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Tuesday, May 6, 2008

Chair

Mr. James Rajotte

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● (1100)

[*English*]

The Chair (Mr. James Rajotte (Edmonton—Leduc, CPC)): Members and witnesses, let's find our seats, please.

This is the 26th meeting of the Standing Committee on Industry, Science and Technology. We are here today continuing our study and review of science and technology in Canada.

We have four witnesses before us today from two organizations.

First, from the National Research Council of Canada, we have the president, Pierre Coulombe. Welcome.

We have three representatives from the Professional Institute of the Public Service of Canada, the vice-president, Mr. Gary Corbett; the section head of research, Denise Doherty-Delorme; and the research officer, Mr. Chris Roberts.

We generally allow up to five minutes for an opening statement, but because we have two groups I'll be a little lax on that. We'll start with the NRC, then we'll go to the Professional Institute of the Public Service of Canada.

Mr. Coulombe, you may begin at any time.

Mr. Pierre Coulombe (President, National Research Council Canada): Thank you, Mr. Chairman.

[*Translation*]

Good day. Thank you for inviting me to speak to you today on behalf of the National Research Council Canada (NRC).

[*English*]

While I will be pleased to contribute to the discussion of any relevant issues, there is one particular point I would like to make. The National Research Council, or NRC, is exceptionally well positioned to support the priorities and vision of the federal science and technology strategy, modernizing science and technology to Canada's advantage.

In developing our own plan a few years ago, entitled *Science at Work for Canada*, we went through a series of in-depth studies and consultations and focused our programs on what are clear government priorities in health and wellness, sustainable energy, the environment, as well as a series of key sectors such as the area of space, advanced material, and information and communication technologies. In pursuing these goals, NRC is building upon a long tradition.

● (1105)

[*Translation*]

Since 1916, the NRC has played a leading role in fulfilling the Government of Canada's commitments in the field of science and technology. Over the years, the NRC has continued to evolve to meet the ever-changing needs of Canadians and of the country's economy. This ability to adapt and renew itself is one of the NRC's most remarkable qualities.

Not only does the NRC conduct innovative research and development, it also transfers the knowledge acquired to cutting-edge technology firms for marketing purposes. Some of the NRC's most noteworthy achievements include ecoplastics, 3D laser scanners, advanced characterization technologies, the artificial pacemaker and the meningitis C vaccine.

[*English*]

In performing its day-to-day activities, NRC is helping to determine Canada's social and economic future by building partnerships that increase national productivity and by creating a competitive advantage for Canada through science and technology. NRC is thus enhancing Canada's entrepreneurial advantage by concentrating some of its unique strengths and competencies in key industrial sectors, such as agriculture, automotive, construction, and biopharmaceuticals.

NRC supports Canada's knowledge advantage by developing a series of national research programs that leverage multidisciplinary competencies and mobilize collective strengths, creating a critical mass in research capacity that will lead to substantial advances in knowledge, development, and application, in Canada's national interest.

Our first national program under our plan is co-led by NRC and Agriculture and Agri-Food Canada. Its focus is on bioproducts and will help to address Canadian priorities, such as the environment, sustainable energy, and rural revitalization, through products that can marry the challenges of effective utilization of forest and agricultural biomass with expertise in fields as diverse as polymer science and industrial systems to increase the competiveness of sectors that include automotive and aerospace.

The second national program will focus on fuel cells and hydrogen technologies. It will build upon NRC, NRCan, and NSERC activities and will help bring government and industry researchers together to meet the critical demand for research and development in this field.

[*Translation*]

The NRC is also involved in multi-partner collaborative efforts, such as the nanotechnology research initiative announced at the end of April. These collaborative efforts are one concrete way for the federal government to help Canada make a name for itself as one of the world's most innovative nations.

Working with the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Business Development Bank (BDC), the NRC collaborates with Canadian researchers on the development of state-of-the-art nanotechnology applications. In the process, it contributes to the attainment of the goals set out in the federal science and technology strategy.

[*English*]

Finally, NRC is supporting Canada's people advantage by attracting and retaining the highly skilled people Canada needs to thrive in the global economy.

So as you can see, NRC's five-year strategic plan, which will lead us to 2011, is perfectly aligned with the federal science and technology strategy. We focus on the same priorities. We strongly support Canada's three distinct S and T advantages, and we generate technological solutions for industry that improve the quality of life of Canadians and others around the world. Therefore, by continuing to implement our programs, initiatives, and collaborative research projects, we hope to maintain our leadership position in helping the Government of Canada meet its science and technology commitments.

Merci.

The Chair: Thank you very much, Mr. Coulombe.

Mr. Corbett, will you be presenting on behalf of the Professional Institute of the Public Service of Canada?

Please go ahead.

Mr. Gary Corbett (Vice-President, Professional Institute of the Public Service of Canada): Thank you, Mr. Chair and members of committee.

The Professional Institute welcomes the opportunity to appear before this committee. PIPSC represents 55,000 scientists, engineers, and professionals across Canada's public sector, the vast majority of whom are employed in the federal public service, including in the NRC, Natural Resources Canada, Environment Canada, science-based departments, regulatory agencies, and field research stations. They often work in close collaboration with their academic and private sector counterparts.

Their research, which is associated with the welfare and livelihood of Canadians, is of concern to Canadians. It's on the minds of Canadians—the quality of the air they breathe, the food they eat, the water they drink, and the safety of consumer products. The members and scientists of the Professional Institute work in this area every day for the public good of Canadians.

The institute applauds the decision of this committee to undertake this study and believes that a thorough review is urgently needed. Despite the unique importance of the public sector to the health and well-being of Canadians, science performed in the federal public service has increasingly been neglected in the nation's science and technology decision-making.

In the last decade, the scientific effort in Canada has shifted dramatically away from in-house government-performed scientific research to university-based research—figure 1 in your brief. In real terms, the federal gross domestic expenditure on research and development—GERD—on the federally performed research in natural science and engineering, peaked in the 1980s and has been flat ever since. At the same time, Canada has failed to improve its position in international R and D rankings. In 1995, Canada ranked tenth in the OECD in GERD as a percentage of GDP, and by 2005 it had slipped to eleventh place.

The decline comes precisely at a moment when the Canadian public relies more than ever on the vitality and unbiased authority of public science. Canadians face profound challenges in the decades to come in adapting to global warming. Canadians expect that their government will maintain the scientific capacity to understand, anticipate, and respond to challenges facing this country, including the capacity to undertake large-scale and long-term research to support scientific monitoring, prediction, and reporting. Public science is essential to this effort. Universities and the private sector are not mandated or equipped to provide sustained and secure support for this research.

Big science projects requiring large-scale investments and long-term commitments in particular need government science leadership and in-house capacity to succeed. Yet after years of in-house program cuts, scientific investigation, monitoring, and data gathering are in crisis. As scientists conveyed to the environment minister in a recent meeting, other governments are questioning Canada's science regionally and internationally. For example, steps taken to terminate the funding to the United Nations global environment monitoring system—GEMS, a world-renowned program housed in Burlington, Ontario, for 30 years, has been reduced. It raises doubts internationally about the Canadian government's commitment to scientific endeavour in the public interest. The institute's federal scientists report that the scientific capacity of the government has been and is eroding.

Given their role in protecting Canadians and their vocation in service to Canadians, scientists are understandably frustrated by their inability to serve that purpose. The quality of their work suffers from their taking on a similar or heavier workload with fewer resources. When constantly changing priorities and bureaucratic rules are thrown into the mix, an even higher number have a diminished ability to serve the public effectively.

Members tell the institute constantly of their frustrations in being unable to apply for research moneys and being deterred from collaborating with scientists in academia and the private sector. Some labs are relying on industry funding to keep the lights on.

Now members are confronted by a future of doing even more with less. The government has a full-blown staffing emergency, with over 40% turnover in many departments. Science-based departments like Fisheries and Oceans report attrition rates of 40% to 45% amongst scientific researchers in the next four years. Health Canada will need to fill 600 positions in 2008 alone.

We have some recommendations. First, public science needs to be revitalized. There is a vital need for leadership on science and technology policy. The government must act with urgency on its commitment to S and T in the public interest and reverse the decline that has been set following program review in the 1990s.

● (1110)

The government must restore and increase resources for scientific research in the federal government, including a strengthening of A-base funding and a reduced reliance on short-term sunset programs and term employees. It must halt the further erosion of public science stemming from the strategic review of SBDA programs and expenditures.

There must be greater support for the work of scientists and researchers in the federal public service. Canada's 21st century knowledge economy requires highly qualified personnel. But when it comes to knowledge workers, the federal government has a significant recruitment and retention problem on its hands. The accelerated rate of attrition is diminishing the federal scientific effort. The government must find ways to attract new scientists and researchers to perform highly qualified science in the public sector.

An immediate and important signal to leading researchers considering public service would be to recognize the professional autonomy of scientific researchers and safeguard the independence of scientific work. Stable funding is required. And they need unfettered access to collaborative research networks, conferences, and forums for exchange of scholarly ideas.

The government must listen to the scientific community. Scientists are eager to work with government and provide expert opinion on science-related policy. The science and technology strategy was conceived with little participation and input from the government's own national science adviser, Dr. Arthur Carty, let alone Canada's broad community of professional scientists.

Canada needs a national science adviser to bring science issues directly to the public agenda. The institute calls for the government to restore a stand-alone office of the national science adviser, with full-time staff reporting to the public and to Parliament.

In addition, as Dr. Carty pointed out, “For advice to be effective, there must be a receptor willing and able to use it.” Government must engage the scientific community as a whole, including the government's own scientists and the Professional Institute that represents them if it wishes to strengthen scientists' roles in the national S and T policy formulation and improve public science innovation capacity.

Finally, the government must align science and technology policy with economic policy. The government needs an economic policy that complements and reinforces science and technology policy. The institute is encouraged that the government has belatedly intervened in the proposed sale of the MacDonald Dettwiler Radarsat technology to an American firm, but it is struck by the government's apparent insensitivity to the vital importance of a nurturing economic and industrial environment in which to cultivate world leading science and technology. The government needs to mandate and invest in a national foresight program, with a network of S and T stakeholders who are capable of discerning long-term trends and informing decision-making.

● (1115)

The Chair: Thank you for your presentation, Mr. Corbett.

We'll start with questions from members.

Mr. Brison, for six minutes, please.

Hon. Scott Brison (Kings—Hants, Lib.): Thank you very much

And thank you for being with us today.

I'd like to start with Mr. Coulombe. You were listing the top priorities for NRC, and I was surprised that cleantech wasn't one of those priorities. As a country, we're a significant energy producer. We're a country with a very high carbon footprint. We're moving into a global carbon-constrained economy. As such, it's going to require new technology to go from traditional conventionals to clean conventionals—cleaner oil and gas, CO_2, sequestration, as well as alternatives. You mentioned biofuels briefly and some research on the cellulosic side. But why is cleantech not at the centre of your focus in the coming years, particularly given the economic opportunities, or risk if we don't act to develop those technologies in Canada?

Mr. Pierre Coulombe: Thank you for your question.

Mr. Chairman, that's a very important question. The core areas of priority that we selected from our in-depth analysis obviously include the environment. It also includes sustainable energy. On the clean technologies, NRC is very much involved with fuel cells and hydrogen. As you know, we have an institute in Vancouver, and we just announced, with Minister Lunn, last week an additional investment of $14 million in support of developing the hydrogen and fuel cell side.

We are also involved in trying to develop technologies to support the tar sands development. That's one thing. But another major issue is that Natural Resources Canada, NRCan, very much has the mandate of developing R and D in support of energy, and we are partnering with them on that front.

Hon. Scott Brison: Do you coordinate or focus some of your work based on discussions with the venture capital community, for instance? Some of the biggest venture capital players are focusing on clean technology. Do you look at the kinds of investments they are making in looking to commercialize downstream activities?

Mr. Pierre Coulombe: We do that in two different ways. First is by trying to transfer clean technologies, which we are developing in our labs, to the private sector through licensing agreements. When that is not possible, we try to create new companies, spinoff activities, and basically engage quite significantly with the venture capital market in Canada.

We have examples of that going on right now. I cannot discuss them in detail, but we have clean technologies we are considering spinning off. We have already received the interest of venture capitalists. So what you will most likely see in the next few months is the creation of a new company designed specifically to commercialize clean technology.

● (1120)

Hon. Scott Brison: In August, the President of the Treasury Board created an independent panel of experts to provide advice on our report on transferring federal non-regulatory labs. It was headed by Dr. Arnold Naimark. It was supposed to report to Treasury Board by December 31. My understanding is that it has not yet reported back.

Did you meet with Dr. Naimark's panel?

Mr. Pierre Coulombe: Thank you for your question, Mr. Chairman.

Yes, we met with Mr. Naimark. We participated in all the round tables that took place across Canada. I think six cities were visited. So we participated with a group of various stakeholders that met on those occasions. But the Naimark report is still with the Treasury Board, so I don't really know the outcome.

Hon. Scott Brison: Some of the agricultural research centres being considered are extremely important to Canadian agriculture. For instance, the Kentville research station in Nova Scotia in the Annapolis Valley is critically important for providing that kind of public research. There is significant angst in the agricultural community about the uncertainty around that report. What is your feeling on the importance of decentralized agricultural research in public facilities across Canada?

Mr. Pierre Coulombe: Thank you again for your question.

You may appreciate that those stations do not report to NRC but rather to Agriculture and Agri-Food Canada.

Hon. Scott Brison: But did you express an opinion to Dr. Naimark?

Mr. Pierre Coulombe: Well, we expressed an opinion to Dr. Naimark primarily about the role of the NRC in the Canadian S and T landscape. We did not express an opinion to Dr. Naimark about other departments or agencies having responsibility for scientific activity, because it was not part of our mandate.

Hon. Scott Brison: I can tell you, from the agricultural community's perspective, about the importance of decentralized research. Apples produced or researched in the Annapolis Valley are different from those in the Okanagan Valley, and with technology we can connect that research. You don't have to have everybody in one place in Ottawa conducting that research. I think that applies to fisheries and it applies more broadly. I'm hearing from industry stakeholders in a variety of industries that decentralized research, connected by technology, is the direction we ought to be pursuing.

Mr. Pierre Coulombe: Again, it is difficult for me to comment, because I'm not very well aware of how Agriculture and Agri-Food Canada is having these facilities spread out all across the country.

The Chair: Mr. Corbett, do you want to comment on that?

Mr. Gary Corbett: Yes, I would like to comment on several of those things.

I appreciate Dr. Coulombe's answers with respect to NRC. But in the delivery of Canadian science, there are science-based departments and agencies that should all be connected, because they all work for the public trust.

With respect to the panel, I received a letter just the other day from the minister saying that this particular report was still in cabinet and that there was no decision on it yet. So that's as fresh as yesterday.

With respect to the comments by the honourable member Scott Brison, absolutely, those facilities are extremely important to Canadians. We find that they're underfunded and they can't perform the mandate they once did, including collaborative research with other agricultural facilities across the country, which we have visited most extensively. It's not only agriculture; it's Natural Resources Canada and Environment Canada. These areas need to be better funded.

There is a lot of angst. There is a lot of angst in the scientific community.

The Chair: Thank you.

Thank you, Mr. Brison.

I'll go to Monsieur Vincent.

[*Translation*]

Mr. Robert Vincent (Shefford, BQ): Thank you, Mr. Chairman.

Mr. Coulombe, can you tell me what your annual operating budget is?

Mr. Pierre Coulombe: The NRC has a budget of approximately $850 million. Funds are divided into three major envelopes: envelope A which totals about $500 million; envelope B, which represents funding in the amount of $100 million which is renewed every five years; and the revenue envelope, which totals between $160 million and $180 million. The overall level of funding varies from year to year, depending, I would say, on the strength of the Canadian economy.

● (1125)

Mr. Robert Vincent: In dollar terms, what does your partnership with the private sector or with other companies represent?

Mr. Pierre Coulombe: In terms of the revenue that the NRC generates through its research activities arising from contracts with the industry or other federal departments, the figure is somewhere between $160 million and $180 million, as I said earlier. Of this total amount, between $80 million and $90 million is derived from industry.

Mr. Robert Vincent: There is a difference between revenues and money invested. One can do research, develop a product, generate a patent and sell a product to a company that can then turn around and make a profit of several million dollars. However, in terms of revenue generated, we're talking about $160 million to $180 million a year, based on a budget of $850 million.

Do you think the NRC is poised to develop a product that will be successful enough to help you generate a profit over the next few years?

Mr. Pierre Coulombe: That is an interesting question, sir.

The NRC enters into different types of contracts with the Canadian industry. There are fee-for-service payment arrangements where industry officials approach us, use our infrastructures and then leave. There are also research projects that are carried out with industry people. In such cases, we share the risk and often, the technology developed, with the industry.

Improving the competitive position of Canadian companies is of paramount importance to us. Much of what we do for Canadian industry is confidential, in that it provides a clear competitive advantage to the industry. When we work with large companies, we transfer technology to them. When these companies find success after collaborating with the NRC, the Canadian economy benefits in general by virtue of the more competitive market position that these companies enjoy. These companies go on to hire people, turn a profit and pay taxes which flow back into the government's coffers.

Mr. Robert Vincent: Have you ever followed up with one of these companies that may have taken your technology and your research and then gone and manufactured its products elsewhere? The profits you alluded to may have found their way to other countries. Is that what happens? Of course, the research could have been so advanced that while the technology may have benefited others in addition to Canadians, the money input remains in Canada.

Mr. Pierre Coulombe: That's an important question. Consider the example of nuclear energy in Canada. This goes back a ways. Nuclear energy technologies were developed by the NRC in the late 1940s. This led to the creation of Atomic Energy of Canada Limited in 1952. Today, AECL posts sales of about $5 billion or $6 billion a year, the bulk of which are made in Canada. A great many Canadian companies are developing the nuclear sector. This technology stems from research done by the NRC during the 1940s and 1950s. Today, AECL continues to conduct research activities at its Chalk River facility in Ontario. This is one example of an industrial sector that started out with nothing, but today, is one of Canada's top performers. I could give you other similar examples as well.

Mr. Robert Vincent: Conversely, can you give us some examples of technologies that were developed by the NRC but put into production elsewhere? Are you aware of any such cases?

Mr. Pierre Coulombe: Once the NRC has obtained a license for certain technologies, it must always contend with a so-called Canada clause governing technology use in Canada. Obviously, technology is a global phenomenon and it cannot easily be contained at the border. In order to move forward, companies must invest elsewhere. They must obtain from other countries technology that is compatible with Canadian technology. Therefore, it is rather difficult for us to say to companies that they cannot develop technology anywhere else but in Canada. The reality is that in order to develop a final product, companies must often combine several different technologies.

● (1130)

Mr. Robert Vincent: There is a difference between developing something in Canada, and producing something in Canada. Let me be clear about this. My question related to production. I want to know if you have ever developed a product, only to have a company turn around and have the product manufactured elsewhere to increase its profit margin. I want to know if the technology developed by our scientists with the tax dollars of Canadians and Quebeckers is ever taken elsewhere for production purposes.

Mr. Pierre Coulombe: Very quickly let me tell you about IMRIS, a company working in the field of magnetic resonance imaging that was created by the NRC in Winnipeg. When the company was first founded several years ago, it had only a handful of employees and its sales were almost non-existent. Today, sales of magnetic resonance imaging systems, all of which are manufactured in Winnipeg, total $60 million.These systems are manufactured and integrated in Winnipeg.

The Chair: Thank you, gentlemen.

[*English*]

We'll go to Mr. Carrie, please.

Mr. Colin Carrie (Oshawa, CPC): Thank you very much, Mr. Chair.

Thank you very much to the witnesses for being here today.

I'd like to ask a question of Mr. Corbett. In your opening statement, you said that:

> "Canada needs a national science adviser to bring science issues directly to the public agenda.

You also stated:

> Government must engage the scientific community as a whole, including the government's own scientists and the professional institute which represents them, if it wishes to strengthen scientists' roles in national S and T policy formulation and improve public science's innovation capacity.

We did have a national science adviser, and there were basically no resources for that office, no reporting structure, and no accountability, and as a result, there were no results.

Now, we have something called STIC, and I don't know if you're aware of the mandate of STIC, but you ask for a national foresight program. I was wondering if you could explain to members how your plan would be different from what's already happening with STIC and the regular state-of-the-nation report.

Mr. Gary Corbett: First of all, STIC is another committee. There have been many committees over the years—CSTA is one, and I can name any number—that have looked at the state of science in Canada for the last 10 to 15 years. Committees are bureaucratic and, by their nature, will be slower. But Canada must move more quickly, and there's a better communication process with the national science adviser. That particular science adviser was, in your own words, ineffective because the position needs to report directly to Parliament. That's what we said in our opening brief: the position needs to report to Parliament, not to the Prime Minister.

Mr. Colin Carrie: But wouldn't that create another bureaucracy? He has to have people working for him and liaising with all of the different people you think they should be liaising with. Why wouldn't STIC be able to do the same thing? Why would it have to be the way you've suggested?

Mr. Gary Corbett: Well, I think if you look at what other countries are doing, they have national science advisers with that mandate, and Canada should be looking at what's happening in other countries before it maybe makes decisions about having just another committee, STIC, for example.

I will point out, by the way, that PIPSC held an international science policy symposium in September, and we plan on doing it again.

Mr. Colin Carrie: When the Canadian Council of Academies was working to create the government's S and T strategy, what did PIPSC offer? What was your contribution to that?

Mr. Gary Corbett: We weren't asked to contribute, I don't believe, but our science members certainly deal with it every day. We would love to have been asked.

Mr. Colin Carrie: Many groups did make submissions. Were you were unaware of it?

Mr. Gary Corbett: I don't know exactly, but I will answer it this way: the panel who looked at moving the laboratories did consult with us, and we had an hour with them. So somebody is asking questions of us, because we do represent the scientists who work in science-based departments and agencies.

Mr. Colin Carrie: Okay, good.

I'd like to talk to Dr. Coulombe for a minute. We hear a lot about commercialization and how there's a gap in commercialization. I was wondering how the NRC is leveraging basic research with universities and private companies to commercialize innovative ideas and intellectual property. Could you explain what we're doing there?

● (1135)

Mr. Pierre Coulombe: Thank you for your question, Mr. Carrie.

Mr. Chairman, the NRC has been and is still very active in the area of commercialization. We have two broad programs. The first one is IRAP, which directly supports private companies in moving to changes in innovation by either using technology they acquire from abroad by licensing or allowing them to develop their technologies in order to transfer those things to products that get to the marketplace. That's one angle we use to do it, and we do it quite well on that front.

As well, all the research programs we have are obviously targeting goals. NRC is not entertaining research programs that don't fit any particular goals. So the goal can be long-term, medium-term, or short-term, but all our programs are focusing on goals. And the goal is to support Canadian industry, roughly speaking, and to support the needs of governments. We are doing quite a bit of work for the various departments of the federal government.

We are very well aware, and we do that by aggressively licensing our technologies to the private sector, trying to identify key Canadian companies that can use the technology rapidly and move that technology into products.

When we're not able to do that—it's possible that for some technology we don't have any significant receptor capacity—we try to create companies out of our own employees that will have the business skills to take that technology and move it into the marketplace. And over the last 10 years, NRC has created more than 67 companies. These are SMEs like the one I mentioned, IMRIS, which is out of Winnipeg. Today it is quite a successful company in the field of MRI technology for surgical groups, so it's one of the unique companies in that area.

But we have others. Some are very successful. In creating spinoffs, we have to recognize that marketing time is going to be longer because we have to create a company; we've got to interact with venture capital in Canada, so we have to find management skills to run that company; and most of the time you also have to complete the development of the technologies, because there is a difference between the technology, as you know, and the product. A lot of work needs to be done.

We do that. We do that by interacting with the BDC communities, by working quite a bit with BDC, the Business Development Bank of Canada, therefore supporting each other and trying to identify the best opportunities, like the initiative we launched on nanotechnologies, which was announced last week, where BDC is a key partner. And we wanted BDC in that equation because we wanted them to be very much aware of the potential R and D opportunities that can result from those five projects that have been funded by $15 million coming from NSERC and NRC. Therefore, with BDC very much connected to the forefront of knowledge in this particular area, they are very well aware of the opportunities and most likely very well aware of any spinoff opportunities there might be. We know about that because we were part of those at the table, evaluating those proposals.

That's how we try to make sure that commercialization is taking place within our own walls.

The Chair: Thank you.

Thank you, Mr. Carrie.

We'll go to Ms. Nash, please.

Ms. Peggy Nash (Parkdale—High Park, NDP): Thank you.

Good morning to the witnesses.

Mr. Corbett, I want to start with you. You said in your presentation that big science projects need large-scale investments, long-term commitments, government science leadership, and in-house capacity to succeed. And then you talked about your view of the lack of commitment, and also a real challenge in terms of demographic changes. What do you think Canada needs to do to address these specifically? I'm thinking about the labour market piece of it.

Mr. Gary Corbett: Certainly Canada has some critical decisions to make. But I want to focus on the different aspects of public science.

The private sector is required, government is required, and universities are required. It has got out of balance since program review. I know that right now in our federal government laboratories their inability to hire is related to no commitment by the government to long-term funding. There are sunset programs and terms rather than long-term funding.

A-base funding has to be put back into the mix so managers in the labs can hire people over the long term, and that would include university students who are ready to take the jobs.

● (1140)

Ms. Peggy Nash: So if I understand you, then, because it's just a short-term commitment, people don't see job security there. What would be the advantage for someone going and working as a government scientist as opposed to a private sector scientist or a university scientist?

Mr. Gary Corbett: Well, that's an excellent question. There are three different drivers. University is longer term, about learning. The private sector is about making a dollar, let's face it. Government is really about public good and the delivery of service to Canadians and the protection of Canadians.

Ms. Peggy Nash: So you feel the public good is suffering because of a lack of long-term funding commitment?

Mr. Gary Corbett: Absolutely we feel that way. We feel that if students and the population out there in the workforce understood the commitment that some of the scientists make to the everyday life of Canadians, this would be a calling—absolutely—to young scientists to come and join the federal government.

Ms. Peggy Nash: Dr. Coulombe, what's your view on this? Do you agree that there's a lack of commitment to long-term funding and that we're soon going to face a severe labour shortage of scientists for public research?

Mr. Pierre Coulombe: Thank you for your question. I must speak from an NRC perspective, if you will allow me.

We have been quite successful in the past and still today in hiring key scientists. Every time we make a job announcement, for instance, on the public networks, we receive a fair number of applicants interested in working at the NRC. As Mr. Corbett just mentioned, there is a difference between being a university professor, being, let's say, an NRC scientist, or being an industry scientist, because the focus is not strictly the same. Those people who are interested in working at the NRC, for instance, would be interested in the public good aspect of the science activity that we do. They would also be interested in working to make a contribution in supporting the industry. This is something that distinguishes NRC scientists—their commitment to support the industry in making sure that the industry is successful as a result of their work.

That is a bit different from a university professor's focus, which would be more on HQP, untargeted research programs, which is fine. But at the NRC we have the skills that basically are relevant not only to the public good but also to supporting industry and supporting departments.

Ms. Peggy Nash: Is there a problem? Do you agree there's a problem created by the lack of commitment to long-term funding?

Mr. Pierre Coulombe: I cannot say we have observed that yet, at least at the NRC, because we still have A-base funding that is allowing us to do long-term research programs; and roughly speaking, year over year, NRC has been investing 25% of its assets in long-term research programs. The difference is that those long-term research programs still have a purpose. They are not long-term research programs aiming at developing knowledge. They're obviously developing knowledge, but in areas where we believe we will have, down the line, an impact on the industry. The impact may not be today; the impact may be in five, six, or seven years, but still we expect there will be an impact.

Ms. Peggy Nash: Just so I understand, on the funding you offer, you said that once projects are completed, the object is to commercialize the outcome and to get companies to take on the licensing. Is there an ongoing benefit to Canadians once that takes place? In other words, does all of the benefit accrue to the company that licensed the technology? Or is there a benefit, aside from jobs and economic development, which is also important? Is there any other continuing benefit to Canadians?

Mr. Pierre Coulombe: I do believe there are a lot of benefits.

When we transfer technologies to industry through, let's say, a licensing agreement—that would be technology that we develop; we own patents on this and we'd like to license it—when we find a company interested in acquiring those technologies, we would be signing a licensing agreement whereby the company would be paying royalty fees back to NRC.

Every year we have between $5 million and $6 million in royalties that we collect. Now, it doesn't seem like a large number—$5 million or $6 million—but if you divide that by the amount of money we are investing in R and D, we are the most successful organization in Canada per dollar invested. On the licensing revenue per dollar invested across Canada, we're well above all Canadian universities.

● (1145)

Ms. Peggy Nash: Do you have a figure on that?

Mr. Pierre Coulombe: Yes, it's $6 million divided by $400 million or $500 million. That ratio is as good as you can see in all major U.S. universities, except maybe the University of California. So we're performing quite well.

The Chair: Thank you.

We'll go to Mr. Eyking, please.

Hon. Mark Eyking (Sydney—Victoria, Lib.): Thank you to our guests for coming here today. My question is for Mr. Corbett.

I got to know you over the last couple of years, and I have to commend your passion for making it a better and more vibrant scientific community in this country. I sense your frustration here a bit today, especially about the neglect and the lack of priority that this government is giving to the scientific community. You also give some examples on how that can be straightened away.

In an earlier question, you alluded to how other countries deal with their scientific community. Time and time again, we read about some of the European countries, such as Ireland and Germany, and even Australia and Japan, but also right now even the emerging economies in Asia—how they seem to be taking off as scientific-based economies. What could we be learning from these other countries on how their governments are treating their scientific communities, so they don't pass us by and leave us so far behind that we're going to hit the wall and never catch up?

Mr. Gary Corbett: It's an excellent question.

I'm a scientist. I started as a scientist, and now I'm vice-president of the organization. The most important thing for a scientist is to go out into the community and listen to what other people are doing.

I used to work in the mining community, as you know. I've done papers at international symposia and talked about what's required. There was no forum for us to talk about what other countries were doing so we could learn from one another. We don't know what we don't know, and we won't know it until we go and look at what other countries are doing.

We could learn so much from other countries in their policies, and they could learn from us. There needs to be a forum. Whether it be growing apples, mad cow disease, or the space race, we could learn a lot from talking to each other, and Canada has the ability to be a leader in that way.

Hon. Mark Eyking: As just a little more on that, these countries have departments of industry or science and technology too. I'm sure they fund them. Do they have a different set-up on how they treat universities, how they work? Are there different models out there that we should be looking to?

Mr. Gary Corbett: I think you could learn from all of the models out there in terms of what is being done right and what is being done wrong or not so right.

The U.K. is set up differently in terms of their science adviser, for example, or their office of foresight, which is a huge office in the U. K. As I understand, there are 26 employees in that office.

Under the current Minister of Industry, I understand there is only one foresight officer in Canada. That has very broad implications for direction and vision for this country in terms of science, because foresight is about emerging trends and where this country will go 10 to 30 years down the road. But it seems that there is no vision beyond a four-year mandate for this country.

I'm not picking on one particular party here. I'm talking about the need for a national vision for science that transcends a four-year cycle. It's not happening.

The Chair: You have a minute and a half.

Hon. Mark Eyking: This question is for either witness. Where is our neglect or lack of investment or prioritizing in the scientific community going to show up first? Will it show up in our economy? Will it show up in the automotive industry? Are you going to see it in the food industry? Especially when you have a shortage of people, if the staff is not there....

Where do you see it starting to hit first?

● (1150)

Mr. Gary Corbett: I see it every day, personally, when I talk to the scientists in the labs across the country. They're worried about what will happen as no long-term vision is done for things such as food and drugs, safety of products, or apples, if I can refer to that.

I'd be crystal-balling to say where we would see it, but I think you're starting to see things emerging now, such as biphenyls in baby bottles. These will be more in the press all the time now. Or the private sector will put a lead test kit on the market, for example, that may not even be the proper, scientifically valid method for testing lead, yet the consumer is going to buy this.

So just look down the road beyond that. It most likely will end up with the public knowing a lot more and asking their politicians why a certain thing is the way it is.

Hon. Mark Eyking: Just as one last thing, more as a comment than a question, our public is becoming more and more critical of products—of everything, about knowing how the weather's going to be. So you see a combination of resources plus a bigger demand, I think, coming through with globalization and what's happening.

That's the connection, is it?

Mr. Gary Corbett: Yes, I think that is the connection. We've realized that connection, and our campaign is to teach the public how important science is, because we believe the public elects you folks.

The Chair: Thank you, Mr. Eyking.

We'll go to Mr. Van Kesteren.

Mr. Dave Van Kesteren (Chatham-Kent—Essex, CPC): Thank you, Mr. Chair.

Dr. Coulombe, we were engaging in an interesting conversation, before we were called to order, involving energy and what was happening in Canada just prior to what happened in Chicago in 1939 or, I think, 1942. You talked about fission, and we had just about obtained it. I'm interested, too, in that; I'm interested in our research into it. We didn't get a chance, and I was just going to engage you in that conversation.

I read just recently that there is an element about two below uranium that's used, barium. Is that something it is possible to use for atomic energy or for those purposes? I'm wondering whether there's research being done on this. Apparently the byproducts of this element can be used for nuclear weaponry, and as well, the discharge of the properties is not as tough as in the case of uranium.

Can you comment? Are we moving in that direction? Are we still working in those areas where we used to be such a leader?

Mr. Pierre Coulombe: Thank you for your question. Unfortunately, the NRC is not working anymore in the area of nuclear physics or nuclear energy, not since 1952. All our work capacity was transferred to AECL.

I know that nuclear energy is coming back under more public scrutiny. There's more interest because nuclear energy has no greenhouse gas emissions. There's a lot of work going on around the world to try to improve how much fuel and how much energy we can extract from the fuels—uranium, plutonium, and other fuels—and to recycle as much as we can, so that the residue we'll have to face with nuclear energy will be reduced at its maximum, or maybe that the longer half-life isotopes will be reduced, so that we'd be facing only shorter half-life isotopes, which are easier to get rid of or to control.

Mr. Dave Van Kesteren: Do you see us moving in that direction again, possibly to do some more research where we left off? I didn't realize that in 1952 NRC was taken out of that equation.

Mr. Pierre Coulombe: It would be a bit difficult for me, because I'm not really an actor in this field, but I would imagine that some Canadian universities may be working in the area of nuclear energies and the nuclear fission reaction. AECL could also be pretty much involved.

We also have to realize that nuclear energy is still a global energy, so the American trades are also contributing quite significantly to move the field forward. I could give you the example of France, which is very active in this file, because a lot of their energy is basically coming from nuclear fission and nuclear reactors.

The United States could also be very much involved in this file because, again, they have a lot of capacity in nuclear energy and nuclear physics through the DOE National Laboratories and Technology Centers.

That would be the extent of my answer at this point in time. I apologize. I could try to get additional information, should you wish. I'd be glad to collect that information for you.

Mr. Dave Van Kesteren: Mr. Corbett, you talked about a national foresight program and suggested government should establish that to identify S and T opportunities, focusing scientific research in the service of government policy strategy. How is your plan different from what the government is implementing with STIC? I'm confused as to whether or not we're doubling up. How is your plan different?

● (1155)

Ms. Denise Doherty-Delorme (Section Head of Research, Professional Institute of the Public Service of Canada): I had the pleasure of listening to Dr. Alper speak about STIC and its vision for its work. He was very clear that STIC was going to be reactive to questions from the departments or from cabinet, that he was not performing the duty of foresight. There's only one person who does foresight in this country, compared to, say, 26 in the U.K.

We do not have the capacity to look for what many of you were asking questions about: what the next trend is going to be, what is going to happen in the future. Government researchers and scientists are the only group who have the capability to be sustained for a long time, able to be called into duty if we should have something happen like a SARS incident or any epidemic. You cannot, without a proper group that's looking at the future, and STIC is not going to, and they have said they're not going to.

You need to have people on the ground who are ready to answer the call of Canadians for the health and welfare of Canadians. We may have some groups who are not working in a commercializable sector of science and technology but are there to offer advice at any moment and who are the best and the brightest in the world. That calls for foresight, and it is not going to be done by STIC or Dr. Alper.

Mr. Dave Van Kesteren: You've mentioned, sir, that we've spent $9.7 billion annually on S and T. I know that isn't directly funnelled into your organization or the others, but there's an enormous amount of money being spent. Should we increase that, or are we not divvying that up in a proper manner?

Mr. Gary Corbett: I'm not sure if your figure of $9.7 billion is correct. It's more like $26 billion. If you look at the sources, the university to the private sector—tax breaks to the private sector—and the government, it's a much bigger number. I think $9.6 billion is just the intramural in terms of government to science-based departments and agencies. But the balance is all wrong; the balance is off. What has happened is, if it's to be considered a triangle, three legs of a stool, where funding has gone to universities, the private sector through tax breaks, and intramural government science, the funding has shifted between the other two. So one leg of the stool is extremely short. You can't have a robust innovation system without all three of those points. That's really what the problem is.

As a matter of fact, it's about balancing those funds and bringing the A-base back into the science-based departments and agencies within the federal government, the intramural system.

The Chair: Thank you, Mr. Corbett.

We'll go to Monsieur André. *Bienvenue*.

[*Translation*]

Mr. Guy André (Berthier—Maskinongé, BQ): Good day, sir. I am pleased to be here with you this morning. I do have several brief questions for you. I see that your mandate encompasses research in a number of fields, including aerospace, biotechnology, construction engineering, information and communications technology and the manufacturing sector. What area of the manufacturing sector do you target the most with your research activities?

Mr. Pierre Coulombe: Thank you for that question. Several of the NRC's programs target the manufacturing sector. You mentioned the aerospace industry. This is a major manufacturing sector in Canada. Without question, the NRC is Canada's primary research institute and it assists Canada's aerospace industry in various ways. It is also Canada's largest research institute.

We also provide support to the manufacturing sector through our work on state-of-the-art materials. These materials are important manufacturing inputs. With the help of our research facility in Boucherville, we support the development of the manufacturing sector by recommending greener, more sustainable and more cost-effective materials for use in the manufacturing process. Similarly, we provide support to the automobile sector by developing state-of-the-art materials and production methods.

So then, the NRC supports the manufacturing sector is a variety of ways. It is involved in the development of efficient, sustainable and economical fuel cell-powered technology that will benefit the aerospace , automobile and construction industries.

● (1200)

Mr. Guy André: Are you presently supporting research in those sectors hardest hit by globalization, such as the textiles and furniture industries that are experiencing a downturn? Do you do any research in an effort to provide more support to these sectors? Should you be getting closer to companies working in these sectors to help them become more competitive?

Mr. Pierre Coulombe: The answer is no. The NRC does not have any specific activities that target the textile industry or the other sectors that you mentioned. When we developed our last strategic plan, we used three main criteria to identify nine key economic sectors in Canada. Firstly, the sector must be important to Canada. Secondly, R&D must be critically important to development in this sector. Thirdly, the NRC must be in a position to make a significant contribution to this sector.

The sector retained must satisfy all three criteria. In total, nine sectors were identified— and you mentioned a few of them—: aerospace, automobile, agriculture, biopharmaceuticals, communication and information technologies, electronics, construction, manufacturing and materials.

We are in the process of developing multiple partner research programs targeting these sectors with a view to supporting their R&D efforts. However, we realize that there are some sectors in which the NRC cannot play a major role. Often, we find that research may not play an important role in a particular sector, such as the financial sector which is not supported by our activities. Or, we find that other stakeholders are better positioned than the NRC to provide support to certain sectors.

Mr. Guy André: Right now, we really need to do some research and find ways of improving the productivity of the manufacturing sector and of companies that work in this area. This is not one of the current aims of the NRC. You do not concern yourself with this.

Mr. Pierre Coulombe: We are working to develop better manufacturing technologies for the automobile, aeronautics and aerospace, construction and electronics sectors. Our activities do not, however, target the textiles industry. This does not mean, though, that if a textile company came to the NRC for help with a particular problem, we would not be able to use our technologies and expertise to lend them some assistance.

Mr. Guy André: However, this is not one of the nine priority sectors that you have identified.

Mr. Pierre Coulombe: The textiles sector was not identified as one of our priority sectors.

Mr. Guy André: And the furniture sector...

Mr. Pierre Coulombe: It was not identified as a priority sector either.

Mr. Guy André: No?

Mr. Pierre Coulombe: No, because again, there are, no doubt, other players in Canada who have a more clearly defined mandate to provide support to these sectors.

The Chair: You have time for one last question, but please keep it short.

Mr. Guy André: You talked about other players. In fact there are a number of other players. The federal government funds many different associations involved in research. Are there too many players in the research field? Could there be fewer of them? Could research activities be restructured or better organized?

Mr. Pierre Coulombe: I do not believe that Canada suffers from a surfeit of players in the field of science, technology and innovation. I think there is room for even more researchers. Of course, the higher the number of players, the greater the effort that must be made to develop partnerships with them to avoid unnecessary duplication. The NRC has a long history of partnerships with stakeholders who can help it to promote innovation in Canada.

[*English*]

The Chair: *Merci, monsieur André.*

Next is Monsieur Arthur.

Mr. André Arthur (Portneuf—Jacques-Cartier, Ind.): Thank you.

Mr. Corbett, I understand that being a witness in front of a parliamentary committee is not exactly the right setting to establish nuances, but your description of the lack of long-term commitment, proper funding, and foresight in science presents a dim view of a scientific career in the federal government. Let's say there's a young scientist or engineer, very brilliant, very dynamic, with a marvellous future. Why would such a person decide to become a public servant? Is the government institution a bottom-feeder in the talent pool?

● (1205)

Mr. Gary Corbett: That's a good question. I'll defer to the honourable member Mark Eyking, who said, “My passion gets out in front of me.”

I'm so frustrated. For 10 years I've been frustrated with this, and perhaps that's coming out. There is a crisis, and there is a dim picture, and we're glad that this committee is looking at it. We need to do something. This country needs to do something fast.

No, they're not the bottom feeders. They're brilliant people, but they're not getting the resources they need to do what this country has asked of them.

Mr. André Arthur: Why would they go to your office and work if they have poor conditions? Are we condemned to hire mediocre people because the right people have gone somewhere else?

Mr. Gary Corbett: We haven't hired anybody new in a long, long time, and that's the problem. We don't have the resources to hire new people, because there's no long-term commitment to funding. They would come if we committed to a long-term future for them, but this government is not committed to that.

Mr. André Arthur: Were any of your people recruited by other organizations or universities?

Mr. Gary Corbett: The average age of a researcher is 47 years old.

Mr. André Arthur: And he doesn't want to part with his pension plan.

Mr. Gary Corbett: I would say that's a fair statement for anybody in the government. No one anywhere wants to part with a pension plan.

[*Translation*]

Mr. André Arthur: Mr. Coulombe, I have a question for you and I'm not asking you in your capacity of President or head of the NRC. Rather, I'm appealing to you as a wise observer of the world of science in Canada. If a young, 19-year-old Albert Einstein, or better yet, a young Richard Feynman, is spending his weekend washing cars in a Toronto suburb, then who is going to discover him? Who is going to recruit him? Which member of Canada's scientific community is going to notice that we need to invest in this individual?

Mr. Pierre Coulombe: Sir, that is not a question that I can answer. However, I can tell you that every year, the NRC welcomes between 1,200 and 1,500 graduate, doctoral or post-doctoral students. They come to work for the NRC because of the stimulating environment it offers them in which to carry out their research.

Not only do we welcome young researchers, we also go out and recruit established foreign researchers and bring them to Canada. The only criterion is that they must be willing to work at the NRC. Otherwise, they stay where they are.

Mr. André Arthur: I expected that answer from the head of the NRC. That is why I specifically put my question to you, as an observer of the scientific community, not just as the head of the NRC. I take it you do not want to answer my question.

Mr. Pierre Coulombe: If you are looking for a more general answer, I would say that through the Canadian government's research chair initiative which has been under way for a number of years, our Canadian universities have been able to recruit Canadians who had been working abroad and who were sufficiently drawn by the Canada Research Chairs Program to leave their job abroad and return to Canada. Furthermore, we have been able to recruit foreigners, that is non-Canadian researchers who saw in this program an opportunity to carry out more stimulating and interesting research work than they were doing in their own country.

Last year, I went to Germany. My colleague at the Max-Planck Institute expressed to me his disappointment at having lost some German researchers who had decided to immigrate to Canada to take advantage of the Canada Research Chairs Program. These were young researchers, generally between 35 and 45 years of age.

● (1210)

Mr. André Arthur: Does the NRC recruit the best of the best or persons who have the most popular personal qualifications? I mentioned two names earlier. If a young Albert Einstein or a young Richard Feynman is washing cars on weekends in Toronto, who is going to discover him? Are the best people necessarily the ones who are the most adept at selling themselves?

Mr. Pierre Coulombe: The NRC recruits the best people, as do Canadian universities and companies, the people who can help us meet our goals. As for a Mr. Feynman who might be washing cars on the weekend, the only chance he would have of being discovered is if he ultimately washed a car belonging to someone who realized that he was in the presence of a great thinker, or perhaps a Nobel Prize laureate. Otherwise, it comes down to fate.

Mr. André Arthur: Fate.

Mr. Pierre Coulombe: Yes, fate, under the circumstances that you have described to me.

Mr. André Arthur: You rely on universities to consistently recruit the best people. However, I know of some universities that do not make any effort in that regard. Come to Québec and see for yourself.

[*English*]

The Chair: We'll go now to Ms. Nash again, please.

Ms. Peggy Nash: Thank you.

I want to take a different approach. I want to compliment the skill, the intelligence, and the results of many of the scientists in Canada who have created such wonderful technology, such as in our space industry.

I noted, Mr. Corbett, that you were pleased the sale of MacDonald Dettwiler and Associates did not succeed. When you think of the technology that has been created, the Radarsat-2 and even going back several years to the Canadarm and the subsequent robotics that have come out of that company, these are scientific accomplishments that I think Canada should be justifiably proud of.

One thing that struck us all during the hearings around the MDA sale was the company's statement that unless there was investment in the space industry, they felt they needed to sell to an American firm. Others have echoed the need for investment in the space industry. This strikes me as a similar situation that's being raised about the lack of funding for scientific research.

I'd like to put this in a more positive framework. Mr. Corbett, you talk about the need for a robust national innovation system. What would such a national innovation system require? What does it take to focus not on what we don't have but what we need, and to build on the expertise that's already been so successful?

Dr. Coulombe, I'd like you to answer that as well.

Mr. Gary Corbett: From our point of view, the whole idea of innovation has shifted to a short-term concept from a long-term one. For example, we see innovation as generating jobs, economic wealth. But some of the greatest discoveries anywhere have been directed at innovation over a longer term, beyond the mandates of governments.

At Agriculture Canada, the discovery of certain types of grains have brought billions and billions of dollars to this country, but that wouldn't be classed as innovation today, because it took 30 or 40 years to deliver. When we talk innovation, we need to look not only at the short term but also at the long term.

● (1215)

Ms. Peggy Nash: Thank you.

Dr. Coulombe.

Mr. Pierre Coulombe: Innovation takes time. Innovation is a balance between long-term research activities, technology development, technology maturation, and technology implementation primarily through the private sector. The private sector transforms innovation into products and therefore into dollars, jobs, and better positioning within a marketplace.

In Canada today, we do quite a bit of knowledge development. We rank number one within the G8 countries in supporting higher education. Supporting higher education is supporting long-term research activities. We rank number one in G8 and number two in the OECD. We're demonstrating that Canada is committed to supporting knowledge development and training of HQP. We do that, and we are not bad at all in transforming innovation into products.

If we look at the statistics in Canada, Canadian industry is investing less in R and D than our competitors are. In OECD countries, the proportion of R and D funding coming from industries ranges between 65% and 68%. In Canada it's more like 55%. So already we have a discrepancy compared with the other countries. This is something that we as a country must try to correct. This is something we are partially doing through IRAP. We are supporting SMEs. Larger companies also do this for tax credits or tax incentives.

Ms. Peggy Nash: Dr. Coulombe, I understand there are 20 research organizations that are part of your organization. I'm wondering if you can tell us which ones get the lion's share of the research dollars that we spend as a country. I'm sure they're not all funded equally. Which ones do we spend most of our money on?

Mr. Pierre Coulombe: Are you speaking of our own allocation, or globally with respect to various industry sectors?

Ms. Peggy Nash: I'm speaking of our government dollars.

Mr. Pierre Coulombe: At the NRC, for example, our largest institute works on aerospace and aeronautics. It's quite interesting. We provide 50% of their funding from our A-base, but they collect 50% and are covering their expenses through collaboration with industry. In my view, this is a good reflection of the connection that our R and D programs in aerospace and aeronautics have with industry needs. Industry is willing to pay to do collaborative research with us. That's a nice example. The aerospace sector is intensive in Canada.

Ms. Peggy Nash: Are there any other major ones like that?

Mr. Pierre Coulombe: The construction industry is another example. The NRC is the research institute for the construction industry in Canada. The construction industries are not very high R and D spenders—they don't spend a lot.

The Chair: Mr. Simard.

[*Translation*]

Hon. Raymond Simard (Saint Boniface, Lib.): Thank you very much, Mr. Chairman.

Thank you for joining us this afternoon.

Mr. Coulombe, I am trying to gain a better understanding of the relationship that exists between the NRC and the private sector. You mentioned a company by the name of IMRIS. This is the first time that I've heard the name. To what extent is this company involved in research? Do you decide to do some research on imaging and then identify companies that seem promising, or do you get these companies involved from the get-go? Do they provide you with funding to do the work and then subsequently, you turn your research findings over to them? How does this process work?

Mr. Pierre Coulombe: Sir, you gave examples of some of the research activities that we carry out. Generally speaking, the NRC's research programs are developed further to an analysis of industry requirements. We consult with industry officials and with our university colleagues with a view to forging partnerships. Once we have identified the major R&D problems that an industry is facing, we develop research programs with the goal of serving industry and providing technology transfers.

The company that both you and I mentioned, IMRIS, evolved from technology developed by the NRC after it observed that in hospital operating rooms, there was no access to nuclear magnetic resonance imaging during surgical procedures, but only two or three days after the fact. We developed a technology that made this possible and we created a company to market the technology. We were able to secure venture capital, and some of our people went to work for this new company. IMRIS is making gains and is continuing to interact with us so as to improve the quality of the product it is marketing to hospitals in North America. IMRIS has become one of our partners, but we recognize that it also forged partnerships with other parties.

[*English*]

Hon. Raymond Simard: Many of our witnesses are telling us that one of the major challenges will be human resources. I think Mr. Corbett spoke to that indirectly. I also read somewhere that NRC has 1,200 guest workers who come from all over the world. Is that correct?

● (1220)

Mr. Pierre Coulombe: Every year we welcome between 1,200 and 1,500 guest scientists. They are primarily grad students and post-grad students, as well as scientists from abroad.

Hon. Raymond Simard: Do we manage to keep some of these scientists from abroad? Do they decide to stay and continue their research in Canada?

Mr. Pierre Coulombe: Some decide to stay, and some decide to go back to their countries. As you know, more and more countries today want to bring their people back, because they need them, as we do.

Hon. Raymond Simard: Mr. Corbett, you were talking about the rate of attrition being 40% to 45% over the next five years. At the government operations committee we were studying that. Is that a higher rate than we would normally see in the public service of the federal government right now?

Mr. Gary Corbett: I'll let my colleague add to this, but I think this has to do with the fact that scientists or highly qualified professionals actually get their degrees later in life, so they would be in a position now to retire. Most of the scientists are older, so that's critical in this particular community. I think it's a bit higher than the normal rate in the public service.

Ms. Denise Doherty-Delorme: The public service as a whole is older than the Canadian public, and the scientists as a whole are older than the public service. They start much later and don't stay past the age of 60. We hear about some staying on an emeritus status, but they do not stay.

On the other issue, as Dr. Coulombe has said, a lot of our scientists are world-class and the NRC is a world-class site. But last year they had to let 100 scientists go, and this year they're facing another 5% cut in their budget, so they may have to let another 300 scientists go. That's not just NRC; that's across a lot of the departments. There has been a lot of attrition due to budget cuts.

Hon. Raymond Simard: Monsieur Coulombe, what percentage of research is done in Canada by your organization compared to other countries in the world? How does Canada compare worldwide? Are we doing enough of that? Are we doing more than the average country?

Mr. Pierre Coulombe: It's difficult to answer your question. I'd like to look at the data. As output per dollar invested in R and D in an organization like NRC, we like to benchmark ourselves against others. I can tell you that we perform quite well. Some organizations are larger than we are, but their output per dollar invested in R and D is not significantly higher.

Hon. Raymond Simard: Are there some things you do better than universities or other research facilities? Are there things you are very good at that people go to you for?

Mr. Pierre Coulombe: Well, first of all, the mandate of the NRC is very different from the mandate of universities. Universities are very good at HQP, because they are the products—HQP—of universities and knowledge. NRC is a research organization that is targeting its activity to fit the needs of the industry. By doing that, we collaborate quite a bit with universities. In fact, 500 to 600 of our scientists are adjunct professors in universities all across Canada , and we do that because we like to partner with universities, but our mandate is very different.

The Chair: Thank you, Mr. Simard.

Now we'll go to Mr. Stanton, please.

Mr. Bruce Stanton (Simcoe North, CPC): Thank you, Mr. Chair.

Welcome to our witnesses this afternoon. Again, this is another intriguing chapter in our science and technology study.

Mr. Corbett, you made some...much like Mr. Arthur, who received your comments as a bit of an indictment of Canada's program around science and technology, when in fact what we've seen is probably one of the more robust, if not the most robust investment in science and technology that this country has seen in the last several years. And that's frankly been built on significantly in the last three budgets of this government—some $2.4 billion added to that commitment, and a new strategy, called mobilizing science and technology, part of Advantage Canada's plan. It aligns entirely with our economic policy, Advantage Canada. So I was rather surprised by your concluding paragraph, paragraph 4, where you talk about aligning our S and T strategy with our economic policy. In fact, that's exactly what the government of the day has done.

I take issue with the premise of your remarks today, particularly when we've heard from earlier witnesses and data that show that Canada right now is behind OECD countries in terms of the representation of business and private sector investment. Don't you think that part of the science and technology strategy should be to engage more of that private sector and to continue to do the good things we're doing on our own in-house research, on the good work that NRC and other like companies are doing, but at the same time, to get the strategy to enable that additional pool of research that frankly other countries are doing much better at than we are. In our competing countries, 68% of R and D is from the private sector, whereas Canada is over-represented right now on the government side. What you're telling us is almost exactly the opposite to what we're seeing in the way the data are presented.

● (1225)

Mr. Gary Corbett: There are a lot of questions in there. I wish I could pick one out, to be honest.

If you go to the laboratories across this country, if you go to those laboratories' science-based departments and agencies and you talk about the issues with my members, you'll know that it's not all rosy. We do agree that, yes, as I mentioned, there are three legs to the stool and industry investment has to be one of them, but it's shifted so far to industry and academia that now government facilities, your own facilities, from Lethbridge to St. John's, Newfoundland, are all struggling and having a difficult time providing science for the public good, for Canadians. And that's the message.

Mr. Bruce Stanton: Mr. Roberts.

Mr. Chris Roberts (Research Officer, Professional Institute of the Public Service of Canada): There are a couple of things about the coherence or coordination between the economic strategy and the science and technology strategy. We know how important manufacturing is to business sector R and D. It performs well over half of business sector R and D. When the economic strategy results in 350,000 jobs lost since 2002 and a wholesale shift in real output and employment to low-productivity services and away from manufacturing, you have a bit of a disconnect between the economic strategy and the science and technology strategy, which is about fostering, encouraging, advancing research and development that's going to result in productivity gains in the economy as well.

Mr. Bruce Stanton: So in your approach, the message I took from your presentation was that you're trying to enhance the livelihood of the members who are in your constituency, certainly, and I understand that. But we're also concerned, as public policy-makers, about ensuring that the investments the public sector makes in fact are achieving return on investment, that they're getting the kinds of results that Dr. Coulombe referred to.

As an organization, what undertakings are you putting in place to sell the fact that these kinds of investments in the public sector, the kind of more robust investment that you're asking for here today...? How can we be sure, as public policy-makers, that those are going to be sound and that Canada's economy and its standard of living are in fact going to benefit from that?

Mr. Gary Corbett: We're not experts on public policy in terms of what the balance is. That's for government to decide. We're simply here today to tell you that from our point of view, the view of our members and what's happening in the scientific community, there has to be a rebalancing of that effort. We're here to say that, because we're looking at what's happening in other countries. If you go to see what's happening in laboratories and you see that there is no investment in science in that particular area, and they can't recruit, they can't retain.... We're here to send that message today.

From our point of view, there has to be a rebalancing and funding going back into intramural. We're not saying that it's not important to have industry involved. Many of the laboratories, including the NRC, have industry and university partners, but these laboratories are facing some crises.

That's what we're saying here.

The Chair: I'm sorry, Mr. Stanton. We're out of time.

We'll go to Mr. Brison for a very brief question.

Hon. Scott Brison: Mr. Coulombe, in September 2007 you announced that two NRC programs in Halifax were being cut. One was on fish diseases and the other was on shellfish. With those marine sciences division cuts, it disproportionately affected Atlantic Canada.

Now, the rationale at that time was that the program cancellations were due to NRC's restructuring and focus on human health rather than animal health. Given the importance of fish and shellfish to the diets of Canadians, isn't it hard to discern or divide between human health and animal health? How can you say that research was not for public good, given the importance of research in the food and fisheries industries?

● (1230)

Mr. Pierre Coulombe: Last year the NRC undertook a revision of its research programs, something that we have to do from time to time in order to make sure our activities are aligned with our own strategy. Therefore, we started the revision of all NRC research programs. As a result, as was mentioned earlier, about 100 NRC scientists were laid off because of program cancellation. Programs were not cancelled because they were not good scientifically speaking. This was not a matter of this being bad science and therefore we have to cut it; it was primarily to realign our activities according to the areas of strategy that were defined for us. So as a result of that, we did some cutting in Halifax, but we repositioned that institute to better serve the community there, including the industry community.

We had to abandon some programs, obviously. We did that elsewhere in Canada as well. But it was not a cutting exercise, because we reinvested that money in support of our strategy. It was a realignment. I do believe it's part of sound business to review your programs from time to time to make sure they are connected to some needs expressed by the industry.

The Chair: Thank you, Mr. Brison.

I'm just going to finish up. I wanted to clarify a couple of points.

Mr. Corbett, in your presentation, on page 3 you state that "Big-science projects requiring large-scale investments and long-term commitments in particular need government science leadership and in-house capacity to succeed."

I was at the synchrotron earlier this spring. If you analyze that particular big-science project, you have the infrastructure part, which is funded largely through CFI, the institution, the provincial government, and other sources. You have the human resource side, which is funded by the granting councils, by the university. You have the institutional costs, which are funded by the indirect costs program federally as well as the university itself. You have the operating costs, which the university raised as an issue that they want this committee and the government to address. Then you have the industry involvement.

So explain to me from your members' perspective why the synchrotron needs in-house capacity to succeed. Where do they fit in that picture?

Mr. Gary Corbett: I'm not really familiar with the synchrotron project. I've been at the synchrotron; I should know more about it. But I'll explain it this way.

Some of the major projects in this country have been identified by government scientists. Diamonds in Yellowknife are an example. That would not have happened if it weren't for Natural Resources Canada and the work of the Geological Survey of Canada. That type of long-term research, that type of long vision, needs to be funded so that there will be a consistency and continuity throughout the entire life of the project.

So with respect to the synchrotron—

The Chair: But I'm asking about big-science projects, so with respect to TRIUMF or the synchrotron and so on. Is there another big-science project?

Mr. Gary Corbett: Well, I'm speaking of big-science projects in the long term, of the synchrotron after 50 years; what can be discovered in 50 years? When we talk about big science, we're talking about long-range science projects, such as mapping the terrain of Canada to figure out where the next ores are, or looking at fish stocks over the long term. A synchrotron is another area for sure, but we're talking about scientific projects with a 50-year lifespan, for example.

To answer your question, there have to be resources committed—long-term, full-time resources—to make sure the project has the committed staff—

● (1235)

The Chair: Yes, but there are; there are through the granting councils. There are through the indirect costs program. There are through universities themselves. There are through CFI, at least initially, and then through the construction of a project.

So where is that in-house capacity required?

Ms. Denise Doherty-Delorme: The synchrotron is an excellent example of where government has done well in big science. The idea of the synchrotron started 20 years ago. It took a lot of federal government leadership to dig that hole and put the synchrotron in there. It's one of a very few in the world. The federal government took a leadership role in getting it there.

Does it need more? I don't know exactly—

The Chair: I know all of that. I'm well aware of that. You're saying that it requires in-house capacity as distinct from a university, as distinct from industry, as distinct from CFI. I'm trying to understand where the in-house capacity is required.

Ms. Denise Doherty-Delorme: It has received sustained funding, since the start to now, from the federal government. That's the big-science in-house capacity that needs to be there. A private company would not have started the synchrotron.

The Chair: But universities are countering this argument, as you well know. They are arguing that the university, partnering with industry, using vehicles funded federally, like the CFI, like the indirect costs program, like NSERC, like CIHR, are able to do this without in-house. That is an argument that some universities and some university presidents will make.

And the counter to that argument is what?

Mr. Gary Corbett: Perhaps I can jump in here.

You know, there's a difference in the research conducted with respect to the synchrotron and.... We're going back to “public good” science here, and perhaps this is longer-range public good.

You ask a very good question; I don't have the answer right off the top of my head. But the government should be concerned about anything that has the potential to affect public good or even have benefits for public good. We really don't know a lot of the spinoffs of this research, so the government should be associated with it in the long term and have stable funding for some people there. If that can be done through partnerships, that's fine; that may work in that particular instance, but it's not working in others.

The Chair: Thank you.

I am unfortunately out of time, but I'd like to tell you, Mr. Coulombe, very briefly, that I very much appreciate reports like this one. I think all members of the committee have one. I think what has happened is that the NRC and other organizations are doing what we've asked them to do in the past—to tell stories and to explain, certainly to parliamentarians, most of whom do not have a science background, exactly what you are doing related to this.

I also want to give kudos to the IRAP program. It receives very high marks certainly from my community, and I believe from communities across the country. I wanted to make sure I said that.

I want to thank you for coming. If there's anything further you want to submit to the committee, please feel free to do so. You can submit it to the clerk and we will have it translated and distributed to all members.

Members, we're going to suspend for a couple of minutes and then go in camera to discuss the service sector report.

Thank you.

[*Proceedings continue in camera*]

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