Written Submission for the Pre-Budget Consultations in Advance of the 2020 Budget

By: Engineers Canada

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Recommendations to the federal government

Recommendation 1: That the government support Indigenous peoples' access to post-secondary engineering education programs.

Recommendation 2: That the government support work in the recruitment, retention, and the professional development of women in the engineering profession.

Recommendation 3: That the government require climate vulnerability processes and risk assessments to be a condition of funding approvals for infrastructure projects.

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 more than 295,000 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 engineers to support several sectors across the country.

Recommendation 1: That the government support Indigenous peoples' access to post-secondary engineering education programs.

The House of Commons Standing Committee on Finance is interested in receiving submissions related to the theme: "Climate Emergency: The Required Transition to a Low Carbon Economy." Section 4.1 of Canada's Pan-Canadian Framework on Clean Growth and Climate Change focuses on taking steps to collaborate with stakeholders to build regional expertise and capacity for adaptation that is guided by scientific and Traditional Knowledge.

Engineers Canada believes that individuals performing assessments for designated projects under section 4.1 of the Framework must do so with high levels of technical skills and ethics. Translating knowledge and expertise into action requires resources as well as skilled, professional, and unbiased individuals. By designating that only professional engineers undertake assessments of engineering work under section 4.1 of the Framework, the federal government can provide assurance to the public that decisions will be made appropriately, and that evidence collected is unbiased and in the public interest. To build regional expertise and capacity for adaptation that is guided by Traditional Knowledge, the federal government must support Engineers Canada's efforts in attracting and retaining Indigenous peoples into post-secondary engineering education and the engineering profession.

Accessibility and feasibility to enter post-secondary engineering education programs and the engineering profession, are not the same for all demographics. For example, systemic barriers disproportionately impact Indigenous populations. This has left Indigenous peoples in Canada severely underrepresented in both post-secondary engineering education and in the profession. While 4.9 per cent of Canada's population identifies as Indigenous, only approximately one per cent of undergraduate engineering students in Canada identify as Indigenous (First Nation, Inuit, Métis).[1] The engineering profession in Canada can better understand, and therefore protect the public interest, if it is representative of the demographics that it serves.

Engineers Canada is dedicated to working with Indigenous engineers and post-secondary institutions to attract and retain Indigenous peoples in post-secondary engineering education programs. Engineers Canada created the *Indigenous peoples' access to post-secondary engineering programs: A review of practice consensus,* which supports the development of engineering access programs for Indigenous peoples across Canada. The report was published in 2016 and provides recommendations for activities that program managers in Canadian post-secondary engineering programs can use to evaluate best

[1] Statistics Canada (2018). "First Nations People, Metis, Inuit in Canada: Diverse and Growing Populations." Retrieved June 16, 2019 from: https://www150.statcan.gc.ca/n1/pub/89-659-x/89-659-x2018001-eng.htm.

practices. Engineers Canada has worked to identify programs that increase Indigenous peoples' access to engineering and is working towards the expansion of these programs to raise the profile, as well as improve the image, of the engineering profession in Indigenous communities. According to Engineers Canada's Enrolment and Degrees Awarded data from 2013-2017, approximately only 1.2 per cent of students in undergraduate engineering programs in Canada identify as Indigenous.

Engineers Canada's Indigenous Peoples' Participation in Engineering Working Group is working with the engineering regulators to develop a national strategy to increase Indigenous peoples' participation in engineering, with a focus on increasing the number of Indigenous peoples graduating from engineering undergraduate programs.

The federal government must provide consistent funding towards Indigenous peoples' post-secondary engineering education programs across Canada—not grants. Ideally, we would like to see one Indigenous peoples' access program in each province and territory. This involves creating supports, such as academic, financial, and social support, for Indigenous students with a variety of backgrounds as well as robust outreach programs to recruit students.

Based on the University of Manitoba's Engineering Access Program (ENGAP), federal funding to establish engineering access programs in existing universities with engineering programs is approximately $500,000 per program, which includes four full-time staff, recruitment, and travel. For instance, ENGAP cost $549,000 between April 1, 2018 to March 31, 2019 to run the program. To support an existing engineering access program for Indigenous peoples, the funding required is approximately $300,000 per year. The University of Saskatchewan's Arts and Sciences Access Program cost approximately $275,000 for curriculum modifications as well as bridging and upgrading courses.

Based on the cost of the existing engineering access programs, it is recommended that the federal government provide $1.9 million in funding to post-secondary institutions to support existing Indigenous peoples' access to post-secondary engineering programs across Canada, as well as to create new engineering access programs in British Columbia and Alberta. Several universities are exploring Indigenization strategies within their engineering faculties and this funding would provide unparalleled support for Indigenous access to engineering education.

Engineers Canada recommends that an Indigenous Peoples' in Engineering Chair be appointed in the Natural Sciences and Engineering Research Council of Canada. The goal of having an Indigenous Engineering Chair is to increase the participation of Indigenous peoples in science and engineering, to provide role models for Indigenous peoples considering careers in engineering, and to dedicate federal research funds towards research by Indigenous engineers.

Engineers Canada is ready and willing to work with the Government of Canada to attract and retain Indigenous talent into post-secondary engineering education, as well as to achieve the TRC's Calls to Action. The federal government must address the Truth and Reconciliation Commission of Canada's (TRC) Calls to Action. Recommendation 92 of the TRC's Calls to Action asks the corporate sector and their leadership to adopt the United Nations Declaration on the Rights of Indigenous Peoples.[2] The TRC calls for meaningful consultation, long-term sustainable opportunities from economic development projects as

[2] Truth and Reconciliation Commission of Canada (2015). "Truth and Reconciliation Commission of Canada: Calls to Action." Retrieved May 27, 2019 from: http://trc.ca/assets/pdf/Calls_to_Action_English2.pdf.

well as education and training for managers on the history of Indigenous peoples, intercultural competency, human rights, and anti-racism.

Recommendation 2: That the government support work in the recruitment, retention, and professional development of women in the engineering profession.

Women in Canada remain severely under-represented in both post-secondary engineering education and the 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.

Engineers Canada is actively working to support the recruitment, retention, and professional development of women in the engineering profession, primarily through its 30 by 30 initiative. This initiative has a goal of raising the percentage of newly licensed engineers who are women to 30 per cent by the year 2030. Nationally, this figure has remained at approximately 17 per cent for the past three years. Reaching 30 by 30 will help drive cultural change in the engineering profession, supporting the even greater involvement of women in the profession.

While the objective is that at least 30 per cent of newly licensed engineers will be women, Engineers Canada's Board is expanding the initiative to include retention and professional development of women within the profession. This strategic priority is aimed at ensuring that action plans are developed and implemented to achieve this expanded scope.

The federal government should work collaboratively with Engineers Canada in supporting the recruitment, retention, and professional development of women in the engineering profession. The federal government must take the initiative to fund outreach programs, bursaries, workplace mentorships, and work-integrated learning opportunities that encourage women to pursue engineering education and engineering careers.

To create a more inclusive work culture across the engineering profession, Engineers Canada recommends that the federal government provide funding towards the creation of diversity and inclusion training modules, focused on engineering for small and medium enterprises. While some large organizations have well established diversity strategies, we have heard from our regional partners that a gap remains with small and medium size businesses who need more support to address the underrepresentation of women.

Leveraging the best talent from all parts of society adds value to employers, increases innovative thinking to transition Canada to a low carbon economy, and provides a deeper understanding of clients' needs. Diverse teams and workplaces are more creative, cognitively flexible, collaborative, and productive. The engineering profession requires diverse problem-solvers to address those challenges in the public's interest and to promote Canada's innovative capacity.

Recommendation 3: That the government require climate vulnerability assessment processes and risk assessments to be a condition of funding approvals for infrastructure projects

Engineers and the engineering community have the necessary knowledge that is imperative to dealing with the climate change, extreme weather events, and transitioning Canada to a low-carbon economy. The profession has been engaged in this issue for over 15 years with a focus on infrastructure climate

vulnerability and risk assessment, as well as proposing adaptation policies, strategies, and professional practices to improve resilience.

It is Engineers Canada's view that climate resiliency is the goal, and adaptation is the key strategy to achieve it. Therefore, all adaptation actions should lead to an outcome of improved resiliency for all communities be it municipalities, cities, towns, or First Nations communities.

Goal 4 of the draft Federal Sustainable Development Strategy for 2019 to 2022 highlights the importance of investing in modern and resilient infrastructure. This includes investments in low-carbon transportation, climate-resilient infrastructure, and clean energy, all of which are intended to protect the natural environment, support healthy communities, and improve the quality of life for all Canadians. Building infrastructure today without adequately addressing and planning for future climate impacts creates vulnerability gaps.

Engineers Canada encourages the federal government to continue to require climate vulnerability processes and risk assessments to be a condition of funding approvals for infrastructure projects. This policy should be applied across other federal departments who own and operate existing infrastructure or design and construct new infrastructure. We are encouraged to see that Transport Canada and Public Works and Procurement Services are conducting assessments as part of their long-term asset management planning. We encourage other federal departments owning infrastructure to do the same.

Climate risk assessment should be incorporated as part of the policy framework for environmental impact assessment of infrastructure projects.

The federal government's work towards a low carbon economy will benefit through a range of efforts that include:

- Consultation and collaboration with the engineering profession on policies relating to climate change. The profession can provide independent, unbiased, and credible expertise and advice on climate adaptation and mitigation that governments can consider developing sound evidence-based policies.
- Continuing to fund climate research to assess impacts and adaptation, and inform the development and updating of codes, standards, and other instruments, thereby increasing the confidence of climate design data used by engineers.
- Continuing to support the Canada Centre for Climate Services in its provision of climate data, information products and advisory services to Canadians. Engineers require scientifically defensible climate information and future projections that are supported by the legal authority of the federal government through CCCS.

Experienced engineering professionals are available to provide technical expertise and impartial advice on a voluntary basis to governments on adaptation and mitigation requirements, and to advise on and help develop sound policies, appropriate processes, and technically feasible implementation strategies to support Canada's efforts towards a low carbon economy.