly in 2020 but is expected to decline throughout the forecast period due to competition from alternative energy sources and lower energy consumption overall. Employment in the sub-sector is expected to fall to **4,400 workers by 2029**.



The Ontario bio-manufacturing gap

COVID-19 highlighted a significant gap in the Canadian bio-economy: bio-manufacturing and processing capacity. Canada was initially unable to produce sufficient personal protective equipment (PPE) to meet its needs and had no domestic capacity to develop and manufacture vaccines. Commitments have been made to build facilities to remedy this, but those facilities will require skilled people to operate them — a supply of talent does not currently exist.

Estimates suggest Ontario will need an additional 5,820 bio-manufacturing workers by 2029 (2,170 in bio-health manufacturing alone), even without taking into account expansion growth due to recently announced investments. Only 25% of those positions will be fillable by predicted supply during this time period.

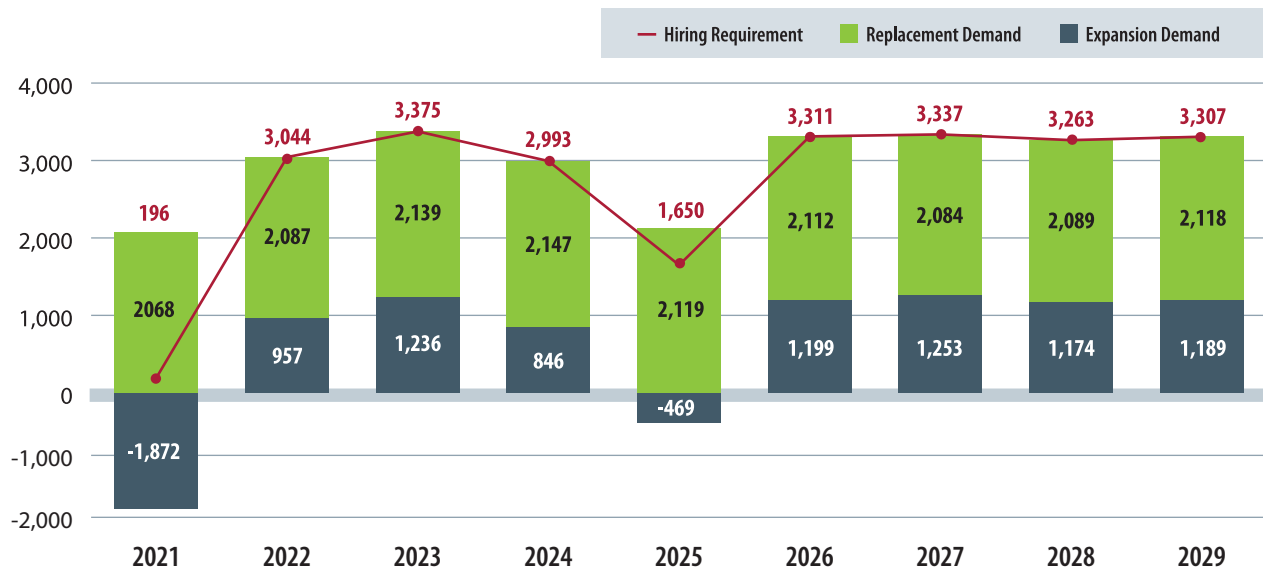
To fill the shortages, the bio-economy will need to develop new strategies, such as training workers from other sectors and more actively recruiting from outside traditional labour pools, including people from demographic groups under-represented in the bio-economy such as Indigenous persons, newcomers to Canada and persons with disabilities.

Expansion and replacement

Most of the requirement for 24,500 additional workers in the Ontario bio-economy to 2029 will be to replace retirees or individuals leaving the workforce for other reasons — in other words, to fill *replacement demand*. A portion will also be needed to fill new jobs as their industries grow (*expansion demand*).

While **replacement demand is expected to remain relatively stable across the forecast period, expansion demand will likely fluctuate slightly**. Expansion demand is weakest in 2021 as the bio-economy contracts back to pre-pandemic levels. A second dip is anticipated in 2025 as Canada's economic recovery results in higher interest rates, which will likely lead to reduced investment (including in labour) in the bio-economy.

FIGURE 7. Hiring requirement outlook by demand type, Ontario



Source: BioTalent Canada Modeling and Projections (2020)

TABLE 3. Hiring requirements by sub-sector from 2021 to 2029, Ontario

Sub-sector	Workers needed	Demand type	Key roles
Bio-health	14,400	Mostly replacement	<ul style="list-style-type: none"> ▶ R&D (24%) ▶ Management, finance and administration (18%) ▶ Manufacturing and production (15%)
Bio-industrial	7,300	Mostly replacement, with a significant proportion of expansion, particularly in 2023	<ul style="list-style-type: none"> ▶ Manufacturing and production (37%) ▶ Management, finance and administration (15%) ▶ R&D (14%)
Agri-bio	2,300	Nearly half expansion until 2023	<ul style="list-style-type: none"> ▶ Manufacturing and production (33%) ▶ R&D (20%) ▶ Management, finance and administration (19%)
Bio-energy	600	Virtually all replacement	<ul style="list-style-type: none"> ▶ R&D (34%) ▶ Manufacturing and production (27%) ▶ Management, finance and administration (18%)

Source: BioTalent Canada Modelling and Projections (2020)

Across all four sub-sectors in Ontario, manufacturing and R&D roles are among the top three areas where employers need to hire. Overall, manufacturing and production roles

are the most critically needed, making up nearly one quarter (24%) of the sector's hiring needs from 2021 to 2029 (see Table 4).

TABLE 4. Hiring requirements by job function, Ontario

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	%
Manufacturing and production	40	760	860	740	490	760	750	710	710	5,820	24%
Research and development	(-270)	650	710	640	290	760	790	790	810	5,170	21%
Management, finance and administration	330	500	550	490	280	530	520	500	510	4,210	17%
Distribution and logistics	80	200	220	180	80	210	210	200	200	1,580	6%
Marketing, business development and sales	80	170	190	150	60	170	160	160	160	1,300	5%
Quality control and assurance	(-30)	160	180	150	60	170	180	180	180	1,230	5%
Information technology	30	90	100	80	10	100	100	100	100	710	3%
Legal and regulatory affairs	50	50	50	50	30	60	60	70	70	490	2%
Other	(-110)	470	520	520	340	550	570	570	570	4,000	16%
Total	200	3,050	3,380	3,000	1,640	3,310	3,340	3,280	3,310	24,510	100%

Source: BioTalent Canada Modelling and Projections (2020)

Anticipated employment demand can be combined with expected supply to model where labour needs will be most acute throughout the forecast period. Overall, **63% of surveyed companies across all sub-sectors in Ontario already report some or significant challenges recruiting and retaining qualified staff.** The outlook suggests these will continue and likely worsen through to 2029.

Two-thirds of Ontario companies are already having trouble recruiting and retaining staff.

Overall labour market ratings by job category are calculated by comparing hiring requirements in each forecast year to the number of expected new bio-economy workforce entrants in the same year. A three-tiered rating scale shows the severity of the hiring challenges:

Level 1

Labour supply is **greater than 75%** of labour demand.

Low to moderate labour shortages are expected.

Level 2

Labour supply is **between 25% and 75%** of labour demand.

Moderate to serious labour shortages are expected.

Level 3

Labour supply is **less than 25%** of labour demand.

Serious to severe labour shortages are expected.

Tables 5–9 show that **distribution and logistics; manufacturing and production; and management, finance and administration are expected to face the most serious labour shortages throughout the forecast period.** This is true across all sub-sectors except bio-energy, which is expected to face only moderate-to-serious labour shortages for most positions. At the other end of the spectrum, the bio-industrial sub-sector could

experience serious-to-severe labour shortages for nearly every functional area throughout the forecast period.

Some of the shortages could be mitigated by more active recruitment of new graduates from relevant fields, but this will not fully address demand. Additional strategies, such as recruiting skilled immigrants and looking beyond traditional pools to attract candidates with a wider variety of backgrounds, will be required.

TABLE 5. Overall bio-economy labour market ratings outlook by job function, Ontario

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Distribution and logistics	3	3	3	3	3	3	3	3	3
Manufacturing and production	1	3	3	3	3	3	3	3	3
Management, finance and administration	2	2	3	2	3	3	3	3	3
Quality control and assurance	1	2	3	2	2	3	3	3	3
Legal and regulatory	2	2	2	2	1	2	2	2	2
Marketing, business development and sales	1	2	2	2	1	2	2	2	2
Research and development	1	2	2	2	1	2	2	2	2
Information technology	1	2	2	2	1	2	2	2	2
Other	1	2	2	2	2	3	3	3	3
Overall	1	2	2	2	2	3	3	3	3

Source: BioTalent Canada Modelling and Projections (2020)

TABLE 6. Bio-health labour market ratings outlook by job function, Ontario

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Manufacturing and production	3	3	3	3	1	3	3	3	3
Distribution and logistics	3	3	3	3	1	3	3	3	3
Management, finance and administration	3	2	2	2	1	3	3	3	3
Quality control and assurance	1	2	2	2	1	3	3	3	3
Research and development	1	2	2	2	1	2	2	2	2
Information technology	1	2	2	2	1	2	2	2	2
Legal and regulatory	2	2	2	2	1	2	2	2	2
Marketing, business development and sales	2	2	2	2	1	2	2	2	2
Other	1	2	2	2	2	3	3	3	3
Overall	1	2	2	2	1	2	3	3	3

Source: BioTalent Canada Modelling and Projections (2020)

TABLE 7. Bio-industrial labour market ratings outlook by job function, Ontario

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Distribution and logistics	3	3	3	3	3	3	3	3	3
Information technology	3	3	3	3	3	3	3	3	3
Management, finance and administration	2	3	3	3	3	3	3	3	3
Manufacturing and production	1	3	3	3	3	3	3	3	3
Quality control and assurance	1	3	3	3	3	3	3	3	3
Marketing, business development and sales	2	2	3	3	3	3	3	3	3
Legal and regulatory	1	2	2	2	2	2	2	2	2
Research and development	1	2	2	2	2	2	2	2	2
Other	3	3	3	3	3	3	3	3	3
Overall	1	3	3	3	3	3	3	3	3

Source: BioTalent Canada Modelling and Projections (2020)

TABLE 8. Agri-bio labour market ratings outlook by job function, Ontario

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Distribution and logistics	1	3	3	3	3	3	3	3	3
Manufacturing and production	1	3	3	3	3	3	3	3	3
Management, finance and administration	1	3	3	3	3	3	3	3	3
Marketing, business development and sales	1	3	3	3	3	3	3	3	3
Quality control and assurance	1	3	3	2	2	2	2	2	2
Research and development	1	2	2	2	2	2	2	2	2
Information technology	1	2	2	2	2	2	2	2	2
Legal and regulatory	1	1	1	1	1	1	1	1	1
Other	1	1	1	1	1	1	1	1	1
Overall	1	2	3	2	2	2	2	2	2

Source: BioTalent Canada Modelling and Projections (2020)

TABLE 9. Bio-energy labour market ratings outlook by job function, Ontario

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Research and development	1	2	2	2	2	2	3	3	3
Distribution and logistics	1	2	2	2	2	2	2	1	2
Manufacturing and production	1	2	2	2	2	2	2	2	2
Legal and regulatory	1	2	2	2	2	2	2	2	2
Marketing, business development and sales	1	2	2	2	2	1	2	1	2
Management, finance and administration	1	2	2	2	2	1	1	1	1
Information technology	1	2	1	2	1	1	2	2	N/A
Quality control and assurance	1	1	2	2	1	1	1	1	2
Other	3	2	3	2	2	2	2	1	1
Overall	1	2	2	2	2	2	2	2	2

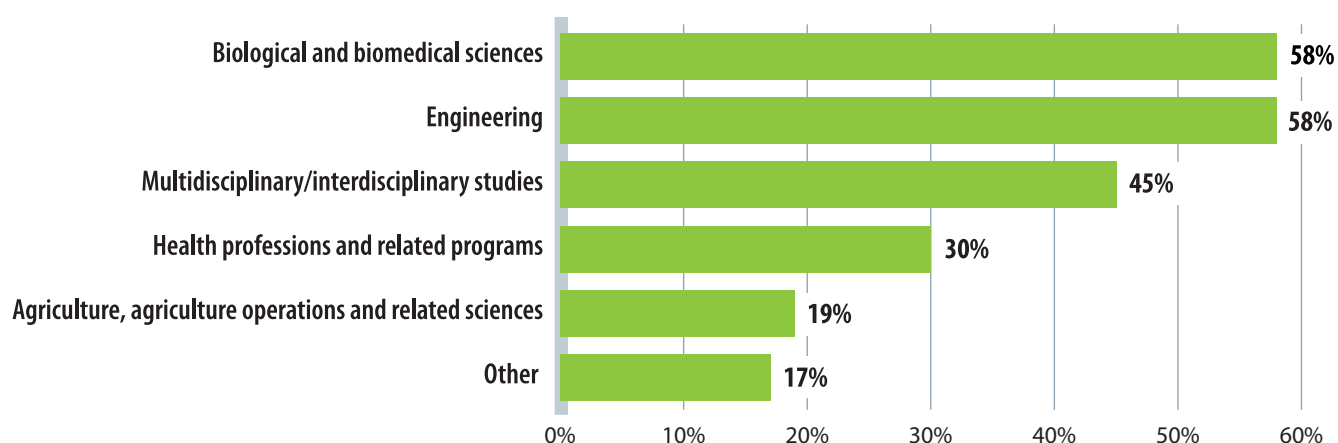
Source: BioTalent Canada Modelling and Projections (2020)

Education and the talent supply

Bio-economy employers seek a wide range of educational backgrounds. **Biological and biomedical sciences are tied with engineering at the top of the list:** nearly two-thirds (58%) recruit workers from these fields of study. Almost half (45%) also look for workers with multi- or interdisciplinary backgrounds, indicating the need for staff with specialized technical skills who also understand the broader business context.

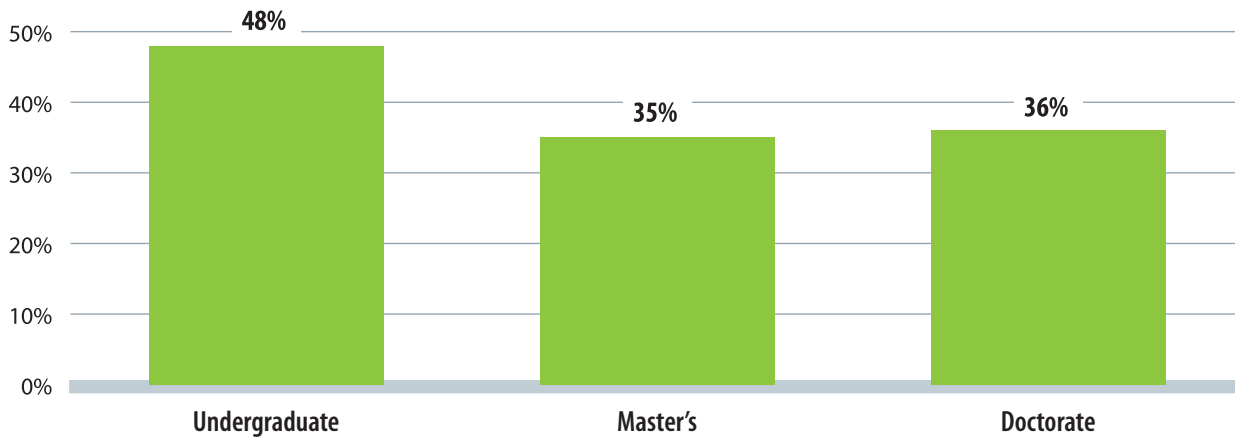
Ontario is home to a high proportion of Canada's university- and college-level programs related to the bio-economy, and student enrolment numbers reflect that distribution. In 2016–2017, more than one-third of Canada's master's and doctorate students and nearly half of undergraduate students in bio-economy-related programs were enrolled in Ontario institutions.

FIGURE 8. Top fields of study sought by bio-economy employers, Ontario



Source: BioTalent Canada, Survey of Employers 2020

FIGURE 9. Ontario's share of total enrolment in bio-economy-related university programs in Canada



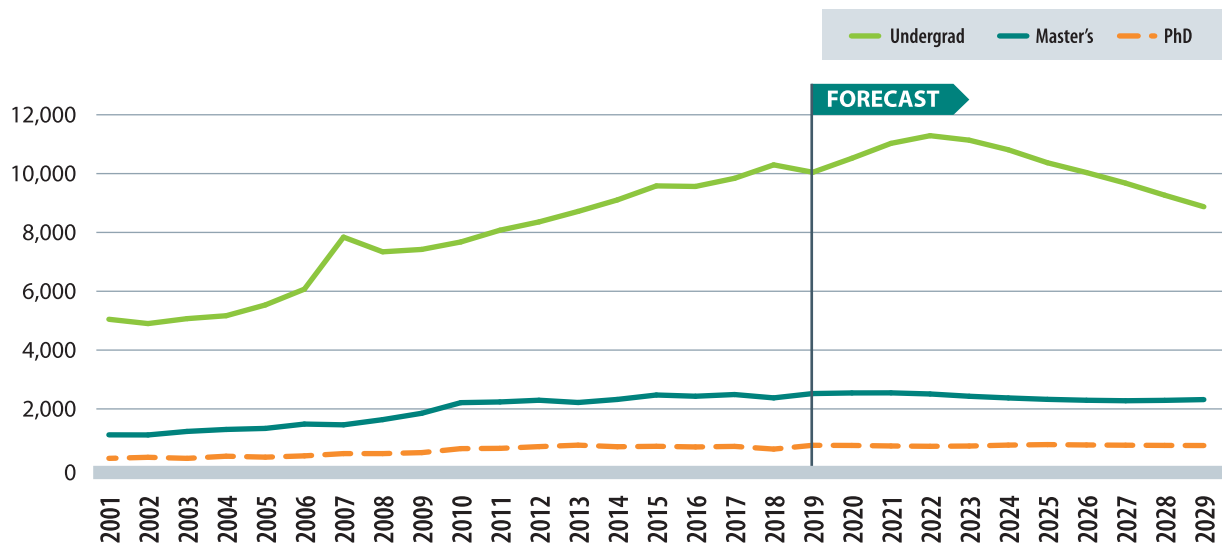
Source: Customized PSIS data, Statistics Canada 2019

Almost half of Canada's bio-economy undergraduate students study in Ontario.

In line with the decline in the post-secondary-aged (20–24 years old) segment of the population, **domestic enrolment in post-secondary education is expected to decrease** in the long term, with undergraduate degree completions dropping by 14% by 2029. Master's and doctorate completions will also decline during this period, but not as sharply.

Ontario attracts a significant proportion of the international students coming to Canada, and these students make up a large and growing share of the region's post-secondary enrolments. Some of them are likely to remain in Ontario as immigrants, particularly following changes to federal immigration rules in 2005 that made it easier for students to work and convert to "landed" status.

FIGURE 10. Domestic degree completions by study level, Ontario



Source: BioTalent Canada Modelling and Projections (2020)

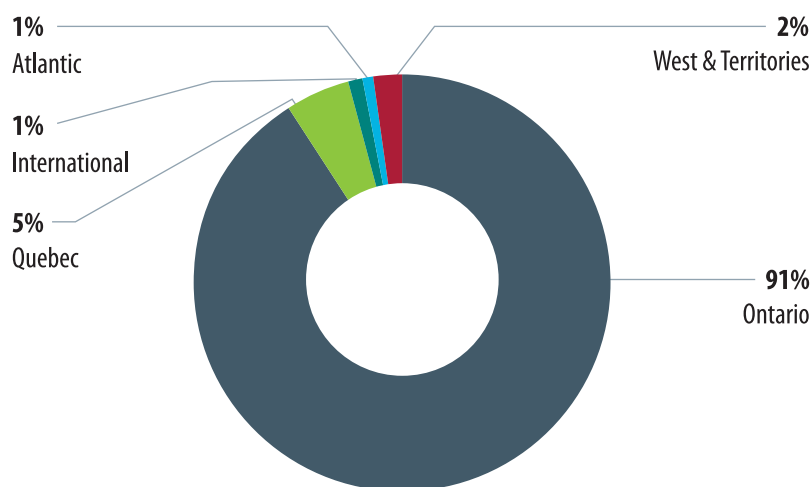
Ontario student immigration programs

In Ontario, international students pursuing graduate degrees can apply for permanent residency through the **Provincial Nominee Program**, even without a job offer in hand. International students who complete their studies in some small communities facing labour shortages may also be eligible for immigration through the **Rural and Northern Immigration Pilot**.

With a large share of both bio-economy companies and bio-economy post-secondary education programs, Ontario generally has an easy time attracting and retaining graduates. **More than 90% of the 2015 graduates from**

Ontario universities in bio-economy related fields of study were working in the same region in 2018. Quebec work opportunities attracted approximately 5% of Ontario's 2015 graduates.

FIGURE 11. Work regions for Ontario university graduates in bio-economy related fields of study



Source: Statistics Canada, National Graduate Survey 2018

Skills and training needs

As in the rest of Canada, Ontario bio-economy companies sometimes have **challenges finding candidates with not only strong technical skills but also “soft skills”** and other highly specific or niche skill sets. The vast majority (90%) of Ontario bio-economy companies offer some form of in-house training to ensure employees receive the required learning, often in the form of job shadowing, rotation programs and other hands-on training. Nearly half (47%) of Ontario employers actively support continuing education, including upskilling and “micro-credentialing” (a form of highly focused training to acquire a specific skill).

Work-integrated learning (WIL) — including co-ops, work placements, internships and clinical placements — are also highly valued by Ontario employers. Anecdotal evidence suggests these programs are expanding as educational institutions become aware of the competitive advantage they offer their students in the labour market.

Several innovative approaches to WIL are being used in Ontario, including:

- ▶ *Technical programs* designed to complement undergraduate or college programs with additional specialized skills
- ▶ *Initiatives focused on developing soft skills*, including writing and communications programs, networking projects, and competitions that simulate real-world challenges and encourage collaborative problem-solving
- ▶ *Professional graduate programs* specializing in noted skills gap areas such as regulatory affairs, data science, project management and business development



HR challenges in Ontario

Ontario bio-economy employers rank HR among their top five obstacles to company development. More than half report management-level skills and labour shortages (58%) as well as skills and labour shortages in research and technical areas (55%). Among their HR-specific challenges, **nearly half (46%) of Ontario bio-economy employers list lack of resources to pay competitive salaries as their top challenge.**

Main issues

46%

Insufficient capital or resources to pay competitive wages to attract and retain qualified candidates

36%

Lack of qualified candidates with required specialized skill sets or experience

28%

Lack of qualified candidates with practical/non-academic skills

17%

Loss of candidates and employees to large, well-known organizations

14%

Lack of applicants

Source: BioTalent Canada, Survey of Employers 2020

What are the skills gaps?

- ▶ **Soft skills:** The most critical skills gaps among candidates and new employers are problem-solving, collaboration and communication.
- ▶ **Business skills:** Companies looking to grow and commercialize innovations from R&D want more employees to have stronger business development knowledge and skills.

How are companies recruiting?

Ontario bio-economy employers rely on similar methods for hiring as employers across the country: personal contacts and employee referrals (76%) and job banks or other online resources (69%). Like the bio-economy overall, Ontario employers could connect with a larger, more diverse talent pool if they expanded their approaches to include strategies with broader reach.

The HR context by sub-region

Ontario is a large and populous province, with sub-regional differences in economic conditions and concentrations of bio-economy activity. Some of the more notable trends include:

Northern Ontario

Largely focused on sustainable development, specifically forestry

- ▶ Recruitment challenges include fewer tradespeople available due to migration, competition with the mining industry and a lack of infrastructure for long-term career progression in the area.
- ▶ Participation in the Rural and Northern Immigration Pilot and First Nations-focused skills training initiatives may help mitigate some of these issues.

Greater Toronto Area

Home to a mix of large companies and smaller start-ups, mostly in bio-health, with a strong focus on pharmaceuticals

- ▶ Start-ups often hire directly from post-secondary institutions, but retention can be a challenge because larger companies can offer better salaries.
- ▶ Mid-level management roles are difficult for most companies to fill because start-ups are often bought out by larger firms before their management teams have a chance to gain experience.

Southwestern Ontario

Home to a bio-industrial hub that relies heavily on technicians

- ▶ Local colleges supply much of the required labour, and students often return to the area after studying elsewhere.
- ▶ The bio-industrial sub-sector experiences significant volatility, which can make it difficult to fill expansion demand after a period of contraction.

Southern Ontario

Focused primarily on agri-bio

- ▶ Entry-level positions are supplied fairly well by a strong WIL culture among the area's universities.
- ▶ Proximity of the GTA presents both advantages and challenges for recruitment and retention.

Eastern Ontario

Grounded in bio-health, particularly R&D associated with government research facilities and the Ottawa Hospital Network

- ▶ Ottawa's high-tech industry also supports a secondary focus on digital health tools.
- ▶ The area's multiple post-secondary institutions make it fairly easy to hire for entry-level positions, but more senior talent tends to leave the area for larger, more lucrative markets.



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Conclusion

While Ontario bio-economy employers are well-positioned to recruit graduates thanks to the province's high concentration of post-secondary institutions, schools are not evenly distributed. Smaller, more rural communities sometimes have trouble competing for talent with larger urban centres such as the Greater Toronto Area, and would benefit from wage subsidy programs or other incentives to attract and retain workers.

Companies in most sub-sectors of Ontario's growing bio-economy are **already struggling to fill R&D, manufacturing and management roles**. Their challenges are expected to worsen throughout the decade due to an aging population, a highly competitive labour market, and a lack of capital to attract and retain candidates.

With many immigrants choosing to settle in Ontario, employers could also mitigate some of their hiring challenges and improve organizational diversity by **adjusting their recruitment strategies to reach more of these immigrants**.

The region may be a model for bio-economy employers elsewhere in Canada in terms of meeting the need for a mix of technical and essential soft skills. Ontario employers have turned to in-house training to address some of these issues, with 90% offering training to current employees.

Employers have also embraced work-integrated learning (WIL) and are **working with post-secondary institutions to enhance and expand WIL programming**.

See our **national LMI report** for more information on labour market conditions for Canada's bio-economy, including recommended actions employers and stakeholders can take to address the labour shortages expected over the next decade. Our **demand and supply outlook** takes a closer look at anticipated hiring needs along with the supply available to bio-economy employers, while additional regional spotlights provide more details on the labour market outlooks for Western Canada, the Prairies, Quebec and Atlantic Canada. For these and other reports, visit biotalent.ca/LMIStudy.



A ready mechanism

BioTalent Canada is prepared to support employers that lack the internal human resource capacity for talent recruitment, retention and development. BioTalent Canada has delivered numerous successful programs that have contributed to the growth of Canada's bio-economy labour market and to building a stronger, more sustainable sector. These include:

- Wage subsidy programs, including the Student Work Placement Program, Science and Technology Internship Program – Green Jobs, Science Horizons Youth Internship Program, Career Starter Program and BioReady™ Paid Internship Program
- Job matching platforms, including the bio-economy-specific job board, The PetriDish™
- Programs for internationally educated professionals, including the BioSkills Recognition Program and BioReady™ designation
- Skills courses, including the Essential and Technical Skills Fundamentals courses
- National Occupational Standards, a set of profiles documenting the skills, education and credentials required for specific bio-economy roles, to help employers recruit and retain the right talent, even with limited in-house human resource capacity

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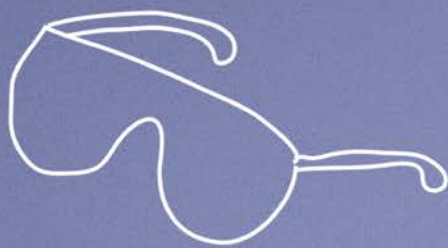
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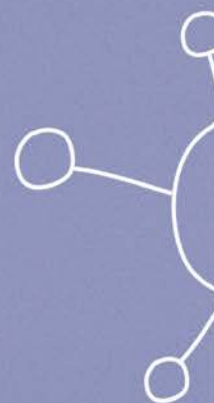
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