



Engineers Canada's Pre-Budget Submission

Engineers Canada is the national organization of provincial and territorial associations that regulate the practice of engineering in Canada and license the country's more than 280,000 members of the engineering profession. Together, we work to advance the profession in the public interest.

Engineering drives much of Canada's economy. Natural resource, manufacturing, technology and other sectors rely upon the expertise of engineers. In particular, the success of Canada's investments in infrastructure relies on engineers for planning, design, operations, maintenance, rehabilitation, and decommissioning. Engineers assure present and future risks have been appropriately assessed.

As one of the top five exporters of engineering services in the world, the expertise and skill of Canada's engineers contributes to Canada's and the global economy. Engineers work tirelessly in Canada and abroad to keep the public safe and to contribute to strong, prosperous communities.

The federal government requested pre-budget submissions from Canadians online in the form of four questions. Below is Engineers Canada's submission following the structure presented online by the government: <http://www.budget.gc.ca/2016/prebudget-prebudgetaire/consultation-en.html>

We are pleased to participate in the pre-budget consultation and eager to be of assistance and answer any questions or provide further any further information required.

1. In your opinion, how can we better support our middle class?

A strong engineering community drives middle class employment and job security in Canada. Much of the work engineers perform supports the middle class by creating jobs, protecting the environment, facilitating transportation and keeping Canadians safe. Many engineers are middle class workers, in middle class families, struggling with the same concerns as others. The government must not only focus on skilled trades when they invest in apprenticeships and create subsidies/tax breaks - they must also place greater emphasis on the similar challenges faced by members of the engineering profession.

Engineering drives many of the industries on which skilled trades rely. In fact, many of the industrial, extractive, manufacturing, and infrastructure-driven projects that will deliver economic growth over the next 10 years cannot mature to the point of larger scale job creation without the initial and continuing involvement of engineers. Engineers Canada's most recent labour market study shows that there will be more than 100,000 engineering job openings in Canada between now and 2025 as engineers retire and the economy continues to grow. Canada is facing a skills gap as engineers in senior level positions retire or leave the workforce and their experience cannot be replaced by students and early career engineering professionals.

The proposed \$40 million annual investment to help employers create new co-op placements for science, technology, engineering, mathematics, and business students should be implemented. But it is



important to remember that the federal government relies on engineering knowledge and skills as much as the private sector in departments including Natural Resources Canada, Transport Canada, Public Safety Canada and Environment Canada. There is an opportunity for the federal government as an employer to lead to way by supporting training opportunities for new engineering graduates.

Promoting and funding diversity in Canada's workforce will also help promote the middle class and the country's economic growth. A diverse middle class workforce includes the best talent from all parts of society and adds greater value to the country. Support must be provided to improve opportunities for women, Indigenous people and new Canadians to receive training and join high skill trades such as engineering. This support will help raise household income, lower household debt and raise the morale of the middle class as more and more members from very diverse backgrounds feel a stronger sense of contributing to Canada's future.

2. What infrastructure needs can best help grow the economy, protect our environment and meet your priorities locally?

From the engineering perspective, climate resilience is the ability of communities to prepare, plan for, absorb, recover from, or successfully adapt to actual or potential adverse climate events. As such, the government's promise to include climate resilience as a key pillar in federal infrastructure programs is a proactive and positive response to this growing threat to our public infrastructure.

The dependence of our health, safety and prosperity on core public infrastructure increases the disruptive impact of any kind of disaster. In particular, climate change is leading to more extreme weather events that result in flooding, ice damage, extreme winds, tornados and record high and low temperatures. Longer term changes in climate can also negatively impact the service life and reliability of infrastructure over its operating lifespan, ranging from 25 to 100 years.

Proactive solutions are required to mitigate the danger, damage and the costs of infrastructure vulnerability to our changing climate. One step is to understand the risks and introduce reasonable adaptations that improve climate resilience. Engineers Canada has developed an assessment protocol that assesses risk to infrastructure in the event of extreme weather and the impacts of a future changing climate.

The Public Infrastructure Engineering Vulnerability Committee Protocol is a structured, formalized and documented process for engineers, planners and decision-makers to identify and recommend measures to address the vulnerabilities and risks from changes in particular climate design parameters and other environmental factors due to extreme climatic events. The assessment helps justify design, operations and maintenance recommendations, and provides documented results that fulfill due diligence requirements for insurance and liability purposes. The government must support infrastructure owners, including federal departments, to develop the capacity to perform climate vulnerability assessments.

These climate risk assessments will help ensure communities can better withstand extreme weather events and the related disruptions. Engineers Canada recommends that a minimum of \$40 million over two years be allocated to enable municipalities to incorporate risk assessments into their infrastructure planning. Additional consideration should be given to supporting funding applications that demonstrate that climate resiliency of the infrastructure has been assessed and considered. A \$40 million investment



will allow municipalities and their engineers to better protect the multi-billion dollar federal government long-term infrastructure plan that will help to grow Canada's economy. A specific focus on ensuring climate resilient core public infrastructure – roads, bridges, water and wastewater, sewers and storm sewers – should also be considered.

This funding should be allocated for two activities:

1. \$10 million for infrastructure climate risk and vulnerability assessment.
2. \$30 million to support additional capital upgrades to improve climate resilience based on the recommendations of the assessments.

We estimate that this funding envelope could support between 150 and 200 projects for small and medium municipalities where the availability of such funds is more limited.

By identifying the vulnerability of new and existing infrastructure to extreme weather events and the associated service disruptions, communities will be better able to withstand the dangers to life and property they may face in the future.

3. How can we create economic growth, protect the environment and meet local priorities while ensuring that the most vulnerable don't get left behind?

Proper investment into resilient core and green infrastructure, multi-sectoral job creation, diversity and green technology helps grow the economy, protect the environment and protect local priorities.

The funding of properly assessed, constructed, and maintained core public infrastructure creates economic growth through job creation while protecting the environment and keeping Canadians safe.

Encouraging innovative green infrastructure and clean technology will create jobs and help reduce emissions.

Promoting and funding diversity in Canada's workforce will also help promote economic growth. A balanced workforce is about more than just reflecting Canada's demographics. A more diverse workforce includes the best talent from all parts of society and adds greater value to the country. Successful organizations tend to have a workforce that reflects the diversity of both its clients and society.

In order to serve the market economy as well as Canadian society at large, governments should support efforts to attract and retain talented individuals to underrepresented jobs from the diverse ethnic and religious mosaic of the Canadian population.

The engineering profession encourages the government to be a leader in funding bursaries, mentorship and apprenticeships that encourage members of underrepresented groups to pursue careers in engineering and STEM (science, technology, mathematics and engineering) subjects more broadly. Engineers Canada is currently focused on attracting more women and Indigenous people to pursue careers in engineering. Increased participation of underrepresented groups in engineering, such as women and Indigenous people, will be necessary to fill engineering positions in Canada over the next decade.



An additional priority is the investment in green technologies. It should focus on those where research and development is completed or nearly so. These projects are at the stage where they need to be tested to confirm widespread application in Canada and other markets. Where the technologies are ready for widespread implementation, it is important to note that it is not only the green technologies themselves, but the services of installation, operation and maintenance that will further develop and mature this industry to the benefit and growth of the Canadian economy.

Another important criterion should be the export potential of the technologies for production in Canada as well as the installation, servicing and maintenance services. These are similar to what Canada's engineering firms provide to major infrastructure projects overseas. An international clean technologies implementation fund might be considered where Canadian companies can offer financing similar to the Canadian Commercial Corporation.

4. Finally, is the implementation of these new priorities and initiatives realistic? Will it help us grow our economy?

Investment in core public infrastructure creates jobs, wealth and improves the quality of life of Canadians. However, this does not happen overnight. It takes time to properly plan and manage to meet priorities that support economic growth. Public expectations must be managed so that implementation is realistic and achievable.

Implementing our recommendations is realistic provided that sufficient time and resources are allocated for careful planning, promoting and building the capacity of infrastructure owners. This effort must utilize an efficient, timely and accountable procurement process and effective program management within a policy and regulatory regime that encourages building stronger greener and more climate resilient and sustainable communities.

Building smart, resilient, green infrastructure will save the economy money that can be used for other social and economic investments. Reliable infrastructure that can withstand the effects of climate change will keep businesses running, people working and reduce costs of emergency response and societal disruption. The experience gained by Canadian firms in such efforts will enhance their competitiveness internationally to build, operate and maintain similar infrastructure in other countries. The benefit is to further increase the export of Canada's engineering services, already among the top five countries over the past 10-15 years.

Improving diversity and engagement in STEM careers such as engineering has an incredible return on investment. It leads to more members of society finding fulfilment in their work, more inclusionary practices, and better chances of generating unlikely idea combinations that can be truly ground breaking. It also drives up employee engagement, leading to more productivity. Initial investments in attracting, training and supporting more women, Indigenous people and new Canadians in highly skilled trades are vastly outweighed by the social and economic benefits.

Engineers Canada is ready and willing to help the government build a better Canada. Among Canada's more than 280,000 members of the engineering profession, there are countless experts prepared to assist the government in strengthening the middle class, tackling green innovations and improving the resilience of the country's infrastructure.



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