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## Thursday, February 7, 2013

## Chair

**Mr. David Sweet**

# Standing Committee on Industry, Science and Technology

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● (1530)

[*English*]

**The Chair (Mr. David Sweet (Ancaster—Dundas—Flamborough—Westdale, CPC)):** I call the meeting to order.

Good afternoon, ladies and gentlemen. Welcome to the 56th meeting of the Standing Committee on Industry, Science and Technology. Today we're pursuing some insights on engineering.

In front of me are our witnesses. I'll introduce them very briefly.

From Engineers Canada, we have Marie Carter, chief operating officer.

As an individual, we have Claude Laguë, dean and professor of the Faculty of Engineering, University of Ottawa.

From the Association of Consulting Engineering Companies—Canada, we have John Gamble, who is the president.

From the Canadian Academy of Engineering, we have Richard Marceau, who is the president.

From the Natural Sciences and Engineering Research Council of Canada, we have Janet Walden, who is the vice-president of research partnerships programs directorate.

It is my understanding there are also two alternates who may possibly be called but who aren't seated in front of us. They are, from the Natural Sciences and Engineering Research Council, Isabelle Blain, the vice-president of research grants and scholarships, and Kevin Goheen, executive director of the Canadian Academy of Engineering.

I will follow the order on our agenda here. I believe everybody has opening remarks of five minutes or less.

Ms. Carter, would you begin, please?

**Ms. Marie Carter (Chief Operating Officer, Engineers Canada):** Thank you very much. Mr. Chair, I am very happy to have the opportunity to appear before you today.

As mentioned, my name is Marie Carter. I am the chief operating officer of Engineers Canada. We're the national body that represents the 12 provincial and territorial regulators of the engineering profession. Our regulators license over 250,000 professional engineers in all disciplines across the country. The regulators' role is public safety. Their role is to ensure that licensed engineers are held to the highest standards of engineering education, professional qualifications, and professional practice.

I'd like to start today by speaking about how Engineers Canada impacts engineering in Canada and about our role and that of federal policy-makers in addressing the challenges we anticipate.

It takes a team effort to get the right engineer in the right place at the right time. Engineers Canada's members and volunteers, the regulators and our volunteers, are committed to making sure there's consistent engineering education across Canada. We already have 271 accredited undergraduate engineering programs in the country at this time. We monitor and recognize international engineering degree programs as well. We're the keepers of several mutual recognition agreements with other countries.

Through our qualifications board, we bring together engineering regulators to work toward consistency on admissions to the profession, continuing professional development requirements for our engineers, engineering-in-training programs and student affairs, sustainability and environmental affairs, professional standards, and discipline and enforcement.

Engineers Canada publishes national guidelines and model guides for practice. We maintain a national examination syllabus, which is used by our regulators to assess academic qualifications of immigrant engineers. We do a lot of research. We investigate emerging engineering areas and emerging practices that are going on worldwide.

I'd like to address the state of engineering in Canada and the policy problems we expect to face.

We know that our engineers are well recognized as experts, leaders, and innovators, and our talented professionals have an important role to play in protecting the public.

As the need for the contributions of engineers to society grows, one of our biggest policy challenges will be how to respond to the looming engineering skills shortage.

We recently released a labour market study, and in that study you'll see that in most jurisdictions across the country there will be shortages of engineers with five to 10 years of experience or specialized skills, while new graduates from engineering programs may have difficulty finding jobs.

We are anticipating a high number of retirements, as we know from the demographics in Canada. Engineering is no different. By 2020 we should see approximately 95,000 engineers either fully or partially retiring.

Today we've got approximately 60,000 undergraduate students in accredited programs across the country. They'll help the shortage somewhat. Combined with an estimated 16,000 new engineering jobs, recruiting into the profession is going to require some focused attention by the regulators, employers, academia, and governments.

Engineers Canada and the provincial and territorial regulators are working together to address the labour shortage as well as we can by promoting diversity in the profession. Therefore, we have a focus at the moment on attracting what we see as the untapped resources in Canada for engineering, those being women and indigenous people.

If we go back to the 2006 census, the most recent information available to us, women comprised 47% of the total workforce but only 13% of the engineering workforce, which is a significant increase from 20 years prior. The rate of engagement by indigenous people is also very low. We're approaching these two groups of people differently because the issues in trying to attract them into engineering are different.

● (1535)

We're also coordinating with federal government efforts to streamline the immigration system. At the moment, more than one in five professional engineers in Canada came from offshore and is an immigrant to this country. We've got quite a substantial number of immigrant engineers working in Canada and licensed in Canada.

Annually our regulators process about 5,500 applications from immigrants. We know that is about the highest in the regulated professions. We are looking at working with the streamlined efforts that are going on with the federal government. We have our regulators on board with us to help with that effort.

Everybody here at the table today works together on a fairly regular basis, so I'm going to leave it to my colleagues to address the question of whether or not we're globally competitive and where those opportunities and growth might be.

In closing, I would like to stress that I think we should all be proud of the engineers in the country who do so much to keep our communities safe, support and contribute to our economic prosperity, and drive innovation in the country. I look forward to continuing working with our federal government to support growth in this area.

**The Chair:** Thank you, Ms. Carter.

Now we go on to Mr. Laguë.

**Dr. Claude Laguë (Dean and Professor, Faculty of Engineering, University of Ottawa, As an Individual):** Good afternoon. My name is Claude Laguë. I am the dean of the faculty of engineering at the University of Ottawa, but I am also the current chair of the Council of Ontario Deans of Engineering and past chair of the National Council of Deans of Engineering and Applied Science.

I will be able to answer your questions with regard to our particular situation at the University of Ottawa. I also have a fairly good understanding of what is happening elsewhere in the country.

There are more than 45 engineering schools in our country. Just to give you a few numbers, that means about 90,000 students who are enrolled in undergraduate and graduate programs of studies. We typically deliver about 15,000 to 16,000 degrees in engineering at the undergraduate, master's, and Ph.D. levels collectively.

Our mission is a dual one. Of course, we have the mission of educating future engineers, those who will practise engineering in Canada as well as in other countries in the future. Also, at the advanced level, we educate the people who are going to be the future experts and researchers in the different engineering disciplines.

We also have, as part of our mission, a very strong emphasis on research and development, so we are advancing knowledge related to engineering in all the different disciplines that we cover.

All in all, in terms of people who are engaged in those activities in engineering, about 7,500 people—professors and employees—are delivering this education and fulfilling this research agenda across our country.

I'm happy to answer any questions you may have on these issues related to engineering education and research when we get there.

**The Chair:** Go ahead, Mr. Gamble.

**Mr. John Gamble (President, Association of Consulting Engineering Companies - Canada):** Thank you for the opportunity to appear before the committee. I was thinking I don't get to see my colleagues nearly enough, so thank you for that opportunity.

Our association represents about 500 private sector companies that provide independent consulting engineering services to a wide range of both private and public sector clients. Their services include the planning, design, and execution of all types of engineering projects, as well as providing independent advice and expertise in a wide range of engineering and scientifically related fields.

In this position, our members have a direct impact on virtually every aspect of our economic, social, and environmental quality of life. At the end of the day our association exists to advocate for a business and regulatory climate that allows our members to be successful and also to offer the highest level of service and the highest possible value to our clients.

We are a federation of the 12 provincial and territorial associations. We're also a member of the International Federation of Consulting Engineers. If you would indulge me with a commercial, their executive committee will be meeting in Ottawa in May. We've been planning to have a reception on the Hill, and you're all invited, or will be.

We're a very influential voice in that organization. In fact, we're the fifth-largest exporter of engineering services in the world, and I think that's something. If there are two types of people who I find are insecure, they're Canadians and engineers, so it's pretty important for us to be number five in the world.

On the state of engineering today, StatsCan uses a category that's a little broader than just our consulting companies, but operating revenue from that whole category of all private sector engineering companies is about $22.5 billion. Our consulting engineering part of that is about two-thirds. The other part would be EPCM firms.

We have companies that build and set up equipment, but they're not really independent consulting services. For example, none of our members are mining companies, but they may consult or provide expertise to mining companies.

Our members directly employ about 75,000 across the country. Again, we're an association of companies, not engineers. Those 75,000 are engineers, land use planners, natural scientists, and administrative staff. More and more are multidisciplinary firms.

By the way, our industry, across the 500 firms, represents about 3,000 different offices around the country.

We've seen a lot of consolidation in our industry. It's certainly been very good since the recession of the 1990s. To give you an illustration of what we've been contending with, since 2002, roughly 10 years ago, the number of firms we represent has gone down by about 24%, and that's not because of economic viability; on the contrary, it's consolidation, driven by a number of factors, including opportunity. At the same time, while our number of firms has shrunk, the staff members our association represents has gone up by 90%. I think that's a pretty good success story for our industry.

Factors contributing to consolidation, of course, are a greater demand for one-stop shopping and multidisciplinary firms; certainly and particularly recently, a capacity for larger-scale and higher-risk projects; and succession planning.

The recession of the 1990s was catastrophic for our industry. The firm I worked for at the time went from 500 to 300 employees in a span of 18 months. We saw massive layoffs. We saw enrolment in engineering drop. We now have a demographic hole in our profession.

There was no stimulus program at the time. There was no major investment. We estimate that fewer than 10% of the practising engineers in our industry are between the ages of 41 and 50. These would be the people you'd be selling shares to. These would be the people you'd be asking to step into leadership roles. That lack of succession or availability of successors in companies has driven a bit of the consolidation in the industry.

With regard to our market sectors, the municipal and government sector and the public sector in general were extremely busy heading into the last recession, but we managed to continue to grow through that. Some of the credit certainly goes to the stimulus program, which, while not a perfect program, we certainly view as a largely successful and worthwhile program. I think there were a lot of valuable lessons from it.

We are cautiously optimistic that a long-term infrastructure investment program will come, hopefully, in the near future.

The resource sector remains very strong. It's offset some of the softness in the industrial and commercial sector, and traditionally tends to be our strongest export sector. As most people are aware, the industrial and commercial sector was probably the most severely impacted during the recession. This certainly caused some displacement. It wasn't all good during that period.

● (1540)

Some jobs were lost, but there was net growth and some displacement within the industry. We thinks it's starting to come back, but of course, like you, we're all watching the world markets. We're all looking at what's going to unfold in the years ahead.

I mentioned that globally we're recognized as the fifth-largest exporter. Our engineering education in Canada is uniformly excellent. Our regulatory system is very good. We have strong capabilities in virtually every sector.

Since I'm getting into the notes, I can certainly address some of the specific policy problems during the question period.

● (1545)

**The Chair:** Thank you, Mr. Gamble.

Monsieur Marceau is next.

**Dr. Richard Marceau (President, Canadian Academy of Engineering):** Thank you very much, Mr. Chair.

I would like to begin by thanking the Standing Committee on Industry, Science and Technology for the opportunity to speak on behalf of the Canadian Academy of Engineering on the state of engineering in Canada today.

The Canadian Academy of Engineering is the national institution through which Canada's most distinguished, experienced, and accomplished engineers provide strategic advice on matters of critical importance to the nation. Though a number of issues will merit your close consideration today, our brief introductory remarks will focus on three keys ideas: the high quality but insufficient number of Canadian engineers, the urgent need for adequate succession planning for Canada's next generation of engineers, and the importance of engineering input in Canada's economy and in creating policy.

On the first point, Canada has the enviable reputation of having one of the finest engineering education systems in the world, as our colleagues have already mentioned. It is characterized, however, by a unique combination of provincial jurisdiction over the institutions that provide the education, provincial jurisdiction of the engineering profession itself, and compliance to high standards of excellence set by a national organization, the Canadian Engineering Accreditation Board, which regulates the accreditation of all faculties and programs.

For engineering graduates to be admitted to the profession without taking exams, all engineering programs, regardless of province or size, must meet the same high standards of excellence set by this board. As a result, Canadian engineers are recognized internationally for their excellence in many fields. I'll name just a few: aerospace, automotive parts, electric power transmission, hydroelectric power generation, nuclear power generation, information and communications, resource extraction, satellites, simulation and virtual environments, and many, many more.

Unfortunately, Canada has among the lowest numbers of engineers per capita of the OECD nations, a fact that creates uncertainty around Canada's capacity to do five things: maintain its present infrastructure, build new infrastructure, meet the needs of growing and emerging industries, develop new applications and products, and stimulate innovation and entrepreneurship.

Let us now turn to the issue of succession planning.

Canada is faced with a generational problem. That too has been highlighted by my colleagues here today. At least a quarter of all Canadian engineers could retire within the next 10 years, at a time when an expansion of the engineering pool is absolutely essential. Simultaneously, Canada is challenged to maintain its present supply.

Historically, the gap between supply and demand has been filled by immigration. Unfortunately, as we look towards the future, this is no longer an option. China and India now wish to keep their engineers for their own nation-building. Those still open to immigration are now aggressively courted by Scandinavia, Europe, and even Japan, countries that traditionally have not had to do so.

The same is true for the university professors who will educate the next generation of engineers. Canada will need to step up efforts to graduate professors from among its own young people, rather than relying on immigration. Canada needs to significantly stimulate its ability to graduate far more engineers at the bachelor, master's, and doctoral levels, especially women engineers and first nations engineers.

Let us now briefly address the third issue, that of the impact of engineers on Canada and policy.

Canada's industry competes in a world economy, and access to engineering talent is a key competitive advantage underlying Canada's capacity not only to maintain but to grow its wealth-generating environment, either through U.S.-style innovation or through Canada's historically successful big-project innovation strategy.

Also, for nations to be competitive, they need enlightened policy. In a world dominated by rapidly changing technology trends, understanding the deeper meaning of these trends is key to a nation's competitive position. The need for engineering input in formulating national policy has never been as important as it is today.

● (1550)

In conclusion, access to a pool of engineers of adequate breadth and quantity is key to the sustainable social and economic development of any modern nation.

The Canadian Academy of Engineering recommends that the federal government provide leadership in creating a joint federal-provincial partnership for greatly accelerating our nation's capacity to develop human capital in all fields of engineering. The academy also recommends that representatives from industry, universities, and the profession be called upon to provide advice on how best to achieve the needed gains in graduation rates at all levels.

Again, thank you very much for your kind attention and for the opportunity to appear before you today.

**The Chair:** Thank you, Mr. Marceau.

Go ahead, Madam Walden, please.

**Ms. Janet Walden (Vice-President, Research Partnerships Programs Directorate, Natural Sciences and Engineering Research Council of Canada):** Thank you, Mr. Chair, for inviting me to talk about the Natural Sciences and Engineering Research Council's role in addressing the shared challenges that impact engineering in Canada.

NSERC is the national funding agency responsible for advancing post-secondary research and training in the sciences and engineering. Our investments in people, discovery, and innovation have had, and continue to have, a profound impact on Canada's ability to remain competitive in today's global engineering environment.

[*Translation*]

With an investment of $1 billion, NSERC gives 41,000 fellows and seasoned researchers at universities and colleges across the country the opportunity to pursue the promising ideas and innovations that will give Canada a competitive edge in the 21st century.

That support includes major investments in a number of engineering fields, including the telecommunications, aerospace, automobile, construction and mining sectors.

[*English*]

In 2011-12, NSERC's investment in these engineering-intensive sectors was more than $320 million, approximately one-third of our total budget. This investment enabled 13,000 students and experienced researchers at universities and colleges across the country to pursue ideas and innovations.

We see solving practical problems as an integral part of engineering. NSERC is a leader in providing opportunities for industry to access the wealth of engineering knowledge and skills available in our post-secondary institutions. This access increases our productivity and the global competitiveness of our industries.

These relationships, however, also benefit our researchers, who are inspired to work on new industry-relevant research, and our students, who gain valuable industry-relevant experience and training. In fact, 55% of all NSERC investments in industry partnerships are in engineering-related fields. For example, Alberta's leading university experts in oil sands maintain very active partnerships with this crucial industry sector through NSERC support.

We leverage the unique strengths, insights, and capabilities in both academia and industry, and these collaborations involve more than 30 companies in the oil sands area and cover virtually every facet of the industry's development, from mining through to their land reclamation. They've contributed new technologies that make the industry's processes more efficient and cost effective and reduce the environmental footprint. Perhaps more importantly, they've contributed many of the engineers employed today by these companies.

Going forward, we need to really ensure that we have a sufficient pipeline of talent—I think you've heard this as a uniform message here—and that this talent has the right skills. We've heard clearly that attracting more women to engineering continues to be a challenge. The share of female enrolment in engineering in Canada has held steady over the past 10 years; however, we are very far from parity. Through policies and programs, NSERC is looking for novel ways to increase the participation of women in engineering. One example is our women in science and engineering chairs program, which provides a mentorship component.

As we've heard, Canada relies heavily on international students. In fact, these students account for 40% of university enrolment in engineering in Canada at the graduate level. We firmly believe that this is a feather in the cap of our excellent Canadian engineering schools; however, we can't rest on our laurels. We must continue to be competitive to attract and retain top engineering talent from all over the world. This is a growing challenge.

Jayson Myers, the president and CEO of Canadian Manufacturers and Exporters, noted very recently that in today's global markets Canadian product manufacturers can't compete on existing technology alone, so design has become the ultimate means of differentiation. Since 1999, NSERC has worked with the engineering community to strengthen training in design in our engineering schools through a series of chairs in design engineering. This is an ongoing and shared challenge with stakeholders such as the universities, and it is a nut that's not yet cracked.

Building our human capital in science and engineering through advanced training is an integral part of all NSERC programs. In 2011-2012 we worked with over 2,400 different industry partners. These partners have helped to provide students with valuable work experience and professional skills. In many instances, they hire these students after they graduate, contributing to our retention.

● (1555)

In conclusion, I want to reiterate that NSERC plays a vital role in ensuring that engineering in Canada remains globally competitive through our investments in people, discovery, and innovation, and by connecting this capacity to the needs of our industry.

Thank you.

**The Chair:** Thank you very much to the witnesses for your opening remarks.

We will now go to our rotation of questions. The first one up is Mr. McColeman, for seven minutes.

**Mr. Phil McColeman (Brant, CPC):** Thank you, Chair.

Thank you, witnesses, for being here today and for explaining each of your unique areas involved with leadership positions in engineering.

I want to go down the line of the gap that exists, the generational gap that was mentioned—I think it was ages 41 to 50—to see how companies and engineering firms are coping with it. What's happening? Is it the quicker advancement of the most talented people below into the senior management positions at a much earlier age than traditionally, or are there any other facets to that?

I invite everyone to speak to this if they wish to, maybe starting with Mr. Gamble, who represents the independent entrepreneurs.

**Mr. John Gamble:** It is a concern. One of the solutions has been to seek amalgamation with other people with deep pockets. The firms are doing extremely well, so the value of the shares, even of employee-owned firms, would be quite great, but there are very few people to sell them to.

You're quite right. A little bit of it is that we're asking some of the leaders in our industry to grow up a little faster and to step into those leadership roles.

Again, as another compliment to the education system, I find that some of the younger engineering graduates have tools that I could not have dreamt of when I went to university. I think they are probably better equipped to step into these roles than I was at a similar age. That's part of it, but it really still becomes a workload issue.

I have also observed that people are working harder and longer to make up the time to bring projects in on budget.

The automation and technology that are available to us to do projects faster are—I'm trying to find the right word—not giving us the leisure society people were promised when I was a kid, but they're still allowing us to deliver the goods as we need to, so that's part of it as well.

Immigration is part of it. The challenge is to get the right people in terms of the discipline, the training, and the appropriate background, and also to get people to step into leadership roles in firms. Often when you're promoting from within, you're looking at people who have relationships with your key clients, people you have watched over many years demonstrating leadership skills. You're watching people who understand provincial codes, provincial laws, and things of that nature. It's a challenge. Frankly, I would suggest that we need to avoid a similar situation so that we don't end up in this position 20 years from now.

I'd like to put in a little plug for a long-term infrastructure investment program. That is critical for us to build our industry, because when you hire a new employee, whether they're 25 or 55, it's usually a year or two before they become productive. It's an investment to hire someone. You take them on; you have contractual obligations if they don't work out, so you have to factor those in, but you have to train them. You have to bring them on board. You have to make that long-term investment in them. It's very difficult to do when you're funding comes from infrastructure programs that run for a couple of years and stop for a couple of years. Building Canada was quite refreshing because it lasted about seven years—not long enough, in my opinion, but that's centuries long in governmentspeak. That would certainly help us build capacity in the industry.

**Dr. Richard Marceau:** I fully agree with everything that my colleague has said. I'd simply like to give you a very specific example in the university area in one particular field of engineering, which is electric power engineering.

The reality is that there are not enough professors today in Ontario or most of the rest of Canada, except for Quebec, to graduate the electric power engineers that are direly needed in the electricity sector in Ontario and the rest of Canada. There is actually a crisis right now regarding the number of people we can find to do electric power engineering for the electricity sector.

How do we cope with it? It takes more time to get people. There are things that don't get done. There are projects that get pushed out. If you're building a switching station or a transformer station, for instance, and you don't have the right people, either you're going to pay too much for the transformer or you're going to get an inadequately designed station that will reach its capacity far before the time that you would like it to, far before the normal lifespan if you had the right expert working on it.

That is what is going to happen. It's already begun.

● (1600)

**Mr. Phil McColeman:** Ms. Carter, on the international question, are we bleeding engineers to other countries? Are those who are being educated here moving into positions outside the country?

**Ms. Marie Carter:** They are to some degree, but it's not the same sort of situation that we've heard with doctors and people in the health industry.

Certainly in Canada we have enough employers working internationally to permit people who want to have international experience to get that international experience without actually jumping ship to another country. I don't think that's an issue for us.

One of the issues that I see coming forward is a lack of mentors. As we move through and see our more senior engineers starting to retire, those ones we've backfilled the gap with, the 30- or 40-year-olds, are not going to have the mentorship or are not going to be mentors for the younger crop coming out.

The business culture in Canada is the key element that we have seen as problematic with immigrant engineers. It just takes those from our main source countries for immigrant engineers a little bit longer to truly understand the cultural aspect of business. I think that may be a bigger issue than losing Canadian engineers.

**Mr. Phil McColeman:** I have one last quick question.

Mr. Laguë, is the elementary education in our secondary schools producing graduates who have the skill set to go into engineering at the post-secondary level?

**The Chair:** I'm sorry, but the time has run out. If you hold onto that, somebody may give you the opportunity to answer. Time is one thing we always have to bear in mind here.

Go ahead, Mr. Stewart, for seven minutes.

**Mr. Kennedy Stewart (Burnaby—Douglas, NDP):** Thank you, and I thank the witnesses for coming.

About a year ago I took over from Madame LeBlanc as the science and technology critic. I have heard a lot from scientists and a lot from technologists, but I was very keen to hear more from engineers. Thanks very much for coming today.

Really, what I was interested in is what you've been telling us: the state of engineering. Being trained in policy, what I'm interested in are problems and solutions. It seems the overwhelming problem that you've been highlighting here is skills shortages, but there seems to be a subset of problems in there.

All of you could answer. Would the skill shortage be the main problem, or are there other problems that we could perhaps discuss here today?

**Mr. John Gamble:** There are others.

One of the challenges we have is that Canadian engineering, when we export, is quite excellent, of high quality, and very expert, but we're not cheap. Part of that is because of the standard of living we have and what we invest in putting in good people. I do believe we deliver very good value.

The solutions are excellent. They provide long-term value. Your invoices might be a little bit higher, but the innovation allows you to reduce the capital investment, which is usually 10 times more than what you pay in engineering and design. In fact, engineering is typically less than 2%, and often less than 1%, of the overall life cycle of a project.

Clients who understand that it is a good investment like Canadian engineers. Largely these would be private companies. As government, you have the challenges of your annual budget and all the process to ensure transparency, whereas a mining company or a steel mill or anyone else bringing in an engineering consultant can say, “We like what you do. You did a great job last time. Get working on the next project and send us an invoice.” This is because they see value. That is very difficult, I understand, in the public sector.

If we get into public clients overseas, it's a little more challenging. Frankly, we are more expensive on an hour-per-hour, day-per-day basis, but again we hope that people look at it in terms of the overall value and the overall success of the project.

● (1605)

**Mr. Kennedy Stewart:** Just before you leave that, what could we do to help you there?

**Mr. John Gamble:** We were certainly pleased that there's going to be more opportunity, again through international development, for private sector participation. I think there's a lot we can do to augment the good work the NGOs do.

In years past, it was actually what gave us some exposure in foreign jurisdictions and allowed us to really strut our stuff, show innovation, and show value. Doing international development is not profitable, but it does help you build reputation and build credibility, and it looks as though that door might be opening a little bit more than in the recent past. That's certainly constructive.

**Mr. Kennedy Stewart:** I'm sorry to be rude. I just have my seven minutes, and I was wondering if I could spread it across the table—

**Mr. John Gamble:** Yes.

**Mr. Kennedy Stewart:** —and perhaps hear from others. Thank you for that.

Just hearing about problems and solutions would be excellent.

**The Chair:** Go ahead, Dr. Laguë.

**Dr. Claude Laguë:** I could draw the same analogy with regard to the cost of delivering engineering education. For example, we deliver a very high quality of education that's recognized all over the world, but this comes at a price, and this price, of course, is going up every year.

The fact is that our funding for the education component of our mission is coming from basically two main sources. It's coming from provincial governments through the grants they provide to universities and through tuition fees that the students themselves are paying.

What we've seen over the last few years is that basically it's getting more and more challenging to get the revenues that are necessary in engineering schools to deliver the quality education that we're expected to deliver. Provincial governments in many provinces are divesting. They're reducing their investment in post-secondary education, with the result that you will find that in many jurisdictions tuition fees are going up. Being from Ontario, we probably have a less than enviable record on that front.

This, of course, is putting challenges on the schools, but it's also making an engineering education something that is becoming more and more of a challenge for students who are coming into our schools, because the cost is going up.

**Mr. Kennedy Stewart:** Could I just follow up on that point? You're probably talking more about undergraduate education, but you are also talking about a shortage of Ph.D.s and master's degrees. I'm just wondering about the funding in that area, a lot of which comes from the federal level through NSERC. How is that holding up?

**Dr. Claude Laguë:** Again, the funding is there. The funding is necessary for us to be able to deliver at the graduate level, but what we see also on the granting council side is that the rate at which that funding is increasing is not aligned with the rate of the increase in our student enrolment in graduate programs, for example, and the increases in costs.

**The Chair:** Go ahead, Mr. Marceau.

**Dr. Richard Marceau:** Thank you, Mr. Chair.

I mentioned in my brief notes that the notion of greater engineering input into public policy would be helpful. I'll give you an example.

There are rapidly changing technologies in a lot of areas, not just in information and communication technologies. I'll give you an example that has to do with natural gas. In 2008 or 2007, natural gas prices were going up. We thought there wouldn't be enough natural gas in many parts of the world. We were gearing up to actually build LNG plants to import natural gas to B.C. and to Alberta simply to serve the needs of various industries, including the oil sands industry.

The dramatic introduction of the fracking process, which industry insiders were aware of, completely transformed the landscape of natural gas. Those who were aware of the research and those who were aware of the investments—the venture capitalists, the industry people, and the people who were building LNG plants—knew what was happening. If the government could integrate that kind of information into its policy framework sometimes, to facilitate the investment in large infrastructure, that could benefit Canada from a competitive position. We would be there first, so to speak. I think that would be very helpful.

I use the natural gas example as one example to illustrate the fact that we're not always talking about information and communication technologies that are rapidly evolving. Many things are rapidly evolving. My colleague spoke about the oil sands. Things are rapidly evolving there.

That's just an idea that might be helpful.

● (1610)

**The Chair:** Thank you very much, Mr. Marceau.

Mr. Braid, you have seven minutes.

**Mr. Peter Braid (Kitchener—Waterloo, CPC):** Thank you very much, Mr. Chair.

Thanks to each of our witnesses for being here this afternoon and contributing to our study.

Madam Carter, you mentioned—and I think we heard the same from many of you—that one of the aspects we're concerned about is a shortage of engineers. I certainly heard you say that. I thought I also heard you say that we may have a problem with new graduates getting jobs. That seems to be contradictory. Could you explain that?

**Ms. Marie Carter:** I recognize that it's contradictory. When we did our labour market survey, we were told overwhelmingly by industry that they're looking for people with five to 10 years of experience, and most grads will come out of university with two years of experience or less. Industry is looking for people who already have experience, mostly because they're trying to fill those gaps. They're looking for people who are going to be able to step very quickly into those leadership positions that Mr. Gamble was talking about earlier.

As a result, we did get that new graduates aren't really the favourite thing for industry. It would be very helpful if there were incentives for industry to hire new grads so that they would be able to train them to have their five to 10 years of experience.

I was very lucky when I graduated just before that group of people who didn't get hired. I was hired in 1989, and I was pushed through very quickly, because they didn't hire people after me. I was it, the junior engineer who needed to learn fast to take a leadership role. I was at the leading edge of that big gap, and industry now is feeling that and wants to find people who have that level of expertise.

**Mr. Peter Braid:** Thank you.

Another theme or thread that we certainly heard today from each of you was the importance of increasing the number of women engineers and aboriginal engineers.

Starting with you, Madam Carter, I'd like to hear from each of you on how we can help to achieve that. I'd like to hear any recommendations you may have on how we move the yardsticks up in both those areas, and any examples of best practices today that are helping to achieve those two policy objectives.

**Ms. Marie Carter:** I will leave it to Dr. Laguë to give examples of what universities are doing.

Engineers Canada has done an enormous amount of research on this issue. We have an initiative under way to see if 30% of engineering students can be female by 2030, which, believe it or not, is quite a lofty goal.

We need to encourage girls—or all kids, really—to understand that science is fun and engineering is fun, and that engineering is of value to society and that we really do help individuals on a one-on-one basis every day in all aspects of life. We think that trying to take that tactic to encourage girls to go into engineering would be very helpful.

**Dr. Claude Laguë:** I think one element that differentiates Canada —and other western countries, for that matter—from many emerging countries is the fact that this whole area of what we call the STEM—science, technology, engineering, and mathematics—is not as valued among young people and among parents as it is in other parts of the world. It is especially sometimes devalued with regard to opportunities for women.

In universities—I can speak of my own—we have the same thing happening in all engineering schools. We have developed a number of outreach programs over the years to reach out to school-age children and to involve their parents, their teachers, and their guidance counsellors in trying to generate or to increase that interest in science, technology, engineering, and math.

If you want to enter the engineering profession, the first step is to get into an engineering school, and obviously you need to have a strong background in science and math. That background is not something you will acquire only in grade 11 and grade 12. The path to that takes a number of years. We need to reach out to those kids much before the time they get into high school.

The network of NSERC chairs for women in engineering and science has been very helpful in that regard in allowing us to have champions across the country who are developing and delivering those programs. We are also doing a lot of things individually at each of our school levels to basically tailor what we are doing in terms of outreach through the specific situations in which we operate.

It's a major challenge. It was mentioned that the proportion of female students in the engineering program has basically not changed significantly over the last few years, despite the fact that in absolute numbers it has increased because we have more students in our schools than we did 10 or 15 years ago.

The fact is that we have not been successful so far in increasing or rebalancing our student body compared with what has happened in other professions. The medical profession has achieved that balance. Law has done the same thing. In engineering, we're still facing major challenges in generating that interest and excitement among young women for those career opportunities.

● (1615)

**Ms. Janet Walden:** To carry on in that vein, we have only five of these chairs in women in science and engineering. It's a huge load for these women to try to mentor so many students. We do also try to work through the schools. We have a PromoScience program, and although it's called PromoScience, it's PromoScience and Engineering, really. We do things like engineering in schools, and we support those kinds of initiatives. Of course there's always a need for more of that.

The other thing we're trying to do is to work with students at the undergraduate level to give them experience in industry and give them hands-on experience doing some practical projects, which really stimulates their interest in moving on to graduate studies. That's again hugely important, because a large fraction of our growth in the graduate schools has been from international and not national students.

**The Chair:** Thank you, Madam Walden.

Now we go to Mr. Regan for seven minutes.

**Hon. Geoff Regan (Halifax West, Lib.):** Thank you very much, Mr. Chairman.

Thank you to the witnesses for coming today.

[*Translation*]

Professor Laguë, would you say we are currently facing a crisis? If not now, when?

**Mr. Claude Laguë:** I don't think we're in a crisis. You need only look at the figures showing that program enrolment is up. Over the past few years, our field has seen slightly higher enrolment than the university system across the board. It's a sign we've been able to get more young people interested in engineering careers.

We were just talking about graduate studies. In that area, we do indeed have a challenge on our hands: attracting more Canadian students to our master's and Ph.D. programs in engineering. Today, we have more than 20,000 students registered in master's and Ph.D. programs in engineering. The problem, however, is the very high proportion of foreign students, 35% to 40% on average. They come from around the world, and many of them go back home after finishing their studies. So we are not necessarily benefiting. There is some benefit in that a percentage of those students end up staying in Canada. Many of them, however, go back to their home countries. Attracting more Canadians to our graduate programs is a challenge.

The challenge we have stems from the fact that a Canadian student has to decide between graduate studies and the job market. Going to school means making financial sacrifices. I don't think every student with the potential to pursue graduate studies will choose to take those financial risks.

● (1620)

**Hon. Geoff Regan:** If we don't take graduate studies into account, how many years do you think it will take before the difficult climate and current pressures are no longer an issue? I am referring to the gap. How many years before the situation evens out, more or less?

In addition, do you know what proportion of those 40% from abroad stay here after five years?

**Mr. Claude Laguë:** I couldn't give you the exact percentage. We do know that a good many of them stay in Canada, but I wouldn't venture a figure on that today.

When will we get there? Our engineering schools have the capacity to grow. Take my own faculty, for example. In one year, we went from 3,100 to 3,700 students. It's clear in our case that we're nearing our limit and won't be able to sustain more growth, without an injection of human capital, money and physical resources.

If we look at what's happening in Canada right now, we see that some universities are in the process of expanding their engineering schools. The most recent example of that is York University, in Toronto. They have a very ambitious expansion plan for their engineering school, and obviously that will increase capacity. It will go from 70,000 undergraduates to 75,000 or 80,000.

However, it is important to make sure that people are being trained in high-demand sectors. And that means looking closely at the labour market to identify and target those sectors where trained graduates could have rewarding careers.

[*English*]

**Hon. Geoff Regan:** Ms. Carter, you mentioned the different issues in attracting women versus attracting aboriginals. Are you the person to ask to tell me more about those differences, or should someone else answer that question?

**Ms. Marie Carter:** I can give you the answer with respect to the information that we've got.

The issue with our indigenous population, largely the first nations population—and we've been working with the first nations on how we can address this—is that they don't tend to finish high school with an adequate knowledge of math and sciences.

I can give you an example. The University of Manitoba has a program that bridges the gap so that they end up in the mainstream of the university degree program, but they start out with a program that brings them up to the same level of knowledge as the normal first-year entrants.

It's more expensive; they have a funding program, and a lot of the big issues with the indigenous population are related to funding. They can't afford it.

Some of it is cultural. We had a couple of representatives tell us that one of the issues with moving off the reserve or out of their community to go to university, get an engineering degree, and then go back into their community is trying to fit back in.

The indigenous population faces a different set of difficulties from the women. With women, it's not so much that as trying to develop interest. We still do have a profession that seems to be painted as the typical Dilbert type. I find it really quite funny myself, but we're not all like that. It's a matter of trying to expose young women to the fact that engineering is something that's valuable to society, and interesting. I happen to like digging in dirt and building things with concrete, but not all women do.

● (1625)

**The Chair:** Thank you very much, Madam Carter and Mr. Regan.

That concludes our seven-minute round. Now we'll go to five-minute question sessions.

We will go to Madam Gallant for five minutes.

**Mrs. Cheryl Gallant (Renfrew—Nipissing—Pembroke, CPC):** Thank you, Mr. Chairman.

Mr. Laguë, I believe it was you who mentioned that some incentives would be needed in order for companies to take on new graduates from engineering. Was that the case, or was it Mr. Gamble?

I recall, Mr. Chairman, last December, that you announced that the Government of Canada had invested $1,133,000 toward internships, which should have seen up to 86 graduates of science and engineering obtain internships at McMaster. At Carleton, the STEM program—that's science, technology, engineering, and math—was also receiving $1,430,000. They were going to coordinate with the University of Windsor, which does the graduate enterprise internship program.

Are those the sorts of incentives you were referring to?

**Mr. John Gamble:** I don't believe it was I who referred to the incentives. I think that while those could be helpful, the bottom line, at least for our piece of the puzzle, is what Ms. Carter described. Our more pressing, critical need is for middle to senior management, the people who are, frankly, billable-ready.

What would actually serve us is more predictability with the job market. That would probably be more important than incentives. Incentive programs come in many different shapes and forms and so forth, and they help, but it's not a solution.

**Mrs. Cheryl Gallant:** Speaking of having more students enter engineering, the co-op engineering programs are very attractive features to entrants to engineering programs. Are any measures being taken to expand the number of co-op programs and the number of positions available therein?

**Dr. Claude Laguë:** I think if you look at the situation right now in Canada, probably about two-thirds of engineering schools have some form of either a co-op or one-time internship programs that in some cases are mandatory and in other cases are optional. I would say that in most schools, as in our school, co-op is an option. About one-third of our undergraduate students go through the co-op route in order to obtain their degree. We've been growing that program over the years, and we'll continue to grow that program.

It's always a matter of making sure you're balancing the number of students you have in the co-op stream with the capacity of the market to absorb those co-op students. The number of work placements available is not infinite, so you have to make sure. Often it's not necessarily distributed in the same way our student population is, so we have to make sure we adjust the number of co-op or internship positions that are available in each discipline to the reality of the job market.

**Dr. Richard Marceau:** I would like to add that when there is an imbalance between the number of students and the number of placements, what happens is that students will accept co-op placements without pay, and that completely usurps the whole fundamental concept of co-op programs.

Co-op programs are superior programs. They help bootstrap the quality of education in all the engineering faculties they are in. It would be helpful if there were tax incentives for companies to be able to accept co-op program students by generating those placements they don't normally have.

The other part of the issue is that it's not easy to take a student who's going to be there for four months. It's actually quite difficult. It's better for them to be there for 8 months or 12 months. An incentive for companies to create a long-term relationship with co-op students and pay them would strengthen the co-op system itself and strengthen the education that students get. They'd become better engineers when they graduated.

**The Chair:** Go ahead, Ms. Walden, very briefly.

**Ms. Janet Walden:** Our experience reflects what Mr. Marceau just said, but there are different ways of getting internships. You can also have collaborative projects between university researchers and industry. Who does all of the work? It's the students, primarily. In that way the students, over a longer-term period of sometimes two to three years—and this is generally at the graduate level—have experienced working with that company or with a group of companies on different research projects that are very much related to the business needs of that particular company. They get that experience in different ways. They are not always kicking them out; sometimes it's on an ongoing basis. They have that interaction.

● (1630)

**The Chair:** Thank you very much, Madam Walden and Ms. Gallant.

Now we will go on to Madame LeBlanc for five minutes.

[*Translation*]

**Ms. Hélène LeBlanc (LaSalle—Émard, NDP):** Thank you very much, Mr. Chair.

Thank you to our witnesses.

I am quite curious about something. I think co-op programs are a win-win situation. On one hand, you've got coaching and on the other, you've got young graduates who can't find jobs for five years, because employers are asking for that much experience. So I think co-op is a win-win.

What I don't understand, though, Mr. Marceau, is why co-op students aren't paid.

**Mr. Richard Marceau:** When the number of students doesn't match up with the number of placements available, some universities encourage their students to accept unpaid co-op placements. When I was dean of the engineering faculty at Sherbrooke university, I would not allow my students to do unpaid placements. I would tell industry representatives that they couldn't have my students' services if they didn't want to pay them.

One year, we had a real discrepancy between the number of placements and the number of students. As dean, I did something highly unusual. I had to invest money in order to create jobs within the faculty for those students who had not been placed. Situations like that happen. It goes in cycles, so there are gaps when it can happen. It all depends on the year.

**Ms. Hélène LeBlanc:** You mentioned four-month placements. That's rather short. Is it possible to have longer placements during the school year, say five or six months? That way, students could gain experience and get back to learning theory afterwards.

**Mr. Claude Laguë:** Most universities with co-op programs offer a certain degree of flexibility. It depends on the needs of industry and the wishes of students. It is possible to extend the usual four-month placement to eight months. Generally, placements are done in four-month increments to correspond with terms. We have to use four-month increments so that students can work co-op into their program.

Some universities offer co-op placements to students only once over the course of the program, and those placements can last 8 or 12 months. When I was dean of the University of Saskatchewan's College of Engineering, students would do 16-month placements. But they could do so only after completing their third year.

**Ms. Hélène LeBlanc:** I realize that finding companies that will take on co-op students is a challenge. But as I see it, the company benefits by having an employee it is already familiar with. It knows whether that person is a good fit. If the person isn't a good fit, steps can be taken. It already has that experience with the person.

Do you have trouble getting smaller companies to take on co-op students and pay them?

**Mr. Claude Laguë:** That can be challenging, but it depends on the sector. Take new technologies and the high-tech sector, for instance. A lot of those companies really depend on innovation and human capital in the start-up phase. Despite being small, these companies are often eager to take on co-op students. The thinking is that the students will benefit the company and improve its ability to adapt to a rapidly changing environment.

Placing co-op students is usually tougher with small companies operating in somewhat more traditional sectors, where the demand for innovation isn't as high. The fact of the matter is that a lot of these businesses don't necessarily have the capacity to supervise students. You need people on staff who can train and support the students, and these business don't necessarily have that.

Another thing to bear in mind is that the institution or university has expectations when it comes to co-op programs and placements. It expects that students will work in an environment in which they will be trained. It expects the work environment to be conducive to learning. That is something we check. As a university, we make sure that companies wishing to take on co-op students can offer that kind of environment.

● (1635)

**Ms. Hélène LeBlanc:** Do you offer any kind of support to small businesses?

**Mr. Claude Laguë:** Yes.

**Ms. Hélène LeBlanc:** Coming back to percentages, we talked about credential recognition, particularly as it concerns newcomers who've earned their degrees in other countries. What's the percentage of those whose credentials have been recognized—

[*English*]

**The Chair:** Madame LeBlanc, your time is up.

[*Translation*]

**Ms. Hélène LeBlanc:** I'm out of time already?

I'll have to come back to it another time, then. Thank you very much, ladies and gentlemen.

[*English*]

**The Chair:** Mr. Warawa, you have five minutes.

**Mr. Mark Warawa (Langley, CPC):** Thank you, Mr. Chair, and I thank the witnesses for being here. It is very interesting.

I have questions on the incentive programs. I am sure you're familiar with the Red Seal program for trade apprentices. I think it was introduced by the government around 2007. It provides a tax incentive for the first couple of years of an apprenticeship and encourages companies to hire these apprentices. That is not where I wanted to go in my questioning, but are you looking to recommend something similar to that program, or any tax incentives?

**Ms. Marie Carter:** I think that would be something to consider, or perhaps something structured in a similar way.

I know the Red Seal program has been quite successful for the trades. Any sort of incentive that will get industry to hire new grads and that can assure them that the person is going to be able to carry out the work and get going would be useful.

**Dr. Richard Marceau:** This is a very interesting topic, because there is a way to incent companies to hire engineers.

Many small and medium-sized companies are offering products and services that do not have a single engineer. Very often they are very innovative and entrepreneurially oriented. They have something unique, but they do not have an engineer on staff to maintain or help with their production. Getting that first engineer through the door is the critical path to hiring more engineers in industry. Once they see the value that an engineer brings to their company and their value-added proposition, then they create the pathway to hiring more, but the key is getting that first one into those SMEs.

**Mr. Mark Warawa:** I want to change the subject slightly.

There was a comment that there's a lack of interest among first nations and women and that generally some of the disciplines would be more popular than others. I want to ask about the importance of our natural resources.

About three years ago, I believe, the environment committee paid a visit to the oil sands. No matter what political party was represented, the common comment was it was very different from what we expected, and engineering played a major part in that. The appearance of the oil sands has changed dramatically, even within the last three years. How the tailings ponds are now being handled has dramatically changed, as well as the life of a tailings pond. Now reclamation can happen much more quickly.

When things as controversial and as important to the Canadian economy as oil sands and pipelines are criticized, does that affect the interest of people wanting to get into that discipline? It is such an important field.

**Mr. John Gamble:** I think it's sometimes the contrary.

One of our strong suits in Canadian expertise is environmental protection and environmental remediation. We've been able to market that expertise all over the globe. Of course, any form of resource extraction has an environmental impact that has to be managed, measured, and monitored. Even the alternative energy sources of wind, tidal, and traditional hydroelectric all create certain other corollaries and spinoff opportunities. Big trucks and lots of pipes are great for some people; some people want to contribute and restore the environment. I find it creates a lot of interest.

I think people are going into environment because they want Canada to be a good player in resource extraction, and that is just one example. You could say the same of manufacturing and even of traditional infrastructure projects.

● (1640)

**Mr. Mark Warawa:** Is there a great deal of interest among engineers in getting involved in the oil sands?

**The Chair:** Give a very brief answer, please.

**Ms. Marie Carter:** All disciplines of engineering are involved in the oil sands. Certainly the environmental aspect of it is very attractive to the females.

**The Chair:** Thank you very much, Ms. Carter.

Mr. Warawa, that's all the time we have.

Now we'll go to Mr. Harris for five minutes.

**Mr. Dan Harris (Scarborough Southwest, NDP):** Thank you, Mr. Chair.

Thanks to everyone for being here, and also to my Conservative colleagues across the way for agreeing with us to do this study. I think we should work together more often on things like this so that we can get experts before us.

Mr. Gamble, I'll start with you because you were talking about long-term infrastructure funding. This is something that's near and dear to me personally, and that we in our party have been talking about for a while. You mentioned the Building Canada fund, and yes, it was I think quite the appropriate comment: seven years in politics is like a hundred years. Of course, a week is a lifetime as well.

**Voices:** Oh, oh!

**Mr. Dan Harris:** You were talking about the need for long-term stable funding. Of course we see the need for it so that the infrastructure projects get built, but from the perspective of engineers and engineering, how will it actually help your field?

**Mr. John Gamble:** Well, first of all, to go to a little bit of what we were talking about earlier, it's very difficult to invest in brand new employees, get them productive, and get them up to speed. It's not just about the salaries. Everyone who works on a project is in a high-liability field. For the salaries our sector receives, there's a disproportionate amount of personal and corporate liability, so there are all those elements.

The ability to know that there will continue to be investment in infrastructure and, with that, all the things that spin off from that.... What I mean by infrastructure is not just the water systems and the roads and so forth; it enables the economy and has the tangential benefit to other sectors that also hire engineers. Knowing it will be there allows employers to make a long-term commitment to a new employee. They know they're going to be there. They're going to get that return on investment. It's worth investing in their training.

It's not just the school. We can't rely just on what the school teaches them. As an industry, we need to continue to help them with continuing education and continuing professional development. We need to get them a breadth of experience. We need to get them to a point where we can charge them out at a rate high enough that they can actually start paying for themselves. Clients want the most experienced guys—not at the best fees, but they want the most experienced guys. We need the ability to get them there.

That's one key element. It makes the business case for us to invest in new employees.

**Mr. Dan Harris:** Actually, that's one of the reasons that the oil sands industry is very attractive to engineers: because these projects are on the scale of 50 years, in most cases, and therefore it's easy to predict. It would be nice to have that kind of predictability in other areas, and we'll certainly be working towards that. I'm sure I'll be talking to you about that again down the road.

Ms. Walden, you were talking about the Canadian Manufacturers and Exporters and the fact that they're having troubles, perhaps, in a more competitive marketplace, in competing using existing technologies. Of course, engineers are critical to helping develop new technologies. NSERC is certainly one component that can help, through the variety of programs. Another one is the SR and ED tax credits.

The CME mentioned to the committee recently that they're expecting that their research and development will drop by about 30%. Do you think it would have an impact on engineers and engineering if research and development in that sector were to drop by 30%?

**Ms. Janet Walden:** I don't think it's going to drive whether or not research is carried on in manufacturing. My comments were around how design is now a really important part of how manufacturing is done and how we need to ensure that we have that skill well imbedded in our engineers so that they are competitive moving forward.

In terms of the SR and ED tax credit affecting manufacturing, I think, as I say, that the value of the dollar, the competitiveness of our industry, and our ability to export, etc., probably far outweigh that. What we do see is that working with the research community in the universities does assist a particular small business to advance its products. In our case, most of the research that's done is SR and ED tax creditable, so for a small business—for a large business as well, but for a small business in particular—it's really helpful to have what we do in NSERC complemented by the fact that the investment the company is making is SR and ED tax creditable as well.

**Mr. Dan Harris:** That's great. Thank you.

How much time do I have?

**The Chair:** Fourteen, thirteen....

**Voices:** Oh, oh!

● (1645)

**Mr. Dan Harris:** Lots of pressure.

In one word only, what's the one thing that would be most important to addressing that skills shortage or mismatch?

**The Chair:** Anytime you want, by the way, if you have a question from a member—and I have to stay pretty disciplined with the clock, because everybody expects me to be fair—you can certainly try to squeeze it in. I think most members are fine with that as long as they get their initial question answered.

**Mr. Dan Harris:** Perhaps, Mr. Chair, it would be a good time to mention that witnesses can always provide information to the committee afterwards if there's a question they didn't have time to answer.

**The Chair:** Very good, Mr. Harris.

Mr. Harris is absolutely correct. If you want to submit anything to the clerk afterwards, please do that, and we'll take it into consideration for whatever is decided by the committee with regard to the information that's presented today.

We'll go to Mr. Menegakis for five minutes.

**Mr. Costas Menegakis (Richmond Hill, CPC):** Thank you, Mr. Chair, and thank you to our witnesses for appearing before us today. It certainly is a very interesting and fascinating subject to discuss.

I'd like to start with you, Madam Carter.

In your opening remarks you commented on the percentage of women in the engineering workforce. Was it 13% or 30%? It seems to me, to start, that 13% is a very low number. Is there a reason for that?

**Ms. Marie Carter:** Up until 1989, the enrollment in undergraduate engineering degree programs by women was about 10%. It started to increase after that. Largely as a result of the unfortunate incident at École Polytechnique in Montreal, there was a big push in trying to attract women into engineering. Nationally, we got all the way up to 23% in 2001 or 2002. We've held steady or fallen a little bit, generally. I think this year we're at about 18% or 19% of enrolment.

We do see that women are far more interested in biological engineering, biomedical engineering, environmental engineering, and chemical engineering, fields where they can see the direct relationship with a gain to society.

**Mr. Costas Menegakis:** Thank you. Actually, you answered my second question with that as well.

I'd like to go over to you now, Ms. Walden, and ask you something. In May 2012, the Minister of Science and Technology, Mr. Goodyear, in an announcement at the University of Toronto, which I was at, announced an additional $325 million over five years through NSERC's discovery grants program.

Can you elaborate on that a little bit, and how that will help, if it does help, which I'm sure it will?

**Ms. Janet Walden:** Our discovery grants program is our foundational program. It's a highly competitive program and supports about 10,000 university professors across the country. About 25% of those are in engineering-related fields. The funding, as I say, is competitive. Engineering is definitely a big part of that. Increases to that budget certainly benefit the engineering field as well.

**Mr. Costas Menegakis:** As a sort of complementary announcement, in that announcement he also announced $15 million for the discovery accelerator supplements program, which, if I'm not mistaken, was to fund a certain number of researchers over the next three years. Is that correct?

**Ms. Janet Walden:** Yes. These are really researchers who have demonstrated tremendous potential. Again, they can be in any field of science or engineering. Additional financing is provided to these people to accelerate, just as the word says, their research programs.

● (1650)

**Mr. Costas Menegakis:** I was quite taken aback with the enthusiasm when I was there. Of course, a lot of the researchers were there, and they were more than pleased that the government was investing additional money.

**Ms. Janet Walden:** This is a pretty exceptional program because it gives researchers the opportunity to pursue research where it takes them, as opposed to being more in a project mode.

**Mr. Costas Menegakis:** One of the areas that the Minister of Citizenship, Immigration and Multiculturalism, Minister Kenney, has been focusing on is the federal skilled worker program to attract engineers, among others, who are skilled workers to come into Canada from other countries. Are you familiar with that process?

As a follow-up question, can you tell us how difficult it is for someone to get Canadian accreditation after coming from another country? Some, I assume, are easier than others.

**Ms. Marie Carter:** We are very familiar. We've been working very closely with Citizenship and Immigration. We've put a tremendous amount of work into making the engineering licensing process a little bit quicker.

The commitment that has been made and kept by our regulators is that once they receive all of the documentation for an application, that individual will have an answer within six months. Most of them give them an answer within about 30 to 45 days now as to whether they need to do anything further in order to be licensed, so they know what they need to do.

**Mr. Costas Menegakis:** One of the problems you noted, which most of us as parliamentarians have come across, is with young graduates trying to get out of that catch-22 situation. They have their degree, but they don't have the experience. Until they get the experience, they can't get the job, but they can't get the job to get the experience. They're stuck in that quandary, if you will.

**The Chair:** Mr. Menegakis, I'm sorry. I was hoping we could finish, but—

**Mr. Costas Menegakis:** Am I up?

**The Chair:** Yes, we're quite a bit over your time.

We now go to Mr. Stewart for five minutes.

**Mr. Kennedy Stewart:** I'm going to talk a little bit about recruiting foreign engineers to come in to fill gaps for companies. You're saying that the pool is drying up a little bit as China and India retain their engineers, and it's harder and harder to recruit people to Canada. Is that largely what I heard? Correct me if I'm wrong, please.

I'm wondering about recognizing the credentials of folks who are here in Canada but failing to have their credentials recognized. I know when I go door-knocking around my community that I run into lots of folks who have had training in other countries, and they're driving taxis and doing various things like that.

Is there some kind of collective effort? Perhaps Ms. Carter can take this question. What could we do at the federal level to speed that up a bit, or to help draw from that pool more effectively?

**Ms. Marie Carter:** We've done quite a bit of work to find out why self-declared engineers haven't actually gone to get licensed. A big part of it is that they need to get a little bit of Canadian experience at least in order to understand the business culture. It doesn't have to be experience gained in Canada, but it needs to be a Canadian business culture type of experience.

We found when we did our study that the vast majority of immigrants moved to a location because of family or some sort of a community connection. Those aren't necessarily in locations where their particular set of skills is needed. I got a call from a marine engineer in Regina. We worked through it.

I know that for the last six or seven years annually we've had 5,500 engineers coming to our regulators' doorsteps to apply. The vast majority of them, something like 90%, get licensed. A lot of what we're seeing are people who haven't acquired licences because they didn't want to move to where the job was—away from their community and from their family—so they've chosen not to pursue the field, or they're not in fact engineers, or they don't know that they need to get licensed. One of the things we are trying to do is to make sure that people understand who they need to go to in order to get the process going.

● (1655)

**Mr. Kennedy Stewart:** Would you say that my perception is a myth, in a sense—that there's not this pool of folks who have this great training but who just can't get their credentials recognized? Should we move on to another policy area?

**Ms. Marie Carter:** I'm not going to say that it's a myth, but it might be a little bit exaggerated.

**Mr. Kennedy Stewart:** Can you provide numbers? Could we get numbers from you on that, or from the report that you issued?

**Ms. Marie Carter:** We know how many people come to the doorsteps. We don't know how many people enter the country and declare themselves as engineers.

**Mr. Kennedy Stewart:** Would you have information on why they were rejected or those types of things?

**Ms. Marie Carter:** Do you mean on why they didn't get licensed if they went to the doorstep? Absolutely.

**Mr. Kennedy Stewart:** It would be perfect to have help in that area.

I was just going to turn to Mr. Gamble and ask about the role that basic research plays in your industry. We heard from the pharmaceutical sector, for example, that 54% of their patents are based on peer-reviewed research. If you're thinking about things that are supplied by basic research like peer review, how do those affect the companies you represent?

**Mr. John Gamble:** First, our companies are like professional service firms. We don't have inventory. Our assets are people whom we charge out. In a cost-competitive market, it's often difficult to do in-house research, because you can quickly become very un-cost-competitive. That's not to say it doesn't happen, but it is a challenge.

To be quite candid—I don't mean to sound glib—one of the biggest barriers to innovation, at least to a sector of our membership, is government procurement, largely because it's very price-focused, and even though Treasury Board directives say “value”, sometimes at the bureaucratic level it's much easier to defend an empirical decision than a value-based decision. As a result, often we see a lot of price pressure, meaning there's not a lot of incentive to grow the scope of the project or propose alternatives and still be cost-competitive.

Second, there's an enormous amount of risk transfer onto our members, particularly by government. Therefore, if they try anything new or unproven, they're asking for trouble.

Third, at the end of the day, if you accidentally invent something, most government contracts stipulate that the government owns all the intellectual property. That's not in every case, but in most government procurement and certainly in the standard stuff we do for Public Works and Government Services, Defence Construction Canada, Correctional Service of Canada, and others, it's a disincentive to doing anything new or creative.

**The Chair:** I let the answer go over a bit because it certainly benefited everybody.

This now marks the last questioner in the five-minute rounds, and then we're going to go into a third round. I'll just advise the opposition that because the last speaker in this round and the first speaker in the next round are Conservatives, if it seems like a long time, it will be because two five-minute rounds are together. Two times five is 10.

Go ahead, Mr. Lake.

**Hon. Mike Lake (Edmonton—Mill Woods—Beaumont, CPC):** Thank you to the witnesses for taking the time to come. This has been an interesting meeting for me.

I'll start with Mr. Gamble.

There's been much discussion about this gap in a specific demographic because decisions that were made when trying to balance the budget about 17 or 18 years ago are having lasting ripple effects today. It seems as if a lot of the challenges you're talking about are related to decisions made that long ago. Are there lessons to be learned for government now as we move forward, based on that experience?

**Mr. John Gamble:** I think the stimulus program was one of the great things that happened, and I have to give credit to Minister Baird. He never said this program was a strategic infrastructure investment; it is a job creation program. It did allow us to bridge until there was a certain bounce-back to the economy. It allowed some assets that might not have otherwise been built to be designed and built. That allowed us to retain our staff, by and large. We did not have to shed those people. We did not have to lose them to the industry and to the profession forever.

That was very helpful to our industry, particularly if we are going to go into another long-term infrastructure program, because we were able to keep those people and that expertise on the payroll. That was key.

**Hon. Mike Lake:** As we move forward trying to balance the budget, I think I'm hearing you say it's important for us not to look at the transfers to the provinces that fund post-secondary education and those types of things as a way to quickly and easily balance the budget. Maybe we should look at other things. I think you're saying that the gap in the demographic resulted from the fact that we didn't have the students coming out of the schools in the mid-nineties, and therefore there's this massive gap in the industry right now. Is that correct?

● (1700)

**Mr. John Gamble:** The drop in enrolment was directly related to the real and perceived lack of opportunity.

We talked about young people going into engineering. Frankly, I'm surprised anyone goes into engineering in our public school system. Nobody knows what engineering is in our public schools. Again I don't mean to be glib, but our school systems across the country are largely designed by B.A.s to create more B.A.s, and it's even worse for trades.

There's a stigma that if you go into a shop class or go into industrial arts in high school, you're a dumb kid, and that's terrible, because not just engineers but tradespeople are sometimes wealthier than we are. That's another area where we have an acute gap. I think we have to rethink a lot of our education right from the ground up and present engineering and science and technology, the whole STEM group, as something that's attractive to all demographics. We have to get away from Dilbert.

**Hon. Mike Lake:** You just mentioned Dilbert, which is going to be my transition here. I'm interested for a reason that you might not expect.

Ms. Carter, you brought up women, and I have a 13-year-old daughter who I have been telling since she was six that she should think about engineering because she is very math- and science-oriented.

I also have a 17-year-old son who has autism, and I'm interested in the Dilbert comment, because one of the things we talk about in the autism community is that we see a lot of families, a lot of parents of kids with autism—there's kind of a genetic component—who tend to be fairly heavily concentrated in fields like engineering, accounting, IT, and those types of things. There is speculation that one reason would be that one of the strengths of people who are high-functioning on the autism spectrum is that real focus on detail and numbers and structure and concrete things, so we would look at that as an advantage.

To what extent have your organizations explored working with organizations that research and look into using those strengths of people who might come across as socially awkward but who have real strengths to offer if organizations like your own might look for those strengths and find out how you can utilize them? To what extent have you done that?

**Ms. Marie Carter:** I don't believe we have done that, and I think that is a really interesting aspect for us to look at. Certainly the engineering community has a range of skill sets from the incredibly detail-oriented to the less detail-oriented and more big-picture, strategic-type thinkers. We need the detail-oriented people as well as the strategic and the big thinkers.

I actually shared my four years of university with a young man who was high-functioning autistic, and I was in awe of his capabilities. I do think that is a very interesting area to consider.

**Hon. Mike Lake:** I'll throw that out as a little bit of a challenge.

There's an organization in Calgary called the Sinneave Family Foundation that has a significant endowment to research this vocational piece, and they do look.... My son's in a little different circumstance. He is a 3- or 4-year-old in a 17-year-old's body, so we're not realistically looking at him getting an engineering degree, but for him they look at the opportunity to work in a warehouse or something like that—something with repetitive tasks, such putting things away, which he loves to do. They look at challenges across the skills spectrum in people with developmental disabilities, and there are people at the high end who certainly would make exceptional engineers. I would encourage you and challenge you to take a look at an organization like that and the opportunities that might be presented there.

I'm going to switch gears for a second.

Mr. Marceau, listening to your comments and your point on succession planning, I was quite surprised to hear you say that the gap between supply and demand had traditionally been filled by immigration, and then you used the words “not an option any more”. I find that pretty surprising, because I represent a riding that is extremely diverse, with significant amounts of immigration. We talk to people with engineering backgrounds, among others, who are looking to help bring people over here through the immigration system. It seems that there is a real demand to come to Canada and benefit from the strength of the Canadian economy and the opportunities that present themselves here.

Costas talked a little bit about the immigration minister's focus on skills in the immigration system and the shift towards focusing on the skills we need, which sounds exactly like what you are asking for right now.

Maybe you could elaborate a little on why you think it is not an option, because I find that surprising.

● (1705)

**Dr. Richard Marceau:** It may be an option today, but it won't be an option for very long. That's what I'm really trying to say.

Look at China and the way it's building infrastructure. They're building thermal power plants, major infrastructure power plants, at a rate of one every week, or something like that. They are coal-fired, oil-fired, and gas-fired plants. They need engineers to build the huge cities that they're presently building. They have built a large number of new universities.

They are churning out a huge number of engineers as we speak, but they have the capacity to absorb those engineers because they are doing nation-building. India is doing nation-building. You can't do nation-building without engineers, so the issue is....

There will be engineers who will want to leave, yes, but then we have to look at what's happening in the entire western world. The issue of the demographic of the baby boomers leaving the workforce and transitioning into retirement is creating a significant gap. It is maybe not as big a gap in some areas as it might be in others, but it is creating a significant gap.

In Europe, the U.S., and Canada, we are not well tooled to fill that gap. We've traditionally filled that gap through immigration, but if engineers elsewhere can have a high quality of life, a well-paid job—and not just a job, but a career—where they grew up and got their education, why would they leave? China is doing everything it can to keep its engineers. So is India.

That's all I'm saying. It's going to be a highly competitive market. We do have advantages. We may yet successfully attract some people, but we used to attract them by doing nothing. Today we're going to have to work hard to get something, but it will be nowhere near the kind of influx of immigrating engineers that we used to get.

That's all I'm saying. We just have to be realistic. We will have to create our own next generation of engineers. We will have to face the fact that we have to retool our universities to supply the engineers we need if we're really serious about maintaining the quality of life and the wealth-generating capacity that we have today.

**Hon. Mike Lake:** I agree with you that a balance is needed. I was just in Africa, though, and saw immense projects being undertaken by Chinese engineers. Because there's not enough work to be had in China, they're sending their engineers to other parts of the world to undertake these massive projects. It was quite an experience to see what's going on there.

I think we have to find the balance, though, and I think you guys have given us some wonderful ideas in that regard.

**Dr. Richard Marceau:** I think the Chinese engineering firms are competing on the world market to bring wealth to China. It's not because they don't have any work in China; it's because they want to create greater wealth for China.

**The Chair:** Thank you, Dr. Marceau.

Now we'll move on to Mr. Stewart for five minutes.

**Mr. Kennedy Stewart:** I have just a quick question, and then we can go to Mr. Thibeault.

**Mr. Glenn Thibeault (Sudbury, NDP):** I have several questions.

**Mr. Kennedy Stewart:** Okay.

I wanted to continue on the basic research question that we were talking about. You're saying that your firms really don't employ folks who are doing basic research.

**Mr. John Gamble:** No, not pure research. We have to support them with our overhead and our markup.

There are exceptions; some firms have successfully developed patents because there was a particularly unique project. Most of the innovation takes place in the context of working for private clients, though, who are prepared to make that investment because they have the luxury of being able to say that they can defer seeing any return on the investment for four or five years. In the reality of government, that's a much trickier proposition.

**Mr. Kennedy Stewart:** Then as with the pharmaceutical industry, a lot of those companies are actually getting a lot of their new ideas from peer-reviewed academic—

**Mr. John Gamble:** Yes.

**Mr. Kennedy Stewart:** Is that something—and maybe I'll go to Ms. Walden in a minute—that your firms do as well? Do they read the journals and say that they see something new they can build into their company, or is there a gap between what's being written and what's being implemented?

**Mr. John Gamble:** Those firms that have the opportunity to do so will do so. In a cost-competitive market, it's a little more challenging. You have to add time to take time. You have to have money to make money. It's a little bit of that. Again, it's another one of these vicious circles.

Some firms do it extremely well. For some firms, it would be very challenging, because they have to open up that margin before they can free up that staff time and that investment in human resources.

● (1710)

**Mr. Kennedy Stewart:** Ms. Walden, would you comment?

**Ms. Janet Walden:** There may be a big difference there between, say, consulting engineering firms and the engineering firms such as Pratt and Whitney or Bombardier, where a lot of in-house research is done. It's the same with IBM. In fact, part of the reason they justify their presence in the country is the fact that they have this access to research, and they're doing a lot of research here.

**Mr. Kennedy Stewart:** Over to you, Glenn.

**The Chair:** Go ahead, Mr. Thibeault.

**Mr. Glenn Thibeault:** Thank you, Mr. Chair.

Dr. Marceau, I just want to jump onto what you were saying, and what I believe Mr. Gamble said as well.

I come from Sudbury. We have a lot of engineers in Sudbury, specific to mining. You were talking about the decline or what we're seeing, as Mr. Lake was saying, in terms of Chinese engineers.

What we're seeing in Sudbury is that we're losing our engineers quite quickly, not only to foreign countries right now—like Mongolia, where they're bringing in Sudbury engineers all over the place—but even within our own country. They're going to Saskatchewan, to Alberta, to Newfoundland. I wouldn't say we have a big problem, but we're starting to see the loss of engineers and the slowdown of mining.

Has there been any thought about this? Are there any discussions within the engineering associations about what we can do to even support our own resource development here with engineers?

**Dr. Richard Marceau:** What I would say is that in mining the whole issue of the primary transformation of the resource—getting it off the ground—is a huge area, a huge issue, and it has been for at least a generation. Mining has lost interest among young people for a long time. We're talking 25 to 30 years.

Universities have partnered with companies to try to stimulate enrolment in mining. When I lived in Montreal, I recall École Polytechnique and McGill University getting together to consolidate their mining engineering faculty and activities. I think this has happened elsewhere in the country.

What I'd simply say is that it's the mirror image of what we've been saying and what Mr. Gamble said a few minutes ago. There are a lot of areas that could attract young people if only we could make young people aware of those areas.

We cannot solve this problem instantaneously. When engineers have opportunities with greater salaries and possibly a career, and they can see down their runway a little more than three to five years and can see that the job could become a career, then they'll go where there is a career rather than a job.

I'm not saying that's not what is offered in Sudbury. I'm sure there are careers in Sudbury, but there is a perception that the grass is greener on the other side of the fence.

I would simply say that to solve this generational issue of more mining engineers and more electric power engineers, resource engineers, petroleum engineers, oil sands engineers, and nuclear engineers, we need to think in terms of 25 years. We have to invest time and go into schools and expose young people to engineers.

A primary school or a high school will often have visits to museums and to artistic and cultural centres, but rarely to a plant in an industrial setting. Rarely do you see an engineer as a high school teacher or as a primary school teacher. There are some; there are just not enough.

There are not any incentives for engineers, with their qualifications, to change in mid-career and go into teaching. They're not recognized because the essential competency is that of teaching, but what one brings as a teacher isn't recognized. If engineers were recognized for their engineering background and went to high schools, the students would be exposed to people other than science graduates and bachelor of arts graduates. Exposure to the kinds of thinking and experience from engineers is essential, but we have to open our minds and get into those schools and show students what opportunities there are. Mining is a great opportunity, but they don't know it.

**The Chair:** We're way over time, but I have a little bit of flexibility.

Madam Walden, do you have a brief comment you want to make in this round?

● (1715)

**Ms. Janet Walden:** I have just a comment.

Mining is a special case because of the cyclical nature of the industry. It goes through boom and bust. If you come back to the theme of what attracts students, it's jobs and excitement. The Canada Mining Innovation Council is looking at this because they have, on the excitement side, a lack of reputation. It's still viewed from a distance as a dirty kind of not very attractive business, and on the job side as being cyclical, so you can be employed or not employed very quickly.

The other thing is that for women, this is not an attractive field because, generally speaking, the mines are not located in areas.... If you work in Fort McMurray or some of the other mines, they're not areas that are necessarily attractive to women. They tend to prefer working in city areas.

**The Chair:** Thank you.

Thank you, Madam Walden. I worked at the Canadian Welding Bureau, and they have similar issues in trying to attract young people into welding. It's a great career as well, but it's very difficult.

I understand Madam Gallant and Mr. Menegakis want to share their time.

Madam Gallant, did you have a question, and then you'll share with Mr. Menegakis?

**Mrs. Cheryl Gallant:** The issue of nuclear engineers was raised in the last session. What is the current demand for nuclear engineers and what do you see it being for the next 10 years? Dr. Marceau, you mentioned that.

**Dr. Richard Marceau:** There is a significant demand for nuclear engineers in Ontario, where there will be a sustained presence of nuclear generating capacity for a long time to come. The nuclear power plants need to be maintained. They need to be overhauled to extend their lifespan. The minute you need to keep those plants running, you need nuclear engineers to plan over 10 to 20 years how they're going to do the maintenance, upgrading, and the transformation that will give them another 10 to 20 years.

Usually they do it in blocks of about 25 years, so there is a need to replace the people who are being phased out, and that need is currently met in two ways. In the early 2000s, a program was created jointly with NSERC and the entire nuclear industry, primarily centred in Ontario. It's called the University Network of Excellence in Nuclear Engineering. This program created a series of chairs that were financed very generously, in part by industry and in part by NSERC. It aimed at creating the succession planning for nuclear engineers at the master's and doctoral level.

It was recognized that to train the bachelors, first you needed to get the experts at the doctoral and master's level who could contribute both to the industry and to educating the future generation of engineers.

We are now at the point where a few universities—very few—including McMaster, Queen's, U of T, and UOIT, where I am located, have the capacity to teach nuclear engineering to young graduates of the bachelor level. At UOIT we have the only stand-alone nuclear engineering program in the country.

What has been done is meeting the supply.

**Mr. Costas Menegakis:** Thank you.

I want to finish my thought. All of you are leaders in the engineering field in very responsible positions, so if a young student has just graduated and says he can't get a job, would you point him to a particular industry or even an area or a province in Canada? What advice would you give him?

**Ms. Marie Carter:** The first question would be what discipline of engineering and what area within that discipline the student is interested in. Having that information in hand, then yes, there are probably parts of the country or particular industries that we can point them to, as well as mentors or people to talk to in that area.

**Mr. Costas Menegakis:** What if they come to you before they start their studies and say they're really interested in engineering? Where do you see the future? Where are their best chances of employment once they graduate? What would you say then?

**Ms. Marie Carter:** I would still be asking where their interest is, because it doesn't matter where the employment is. If you end up in an area you're not really enjoying, how much are you going to be able to...?

● (1720)

**Mr. Costas Menegakis:** Is there a lot of demand in any particular area?

**Ms. Marie Carter:** A lot of demand has been mentioned in a number of areas in Canada, areas where we're not producing enough engineers. Mining and nuclear were mentioned. Certainly the nuclear medicine side of things, which wasn't mentioned, is really growing, as are the biomedical and nanotechnology areas.

**Mr. Costas Menegakis:** Fantastic. Thank you.

**Dr. Richard Marceau:** I will speak for my parish.

The generational gap is in universities as well. If a young person has graduated from engineering and has trouble finding a job—or in any area, whether you've graduated from business or anywhere—I'd simply say to get a master's and think about the possibility of a career as a university professor, because the generational gap is there too.

**Mr. Costas Menegakis:** That's very useful. Thank you very much.

**The Chair:** Thank you.

Now we go to Mr. Regan for five minutes.

**Hon. Geoff Regan:** Thank you, Mr. Chairman.

Let me start by asking Ms. Carter something.

I think it was you who mentioned that regulators process 5,500 immigrant applications per year. How many are accepted?

**Ms. Marie Carter:** In excess of 90% actually meet the requirements. Some individuals are asked to write confirmatory exams. In Ontario, it's a small number of the applicants who end up actually writing confirmatory exams, because they will interview the individual. In the interview process, they'll really be able to assess whether or not they've got that knowledge in what appeared to be a gap in knowledge from their transcripts.

**Hon. Geoff Regan:** The reputation, if I can put it that way, is that engineering societies have done a much better job with this than some of your professional counterparts—such as law societies, for example, one of which I belong to in Nova Scotia.

This is not really about engineering, but in terms of skills gaps and immigrants and so forth, what do the others need to do that you're doing right?

**Ms. Marie Carter:** Thank you to the federal government for the enormous amount of funding that we've had over the last 10 years on this. We were able to put a lot of work into getting the regulators to work together to come up with strong systems, support each other, and share best practices.

We belong to a network, the Canadian Network of National Associations of Regulators, and we regularly meet with them. We have a conference every year. Usually HRSDC and CIC have representatives there, and we share our best practices.

We've learned from them. Some of them do a few things better than we do, and we've tried to ferret out what those things are. We're always happy to share where we can, and we've worked very hard with CIC and HRSDC. We've been invited to present at the Canada-Australia round table in March on how to develop reciprocity agreements with other countries.

**Hon. Geoff Regan:** Two and a half years ago, you entered into an agreement with the AFN to help promote aboriginals in engineering. I'm not expecting you to tell me that you've transformed everything in that two and a half years, because that's not very long, but what can you report in terms of positive results so far about that agreement?

**Ms. Marie Carter:** What we can report is that there's certainly a heightened level of interest from the AFN. It's been taking us quite a while to be able to sit down and ferret out how we can help. Certainly the situation recently with Idle No More has taken much of their attention, and we've had a bit of a gap in communications. When that settles down, we'll get back to sitting down with them and trying to work it out.

What I understand is that a big part of their challenge is the diversity of their own communities, which means that what might be a solution in one area is not the solution in another area. We may have to work with them on numerous solutions and think about how we can do that.

**Hon. Geoff Regan:** When you said “numerous”, it reminded me, oddly enough, of the word “numeracy”. I want to ask you about the development of children between the ages of one and five in terms of their numeracy skills and what that means for engineering. How important is that, and what should the Government of Canada be doing about it?

I'll let anybody answer.

● (1725)

**Dr. Claude Laguë:** If we want young people to move into careers that require this scientific and mathematical knowledge, this is something that is key. In my opinion, we have to expose all our children in Canada to mathematics, science, engineering, and technology from a very early age so that they're aware of all the opportunities that will present themselves and be available to them in the future.

When we neglect to some extent the mathematics and science component in our primary and secondary school system, we basically limit the future opportunities of those children, because we close doors that they will never be able to open. This is definitely key.

As a country, we can probably do better. We can probably look to what other countries are doing on that front. In some of the emerging countries we've talked about, such as China, India, and Brazil, this issue is taken a lot more seriously at both the primary and secondary school level to prepare children to enter into those professions. I think we need to do the same thing.

**The Chair:** Please answer very briefly, Mr. Marceau.

**Dr. Richard Marceau:** Dr. Laguë is absolutely right. I'd simply add that between the ages of zero and five, children love mathematics. We manage to kill that love when they get to school.

**Some hon. members:** Oh, oh!

**Mr. John Gamble:** If I can offer a quick corollary, language skills, communication skills, and soft skills are barriers to a lot of recent graduates ability to enter our industry, because that's a premium. We actually swung the pendulum too far one way.

**The Chair:** Thank you very much to the witnesses.

I wrote down two things here, and I'm glad Mr. Regan surfaced one that I wanted to cover, which the credential recognition directorate. It sounds as though you have a very good relationship. That's extraordinarily good news, really, for all of us, because all of us have dealt with many constituents who have professional credentials in the jurisdictions they come from. It's nice to know there's one discipline now in which we're seeing some results, so thank you for that.

There is another thing I wanted to ask you. Are you able to get good possibilities for future engineers out of the Canadian Forces, with the engineers who are developed there in the minor ranks—the sappers, etc.? Do you find there's a good stream of retiring Canadian Forces folks who are young enough to go into an engineering career?

**Ms. Marie Carter:** I can speak for at least one individual who was just hired recently as the chief executive officer of the Alberta professional engineering and geoscientists association. As we're in Ottawa, we do have quite a few of them around, so from the Ottawa chapter we see a number of these folks, and they do seem to be able to transition in.

From my limited knowledge of them, they tend toward the industry that supports DND, because they have that basic knowledge.

**The Chair:** Sure. They'd have that familiarity, as well as expertise. It's good that we're putting out a good product from the Canadian Forces as well.

Thank you very much. Thank you to my colleagues, and thank you to the witnesses for some great information.

The meeting is adjourned.