



Written Submission for the Pre-Budget Consultations in Advance of the 2019 Budget

By: Engineers Canada

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Recommendations to the federal government

Recommendation 1: That the government support work to attract and retain women and Indigenous peoples in post-secondary engineering education and the engineering profession.

Recommendation 2: That the government invest in engineering labour market data collection and analysis.

Recommendation 3: That the government extend funding to public infrastructure climate vulnerability assessments into life-cycle asset management to enhance infrastructure investment.

Detailed recommendations to the federal government

Overview:

Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate the practice of engineering in Canada and that license the country's almost 290,000 professional engineers. Engineers drive much of Canada's economy. As one of the top five exporters of engineering services in the world, the expertise of Canada's engineers contributes to both the Canadian and international economy. In the face of changing economic landscapes, Canada must rely on the unbiased and professional expertise of licensed engineers to support several sectors across the country, such as natural resources, manufacturing, technology, healthcare, and transportation sectors.

Recommendation 1: That the government support work to attract and retain women and Indigenous peoples in post-secondary engineering education and the engineering profession

Women and Indigenous peoples in Canada remain severely under-represented in both post-secondary engineering education and the engineering profession. Women make up over 50 per cent of the Canadian population yet comprise less than 13 per cent of practising professional engineers, and only 20 per cent of undergraduate engineering students. The percentage of Indigenous peoples in engineering education is even lower. While 4.3 per cent of the total population self-identifies as Indigenous, only approximately one per cent of undergraduate engineering students identify as an Indigenous person (First Nations, Métis, and Inuit).¹

Advancing the equal participation of women and Indigenous peoples in Canada's high-productivity sectors has the potential to add \$150 billion to Canada's GDP by 2026, or an annual increase of 0.6 per cent to the country's GDP growth, helping Canada to remain competitive in the face of a changing economic landscape.² Strengthening diversity in engineering is critical to supporting Canada's innovation agenda and economic growth.

There are several factors that may work to deter both women and Indigenous peoples from becoming or remaining licensed engineers in Canada. For women, the lack of apparent role models, coupled with other barriers including the stereotype that engineering is a male-dominated profession, often sends the message that engineering is not a career for women. For Indigenous peoples, underemployment, insufficient high school education—particularly in remote communities where prerequisite science and mathematics courses may not be adequately offered—and limited information regarding a career in engineering are all potential factors that restrict Indigenous peoples access to both post-secondary

¹ Engineers Canada (2016). "Enrolment and Degrees Awarded Survey." Retrieved June 6th, 2018, from: <https://engineerscanada.ca/reports/enrolment-and-degrees-awarded-report>.

² McKinsey & Company Canada (2017). "The Power of Parity: Advancing Women's Equality in Canada." Retrieved June 6th, 2018, from: <http://www.mckinsey.com/global-themes/women-matter/the-power-of-parity-advancing-womens-equality-in-canada>.

engineering education and the engineering profession.³ Information regarding these deterrents is mostly anecdotal.

Engineers Canada is actively working to attract and retain more women and Indigenous peoples to post-secondary engineering education and the profession through several initiatives. Some of these initiatives include our commitment to raising the percentage of newly licensed engineers who are women to 30 per cent by the year 2030, as well as our report, *Indigenous Peoples' Access to Post-Secondary Engineering Programs: A Review in Practice Consensus*, which is intended to support the development of engineering access programs for Indigenous peoples across Canada.

To strengthen Canada's economy and to support diversity within the engineering profession, the federal government must first support the engineering profession's efforts in attracting and retaining talented individuals from Canada's diverse population. This includes taking the initiative to fund outreach programs, bursaries, workplace mentorships, and work-integrated learning opportunities that encourage women and Indigenous peoples to pursue engineering education and careers.

Second, federal research funding that is specific to engineering is required to identify the barriers to women and Indigenous peoples' access to the profession. This is critical to implementing appropriate interventions to eliminate barriers to underrepresented groups' full participation in Canada's engineering profession.

Finally, to close the gap between Indigenous and non-Indigenous students' achievement of engineering degrees, and their securing of engineering jobs, the federal government must continue to provide consistent and sustainable funding to support engineering access programs for Indigenous peoples across Canada. If the engineering profession is to continue to solve society's complex problems, it must be reflective of the demographics of this society. For the profession to reflect Canadian demographics, more Indigenous students must enter and persist through post-secondary engineering education.

Considering this, some efforts have been made to attract and retain Indigenous peoples to post-secondary engineering programs in Canada. The University of Manitoba's Engineering Access Program (ENGAP) has been in existence for over 30 years and has graduated over 100 Indigenous students in engineering. Aboriginal Access to Engineering at Queen's University is a relatively younger program whose scope extends beyond post-secondary engineering and provides culturally relevant materials for teachers and parents of young learners to motivate their interest in mathematics and science. Investing in a diverse workforce will ensure that Canada remains competitive at an international level.

³ Engineers Canada (2016). "Indigenous Peoples' Access to Post-Secondary Engineering Programs: A Review of Practice Consensus Practices." Retrieved June 6, 2018, from: <https://engineerscanada.ca/reports/research/review-practice-consensus-indigenous-peopels-access-post-secondary-engineering-programs>.

Recommendation 2: That the government invest in engineering labour market data collection and analysis

For Canada's economy to remain competitive during times of economic changes, information regarding the engineering labour market needs to be up-to-date and readily available for policy-makers, industries, students, and educational institutions. This is required to identify, address, and develop the appropriate strategies to effectively deal with labour market changes, such as increased demand for emerging engineering disciplines, unemployment rates, and skills shortages within the profession.

In Canada, data sources have shortcomings, including their relatively short-term nature. With fragmented and unreliable data regarding Canada's labour market, Canadians'—specifically under-represented groups such as women, newcomers to Canada, students, and Indigenous peoples—are unable to make informed decisions, thereby hindering their ability to fully participate in the national economy. Equal representation of skilled workers and an appropriate mix of engineering disciplines to serve local, regional, national and international markets, within Canada's engineering profession will drive economic growth, support a qualified workforce, address potential skills shortages now and in the future, promote innovative thinking to solve complex problems, and leverage the full potential of the profession.

Leveraging the best talent in society will work to make Canada more competitive in the global economy; specifically, by capitalizing on the innovative thinking and expertise of traditionally underrepresented groups.

Engineers Canada supports several initiatives that were outlined in Budget 2018 to support the participation of underrepresented groups in Canada's labour market. These include stronger recruitment and retention policies, investments in skills training, and job training. However, continuing to promote initiatives without accurate, reliable, and up-to-date labour market data may inadvertently prolong the exclusion of underrepresented groups in Canada. Relying on unreliable labour market data may also jeopardize economic investments towards jobs training and skills development.

Federal initiatives and investments that support increased labour market participation must be based on reliable labour market data. For this reason, the federal government must invest in better labour market data collection so that policy-makers, educational institutions, and industries have a true understanding of national and regional labour market needs. Up-to-date labour market data will inform Canadians of their prospects of securing meaningful employment, specifically in the engineering profession, and will ensure Canada's competitiveness. We ask the federal government, through Statistics Canada, actively collect targeted data on the engineering fields to support better policy-making decisions

Recommendation 3: That the government extend funding to public infrastructure climate vulnerability assessments into life-cycle asset management to enhance infrastructure investment

Resilient infrastructure is required to support productive societies, stable sectors, and increased public confidence in civil infrastructure. The Canadian Infrastructure Report Card outlines that much of

Canada's current infrastructure is vulnerable to the effects of extreme weather, which is becoming increasingly frequent and severe. This presents a risk not only to public safety, but also to Canada's economy as individual and business productivity depend heavily on resilient infrastructure. Extreme weather can have devastating and immediate effects on vulnerable infrastructure and on communities. Extreme weather can also have consequential impacts on crucial sectors of the global supply chain, such as energy, water, food, and transportation. To promote public confidence, the federal government should ensure that climate vulnerability risk assessments are consistently applied throughout a project's life cycle. Mitigation can be a positive economic force. Energy efficiency retrofits and green buildings are significant job creation drivers in Canada and a key element of the shift to a low-carbon economy.

The Government of Canada announced in June 2018 that, as part of the *Investing in Canada Plan*, new major infrastructure projects seeking federal funding will be required to undertake an assessment of how their projects will contribute to or reduce carbon pollution, and to consider climate change risks in the location, design, and planned operation of a project. This Climate Lens announcement puts Canada on track to having climate change considered as a core part of the country's infrastructure planning—something that Engineers Canada supports.

The Climate Lens also lists Engineers Canada's Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol as one of the methodologies for climate change resilience that is consistent with ISO 31000. While this investment is an important first step, Engineers Canada encourages the federal government to continue to support climate resilience and adaptation initiatives by;

1. Investing to make PIEVC a national and international standard since the process was co-developed and financed by the Government of Canada in partnership with Engineers Canada.
2. Extending funding for climate vulnerability assessments for First Nations communities. This should include funds for investing in First Nations, Métis, and Inuit community infrastructure based on the results of the vulnerability assessments, as well as the capacity development of individuals in these communities to integrate such assessments into asset management and decision-making.