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# Standing Committee on Industry, Science and Technology

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**EVIDENCE**

## Thursday, May 29, 2008

## Chair

**Mr. James Rajotte**

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● (1330)

[*English*]

**The Chair (Mr. James Rajotte (Edmonton—Leduc, CPC)):** I will call to order the 42nd meeting of the Standing Committee on Industry, Science and Technology.

We have a very short time here with a number of very distinguished guests. We have an hour for our first panel.

This is our national study on the state of science and technology across Canada, part of our western tour. We were in Winnipeg first, on Tuesday, and then in Saskatoon yesterday. Now we're in lovely Vancouver. We had excellent visits this morning to TRIUMF and the NRC's fuel cell institute.

We have two panels here this afternoon. For the first panel, we have representatives of four different organizations.

From the British Columbia Innovation Council, we have Mr. Soren Harbel, vice-president, innovation development. He's on his way, I understand.

Second, we have the British Columbia Institute of Technology, with Mr. James Watzke, dean, applied research, and director, technology centre.

The third organization is Simon Fraser University. The representatives are on their way as well.

Fourth, we have the University of British Columbia, where we were this morning. We have the associate vice-president for research, Mr. Donald Brooks. Welcome. And we have Mr. Angus Livingstone, managing director.

We are now being joined by the representative from Simon Fraser University, Mr. Michael Volker, who is director of the university-industry liaison office.

We have 60 minutes in total. I think you'll find that the discussion with members is a very productive part of the session. We'd like to have 40 minutes for discussion with members, with questions and answers, so we will allow up to five minutes for opening statements.

We will start with the British Columbia Institute of Technology.

**Dr. James Watzke (Dean, Applied Research and Director, Technology Centre and Dr. Tong Louie Living Laboratory, British Columbia Institute of Technology):** Thank you, Mr. Chairperson, and thank you to the committee for allowing BCIT this opportunity.

BCIT is a polytechnic in the post-secondary system. We have a 44-year history of providing career-ready graduates. Approximately 50,000 students come through our doors each year.

Equally important, we have a 20-year history of executing industry-based applied research. Our mandate to do applied research and commercialize is in the B.C. legislation. You might ask how we do this. We beg, borrow, and steal about $3 million from our core budget, and then my portfolio promises to turn that $3 million into $4.5 million under a 50% expense-recovery model.

We're driven by industry pull both in our training and our research and development and commercialization. You'll hear me refer to R and D and C as our model. This orientation is unique to polytechnics in that it requires external validation from industry. We don't do anything at BCIT unless someone in the external community has raised their hand and said “That's a problem we want solved. That's a course we want taught. That's a technology we want you to help us develop.” We call that the total solutions approach.

We are very pleased to take on the problems of our private industry clients that others may not be interested in. We do the proof-of-concept work, the prototyping, the testing, the incremental innovation. We do cost-mistake avoidance. Sometimes these are hard things to put on your curriculum vitae, but we feel very proud of our attempts to help with those kinds of problems.

We articulated our R and D and C model in a recent application to something called a CECR, or centre of excellence for commercialization and research. It was rejected. We called this the “square peg in the round hole” phenomenon. By the way, we will achieve the centre; it just won't be with tri-council funding.

We gladly take on and solve these difficult, less-sexy R and D and C problems, and we know we will not earn a Nobel Prize. However, BCIT has been associated with a number of Canadian commercial successes, and I have four of them listed in my speaking notes. One is called the GlideScope—this is with Saturn Biomedical Systems—the world's first plastic, reusable, video laryngoscope. It helps intubate people who are having airway problems.

The second example is the micro linear actuator. This is with a company called Firgelli. This is a turnkey position-feedback actuator for robots, medical devices, and motion-enabled consumer products.

The third example is Pyng Medical's FAST1. This is an innovative tool that delivers life-saving drugs and fluids quickly and reliably to people in the pre-hospital environment. We call it the fire hose for drugs. It goes into the sternum, and it's saving lives right now in Iraq and Afghanistan.

The fourth example is called the StarGuide GEMM. This is a GPS mobility-enabled module for the real estate market. It is very innovative. It is going to help realtors and their clients be able to figure out which houses they want, all done through a handset.

We appreciate that these successes are not on the scale of QLT or RIM—we do work with RIM—or U of T's invention with regard to insulin, but one humble SME at a time, they do add to Canada's GDP. With proper support, we could generate even more commercial successes. I won't go into them. In my speaking notes I have listed 10 or 11 other products that we weren't able to get to market but that, with the right support, we could.

I will close with the question of what kind of commercialization support BCIT would benefit from.

Obviously we'd like access to funding that allows BCIT to serve the needs of our industry partners and clients, especially SMEs. This funding would need to be timely and nimble. It's very important. If we—and when I say "we", I mean not just BCIT but the polytechnics—had 1% of the tri-council funding, I think you'd be amazed at what we could do with that.

Two, we'd like to acknowledge our polytechnic performance metrics. Polytechnics Canada, from whom I hope the committee will be hearing in the fall when it heads back east, will be more eloquent about this. We're getting ready to put together a paper on what we think the metrics of polytechnics are, and you will see that they will look different from those metrics of university colleagues and colleges.

● (1335)

Three, we'd like Canada and the federal government to recognize BCIT faculty students and grads as HVPs—highly valued personnel—not HQPs. I can't tell you the number of tri-council proposals I've filled out, and when they get to the HQP part.... We don't have graduate students at BCIT, but we have hundreds of very talented faculty, and I think they deserve to be recognized somehow in the system.

Finally, we'd like Canada's polytechnics, including BCIT, to have the opportunity to prove our economic impact value proposition. In my speaking notes is the URL to our latest economic impact report. Just as an example, my portfolio at BCIT, which is in the $4-million range, is estimated to contribute $77 million of economic impact to our community.

I'd like to thank you very much for this opportunity.

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

We'll go now to Mr. Brooks, please.

**Dr. Donald Brooks (Associate Vice-President, Research, University of British Columbia):** Thank you very much for inviting us, committee members.

UBC is a leading Canadian research university, routinely placing among the top two or three university recipients for the CFI and tri-council funding. Internationally, UBC is ranked in the top 40 research universities worldwide by three independent rating organizations. UBC is a research and patent powerhouse that attracts leading scholars from around the world.

To effectively support basic and applied science and technology research, the federal government must strike a funding balance between support of research talent for the direct costs and indirect costs of research, or ICRs, and the research infrastructure. To increase funding to any one of these research pillars without a commensurate increase in others is equivalent to supplying funds for a new building but not for the staff or the resources to operate it.

Increases to direct costs of research proposed in the fiscal year 2008 federal budget do not include a commensurate increase in ICR. The tri-council funding increased by $80 million, but the ICR only by $15 million. The accepted value right now is 25% of the tri-council amounts, so 25% of $80 million is $20 million. Similarly, funding for Genome Canada has doubled—the FY 2008 increase of $140 million to defray $280 million in direct costs—yet there is no funding to defray the $70 million in ICRs.

At UBC the most critical research funding needs are for support of scholarly talent and the ICR issue. UBC's immediate priority is to attract more domestic and international graduate students to address training gaps in key industries—for instance, geology, or drug research and development. Canada trails the U.S. in training doctoral students, however, by about 25%. The Vanier scholarships that are coming are an important step in attracting scholars, but there must be an accompanying increase in ICR funding to have a sustained impact in research and industry.

The 25% of tri-council funding currently apportioned to defray the indirect cost of research, which is essential to meet operating costs, is only half the U.S. average of 50%. So UBC endorses the AUCC's proposal to increase tri-council funding of ICR to 40%.

There is a continued need to fund the full cost of basic research at an appropriate level, including ICR. UBC strongly believes that basic research underlies all patents and technology transfers. I'll give you two cases to illustrate the benefits of funding basic research, one of which was mentioned earlier.

NSERC provided funding for Professor David Dolphin's basic chemistry research program that was subsequently found to be relevant to the treatment of age-related macular degeneration, the leading cause of blindness in people over 55. The resultant drug, Visudyne, has been used to treat more than 500,000 people in 70 countries since 2000, and is the largest-selling ophthalmology product ever launched. The spinoff company, QLT, has generated over $70 million in income to UBC, at a 2% royalty rate, based on $3.5 billion in cumulative sales.

The second example coming up is Galvanox. It's a promising new copper-leaching process that is nearing its first commercial field test. This technology dramatically reduces pollution and emissions during the on-site refining of concentrated copper. The first licence will be issued to a B.C.-based copper mining company. Galvanox began as a mathematical modelling exercise in basic research.

Encouraging industry partnerships is vital to supporting higher education and commercialization. A proven means of engaging industry is to establish affiliate programs, such as the 50 extant at Stanford University right now. These programs build a community of interest by cross-pollinating students with companies, research with existing problems, and non-research performers with established research players. This in turn produces industry-savvy S and T students and graduates, guarantees continued exposure to and training in new methods and techniques, provides exposure to international practices, and increases domestic business expenditures in R and D.

Meaningful exchanges can occur by establishing affiliate programs that focus on niche technology sectors and applications. This narrows the scope of industry stakeholders to five to twenty local, national, and transnational companies.

In conclusion, UBC has produced a cumulative total of 129 spinoff companies, 95% of which are B.C.-based. They have collectively generated over $4 billion in sales and over 40,000 employment years, or roughly 2,000 jobs for highly qualified personnel per year.

Thank you.

● (1340)

**The Chair:** Thank you very much, Mr. Brooks, for your presentation.

We will now go to Mr. Volker, please.

**Mr. Michael Volker (Director, University, Industry Liaison Office, Simon Fraser University):** Thank you, Mr. Chairman, and thank you to the committee for this opportunity to speak.

Simon Fraser University, like most universities, was in the 1990s a traditional technology-transfer-oriented—i.e., a technology-push-oriented—institution. We take a technology, patent it, and license it to an existing company or a new start-up.

One of our most notorious success stories in this area is the V-chip. The V-chip is now under U.S. legislation, mandated to be in every single television set that is sold in the United States. It actually made its way to the White House, and Bill Clinton and Al Gore were involved in helping us put it into legislation. It's also one of our more notorious and better-known spinoffs.

At SFU, our intellectual property policy is inventor-owned. While the university is entitled to a small percentage on any successful commercialization, it is incumbent on my office to invest time and money in new ventures that are created.

New ventures, in my view, can produce better financial returns than those generated from royalties and licensing fees—i.e., the traditional model. As we've seen, payback on licensing is actually quite minimal. Globally it's well under 1% of R and D expenditures.

The big returns in technology have come from entrepreneurial students, often dropouts—for example, Bill Gates, Michael Dell, Richard Branson, and, in Canada, Mike Lazaridis of RIM.

I remember negotiating RIM's first angel investment back in 1987 when I was in Waterloo, when they were a struggling operation located above the 7-Eleven strip mall. They had no university support. Instead of dropping out of university, maybe they could have been encouraged to stay in. Maybe the university could have given them some entrepreneurial guidance and support. If we could embrace and nurture start-ups such as this, maybe there would be many more RIMs.

Students, in my view, are the instruments for technology transfer. Lazaridis often makes this point about commercialization. His point is that the university's job should be to produce talent for companies like his. While I agree with that, I think it's also important that we encourage more companies like RIM to begin.

Commercialization is synonymous with entrepreneurship. Indeed, the federal S and T strategies identify entrepreneurial advantage as one of three important Canadian advantages. Entrepreneurs are the champions of innovation. Sometimes faculty members become entrepreneurs, but more often than not it is their students who do so.

The internal reward system in universities does not encourage faculty members to pursue industry links to look for industry problems in need of advanced research solutions. Dr. Branda, who is with me today, will speak to that aspect. In fact, he is head of one of our up-and-coming spinoff companies, Switch technologies.

Instead of pushing out technology or developing linkages with industry so that industry can pull technology through faculty liaisons, I believe the operative word here should be “pump”. We should pump up the students by fostering an entrepreneurial environment—i.e., through developing resources, mentoring, angel investors, business connections, access to lawyers, accountants, IP professionals, marketing people, venture capitalists, and other entrepreneurs.

This could be accomplished with a very modest incremental investment, or even the repositioning of current activities. We do this at Simon Fraser University through additional support for the so-called indirect costs of research, along with support from organizations such as NRC, Western Diversification, and Industry Canada.

We have become very active in community-wide, province-wide programs to provide this kind of support to budding entrepreneurs and students. We run mentor panels, business competitions with substantial prize money, and angel networks. In the last decade over 500 companies and entrepreneurs in British Columbia have been helped through this process.

Along with UBC and other organizations, we have created the Vancouver Enterprise Forum, the VANTEC angel network, an angel fund, and many other initiatives. This latter—

● (1345)

**The Chair:** That might be your BlackBerry, if you have one.

**Mr. Michael Volker:** Oh, I'm sorry. Speak of the devil—the BlackBerry.

I have one quick comment. One recent initiative we've embarked on is the Western Universities Technology Innovation Fund, which is very instrumental in funding pre-venture capital companies. This is a fund that we set up using provincial tax credits. Without those tax credits it would not have been possible.

There has been a lobby effort by the National Angel Organization to bring this to the federal level to have refundable tax credits to encourage successful entrepreneurs to take these kinds of risks.

The fund that I'm involved with has invested in over 40 companies and has raised in excess of $250 million for these companies.

In summary, I believe universities can and should change their view of commercialization and think not just about pushing technology out but about being catalytic in all fronts of venture creation and economic development.

I believe the government can support this by funding the indirect costs of research and by providing more incentives to successful entrepreneurs to reinvest in new ventures through tax credits. These will provide the commercial stimulus to complement the scientific and experimental development tax credits that are already so effective at the R and D stage.

Thank you very much.

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

The fourth organization we have here today is the British Columbia Innovation Council. We have the vice-president, innovation development, Mr. Soren Harbel.

Mr. Harbel, you have up to five minutes for an opening statement.

**Mr. Soren Harbel (Vice-President, Innovation Development, British Columbia Innovation Council):** Good afternoon.

Thank you very much for the invitation to speak.

The B.C. Innovation Council is a creature of the Government of British Columbia. We are a crown agency under the Ministry of Advanced Education and we live in three specific areas. We operate in the talent space, so looking at the people side of the science and tech industry; we look at the innovation side; and we look at the commercialization side. I'll go through those in quick order.

In the talent space, the province—not unlike most other jurisdictions in the western world—is facing a huge crisis on the people side of the science and tech industry. We have about 9,000 openings in British Columbia in the science and tech space. We have 67,000 kids in grade 11, we have 41,000 kids in grade 1. Whether or not we manage to get all of those 41,000 into science and tech is, of course, a major challenge. Consequently, as we start looking at this the solution is going to be partly homegrown, but it will also have to be grown from outside of Canada. That's one of the issues we're focusing on.

The second issue we're focusing on is the innovation space, where we're trying to encourage kids at different ages to get involved in innovation, not just high marks. We've run a number of things along the lines of encouraging more science fairs and the like in the schools, to encourage them at an earlier age into science and technology careers. As you go up through the system, we award in every high school a scholarship for the most innovative kid to go into university; it's not necessarily the kid with the highest marks.

As we go through the university system we spend a fair bit of time doing match-ups between the different faculties. So we do a lot of the silo-busting of what is normally difficult to do in many environments, which is to mix up the science student from UBC with the business student from SFU to work on a joint business plan to win a particular scholarship—and we're seeing a lot of success—so that science students understand that there is such a thing as price and market and all of those horrible things, and on the other side, the business students understand the implications of what is there in the minds of the scientists.

On the commercialization side we have a number of initiatives that range around the province, where we have nine regional councils. We partly fund the UILOs at the universities and colleges, and we spend a fair bit of time trying to work with these organizations to get as much volume through the system as we possibly can. We look at what we refer to as the garage stream as well as the university stream. And we say “garage stream” in honour of Mr. Hewlett and Mr. Packard, not in terms of anything derogatory.

With the idea that we are trying to create an environment, we're using a variety of virtual boards, mentors, etc., to push a number of companies through, using things like the New Ventures BC business plan competition, to graduate as many organizations as we can from a business plan point of view. And then we have a funding mechanism where they can then, as graduates, apply for either a proof-of-concept or a prototype fund where they can go to take their innovation to the next level.

A key observation on our part is that the tolerance for pain or risk amongst angels and venture capitalists is getting less, and the time from when the innovators run out of money from friends, fools, and family until they hit the venture capital side or the angels is getting broader. The ability to fill that gap is what's going to be critical for us to draw the volume of businesses that we'll ultimately need to be part of the knowledge economy as the western world moves away from manufacturing and the like.

I'll end my remarks there, and I'd be happy to answer questions in the second round.

Thank you.

● (1350)

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

I just want to make a brief response as the chair.

All of your presentations were excellent. They were all within time and they were all very specific in terms of recommendations. I do want to compliment you for that. The committee is really looking for specifics in terms of what we can recommend, and also for real examples of models that we should look to emulate. I want to compliment all of you for that as well.

We are going to start with Mr. McTeague. I believe you will be sharing your time with Mr. Simard.

**Hon. Dan McTeague (Pickering—Scarborough East, Lib.):** I will be sharing my time with Mr. Simard, so I'll just have a very brief question. I'm glad to be here.

Thank you for those succinct and very helpful insights.

Mr. Volker, you referred to funding indirect costs of research. You didn't really have time to give a better illustration of that, but I suppose you're referring to accountants, lawyers, and the soft costs involved with research. Or is there something else?

**Mr. Michael Volker:** IP protection, marketing analysis....

**Hon. Dan McTeague:** Okay, I've got it.

Let me ask both you and Mr. Brooks, who represent universities, what percentage involvement do you have in breakthrough or innovative types of discoveries, if something is patented or a new breakthrough product is developed at your institutions?

**Dr. Donald Brooks:** I'll let Mr. Livingstone answer that.

**Mr. Angus Livingstone (Managing Director, University of British Columbia):** Ultimately we'll end up licensing about 22% of the innovations that we see. We get 180 of them a year on average. We'll get considerable revenue out of only about 5% to 10% of that 22%. So on a technology push model, it's not something that routinely generates large amounts of money in return.

**Hon. Dan McTeague:** Mr. Brooks or Mr. Livingstone, you've also mentioned that we trail the U.S. in grads by 25%, proportionately speaking. Can you explain that? What's the problem there?

**Dr. Donald Brooks:** It's simply the number of dollars and the number of good students—both. We need to be able to attract international students, as was pointed out by one of my partners here. We don't have enough students coming through the system at the very highest level. We look abroad a lot to bring in international students, particularly graduate students and post-doctoral fellows, and that's a direct function of funding. So the support level is a big part of that.

**Hon. Dan McTeague:** I was going to say that it backs on to what Mr. Harbel had said a little earlier.

I'm going to pass this over to my colleague Mr. Simard.

**The Chair:** Mr. Simard.

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

Mr. Volker, you spoke of entrepreneurs, which is interesting, because it seems to me that our focus over the last couple of days has been on the people who are funding entrepreneurs. But if angels and venture capitalists continue to back off, as Mr. Harbel was saying—with the statistics showing that Canada used to raise about $4 billion a year in venture capital, but it's now about $1 billion—it's going in the wrong direction.

First of all, what should we be doing to encourage young entrepreneurs? Secondly, somebody yesterday recommended that maybe the government should support young start-ups and younger businesses for a longer period of time. For how long should we be supporting these small businesses?

● (1355)

**Mr. Michael Volker:** In my experience, and certainly in this community, there's a wealth of accomplished entrepreneurs willing to invest in young new start-up entrepreneurs, people who are willing to put their time and money in.

I run this angel network in Vancouver and have been doing it with my colleagues from UBC for over 10 years now, and there's no shortage of entrepreneurship in this province. There's a huge appetite on both the ideas side—there are many new ideas coming—and the investment side, as there are a lot of investors. In fact, we often refer to the venture capital statistics, as you did, but the private equity capital that's available to these companies is at least double the published venture capital numbers. It's not tracked or reported. Here in British Columbia last year, $300 million was the official figure for venture capital investment. I can point to at least double that in pre-venture capital investments in start-ups.

**Hon. Raymond Simard:** Mr. Brooks, you spoke of several products that you actually brought to market. Galvanox was one of them.

Can you tell us at what point you got the industry partners involved? Was it right at the beginning of the product? At what point was it exactly?

**Mr. Donald Brooks:** It wasn't at the beginning for Galvanox. That was a math exercise—but Angus was involved in the licensing, so....

**Mr. Angus Livingstone:** These things happen over a period of time.

I'll give you another example, in this case technology that's gone into Westport Innovations, allowing diesel engines to run on natural gas. It sounds like a wonderful idea. It came into our office in 1987. We thought that we would just patent it and turn around and license it to Detroit Diesel Corporation and Cummins, the large manufacturers. But no one would touch it; it was before its time.

It wasn't until the early 1990s when the EPA put out new legislation on emission standards, and this technology started to be picked up in California, that there was a business opportunity. That's when an entrepreneur came along, and the company was born in 1994. It's now listed on NASDAQ. It has sales in California and China. It's doing marvellously well, but we just had to keep that technology alive for the first three or four years, because it was ahead of its time.

**Hon. Raymond Simard:** But for every one of those, how many fail? And that's probably what's discouraging investors right now. If you have one success story and 50 that fail, the odds aren't in their favour. I guess our objective is to try to increase that number.

**Mr. Angus Livingstone:** Definitely there is a large proportion that fail. When we look at what's happening in the U.S., particularly in some industries like drug development, there is more effort to develop the technologies further in the institutions, so that when they come out, they are more industry-ready and have been "de-risked".

**Hon. Raymond Simard:** Thank you.

I think it was Mr. Volker who was talking about pumping up angel investors and venture capitalists.

**Mr. Michael Volker:** And pumping up the students.

**Hon. Raymond Simard:** Pumping up the students, yes; I like that as well, because we haven't talked about that a lot at this committee.

You also spoke about mentor panels, which is interesting. I don't think we've met with any mentors.

I think that's maybe an idea for us, Chair. We could invite some mentors here and see how successful they've been.

Can you talk to us about that mentor panel and what exactly it does? Are the mentors on the job with these businesses?

**Mr. Michael Volker:** Absolutely I can. It's a key component of the New Ventures BC business competition that Soren referred to and that we do jointly with UBC and the University of Victoria. What is consists of is accomplished, experienced business people—entrepreneurs and investors—who work with the start-ups. We have formal mechanisms for bringing those people together. The payoff is huge. The preparedness of these start-up companies when they come to make investor presentations is of an order of magnitude better than it was a decade ago.

**Hon. Raymond Simard:** Thank you very much.

**The Chair:** Thank you.

We'll go to Madame Brunelle.

[*Translation*]

**Ms. Paule Brunelle (Trois-Rivières, BQ):** Good afternoon. Thank you for being here. Your presentations were very interesting.

Mr. Volker, you said you have technological innovation funds and I wonder where the money is coming from. Does it come from private investors or from the government?

Did you hear the translation or should I repeat my question?

● (1400)

[*English*]

**Mr. Michael Volker:** Were you asking about where the money came from within the fund?

[*Translation*]

**Ms. Paule Brunelle:** Yes, that is right.

On the one hand, I am wondering where these funds for technological innovation come from.

On the other hand, you referred to refundable tax credits. Were you talking about provincial tax credits? Unless I am mistaken, there are such credits from the federal government.

Those are my first questions.

[*English*]

**Mr. Michael Volker:** The answer to the first question is that currently there are about 150 investors. These are private individuals, typically accredited investors, and typically successful entrepreneurs. I have a list of over 500 of these people who are invited to our monthly meetings. They're all accomplished and experienced people who are willing to put money into new ventures.

The refundable tax credits come entirely from the B.C. government. They're very limited. There's a budget cap of $25 million province-wide on this, but it was recently raised to $30 million. There have been discussions about doing a joint provincial-federal tax credit, where the province would put in 15% and the federal government would contribute the other 15%. This is very important for pooling of capital.

Angel investors know that it's very, very risky. As was pointed out, many ventures fail. What worries me is that when I invite these accredited credited investors to meetings, they'll invest in three or four companies and those companies will fail. So they invested in the wrong three or four, but maybe the next three or four would be successful. The way to get around this is by pooling and investing in a fairly large number of companies.

Angel investors are realizing that it is very much a numbers game. So they are tending to pool their capital and do team investing, where maybe a group of five or ten or, in my case, a group of over 100, will invest in companies. We do about one investment per month. We've done 40 technology companies in B.C. in the last three years.

[*Translation*]

**Ms. Paule Brunelle:** Mr. Harbel was telling us that angel investors are more sensitive to risk.

Do you believe that what Mr. Volker has just talked about could be a solution to make them a bit less hesitant? How do you explain that they are more sensitive to risk? It seems to me that the economic situation is still quite good

[*English*]

**Mr. Soren Harbel:** It's certainly part of the solution to find more ways for people who have done well to participate in the development of science and technology companies and growing the knowledge economy. That's absolutely welcome.

The Government of British Columbia has put limited tools on the table to enable these entrepreneurs to get tax credits for the investments they make. If you look at the number of companies that come through the door looking for these dollars, it's oversubscribed and is used up within a few months of when it's launched every year.

So there is ample room to improve this. The model is certainly one that works. It's part of the larger solution that needs to take place if we're to bridge the gap.

[*Translation*]

**Ms. Paule Brunelle:** I will give my time to Mr. Vincent.

**The Chair:** Mr. Vincent.

**Mr. Robert Vincent (Shefford, BQ):** I will continue on the same topic.

All these organizations at the table are into inventing new things. There are far too many inventions for the number of investors. Some kind of council might decide that a given invention has potential and would be a benefit to the community.

Could you pool your resources and, with a business plan, find investors to bring those inventions to fruition? In that way, we would avoid having everyone working on his own.

● (1405)

[*English*]

**The Chair:** Who'd like to take that?

**Mr. Michael Volker:** I'd be happy to.

**The Chair:** We'll start here, and then we'll go to you, Mr. Volker

**Mr. Angus Livingstone:** It's certainly something we are doing now. We work quite collaboratively amongst ourselves, so when one institution is working on a project the other one gets behind it. An example is SFU and Michael from the angel network, which UBC takes good advantage of.

To speak directly to your point, a new initiative that has come out of the B.C. universities and hospitals is the Centre for Drug Research and Development. It has raised $70 million to date. It involves all the universities, health authorities, and health hospitals moving early-stage technology from discovery through to stage and pre-clinical development, where it then can be licensed and moved forward. It's about how to pool our resources and, more importantly, how to pool the expertise—that's really where we're being fragmented as well—so these things can get out the door at the other end.

**The Chair:** Mr. Volker, you wanted to comment.

**Mr. Michael Volker:** Another example is the New Ventures BC competition we run. We have the University of Victoria, the University of British Columbia, and Simon Fraser University working collaboratively on that. In fact, the three deans of business from those respective schools are on the board of directors of that competition. Another example is the WUTIF fund I mentioned earlier. It has invested in a number of UBC and University of Victoria companies.

There's a spirit of collaboration in the province, and we often meet with one another to look at ways we can maximize the output from our research institutions.

**The Chair:** Mr. Watzke.

**Dr. James Watzke:** I just wanted to say—I only had five minutes—that BCIT collaborates with university professors and researchers fairly often. It's interesting when that happens, because as I've tried to explain to the committee, we're kind of like the infantrymen and women. We want to be in the trenches. For example, right now there's an NSERC I2I with one of the professors from UBC in mechanical engineering. He has a concept and has come to BCIT. We're doing the electromechanical steering mechanism. It's a surgical-vision positioning technology. We're doing the vision system and we're doing the industrial design.

I know that's not venture capitalism, but we're trying to get these product so that when they end up in front of the venture capitalists they're as ready as they can be, and those venture capitalists can make better decisions. So we work all the time with our university colleagues.

**The Chair:** Thank you very much.

We'll go to Mr. Stanton, please.

**Mr. Bruce Stanton (Simcoe North, CPC):** Thank you, Mr. Chair. I'll be splitting my time with Mr. Carrie.

To Mr. Brooks, one of the things we've considered over the course of this study is the current imbalance in Canada. We're investing a lot of money in the front end—the basic research side, and with universities through the tri-council and so on—but we haven't been as successful in enabling or engaging the private sector.

You mentioned your affiliate program. Considering that we came to the table and bumped up that indirect cost side of the equation, how can we find ways to make sure that's also levering us greater advantage with bringing the private sector to the table?

**Dr. Donald Brooks:** I'll ask Angus to speak to that in a moment, but I would say a word about the CECR program. That was an attempt by the federal government to do exactly what you said. I think it will have been largely successful if it continues in the vein it's been in.

We took advantage of it quite a lot in British Columbia. We had five heavily engaged from B.C. in general and four largely from UBC. They fit this model of taking it to the next step very well. They have independent business people on boards and so on who help the university people. There's a little bit of a problem, I think, in having to incorporate those independent bodies, because these are university people paid by the university, and we own their IP, and yet there's an incorporated body sort of telling them what to do while the teeth are not there. But I think the program in general is a very good one.

Angus, you'd like to comment?

**Mr. Angus Livingstone:** The use of indirect costs for the affiliates programs is already happening to a certain extent, but the amount of reimbursement under the indirect costs program is 25% when the real costs are 50%. So that money is really spent in multiple directions, and there's not a lot of it allocated towards any specific use because the draws on it are so large.

I think there's also something that we can learn from the industry affiliates programs in the U.S. The example that I think of is Stanford, where they have 50 of these in play. They bring in close to 300 different companies associated with those individual affiliates programs. I think that's a great way of starting to engage the company, which is what I understand we're trying to achieve here, and to a certain extent trying to get them to change their culture so they value research.

● (1410)

**Mr. Bruce Stanton:** Thank you.

**The Chair:** Mr. Carrie.

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

Mr. Watzke, as a representative of the colleges, you seem to be in the minority here today. I was wondering if you could comment on whether you think there is a bias in the government granting councils in terms of giving money to universities versus colleges, say for theoretical research versus applied research. You mentioned wanting to get 1%. I'm surprised. How much do you get now?

**Dr. James Watzke:** It's much less than that.

**Mr. Colin Carrie:** It's less than 1%?

**Dr. James Watzke:** Yes. It's actually a fact. I mean, even with the CFIs, or you can go to any of them.... First of all, colleges aren't eligible for a number of the tri-councils. BCIT has worked very hard—we are—but then we don't perform well; and here's how I'd put it in a nutshell.

Although they may change the front-end rules and say that BCIT is allowed to submit a proposal for CECR or NSERC or SSHRC, in my opinion, at the back end they haven't changed their reviewing processes. It is an old club. It's a university club with lots of very respected, very good academics. When they see our applications come in, there are not enough PhDs. They don't count what we're good at, such as the things I mentioned in my presentation. We're really good at making the things, and fixing and solving those problems, but what they're really looking for is licences, patenting, and number of publications.

So we're in a constant dialogue, trying, with these tri-councils, to just get them to use a different filter, and then we'd be willing to be tested. We're willing to say our contribution can be important. But right now it's not working out that way because the system hasn't changed at the back end.

**Mr. Colin Carrie:** So the rules are set up biased against you. Would you say that?

**Dr. James Watzke:** Right.

**Mr. Colin Carrie:** I had another question. You talked about external validation. I heard a quote one time about applied research: if private industry puts up their own money for the research, usually it's a good research project because they know that they're going to get some type of return.

Could you explain a little bit more about this external validation process you go through? Is this something you think we should apply to all research?

**Dr. James Watzke:** Well, for our work it's really simple. Here's what we do. We qualify our private clients, even if they're an entrepreneur from a garage or they're a bigger company. We look at four simple things. We see if they have management experience. We see if they have money—and hopefully it's not their mortgage on their parent's home. We see if they've been in this game before, because we've done an analysis of our SMEs that end up having success, and they've always had a previous marriage or previous product. The fourth thing we ask is whether they have any money behind them. We qualify them.

Fifteen years ago we didn't have that luxury, but we're successful enough now that we can do that. You'd be surprised. When an SME comes in our door, as soon as we ask those four questions, we know whether or not we should be working with them using our own time and energy. It's increasing our success rate tremendously.

**Mr. Colin Carrie:** Do you have any recommendations on how the government could encourage more cooperation between universities and colleges?

**Dr. James Watzke:** Sure: just make us the finishing school for them.

**Voices:** Oh, oh!

**Dr. James Watzke:** No, I'm just kidding.

The universities are great at pushing the knowledge out, and we belong right in there—that's actually who our clients are—before it gets ready for the market, and before the venture capitalists get ready. We have a role to play right there.

We've done that with UBC, SFU, and University of Toronto. We're actually quite humbled by and happy with that role. But a lot of the councils and funding mechanisms don't allow that collaboration to happen easily. If that were part of the deal and NSERC were to say, “If you're serious about commercialization, get a polytechnic as a partner”, I think the game would change.

● (1415)

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

Ms. Nash, please.

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

Thank you to all the witnesses this afternoon for your very succinct and interesting presentations.

My first question is to Mr. Brooks. You talked about balance and ICR funding, and you had a recommendation for a greater proportion of funding for ICR. We've also been talking about looking at the balance of funding between pure research funding and research that's more product-oriented—more commercialization.

I'd be interested in your views, or the views of anyone else, about the current balance of our investments in pure research versus other kinds of research—perhaps the kind of funding you're looking for, Mr. Watzke, which is very specific and niche-oriented.

Clearly we need to make some change to the balance. What would your recommendations be?

**Dr. Donald Brooks:** If you look at NSERC, for instance, they have committees in different areas, and some of those areas are clearly very basic—math, atomic physics, and that sort of thing. In the applied sciences and the health sciences, the allied health sciences, there's a lot of weight given to where this development, whatever it is, will go: what are you going to use the database for, and how is this going to help society?

At the purely academic level we have a pretty good balance for the people who want to take it to the next step. I think it's more in this area where the university is kind of finished. We've gone as far as we can with the kind of funding we can generate as academics, so what's the next step?

Angus mentioned the Centre for Drug Research and Development. That's one category of next steps. These people have all had university careers. One was a CEO who used to work for Angus. They've gone out and raised money from the federal government competitively, and from the provincial government by just making a very strong case. They're in a very good position, because of their own industrial backgrounds, to move these products close to the market.

But it was very awkward for them to fund this. I think the only reason they got funded so well was that they were exactly at the right place, at the right time, with the right people. It would be almost impossible to reproduce. There's no source of money they could have gone to and said, “Okay, we want to put together a process, a set of people, a set of testing laboratories, a partnership with BCIT or whatever, to take that kind of step.”

If there was a source of funding for that level of activity, it would be very helpful. CECR are in that direction, but they're very tightly focused and there aren't very many of them. A larger part where people could apply to that fund, perhaps in partnership with people like my colleagues, would be a useful thing to try.

**Ms. Peggy Nash:** Maybe I could also explore the issue of IP. It's something we've discussed. At SFU, if you invent it, it's yours. That's also the process at Waterloo. At the research council it's 100% the other way. Some universities have a balance.

I'd like to hear your thoughts on that. Should we have one system for the country? Is it best to let the universities develop their own IP strategies? How should that work?

**The Chair:** Mr. Livingstone.

**Mr. Angus Livingstone:** I think it's a red herring in terms of being a real problem. A lot of it really depends on the nature of the technology. In the IT world, it should flow out with the individual—that's the way that place works. That's a good example of what Waterloo has done.

If you get into the biotech and life sciences, you'd better have pretty strong patent protection. If you take some IP that has been generated in the better-owned institution and try to get investors to put money into it when you can't guarantee you have ownership because you've correctly identified the inventors—that's what happens in better-owned institutions—they will walk away from that kind of transaction.

From a national point of view we want to look at the mandate behind it. The mandate is to disclose it so we know it's there; make sure it's developed for the benefit of Canadians; and make sure there's some sort of return back to the institution as an incentive. But after that, leave it to the institutions to make the decisions on the best way to make that happen in their localized jurisdictions, because each one is different. The UBC model would not work at Waterloo. That's very clear.

● (1420)

**Ms. Peggy Nash:** Okay, thank you. Is there anyone else?

**Mr. Michael Volker:** There's another component to it that perhaps Dr. Branda could speak to, being a researcher at SFU who works under that policy.

**Dr. Neil Branda (Professor and Canada Research Chair in Materials Science and Director, Molecular Systems, 4D LABS, Simon Fraser University):** One of the reasons I came to SFU was the freedom policy, and I'd normally get into trouble making a lot of these comments.

**Ms. Peggy Nash:** Go ahead.

**Dr. Neil Branda:** It's always very cliché when you talk to professors about why we went to universities and didn't take higher-paying jobs in industry. The answer is always intellectual freedom. And that is true until something works and has value, and then universities like to take it over.

I think having the IP in the inventor's hands is absolutely critical to making sure it's done well. Now, the universities can have a role in facilitation. I think Mike Volker's office does a very good job of that. They help us when they can. They give us a choice of how much to engage them, how much to ask for their help, and I think there has to be a balance there.

**Ms. Peggy Nash:** What about Mr. Livingstone's comments?

**Dr. Neil Branda:** I think it's very well put that it depends on the research sector. There are some sectors that we identified in biotech where it would be much more dangerous to go forward without good IP protection. He's absolutely right about that.

That being said, my experience these days with a lot of investors is that they want direct tech transfer into a company if it spins off, because, especially in the area I'm in, which is material science, a lot of developments may be made peripheral to the initial products that you're aiming for. So even though that product may not work, they don't want a licence any more, they want to have direct ownership of the IP. Having fewer people involved in IP ownership makes it easier for the companies.

We've had many Canadian and American companies come to us at 4D LABS because we own our IP, saying it's refreshing that they don't have to deal with a larger body of people who get in the way; they can deal with the individual.

**Ms. Peggy Nash:** Thank you.

Mr. Watzke, I'm curious, what happens with the IP in your facility?

**Dr. James Watzke:** At BCIT we have a very inventor-friendly IP policy. There's one distinction—I'm not even sure my colleagues know this about our policy—and it's a lot about value. Since we don't have as many resources as some other institutions, what we do is make sure, before we start to foster or try to protect the IP, that we think there's some value there.

Then once we do that—as I said, it's often inventor-owned—where our policy is special is that when royalties start to come back, when that first dollar starts to come back, we start sharing with the inventor immediately. We don't wait until the institute has started to recover its expenses. Now think about that. That does make a difference.

We're not in the QLT game, but I have a faculty person right now who got his royalty cheque. We just started getting money from one of the licence agreements, and he got his $1,000, then we got our $700. It started right from the first cheque that came in.

**The Chair:** Thank you.

Thank you, Ms. Nash.

We'll go to Mr. Simard, and then to Mr. McTeague.

**Hon. Raymond Simard:** Thank you very much.

Mr. Volker, my stereotype of an angel investor or venture capitalist is an older person who's retired and wants to have a little bit of fun. Can you tell me what an angel investor looks like? Is he or she older, younger? Is it a corporation looking to diversify? What do they look like?

Secondly, how difficult is it to get them to invest in science and technology firms as opposed to when somebody is producing a widget, which is a lot more tangible? Maybe you can tell us about that.

**Mr. Michael Volker:** Well, to your last point, the people I deal with are all science and technology angel investors—i.e., they're successful technology entrepreneurs who've made money building their own businesses and now are willing to put some of that back, both in time and money. That's the differentiating feature. They're not just investors, they're also mentors at the same time. There are a few silent investors, but not too many.

As far as the profile goes, there are some very young ones. In my fund, for example, I have some in their 20s, I have some in their 80s. It's quite a range. There are serial entrepreneurs who like to score and then score again and again. Then there are those who like to score once, and then they spend their time helping many others develop their businesses. It's quite a mix.

**Hon. Raymond Simard:** Thank you.

**The Chair:** Mr. McTeague.

**Hon. Dan McTeague:** Related to that, and perhaps any of you can answer this, the current economic climate with respect to the credit crisis has certainly led to doubts about the availability of commercial credit, which might impact venture capitalists. Have any of you in your experiences or with those you deal with in the private sector heard that there is a situation where credit available to new innovation or technology is drying up?

● (1425)

**Mr. Michael Volker:** I've certainly not seen it. I always maintain there's no shortage of capital for good projects.

Our job, and the challenge, is the matchmaking, because I hear the other side. What my office does is to try to bring those together.

**Hon. Dan McTeague:** Good.

Usually at this time there are a few minutes left for the chair.

I might just do that, Chair, if you wish.

**The Chair:** I do have two more members, so you have some more time, Mr. McTeague.

**Hon. Dan McTeague:** No, I'm fine.

**The Chair:** Mr. Simard.

**Hon. Raymond Simard:** Is there a labour-sponsored fund in B. C., and how is it working? Does it have a mandate to assist the start-ups and smaller corporations?

**Mr. Michael Volker:** It does that, but it doesn't have a mandate to do so.

**Hon. Raymond Simard:** It doesn't have the mandate. It's probably the labour-sponsored fund that just bought ENSIS in Manitoba, actually. We have had two labour-sponsored funds that were actually disastrous; they didn't do very well.

I've asked about this in Saskatchewan and also here, but is your fund working fairly well here?

**Mr. Michael Volker:** Yes.

**Hon. Raymond Simard:** It is.

Okay, thank you.

**The Chair:** Thank you.

We'll go to Mr. Van Kesteren and Monsieur Arthur.

**Mr. Dave Van Kesteren (Chatham-Kent—Essex, CPC):** Thank you, Mr. Chair. I will be splitting my time with Mr. Arthur.

Thank you, panel, for coming.

I'm going to direct my questions to Dr. Brooks. We had the privilege of doing a tour through TRIUMF and were introduced to young lady who was involved in particle physics work. I have to tell you something: there's a difference between scientists and entrepreneurs. These people are not entrepreneurs.

We've conducted this tour and, obviously, as a government, we want bang for the buck, but I want you to be dead honest. Are we barking up the wrong tree? I'm addressing you as an academic, but should we be allowing students who have the potential to go on with this? An entrepreneur is going to see an idea, and the reason he drops out of school is that he wants to get, and market, that thing before somebody else does. But these people are not slightly interested in that. They couldn't care a hoot.

Should we allow them scholarships, bursaries, and grants? And should we, as a government, just basically fund science, and just let it go and let the chips fall?

**Dr. Donald Brooks:** Well, the answer is yes, you do and you should.

Did you go to Nordion at the TRIUMF site?

**Mr. Dave Van Kesteren:** Yes, but most of us were in a daze.

**Dr. Donald Brooks:** I understand that. I'm on the TRIUMF board, and I go to these meetings and come out after meeting atomic physicists and....

A lot of people at TRIUMF, as you said, are fundamental physicists at the very basic level. These are the guys who gave us the atomic bomb. They've done a lot. You could argue about this, but there's an immense amount that's come out of those programs generated by people like them.

There are also people at TRIUMF who recognize the strength in what they've developed. They don't expect the investigators to do it, but they have the engineering background or just the smarts to understand that, well, if we can make all these funny isotopes and there are some guys down the street who are looking in brains with these isotopes, let's get together. That's how the PET program started here, and where the medical isotopes that Nordion produces all over the world came from.

If you look at almost any field that suddenly takes off, there's some fundamental discovery behind it. There are all these stupid examples: RIM, and computers, and chips, and all of that stuff. And we cannot tell where these things come from.

This Galvanox process started with a modelling exercise. Dave Dolphin was working on those kinds of molecules for 20 years and suddenly this idea came along to make a drug that, when you flash it, does something inside your head.

We don't know where they're going to come from.

The question over here is correct: these are not the high percentage winners, but boy, when they win, they win hugely. And our society has moved ahead because of a lot of these events. Universities are the only places we can do that. You're not going to do it in a company, or rarely. So I think, absolutely, you have to fund it.

**Mr. Dave Van Kesteren:** Do you feel that you're being pressured by governments to produce monetarily, when in fact you should—

**The Chair:** There are two minutes left, Mr. Van Kesteren.

**Mr. Dave Van Kesteren:** I have to cede my time. Maybe we'll have a chance to talk about this a little later.

[*Translation*]

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

Before asking my question, I want to express my satisfaction at the end of a week that has been remarkable. I want to underline your leadership and the leadership of your co-chairs as well as of Mr. Carrie. The working atmosphere of this committee is extremely positive. People In Vancouver will be very disappointed if they expected to see a House of Commons committee where members fight among themselves as it sometimes happens in other committees in Ottawa.

The Standing Committee on Industry, Science and Technology is very effective. I would like to thank our chairman, who is in large part to responsible for this state of affairs, as well as Mr. McTeague, Mrs. Brunelle and Mr. Carrie. I also want to thank our staff, the clerk, the researchers, the translators and the people responsible for the sound system and for logistics. This has been an exhausting but quite memorable week.

● (1430)

[*English*]

Now, we look for friends along the way, as we did during this past week. In Saskatoon the other day, we had a Mr. McCulloch, who was talking about his community college, like the infantrymen you just described, which cannot get any respect.

You just expressed the same thing. At the college level, you seem to be the Rodney Dangerfields of innovation: you never get any respect.

**Voices:** Oh, oh!

**Mr. André Arthur:** So my question is, are you victims of snobbery?

**Dr. James Watzke:** I'll take that.

You know what? I have a PhD and I'm proud of it, but some of that does go on. The reason I'm not in therapy over it is that my colleagues here know that when we do work together, BCIT has a contribution to make.

I'm not sure the external system encourages that marriage often enough. That's why I came today, as I'm hoping to make that work in some way. I hope they would agree that when we do get to the same table to help solve a problem—which often has started in their halls or labs—and which we're trying to get it closer to the market, they would know that we have a role to play. But the problem is that we're not forced to dance together.

**Mr. André Arthur:** You expect them to come and dance, but then you would like somebody to force them to see that you exist.

**Dr. James Watzke:** Yes.

**Mr. André Arthur:** Thank you, sir.

Thank you very much.

**The Chair:** Thank you, Mr. Arthur. And thank you for your very kind statement about our committee and our staff.

Unfortunately, we are running out of time, and three of our members have to catch a plane back east. Perhaps I'll ask a very short question, just to finalize this.

Mr. Volker, what you said about being an angel investor in the venture capital community was different from what we've heard before. I'm just wondering as chair if we would be able as a committee to unofficially observe your community get-together and see the process from the inside, so we have an understanding of how it would actually work at some point. Do you allow observers to come in?

**Mr. Michael Volker:** Absolutely we do, and we encourage it.

**The Chair:** I think it would be very educational for the committee to see that.

Mr. Brooks, you've mentioned some very important points about indirect costs, and you've also mentioned something with respect to affiliate programs. On the affiliate programs, could just get us some more information on how they actually work? They're new to us. You don't have to provide it now.

We appreciate the indirect costs of research, as we've asked a lot of witnesses what the ratios should be. So are you saying that if we increase funding, say, for the granting councils, there has to be a commensurate 25% increase for indirect costs of research? Am I reading you correctly on that?

**Dr. Donald Brooks:** Well, there are two elements. One is that if you increase it for the councils, you should at least increase the indirect costs to cover that increment. At the 25% level, that's an easy bit of math.

The other piece is that the real costs to us are between 40% and 50%. The universities and AUCC have been pushing for a long time to move that 25% to 40%, and then we'd be closer to recovering what it actually costs to do the research.

Right now, out of our pocket, out of our endowment, and from what we steal from our teaching—we get it from anywhere we can—we have to put the 15% or 20% that we don't get into each research project. It costs us money to do research. After a while you start saying, well, don't answer any more, because we can't afford it. We can't afford to run some of the buildings that we have from CFI funds. The carrying costs and the indirect costs are major things for the universities.

● (1435)

**The Chair:** If you have any further details on that, please provide them.

But you're saying about, for example, Genome Canada that if we increased the funding from $140 million to $280 million, the indirect costs would therefore be $70 million. So they are basically about 50%.

**Dr. Donald Brooks:** Yes. There's no money at all for the indirect costs of Genome Canada; they're not covered by the program. CFI is not covered by the program. None of the disease clubs, the charities, are covered by the program. Only NCE is. I don't even know if CECR is.

Does anybody know? We haven't been told. It was run through the NCE office, but I don't know if CECR has attracted indirect costs or not.

**The Chair:** If you have anything further to add on the ratio of funding, we'd certainly appreciate that number.

**Dr. Donald Brooks:** I'm sorry, but I don't understand what you mean. Do you mean the ratio of the indirect costs to direct costs?

**The Chair:** I mean in terms of the 40% figure; say $100 million were allocated under granting council funding, then I assume $40 million—

**Dr. Donald Brooks:** We would like to see it to go to 40%. Right now it's in the order of 25%, depending on the institution.

**The Chair:** But you also, then, want CFI and other programs—

**Dr. Donald Brooks:** I would like it looked at in a more realistic way. It isn't that suddenly the genome research is free. It still hurts, and it's a federally funded process. Why not be consistent? That's my concern.

**The Chair:** Okay. I appreciate that.

I'm sorry to end this excellent discussion. I want to thank you all for your time and your presentations. If there is anything further you'd like to submit to the committee, please do so and we will ensure that all the members get it. We will look at hopefully coming back again. It's been a very good visit.

We will suspend temporarily, members. I know that three of you have to catch a flight. Then we will bring the second panel forward and resume.

Thank you.

● _____ (Pause) _____

●

● (1445)

**The Chair:** I'll call the second panel to order. I'll ask members and witnesses to take their seats for the second panel.

Again, it is a very tight timeline. We have an hour for both presentation and discussion. We have three organizations presenting here. First of all, from ASL Environmental Sciences Inc., we have the president, Mr. David Fissel. Second, from Day4 Energy Inc., we have the chairman and CEO, Dr. John S. MacDonald. The third organization is Hydrogen & Fuel Cells Canada. We have the president and CEO, Mr. John Tak, and the manager of the hydrogen highway project, Mr. Gary Schubak. Welcome.

We will allow up to five minutes for an opening presentation from each organization. We'll start with you, Mr. Fissel, and then we'll go to Dr. MacDonald and Mr. Tak, and then we'll go to questions from members.

Okay.

**Mr. David Fissel (President, ASL Environmental Sciences Inc.):** Mr. Chairman and members of the committee, thank you for the opportunity to speak to you today.

I'd like to raise three issues that are important to Canadian small and medium-sized enterprises, SMEs, in the science and technology area, such as my own company, ASL Environmental Sciences, of Victoria, B.C.

Science-based SMEs represent the great majority of companies conducting research and development in Canada. In my industry sector of ocean science and technology, our companies are well established, very active in global markets, and focused on particular science and engineering niches.

Ocean high-tech companies in British Columbia provide a very substantial contribution to our economy, with annual revenues of $1.1 billion and total employment of nearly 5,500 people in this province. This science sector represents about 10% of the total economic activity of the ocean and marine sector in B.C., accounting for annual economic activity of $11.6 billion per year.

To be globally competitive, ocean high-tech companies are continually developing products and services. Science and technology SMEs represent a vital conduit for development and commercialization of Canadian research, whether conducted in universities, such as the VENUS and NEPTUNE projects at the University of Victoria, or government labs, or in their own in-house R and D programs. SMEs have greatly benefited from the major funding program of scientific research and experimental development—SR&ED—and tax credits provided by the Canadian government, supplemented by British Columbia and other provinces.

The SR&ED program was recently improved in the 2008 budget through raised expenditure and revenue ceilings, yet more needs to be done. Specifically, the administration of the SR&ED program should be improved by simplifying and expanding the eligibility of qualifying activities, reducing processing time for claims, and expanding the awareness of SR&EDs among start-up companies, which often do not fully utilize this very important program.

Bringing new science-based products to global markets requires considerable funding for the later stages of R and D. While most other developed countries provide a strategic first-adopter market and/or direct funding for such development activities, Canada is rarely an early client and no longer provides funding for the later stages of R and D since the demise of NRC's IRAP pre-commercialization program in 2005. A replacement program is urgently required to provide partial funding to supplement company investment, with the funding being fully repayable starting when the products reach the marketplace.

The second issue is that we have an extraordinary new opportunity in the combined economic, environmental, and energy wins offered by renewable ocean energy. We anticipate that as much as 5% to 10% of Canada's electricity can be generated from ocean and river currents and ocean waves, representing a very substantial new source of green energy. However, a considerable amount of science and technology must be developed and tested, which will require 10 to 20 years and very large funding investment.

Canadian resources and approaches to date give us the prospect of making Canada a world leader in commercializing this important new technology and power production opportunity, with enormous world markets. To be successful, government programs are required for funding of prototype intercomparison sites for testing new technologies and providing funding assistance for R and D, as I have already mentioned.

If we are to realize the economic opportunities, it is critical that all governments come together with ratepayers to create the early marketplace for marine energy by providing higher green-premium rates for energy delivered to the electrical grid during this extended development period.

● (1450)

Finally, I'd like to raise one more issue, the issue of delays in the regulatory process for new ocean and river energy projects in Canada, whether renewable or non-renewable. Over the past 15 years, cutbacks have reduced the science-based capacity of Canada's major line departments, including the Departments of Fisheries and Oceans, Environment, and Natural Resources. The regulatory review of new developments is a science-based process, but the diminished scientific capacity in the government departments can delay or stop important new energy developments. More funding, focused on expanding the science capacity of the line government departments, is urgently required.

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

We'll go now to Mr. MacDonald, please.

**Dr. John MacDonald (Chairman and Chief Executive Officer, Day4 Energy Inc.):** Good afternoon. Thanks for the opportunity to talk to you.

I'll tell you a little about Day4 Energy to begin with, and then make some other comments.

We're in the business of manufacturing a new type of solar panel. It performs better and opens the door to new innovations in that field. We're evolving into a supplier of solar electric generation systems. The technology is a new way of interconnecting two photovoltaic cells to make a marked improvement in the performance of the panel. But more importantly, this technology also allows us to take the next step in cell design to make the cells perform better.

The company's major objective is to move solar energy toward cost parity with the grid. This is an important issue, because, as we all know here, we are now living in what will become known as the energy century. Human beings will change the way they generate the energy that sits at the basis of their economy.

We started in 2002. We began this year with a capacity of 12 megawatts annual output. We will be at 40 megawatts by the middle of July, and at 90 megawatts by the end of the year. We're sold out for this year.

Our major market is in Europe, with 90% of our business there, dominated by Germany. We already have an order booked with 55 megawatts for 2009, and one for 66 megawatts in 2010. The company is obviously growing very fast.

Since I joined the renewable energy business—I came from aerospace, as some of you may know—I've learned that here in British Columbia we have a very strong knowledge base in renewable energy, but it's all located in pretty small companies. Zantrex, Carmanah, and Day4 are the big ones. The rest are pretty small. If you look at renewable energy and the markets that'll be created for it, I think it's a huge opportunity for Canada. We can discuss ways the government can influence that during the question period.

I have been for around a while, as most of you probably know. I served on almost all of the science and technology advisory gizmos that various governments have dreamed up over the years—mostly during the Trudeau and Mulroney administrations. I gave up in the early nineties, saying “I've done my bit, and nobody listens anyway”.

I saw some good policies come, and I also saw them go. I saw some schemes that were good, and some that weren't. I saw some good ones get wrecked, and I saw some not-so-good ones persist. They change names every once in a while.

I'm an engineer by training, and over the years I've learned that Canadians are the best engineers in the world. I think the reason for it is that our resources are so small. You have to be clever to do anything with small resources. But as a group of people, our ability to exploit that talent is dismal. We don't seem to be able to generate much wealth from the wonderful things we can do.

With that, I pass the floor back to you.

● (1455)

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

We'll go now to Mr. Tak. I understand Mr. Tak has a presentation. Mr. Schubak has a presentation as well. I incorrectly put them in the same organization, but they were invited separately.

Mr. Tak.

**Mr. John Tak (President and Chief Executive Officer, Hydrogen and Fuel Cells Canada):** Thank you very much, and thank you for the invitation to speak today.

I'm going to be referring to the hydrogen fuel cell sector of Canada. It's interesting, because I think the hydrogen fuel cell sector represents a direction the government is trying to push the industry towards in science and innovation. I'll give you a few statistics.

In 2005 the private sector in Canada invested over $200 million in research and development. The total energy R and D in Canada in 2005 was $680 million. That's the oil and gas sector, everybody. So the investment by the hydrogen fuel cell sector of over $200 million represents about a third of total energy R and D in Canada, according to NRCan stats. That makes the hydrogen fuel cell sector the number one clean-energy R and D investor in Canada. It's pretty significant.

The rate of that investment has continued over the last five years. There has been over a billion dollars of R and D investment. Keep in mind, this is a next-generation clean-energy technology that we're focusing on here, so that rate of investment is extremely high. The Government of Canada over that period invested about $170 million. That means that 85% of the R and D in this sector is being done by the private sector—not by university labs, not by government labs. It's pretty significant. For every dollar that's invested by the private sector, there's about 15¢ of public money backing it up. In the biotech sector—this is an Industry Canada statistic—for every dollar that's invested, there's more than a dollar matching it. So there's a bit of an imbalance there, but what we've done is we've created over 2,000 new jobs. We have technology that addresses economic development, clean air, and GHG reduction.

Canada, globally, is a leader in this technology. We are not “the” leader any more, but we are a leader. So what's happening with that?

Well, it's great to do R and D, but I want to point out that product is selling now. That's something we didn't have five years ago. We said it was going to come. The prediction with cars was overstated, but other technologies.... We don't know exactly how this is going to roll out.

What has happened is that strange products, like fuel-cell forklifts, are starting to sell today. You may have heard that Wal-Mart has started purchasing them. Because of what happened in New Orleans when their power system went down, backup power systems for telecoms are starting to sell. The FCC last year introduced a regulation that you must have a minimum eight-hour backup power. Batteries are challenged to meet that, and fuel cells are filling the gap. Companies like Hydrogenics, Ballard, Hyteon in Quebec, and QuestAir are selling those products. In Japan, residential cogeneration systems are used in homes, and 2,300 units have sold.

So these products are starting to sell. That's the key message.

From 2003 to 2008 Canada had the hydrogen economy project, $215 million, and the impact from that created a lot of this innovation and commercialization. That $215 million was cut in 2006 to about $170 million, and it ended in March of this year. We now have the ecoENERGY fund, which is helpful, but it's $240 million over five years, and we're not clear exactly how much of that is going to hydrogen fuel cells. There's FCTC money, and we're not exactly sure how much of that is going to....

The challenge is in how we can raise more private sector capital when it's not clear what the government partnership is. That's challenging. We live in a world where government does pick winners and losers. We have $2.2 billion towards biofuels and ethanol, and approximately $20 million to $50 million going to hydrogen fuel cells. I think we do have a world where we do that.

My recommendation is that Canada pick five or six of the top technologies that we are leaders in and focus on those technologies. It's not a silver bullet, but it's not an everybody-is-equal kind of situation either. That's one of our recommendations.

This is happening globally now, so that's good news for Canada. We're not the only ones doing this. Japan's annual federal budget is $380 million for their fuel cell program. Denmark is the leader in wind technology. Thirty years ago, if you'd said Denmark is going to be the leader in wind technology, people would have laughed. Thirty years ago, if you'd said Finland is going to be the leader in cell communications, you would have laughed. Nokia now is the biggest cell company in the world.

● (1500)

We can do it; we just need to have a national program. Investors are coming. They can invest anywhere. Capital is going to follow where there is a balance between government incentives and it helps the investor to evaluate the risk.

I'll close my comment by saying we hope there will be a national strategy for hydrogen fuel cells. It will make clear what the government policy is, and it will allow us to continue raising the significant amount of capital that I introduced to you earlier.

The office of the U.S. President just issued a letter two weeks ago saying the hydrogen economy is one of the three top manufacturing R and D priorities. That means they are going beyond R and D, and now they're asking, how do we manufacture these things in volume? It's a significant statement, and I hope we can engage the government in that approach.

Thank you.

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

We'll go now to Mr. Schubak, please.

**Mr. Gary Schubak (Manager, Hydrogen Highway Project, Hydrogen and Fuel Cells Canada):** Thanks very much for having me today. I appreciate being here.

My name is Gary Schubak. I manage the Hydrogen Highway here in British Columbia. I work with John. John is my boss.

My intent is just to take five minutes and explain what we're doing in British Columbia on the Hydrogen Highway and emphasize the importance of government partnership to our effort.

What is the Hydrogen Highway? I think I'll begin with that.

The Hydrogen Highway is a practical demonstration program of hydrogen and fuel cell technology. Its aim is to accelerate the commercialization of these technologies, get them out in the public, and provide an infrastructure for vehicle companies, bus companies, and other technology providers to deploy in British Columbia. It's about environmental stewardship. It's about growing the economy and homegrown Canadian technology companies.

We're a leader, as John said, and we want to maintain that lead. We look at the Hydrogen Highway as a practical program to build that lead and maintain it.

There are a number of factors that are important to mention. One is the infrastructure, and I'll speak quickly about that.

In British Columbia today we have a good, budding growth of hydrogen infrastructure. We have five filling stations in the lower mainland, in Victoria, that fuel hydrogen vehicles for demonstration programs. Our goal is to have seven by the time the 2010 Olympic Games are being deployed in Vancouver-Whistler. Not a lot of people know that, but that's something about which we're trying to get the message out.

These are stations that are active and functioning. Vehicles are being deployed and filled every day by these stations and are being driven every day on the roads of Vancouver and Victoria.

In partnership with the fueling stations, we have a number of demonstration programs in the city and in the southwestern province. We have a fleet of Ford Focus fuel cell vehicles in Vancouver and Victoria. We have a number of shuttle buses and hydrogen-powered pickup trucks. We have four transit buses in Port Coquitlam that operate on a blend of natural gas and hydrogen that reduce emissions and improve efficiency. All these vehicles are operating around the network of fueling stations we've installed in partnership with the government over the last five years.

Our goal now is to move from demonstration to commercial deployment, and we're starting to see that. We've maybe all heard the announcement that B.C. Transit will be putting 20 fuel-cell-powered buses in Whistler for the 2010 Olympic and Paralympic Winter Games. That's fantastic.

It's another node on the Hydrogen Highway where the world's largest fueling station for hydrogen will be deployed in Whistler. The world's largest fuel cell vehicle fleet will be deployed in the community of Whistler. These are Canadian technologies. This is a New Flyer bus, the chassis provider. Ballard Power Systems is the fuel cell provider.

Who am I forgetting?

Dynatek provides the fuel tanks, and Air Liquide Canada is providing the hydrogen. This is a Canadian solution that we get to deploy and showcase in front of the whole world through the Olympics. This is one growth idea that the Hydrogen Highway can promote.

There are others that we want to promote, with shuttle bus fleets that could take people from the airport to important venues, or the deployment of hubs of hydrogen for material-handling warehouse applications that are on the cusp of commercialization right now. We can get behind that and accelerate it here.

That's what the Hydrogen Highway is about, and the reason we're here is that it's also about partnership and having the opportunity to talk to you and express our gratitude for the past partnership we've had with government to get where we are today. But to reinforce that to go forward, we need that partnership to be even stronger and more robust.

It's about growth, and we are at a point now where we see a lot of exciting growth opportunities for building these fleets, building the infrastructure, attracting the companies that are leaders in this area to come to Vancouver, to come to British Columbia. That's certainly something that I, as the manager of the Hydrogen Highway, would love to see.

Thank you very much for your time.

● (1505)

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

We'll now go to questions from members. We'll start a six-minute round with Dan McTeague.

**Hon. Dan McTeague:** One word—fascinating. I'm thinking of the four of you who have presented here, and if tomorrow I could wave a magic wand, everyone would live in a zero-emission environment—whether I took my bus or my car, or had electricity generated in my home or off the shores.

Most of us would not have considered these things to be absolutely pressing, certainly in the area of energy, until the past couple of months, with the way the price of energy is going and where it's going. As politicians we're extremely sensitive to where those failures may very well lead us, and that there are consequences for all of us in not moving in those directions.

I'll start with you, Mr. MacDonald. I was very interested in your comments, because I had written here that you had done so well in Germany, so why not in Canada? Yet your comment at the end was more why aren't we doing as well overseas compared to Canada?

I don't see a problem if we're doing well internationally, but it seems to me you're saying we can't create the wealth or interest, or generate an adequate and comprehensive policy in Canada to ensure that all of you in ten years will be able to make me live in a zero-emission environment.

● (1510)

**Dr. John MacDonald:** Germany has become the world leader, and there's a very simple reason for that. When I first entered this industry in 2002, the Japanese were the leader. Then the Germans invented something called the feed-in tariff. Almost all the renewable energies—with the exception of big hydro, which has been with us for a long time—are supported by subsidies these days. They're all developing, and the costs don't yet meet the kilowatt-hour crisis on the grid, except in very special circumstances.

The feed-in tariff type of subsidy is a very interesting way of supporting this kind of thing. It's basically purchasing. The Bundestag passed a law and it had three characteristics. First, if you're a utility and somebody offers you renewable energy you must take it. Second, you must pay a certain tariff for it. I know the numbers for solar, and there are others for wind, biofuels, and all the rest of it.

The tariff for solar started at 55 euro cents a kilowatt-hour, which is about four times the regular rate of electricity in Germany. It comes down by 5% a year, and they're now starting to talk about accelerating the fall. The utility is obliged to pay that. The third thing that really makes it work is they're going to guarantee that rate for 20 years. That makes it financeable.

This is a way of transferring the subsidy from the taxpayer to the ratepayer. Like all utilities, the old utility goes to the regulator to increase their rate. It costs the average German ratepayer about 1.5 euros a month—which is about the cost of a cup of coffee in Munich. It works like a hot damn. The Italians are adopting it. The Spanish have adopted it. The Greeks are talking about it. That one thing has led to Germany just rocketing past Japan. Germany is now the leader in this technology.

Ontario's standard offer program has a similar arrangement. The problem with the program is that at 42 cents Canadian a kilowatt-hour it's quite marginal.

**Hon. Dan McTeague:** You said we're not generating enough wealth in Canada with what we can do.

**Dr. John MacDonald:** Absolutely.

**Hon. Dan McTeague:** What are you suggesting we do?

**Dr. John MacDonald:** I've repeated this so often I could do it in my sleep. A government has three levers to encourage industry: procurement, fiddling around with the tax system, and granting, in that order of priority.

I guess all of you know I was one of the founders of MacDonald Dettwiler, which had something to do with the design of Radarsat-2. But I'm not talking about that today. We'll talk about that offline.

**Hon. Dan McTeague:** It's been a long run.

**The Chair:** We followed Mr. McTeague's advice.

**Dr. John MacDonald:** We built that company because we were in the level of technology most of your customers or governments are in. It's just the level of technology that does that. We diversified our marketplace by quickly becoming an exporter.

But we used to do the first system—we still do, I guess—by having it procured by the Canadian government. We developed the technology, and the thing that happens.... It was part of what was in those days called the unsolicited proposal program, which got shot in the head at some meeting of bureaucrats at some stage.

The beauty of that program was that you could make a proposal to the government and the government would say "Yes, we want one of those. We'll buy it from you." In effect, they were a friendly customer. We then adopted the paradigm of taking that and exporting it. We became the world's leader in remote-sensing ground stations. Ultimately, as you know, it became a space company.

The R and D takes place in the corporation. You develop the knowledge base inside the company, so it can respond to changes in the marketplace more quickly. That's extremely important for all of these science and technology-based industries, because we live in a world where the technology changes very rapidly.

I think it's important to understand that policies that put the knowledge development next to the market are important. Canada's done a pretty good job in the tax system area. The SR&ED arrangement works pretty well. We even took a little bit of advantage of that at Day4.

Finally, regarding the granting system, grants have their place, but I'm not a big fan.

● (1515)

**Hon. Dan McTeague:** Thank you.

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

We'll go to Mr. Carrie.

**Mr. Colin Carrie:** Thank you very much, Mr. Chair.

I'd like to say I'm a little disappointed we have only an hour with you gentlemen. It's the end of the entire week, but I think this is the most exciting part.

I'm going to try to do three questions, which means about two minutes each.

We talked about the tidal projects, and you mentioned delays in the regulatory process. I've heard of the Bay of Fundy thing for years, and it just makes a heck of a lot of sense, with tides going up every 12 hours. Why aren't we working on that? How can the federal government help commercialize big projects like this?

Second, Mr. MacDonald, you mentioned there were some good policies, and I was wondering if you could give us a couple of ideas. We really want your feedback on what policies we can come forward with to help you out. You are the guys who are getting the job done. We have the research, but we want to see you guys out there commercializing it, making a lot of money, and paying a lot of taxes to the government. So what are the good policies, and where did they go?

My third question is with regard to the hydrogen fuel cells. I come from Oshawa, and I just saw GM's Volt. I thought it was the most fantastic idea coming forward. So the technology is coming here.

What is a good government partnership? What should we be doing? You talked about the infrastructure. I'd like to see that hydrogen highway between Windsor and Montreal, actually, because Oshawa is right in the middle, and with two nuclear plants we could get a lot of hydrogen going. Dan's got a nuclear plant in his riding, so that would be great.

What should the government be doing with those partnerships?

You might be down to a minute each now.

**Mr. David Fissel:** Can I start on the tidal?

As I mentioned, it's a combination, it's not just one solution. It has to be a coordinated set of programs based on a partnership with industry, and industry-led, with key support from government and universities sometimes. John talked about the feed-in tariff, and that's critical for any developing technology. It applies just as much to tidal and wave energy as it does to solar panels or anything else.

I mentioned the regulatory regime, and I think this may be more unique to ocean renewable energy. We often overlook that. It's critical. There are roadblocks in the way. It's not always just investment that's required. Sometimes we can't get our technology out there in the ocean because of the cumbersome regulatory regime, and I'm convinced a lot of that is because the departments in government that I mentioned need more funding. They need to respond better by having better science. They've been pressed for funds on that.

I'll leave it at that, given that time is short.

**The Chair:** Who wants to go next?

Mr. MacDonald.

**Dr. John MacDonald:** I think the question was about good ones and bad ones.

I mentioned the unsolicited proposal program. In those days, the purchasing agent was DSS, the Department of Supply and Services. You could make a proposal to DSS and they would shop it around the departments, asking, “Does somebody want to buy one of these things?” Sometimes they would and sometimes they wouldn't. We built our first ground station that way. We then dominated the world market.

The IRAP has been a granting program over the years, and it has been by far the best one. It's getting ruined now by the accountants. It's still on, but it's a mere shadow of its former self. The beauty of that program through the years that NRC ran it was that the judgments were made by scientists.

With other types of granting programs, there's so much bureaucracy to try to make sure the government doesn't get cheated that they're not efficient. A small company can't use them. They're too expensive. You can fool an accountant any day of the week, but you can't fool a good scientist, and it was the fact that the judgments were made by competent scientists.

I think the principle of contracting out research is a very important one. That develops the knowledge base close to the wealth generation. Government is a wealth-consuming organization. The universities, through their students, and industry are wealth generators.

To the whole idea of procuring R and D, I worked on a study in 1984. It was led by Doug Wright, who at the time was president of the University of Waterloo. We concluded in that study that there were only two roles of science in government. One was to maintain the regulatory knowledge base necessary in a department—and I'm thinking of bad mussels in P.E.I. and stuff like that with Health Canada—to maintain the department's competence as a smart buyer. Doing a lot of academic R and D in government really didn't have a place. Of course that is now collecting dust, and has been doing so for some time.

● (1520)

**The Chair:** Mr. Tak, you have about a minute.

**Mr. John Tak:** In summary, again, the hydrogen fuel cell sector is the number one clean energy R and D investor in Canada, with over $1 billion of investment in the last five years. I hope we can keep that going, and I would recommend that the government restore a policy on hydrogen fuel cells—in other words, develop a national strategy. One has been written through cross-country consultations already, and I believe if you check with the Natural Resources Canada you can probably get a copy of it. That has all the elements that Mr. MacDonald talked about: the procurement, tax, and grants. You need those three legs to make this happen. I would strongly encourage it.

We would be copying Denmark, because their next strategy for clean energy is a national hydrogen fuel cell strategy. Their energy minister announced it at our conference last year. They're a country of five million people, and they're funding that with $30 million a year. We are 30 million, and we're well ahead of the game.

So I would say, please, ask for a copy of that national strategy. Look at it. That's what's going to help us maintain our lead and help Canada make sure the benefits of all the investment we've made to date, private sector and government, accrue to Canada and not to countries overseas.

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

We'll go to Ms. Nash.

**Ms. Peggy Nash:** Thank you.

Boy, this is a really interesting panel. Thank you for your presentations. They're very focused, and I think your recommendations build on what we've seen and heard in other tours or panels. The fact that you are very focused is helpful for us.

I read somewhere recently that Germany is on track to create by 2012 about 400,000 jobs through green energy. It seems to me that not only is this the right thing to do, not only is this the sane and healthy thing to do, but as an economic development tool, as a wealth creation tool, as our manufacturing sector changes and evolves, this is an area Canada ought to be a world leader in.

We have such a vast geography, vast coastline, such abundant natural resources. I guess that's been a plus and a minus, because it's made us lazy, perhaps, in some areas in adapting to a green-energy future.

You've outlined some of the things you think we need to be doing. And I hear you saying we should focus on the winners, the ones that we're doing well, and build on our excellence to become world leaders in the things that we do very well. Picking those winners and those sources of excellence is always a challenge, because the one that perhaps has been a leader may not continue to be a leader.

Do you have any advice in terms of how the government, going forward, can make sure that we're not just running behind the Denmarks and Germanys but that we are in fact leaders and really exploiting the natural abundance that we have? That's a sufficiently open-ended question for you all.

● (1525)

**Mr. David Fissel:** Let me take the first shot at that.

I think we should look at where our strengths are right now. Canada has a lot of them in science and technology, but we are really strong—and I go back to this—in tidal and ocean wave technology. Right now we are out there right on top of the world, but if we don't do something to.... This is a 10-year to 20-year proposition. We have to seize the opportunity now and run with it.

And I think the way to pick the winners is not to look at which company is the winner but to strategically focus on the sector that's going to be to the benefit of the country on a decade-long time scale.

**Dr. John MacDonald:** You know what I'd do? I'd start using renewable energy. This is the energy of the future. I'd do an analysis. We don't have time to talk about it here, but take the Bay of Fundy project. Do it. It's very simple.

Governments can't pick winners or pick companies or even technologies for that matter. Nobody can. But there is a need. We need to generate renewable energy by various means. Certainly on this coast we have lots of tidal rapids around here, and it is similar on the east coast. Build a power generation system.

The picking of the winners will take place in the procurement process. And put in place methods of building Canadian jobs into that.

You're right about what Germany is doing. They see renewable energy as being a big part of their economy. They're an energy-poor country. We're an energy-rich country. But the same equation applies to us as applies to them. They're just getting kind of anxious because they don't have much energy and almost no clean energy aside from wind and solar, which they're building furiously. And their industry is now the world leader, beyond any question.

**Mr. John Tak:** I appreciate what John is saying, but at the end of the day, we do make choices. You have to. As individuals we have to make choices, and as governments we have to make choices. So it's not really possible to say "Let's just create a policy that lets whoever emerges win" unless you create it equally for everybody. But that is not going to happen, and we all know that. We've already seen what the U.S. is doing and what Japan is doing.

So I think what you have to look at is getting as much information as you can. The Council of Canadian Academies has a report, and it's recommended to the government what the top areas of investment should be. I'm happy to say hydrogen and fuel cells is one of the top five in that category. So use that source of information.

Look at what the private sector is doing. What is one of our national objectives? It's that the private sector pick up the burden of R and D. Okay, well look around at which sectors are investing in R and D. In the hydrogen and fuel cell sector, 85% of all R and D is private sector. That sector should be rewarded for that kind of behaviour.

So I'd use those criteria, and at the end of the day, you pick winners and losers. We've already done it with ethanol and $2.2 billion, and that's an intelligent choice based on our abundance of resources, as you point out.

So pick your top five or top seven, and then create the strategies and the policies that will support the commercialization and success of those technologies.

**The Chair:** Ms. Nash, Mr. MacDonald wants to comment again.

**Dr. John MacDonald:** When you pick a project, it fulfills a need. I'm not saying we can't find good things to do and open the door to Canadians to respond. We're going to have to have clean energy in this country. Let's get on with building it and open the door. Put in policies that make it possible for skilled Canadians to respond. That's what other people do. That's what Denmark did. That's what Germany has done. That's what the Japanese did.

The Americans have funny subsidy policies, but they also have things called "renewable portfolio standards". It's a state-by-state thing, so it would probably be a province-by-province thing in Canada, but that mandates that the utilities have to produce a certain amount of renewable energy every year.

● (1530)

**The Chair:** Mr. Schubak, did you want to comment?

**Mr. Gary Schubak:** I'll be very brief. I want to reiterate something I may have already said, but I don't want to sound like a broken record.

I come from the fuel cell industry. I've been there for almost 20 years, working in that area. We have a lead in a very important area, and that's transit. Our fuel cell sector and its cooperation with bus manufacturers and integrators in that area is currently one of two offerings that are really out there in the globe right now and doing things. Our B.C. Transit program, with the Olympic Games coming in 2010, is a huge opportunity to showcase something we have that nobody else has.

Well, I shouldn't say nobody. There is another really strong contender out there, but we have a lead in this area and we should be paying attention to that lead now, because it could be a huge growth opportunity for us.

**The Chair:** Thank you very much.

Thank you, Ms. Nash.

We'll go to Mr. Simard, please.

**Hon. Raymond Simard:** Thank you very much, Mr. Chair.

Thank you for being here this afternoon. I have about ten questions, but I'll start with three or four. I think my first one is more a comment, actually.

When you speak about clean energy, alternative energies, I find that fascinating. I had the opportunity of speaking to the president of New Flyer Industries about a month ago. My numbers might be off a little bit, but it seems to me he told me that in 2003, 3% of his sales were hybrid or new technology. This year, 30% of the work they're doing is clean energy stuff. He has $1.2 billion of orders, and 60% of that is new energy.

We can build economies around this stuff. It is that powerful. This is the first time we've actually talked about it on our visit, so I'm very pleased to hear you speak to that.

That's more of a comment.

My question for Mr. MacDonald is this. You said you're moving towards cost parity with the grid. I'm trying to get a feel for what 100 megawatts would look like.

In Manitoba we had a wind farm, hooked up to the Manitoba Hydro grid, of 99 megawatts, and it cost $280 million, I believe. What would it cost for a similar thing in solar panels, and what would it look like physically?

**Dr. John MacDonald:** Is that 100 megawatts?

**Hon. Raymond Simard:** It was 99 megawatts.

**Dr. John MacDonald:** That's pretty big.

It's about 200 acres, roughly. With the technology at the moment, it's about 6,000 panels per megawatt, and the panels are roughly a little more than one metre square.

**Hon. Raymond Simard:** What would it cost to develop 99 megawatts with solar energy?

**Dr. John MacDonald:** At the moment, you can just multiply by somewhere between $7 million and $8 million. So for 99 megawatts —call it 100 megawatts—it would cost $700 million or $800 million.

**Hon. Raymond Simard:** So it's substantially more at this point.

**Dr. John MacDonald:** It's substantially more, but like all the renewables—or most of them, anyway—when you purchase the system, what you are really doing is buying future kilowatt-hours. So you have to amortize it over a length of time, and it gets fairly complicated.

**Hon. Raymond Simard:** And the technology evolves as well.

**Dr. John MacDonald:** Of course it does, and we have ways that we think we can creep up on cost parity. We have a long way to go.

**Hon. Raymond Simard:** Mr. Fissel, one of the things we've noticed in the last couple of days is that a lot of the federal government departments actually work very collaboratively with organizations, universities, and all that—Agriculture Canada in Winnipeg, working on nutritional foods, and Health Canada, working with the lab. So there is very good collaboration, and actually an exchange of scientists.

Is that happening with the Department of Fisheries and Oceans? It seems to me that they have the expertise in what you're talking about. Was it happening in the past? Is there something we can do when it comes to that specific department?

**Mr. David Fissel:** I'd like to say it is happening, but I think the programs in the Department of Fisheries and Oceans in the particular sector of renewable energies are not strong.

**Hon. Raymond Simard:** It's not their main focus?

**Mr. David Fissel:** No. We need to establish priorities in government in partnership with where we see priorities in the future of Canada's S and T policies, and where we want to go. Fisheries and Oceans has a huge mandate, so it's understandable. But again it's a matter of prioritizing, of deciding where they're underfunding, and putting more money in the science and technology there.

● (1535)

**Hon. Raymond Simard:** Are they best suited to handle this, or should we do it through industry or...?

**Mr. David Fissel:** I suspect it's true for all of us, but certainly for the ocean renewable sector it's not just one department. NRCan has a role. Fisheries and Oceans certainly has a role in the ocean engineering and technology side, and Environment Canada does as well. So on the way the federal government system works, we have split jurisdictions there, and sometimes they can be a barrier.

**The Chair:** You have a minute.

**Hon. Raymond Simard:** Perfect.

I think Mr. Schubak said we have five filling stations right now for hydrogen.

**Mr. Gary Schubak:** That's correct.

**Hon. Raymond Simard:** One of the comments made at our previous visit was that it's very difficult to handle hydrogen and move it as you move gas or fuel. How are you doing that, and is that going to be an obstacle down the road?

**Mr. Gary Schubak:** That's a good question.

Currently within the B.C. Hydrogen Highway, a local green source of hydrogen is being produced and purified from waste streams. So we have some industry on the north shore, and they vent out enough hydrogen for thousands of vehicles.

**Mr. John Tak:** It's enough for 20,000.

**Mr. Gary Schubak:** Yes. We're taking a slipstream of that within one of our programs, purifying it, compressing it, storing it in high-pressure power cubes, and dispensing it to various sites for usage. One of them is going to Port Coquitlam to use in the natural gas blend for vehicles there. It's being utilized at a fuelling station for hydrogen vehicles.

**Hon. Raymond Simard:** So you're shipping the product that creates hydrogen.

**Mr. Gary Schubak:** We're producing hydrogen locally from a green source, and then shipping it to the sites where we fill our vehicles. That's one program we have; it's not the only solution. I toured the facility this morning for the first time and was very impressed.

**Hon. Raymond Simard:** And it works.

**Mr. Gary Schubak:** Yes.

**Hon. Raymond Simard:** Thank you very much.

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

We'll go to Mr. Stanton.

**Mr. Bruce Stanton:** Thank you, Mr. Chair. I'll try to leave some time for my colleague, Mr. Van Kesteren.

Mr. Fissel, you mentioned some problems with the administration side of the SR&ED tax incentive. I think it's the first time we've heard about that at the panel. Can you give us some details on that? What's the main issue there?

**Mr. David Fissel:** SR&ED is a very good program, and one of Canada's real strengths for everybody in science and technology. It has been funded more in this last federal budget. As you probably know, it is administered by Canada Revenue Agency, which is not a science and technology department—it comprises accountants. In spite of their best efforts, they sometimes look to audit rather than encourage. That's a different mindset, so it's understandable. Canada Revenue Agency should focus on supporting industry with this program, not making sure the claim is 100% audit-proof, or something like that.

**Mr. Bruce Stanton:** Thank you very much.

Mr. Tak, either you or Mr. Schubak spoke as if there were almost a space race going on here for who was going to advance hydrogen technology into a practical and affordable technology for today's consumers. In this flat world, that seems to be a bit counter-productive.

Is there some way there could be some collaboration among the brightest minds in this field to find a way to move this forward more quickly, instead of each nation beating each other up trying to get there first?

**Mr. John Tak:** Absolutely, and there is that. We have memorandums of understanding with the California fuel cell partnership and the Scandinavian fuel cell partnership, where we share lessons learned. Right now there is a lot of global collaboration to get the market established. Then we'll blow our brains out in competition. So there is quite a bit of global cooperation.

It's interesting that the 20 buses Gary mentioned are hybrid fuel-cell buses. A lot of people think that hybrid technology is one thing and fuel cell technology is another thing, and that's absolutely wrong. These are hybrid fuel-cell buses. So we're cooperating with other sectors as well.

**Mr. Bruce Stanton:** Thank you.

**The Chair:** You have two minutes, Mr. Stanton.

**Mr. Bruce Stanton:** Let Dave go ahead then, and if there's time at the end, I'll come back.

**The Chair:** As we have four members here who have to catch a flight, I was going to gently impose on the panel and suggest that we perhaps go an extra five or seven minutes. Mr. Van Kesteren and Mr. Carrie and I are leaving tomorrow, and the four others are leaving. So Mr. Stanton, if you want to finish your questions....

Panel, is it okay for us to impose on you for another five to seven minutes?

**Mr. Bruce Stanton:** Thank you, Mr. Chair.

Okay, maybe I'll go back to Mr. Fissel. One of the comments you made was about the demise of IRAP in 2005. In fact, as I understand it, the program is still there. What do you mean by demise?

● (1540)

**Mr. David Fissel:** It's a good question.

I was talking about a specific IRAP program. The National Research Council's IRAP program continues to exist, though it's changed. I was specifically referring to the IRAP pre-commercialization assistance program, which was cancelled, as I understand it, in September of 2005. That program, in my view and that of the industries I'm a representative of, was at the key pre-commercialization stage of development. That's the final stage in R and D.

Research is well funded in Canada, but for getting into development and then into pre-commercialization and commercialization, where the economic benefits are, that program was the only one in IRAP and the only federal government program that had really supported that, other than a bunch of bigger programs called TPC, Technology Partnerships Canada.

**Mr. Bruce Stanton:** That's moved over now to—

**Mr. David Fissel:** Aerospace, yes. But that program was removed from the IRAP portfolio, unfortunately.

**Mr. Bruce Stanton:** And what's the distinction between the two? In terms of pre-commercialization, as I understand it, IRAP is really about getting money to the SMEs, and so on. Could you distinguish between those two again?

**Mr. David Fissel:** Most IRAP funding is more around the research end of things or the initial part of research and development, as viewed by SMEs. Often the gap comes when you have the proof of concept in place but then have to take it to the market, which is often much more expensive work.

**Mr. Bruce Stanton:** Well, is this applied research now, the kind that the community colleges are doing in advancing and developing the technology to the point where it could be picked up by a venture capital company, and that type of thing?

**Mr. David Fissel:** Yes, it's after the research and more on the development side of things, building the scale of something that's really commercial.

**Mr. Bruce Stanton:** It's the second part of the second stage.

**Mr. David Fissel:** That's right. It's a good point.

In attracting outside investment, this IRAP program plays a key part, because you can then leverage money. It's about partnerships again, and it really opens up getting outside investment too.

**Mr. Bruce Stanton:** I think Mr. Tak had something he wanted to add.

**The Chair:** Mr. Tak.

**Mr. John Tak:** I did want to add something that's not directly related to IRAP, but it is related again to the need to look at these sectors and to provide national strategies, and within those to take a purchase incentive. I think it's ironic that all of our wind technology is imported, mainly from Denmark, where they had a national strategy for wind power, but there's no incentive for fuel-cell products. Nobody gets an incentive to purchase the buses that are built in Winnipeg, but we are selling in the U.S., where they do have a fuel-cell purchase incentive. Korea has a fuel-cell purchase incentive. We don't count fuel-cell energy as renewable in Canada; there's no feed-in tariff for fuel-cell energy. In Korea there is a fuel cell....

So why is it that we're a leader in this sector but we have to go elsewhere to get the incentives to help us to commercialize it? That's a question for the committee.

**The Chair:** Okay.

Thank you, Mr. Stanton.

I'm going to go to Mr. McTeague for a 30-second question, and then Mr. Van Kesteren.

**Hon. Dan McTeague:** I appreciate that.

It dawned on me today and in the past couple of days that we've found ourselves in a situation—or at least one member has—where we are monitoring gas prices since coming out west. But the interesting part of that is I just came to the conclusion that Alberta, Manitoba, and Saskatchewan are in a very, very acute or critical situation.

Putting together all of what you've said, Mr. Tak, and Mr. Schubak, on your highway proposal working here, how likely is it that you'll find the kinds of wealth or investment opportunities you need, so that you can start to take the pressure off those three provinces, which are in a very critical or acute stage?

I just want to let the chair know that it's going to get a lot worse this summer, more so than for the rest of the country, including B.C.

How do you see yourselves working in those three provinces? Because in the next two months, they are going to be at a real loss.

**Mr. John Tak:** They have a challenge with greenhouse gas reduction and creating clean energy. A lot of fuel cells operate directly on natural gas, but because of their efficiency, they help reduce the greenhouse gases and the emissions that come out of using natural gas.

We're not talking about replacing fossil fuels. We're talking about working with fossil fuels to make them cleaner and last longer, and then gradually transitioning to using fuel cells that run directly on totally renewable hydrogen. So we're totally complementary to working in those sectors.

● (1545)

**Hon. Dan McTeague:** I want you there now, is really what I'm saying. It's becoming a serious problem.

**Mr. John Tak:** Okay, I'm happy to follow up.

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

We'll go to Mr. Van Kesteren.

**Mr. Dave Van Kesteren:** Thank you.

Mr. MacDonald, I'm curious, is Day4 in reference to the biblical story—

**Dr. John MacDonald:** You're number six in six years.

**Mr. Dave Van Kesteren:** —of the creation of the sun, the moon, and the stars?

**Dr. John MacDonald:** Yes, we have a little thing going. Until about ten seconds ago there were only five people who've known that since 2002. Now there are six.

**Mr. Dave Van Kesteren:** For the benefit of those who don't know, that was the creation of the sun, the moon, and the stars, and day and night.

I want to ask Mr. Fissel a question.

We've talked a lot about universities and how they can interact with industry. What about the reverse of that? How are you interacting with universities? Are you utilizing them?

**Mr. David Fissel:** Yes. Speaking for my own company, I can tell you that ASL Environmental Sciences has worked very actively with the University of Victoria, as we're in Victoria, and the University of Victoria's NEPTUNE and VENUS projects—the underwater observatories. There's a lot of back and forth. We sell products and technology with discounts to that major Canadian research effort, and our scientists work with their scientists.

This is a work in progress. I can't point to any great results so far, because the funding is just under way now, but ultimately, in the end we see the benefits being that we can take the technology that arises from the research there in this groundbreaking or deep-ocean water-breaking effort, and by working with them we can look for opportunities where we can commercialize it through companies like ours.

Also, the people who are there are a tremendous resource. Universities provide great people. I think somebody else here mentioned that Canadian scientists and engineers are second to none in the world in terms of their capabilities when they graduate and come out of those universities. Sometimes the issue is what will they do then, because universities can't employ them all. Again, that's where you need a very strong private sector. We need to do better in Canada in that area.

I don't know if that answers your question.

**Mr. Dave Van Kesteren:** Does anybody else want to comment on that from their own experience? Are you using the universities' work?

**Mr. John Tak:** Absolutely, and we have a number of networks. We have a PEM fuel-cell network, a hydrogen research network, and a solid oxide fuel-cell network outside of Alberta. They're tied into universities across the country, identifying the research expertise of each professor. We have a website where we tie in and they can find out what each is doing.

Getting back to your question of collaboration, absolutely, it's critical.

**Mr. Dave Van Kesteren:** How much time do I have?

**The Chair:** You have two minutes.

**Mr. Dave Van Kesteren:** I asked a question earlier to one of the professors. I fear somewhat that as a government, because we're so obsessed with getting results for the money that we spend, we tend to funnel and herd them in a certain direction. Is that the right approach? Should we just let academics go out there and do what they're good at, discovering things? Will you get the benefits if we adopt or go back to that process?

**Mr. John Tak:** Actually, the government does now. Many programs require researchers who are getting money to link in with the private sector. You have to have a certain matching amount. That sort of guides the research that they do. But I think you do need some fundamental pure research going on, and you don't want to hamper that at the same time.

**Dr. John MacDonald:** I taught at universities for 12 years. These are the places where knowledge is discovered. I think the idea of coupling it into the industry provides a mechanism to get it applied—for example, the sponsoring of research chairs and that type of thing. The mandates that the team that's working on whatever project it is be both industrial and academic are very positive things.

But I don't think one should ever get carried away with trying to force professors into applied research if they don't want to go there, because they won't.

● (1550)

**Mr. David Fissel:** I could add that the interface between university and industry is highly variable in Canada right now. In some places and with some programs, it works quite well, and in other places it doesn't work at all. That's an area in which we could do a lot more and try to be more uniform.

It's true about university technology transfer offices; better yet is active collaboration by bringing industry in at the research stage. Industry will decide what makes sense and what doesn't in terms of going further, but often now I think there are Canadian companies that aren't even engaged, and that's maybe a missed opportunity.

**The Chair:** Thank you, Mr. Van Kesteren.

As chair, I will just take a few minutes again to impose on your time.

I'm interested in your comments about the IRAP program and I want to ask about solar energy, but can we get some further feedback about why the pre-commercialization program was cancelled?

You said, Dr. MacDonald, that IRAP is being ruined. You probably have a big answer to that, so if you want to give us—

**Dr. John MacDonald:** I'm sorry, what was it you just asked?

**The Chair:** You said the IRAP program is getting ruined by the accountants.

**Dr. John MacDonald:** Yes.

**The Chair:** That's a big question, and you may want to touch on that, but I do really want to ask about solar. My riding actually has the Imperial Leduc No. 1 well. It was the biggest oil discovery in 1947 and started the modern oil industry in this country, but Alberta, I'm told, has a greater percentage of days of sun than any other province, and I think it's a shame what my own province has done in not utilizing that at all.

Last weekend I was down in New Mexico at the Sandia national research facility on solar energy, and I just think it's astounding how we haven't utilized it. California is apparently going 20% solar by 2015, a very ambitious target; you've mentioned what Germany has done.

In my own riding a small solar provider gave me an earful and said Alberta is the most backward place in the world in terms of solar energy. He talked about the feed-in tariff and about something else you need in terms of getting on the grid, but then he also talked about the way in which the small solar producer interacts with the grid, and there has to be a neutrality or something. Can you enlighten us on that?

**Dr. John MacDonald:** I'm not quite sure what he meant. The small producer.... The utilities don't like distributed generation, but the future will have to be that way, so there's a lot of work to be done.

When you interact with the grid, there has to be an interface so that when the solar is producing energy, it's feeding it into the grid or you're using it yourself. It's basically free energy in terms of the fuel.

I'm not quite sure what he would have meant by balancing.

**The Chair:** The term applied the way you just said it: at certain times someone will be feeding in, and at other times the person will be utilizing it.

**Dr. John MacDonald:** Oh, yes, absolutely.

**The Chair:** I don't know what the phrase is for that.

**Dr. John MacDonald:** In fact Xantrex, which is a Canadian company here, specializes in the equipment that does that.

**The Chair:** Is the feed-in tariff something the federal government should do, or should the provincial governments do it? Should it be joint?

**Dr. John MacDonald:** It would depend on who has the constitutional responsibility, I suppose. You guys know more about that than I do.

It's basically legislation that makes the utilities do certain things, and I described it. Ontario, as I say, has this so-called standard offer program, which is in fact a feed-in tariff structure. It's the only province in Canada that does. It works very well, at least in my experience. It's a procurement system. You could do the same thing with the Bay of Fundy or wherever, because we're going to need renewable energy. Starting projects by whatever means....

Look at what we did in B.C. when W.A.C. Bennett was premier: we built all those dams. That was done by government. This is the same thing, 21st century style. It's the same concept. It's infrastructure for future energy generation. Provinces such as Alberta and Saskatchewan—provinces that are basically fossil-fuel-supplied—should be very interested in that.

You're quite right about the solar insolation supply: Alberta is the place. Southern Alberta is the sunniest place in Canada, and southern Saskatchewan too; the two of them are together.

● (1555)

**The Chair:** For your information, our colleague, the chair of the environment committee, Bob Mills of Red Deer, is spending about $55,000 to make his home a solar home and put power into the grid. It's interesting that because he's an Albertan, they made him join the Alberta energy producers. So there's Suncor, Syncrude, EPCORP, TransAlta, and Bob Mills. I thought you'd find that interesting.

**Dr. John MacDonald:** He's in there with all the bad guys.

**The Chair:** I see I'm out of time. We can have a bit of an off-the-record discussion afterwards.

I want to follow up, Mr. Fissel, on what you talked about with respect to SR&ED. Perhaps we can do that offline, because I know members have to catch a flight.

I want to thank you. It was a fascinating panel. If you're ever in Ottawa, please let us know. We'd be glad to get together with you again.

Colleagues, thank you very much for this week. It was a fascinating and wonderful experience.

I want to concur with what one of our colleagues said earlier today. Thank you to all of our staff who helped us out this week. It was a trying experience for them, and hopefully as enjoyable for them as it was for us.

Thank you.

The meeting is adjourned.

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