



Building skills for Canada's bio-economy

RESEARCH BRIEF

Amplifying Success

The value of a STEM education for the bio-economy



Canada's bio-economy is faced with labour supply issues that need to be addressed if the industry expects to maintain—and gain—momentum. This challenge and the current state of degree program enrolment are the key topics in this research brief. All the data comes from an extensive labour market information (LMI) study for Canada's bio-economy.

This study will help close the skills and knowledge gap in the bio-economy and provide stakeholders with a clear picture of trends shaping the biotechnology industry. Employers will gain a strategic advantage to compete nationally and globally for job-ready talent and have the ability to go to market faster.

Complete, detailed study results are expected to be available in 2021. (*note: this date is fluid*)

BioTalent Canada will release research briefs in the interim to update stakeholders and partners on preliminary findings. Visit biotalent.ca/LMIStudy for additional details.

Who is training for Canada's bio-economy?

The Canadian bio-economy is complex and multi-dimensional. However, BioTalent Canada's stakeholder roundtables, held in 2019, revealed a consensus: there is a labour supply issue that needs to be addressed as a top priority. The main source of labour supply for the bio-economy is recent graduates with a degree¹ from Canadian post-secondary education (PSE) institutions.

This brief outlines preliminary findings from BioTalent Canada's LMI study. Early results show:

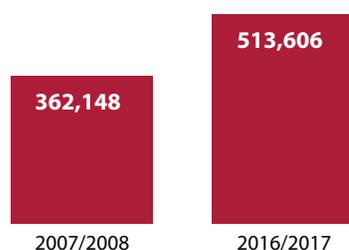
- enrolment trends in bio-economy post-secondary education (PSE) degree programs in Canada, and
- insights on how to increase the pipeline of workers with the right skills and knowledge.

STEM enrolment on the rise

Enrolment in Science, Technology, Engineering, and Mathematics (STEM) programs at Canadian post-secondary institutions grew significantly over the ten-year period between 2007/08 and 2016/17. (see Fig 1) Enrolment in:

- STEM-related programs increased by 42%.
- all other degree programs increased by 23%.
- STEM-related programs accounted for 40% of all enrolment in 2016/17.

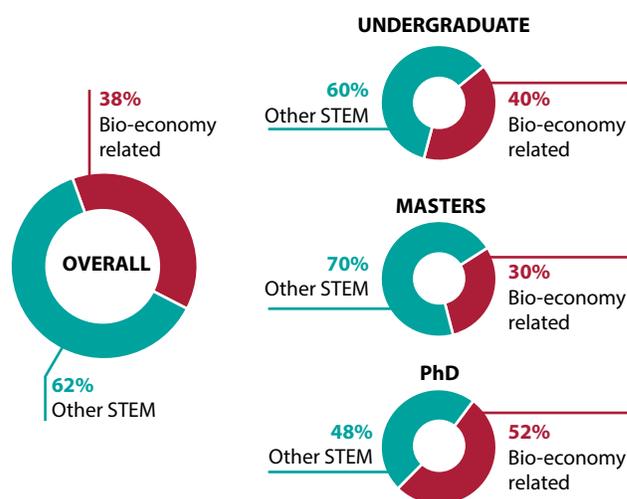
FIGURE 1
Growth in STEM enrolment- Canadian degree programs



STEM and bio-economy-related degree programs

A significant percentage of bio-economy-related degree programs fall within the definition of STEM programs. (see Fig 2). Some examples include: biomedical engineering, biology, chemical engineering, geological and earth sciences, and public health.

FIGURE 2
Enrolments in Canadian STEM degree programs (2016/2017)



BioTalent Canada used data from Census 2016 to better understand the educational makeup of the bio-economy workforce. The workforce was defined by identifying industry-relevant occupations² and sectors³. The educational⁴ background of the individuals working within these occupations and sectors were examined.

The post-secondary programs that were represented in high concentrations are considered to be "closely related" to the bio-economy. Programs with a lower concentration of graduates were found to be "somewhat related." BioTalent Canada discovered that in 2016/17, 38% of overall enrolments in STEM programs fell somewhere on the bio-economy spectrum. It was also determined that **some health-related programs are bio-economy-related.**

¹ This analysis focused on degree programs which include all universities and some colleges.

² Occupations are identified using the National Occupational Classification (NOC) – Canada 2016 <https://www.statcan.gc.ca/eng/subjects/standard/noc/2016/indexV1.3>

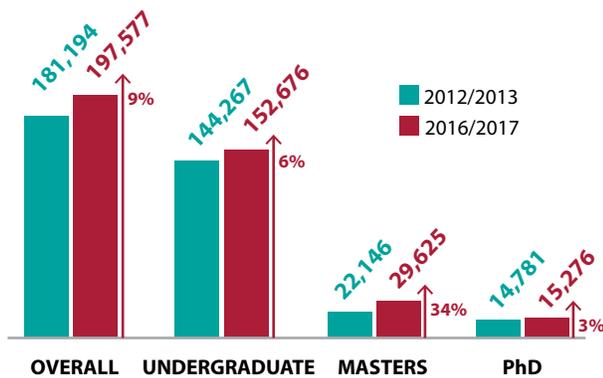
³ Industries are identified using the North American Industry Classification System (NAICS) – Canada 2017 Version 3.0 <https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TV=1181553>

⁴ Programs of study are identified using the Classification of Instructional Programs (CIP) Canada 2016 <https://www150.statcan.gc.ca/n1/en/catalogue/12-590-X>

Masters programs lead the way in Canadian bio-economy enrolment growth

Enrolment in bio-economy-related degree programs experienced a steady 9% growth between 2012/13 and 2016/17. The greatest growth over that five-year span was in Masters programs, which saw a 34% boost in enrolment. (see Fig 3)

FIGURE 3
Enrolments in bio-economy related Canadian degree programs (2012/2013 and 2016/2017)



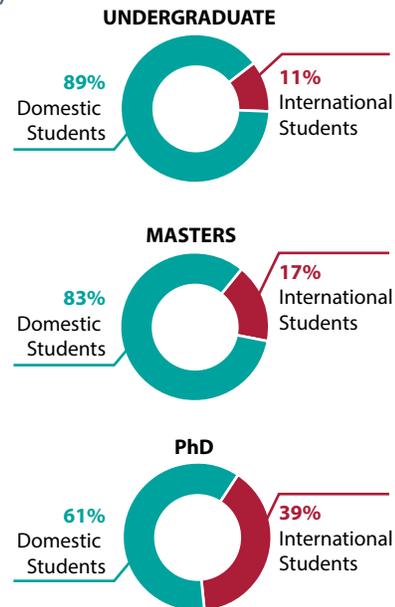
International students and their role in Canadian bio-economy supply

A key finding from stakeholder roundtables was that international students enrolled in bio-economy-related programs at Canadian universities are an essential source of talent for entry-level positions with bio-economy employers. The numbers back this up. (see Fig 4).

- Over the past five years, international student representation in undergraduate programs grew from 7% to 11%.
- International students accounted for 39% of PhD student enrolment and 17% of Masters students in 2016/17.

These numbers are a result of Canada's demographics and; therefore, its inability to produce enough high school graduates to grow university enrolments. Over this period of time, there was a 1% growth among domestic students compared to a 73% growth among international students in bio-economy related programs.

FIGURE 4
Enrolments in Canadian bio-economy related degree programs (2016/2017)



What does all this data mean?

Today, more students graduate from Canadian post-secondary institutions with bio-economy-related degrees than ever. These graduates are in high demand within the various bio-economy sub-sectors and from other industries. Unemployment rates in 2019⁵ among people with STEM-related post-secondary education were at an historic low.

Roundtable discussions made three determinations:

1. **Flexible initiatives are needed to help facilitate connections between graduates and industry.**
It's not sustainable to lose job-ready talent to other industries. Work integrated learning (WIL) programs like BioTalent Canada's Student Work Placement Program provide biotech employers with a way to tie students to the industry prior to graduation that offsets some of the costs and mitigates the financial risks.
2. **Greater emphasis must be placed on transitioning international students to permanent residents.**
Canadian bio-economy employers rely on the pipeline of these students. Today, two-thirds of international students intend to remain in Canada when they first enrol; however, less than 30%⁶ become permanent residents within ten years.
3. **Increased resources are required to assist employers navigate immigration issues for recruitment of new talent.**
The dependence on international students, and internationally-educated professionals, will increase as Canada experiences continued decline in the proportion of post-secondary aged domestic youth.

⁵ <https://www150.statcan.gc.ca/n1/daily-quotidien/200110/dq200110a-eng.htm>

⁶ Lu, Y., & Hou, F. (2015). International students who become permanent residents in Canada. Statistics Canada, Ottawa, Ontario.



BioTalent Canada LMI Study next steps?

These preliminary findings will serve as a basis for additional data sourcing throughout 2020 and 2021. The following areas are currently being explored based on these initial discoveries:

- Gender and regional distribution analysis within enrolment data and how these reflect the current composition of the bio-economy workforce.
- Examination of additional sources of talent for the Canadian bio-economy, such as diploma/certificate programs, different immigration pathways, and crossover from other industrial sectors.
- Understanding the different approaches used by employers and learning institutions to address knowledge and skills gaps among students, graduates, new entrants and established workers.
- An assessment of the bio-economy labour market by determining the gap(s) between current and projected demand and supply for the Canadian bio-economy.

Additional research briefs in development include:

- Defining the bio-economy
- Occupations in high demand
- Where graduates go
- Key results from co-ops and wage subsidies in the bio-economy.
- Preliminary indications of the impacts of the pandemic on the bio-economy labour market

In-depth findings coming in 2021 include:

- National, 5 regional, 3 hub LMI reports
- Hot jobs report
- Talent supply report

Questions or want to participate?

Contact BioTalent Canada Project Manager **Adriana Saenz** (asaenz@biotalent.ca) if you have any questions or would like to offer your expertise to this or any future LMI study.

Methods and Sources: This research brief is based on findings from:

1. A series of three facilitated roundtable discussions held in late 2019 with a cross-section of 119 stakeholders from the Canadian bio-economy.
2. An analysis of various Statistics Canada data sources including the Postsecondary Student Information System (PSIS).
3. A systematic review of sector-based reports and articles.

Funded by the Government of Canada's Sectoral Initiatives Program. 



About BioTalent Canada

BioTalent Canada™ is the HR partner and catalyst for growth in Canada's bio-economy. Our engagement with employers, associations, post-secondary institutions, immigrant serving agencies and service providers has built a dynamic network that is strengthening skills, connecting job-ready talent to industry and creating opportunities. Recently awarded a Great Place to Work® Certification, BioTalent Canada practices the same industry standards they recommend to their stakeholders. For more information visit biotalent.ca.

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