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COMMITTEE

ON

ECONOMIC DEVELOPMENT

Thursday, February 13, 2014

RED CHAMBER

Oceans Technology Sector

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ECONOMIC DEVELOPMENT COMMITTEE

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Mrs. Darlene Henry
Legislative Committee Clerk

WITNESSES

Oceans Technology Sector

Mr. Jim Hanlon, CEO
Institute for Ocean Research Enterprise

Mr. Tony Goode, Associate
CFN Consultants (Atlantic) Inc.

HALIFAX, THURSDAY, FEBRUARY 13, 2014

STANDING COMMITTEE ON ECONOMIC DEVELOPMENT

10:00 A.M.

CHAIRMAN
Mr. Joachim Stroink

MR. CHAIRMAN: Good morning, I would like to call this meeting to order. I remind those in attendance to please have their cellphones turned off, silent. We will start with the members of the committee, please introduce yourselves.

[The committee members and witnesses introduced themselves.]

MR. CHAIRMAN: Thank you all for coming today. Today we have the following item on the agenda: the Oceans Technology Sector. Reporting on this are Mr. Jim Hanlon and Mr. Tony Goode. Good morning, gentlemen, you may now begin your presentation.

MR. TONY GOODE: I'll get this presentation up here. I thought I had it but sometimes technology escapes you.

Ladies and gentlemen, thank you very much for the opportunity to brief the committee this morning. I have a number of charts so I'm going to try to go through them very, very quickly. My presentation will go through sort of an overview of the ocean-tech sector, some of the options, and some concluding comments about the state of the sector at this stage of the game.

What we'd like to say is that the ocean-tech sector covers a broad range of sub-sectors, if you would, in the province, and these are just some of them: offshore or coastal energy; marine transportation; marine-based resources including the biotech, the biofood of life; defence and security; education and training; ocean observation; marine recovery; and government services. It's a very broad-based sector and it's very hard to define because it is so broad-based and it affects so many parts of the economy.

The expertise is strongly focused on the offshore and coastal energy sector, defence and security. The companies are largely small and medium-size enterprises. There are very few large companies at work in this sector at this stage in the game. I'll show you some stats to support that and, as a result of it, their annual sales are relatively small as well, ranging anywhere from $0.5 million up to over $10 million - some of the larger companies. In aggregate, as I will show you, it represents a big chunk of the economy at this stage of the game.

One of the things that has supported this sector is the fact that they export. The latest study we did a couple of years ago showed that 86 per cent of the responding companies got some of their revenues from export, and over one-third of those companies received over 50 per cent of their revenues from export. Export has been what has allowed them to survive, and they've done that without literally any government support whatsoever. These guys are truly entrepreneurial because they have to be, and it is survival of the fittest in a very, very tough sector.

As a result of that, they innovate. They conduct a great deal of research and development. Many of them, almost close to half of them, generate intellectual property which they patent, which helps them survive in the sector. I'll show you some stats which sort of support this at this stage in the game. This is information, data that was provided from the Department of Finance that shows the revenues that these companies report in the sector. Now there's some overlap so you can't add it all up, unfortunately.

The aerospace sector - and you see the other thing that's key - has grown significantly over the space of the last 10 or 11 years. So aerospace, companies such as IMP and L-3 Electronic System Services, they have generated $744 million in revenue and that's almost triple. Defence, $1.4 billion here in Nova Scotia and growing and forecast - even with the decline in defence spending - to grow even more as a result of the National Shipbuilding Procurement Strategy, and then Ocean Technologies over $1 billion as well. So there's some overlap, you can't add these all up, unfortunately, because companies that work in aerospace also do work in ocean tech, companies that work in defence do work in ocean tech, as well as the other side. In aggregate, it's a large chunk of the economy and, again, flies beneath most of government's radar at this stage in the game.

This is a very busy chart. You've got a copy of it in the slides but it shows you what the companies are actually doing, what sectors or what sub-sectors they are working in. It shows the diversification and the expertise across a wide range that Nova Scotian companies have developed. I think our stats show close to 300 companies working in this sector, ranging in size from four or five employees up to those with a couple of hundred, et cetera. It's a very, very large sector in the economy and, as I say, flies beneath the radar a great deal.

This shows the number of employees of the company. Unfortunately, with my glasses I'm having trouble reading this at this stage in the game. Most of them are relatively small companies and very few are over the 100-plus employees at this stage of the game. Our sample size - we did a survey a couple of years ago and we surveyed over 250 companies. We got about 75 or 100 that answered. Some didn't answer completely because they're very sensitive to retaining their information.

Annual revenues, again they range from some at $0.5 million - a lot didn't report - and then a significant number with revenues over $10 million. Again, all of these figures are in your package.

Export sales, virtually everybody exports, about 80 per cent of them export. Some receive less than 10 per cent of their revenues but others receive a great deal more of their revenues from export and it's the key to their survival, given all the ups and downs of spending in Canada. If they didn't, if they relied on the Canadian market, they wouldn't survive.

The export markets, they export around the world, but as you would expect, most of the markets are in North America, South America, Europe, and Asia, but they're around the world. As Jim says, many of the executives of these companies have elite status on Air Canada because they're always on a plane. They're going everywhere around the world to sell their wares. They are competitive and they're able to do so in a very tough world.

The key to their success and their survival is the fact that over 60 per cent do research and development. Without the research and development - and they take advantage of the federal SR&ED credits - they wouldn't be able to survive. That sort of gives you the number that we're talking about.

This chart shows you the fact that a lot of them funded themselves through their own internal sources. Others get their money from external sources, from IRAP programs or from other companies or universities that fund from the research, et cetera. Then out of the number that we've got there, a significant number, close to 40-plus per cent of them, generate IP, which is basically patents that they then can protect, which allow them to support their business going forward.

The research and development, as I've indicated, is a key part of the value chain because without it, they would not be able to sell around the world so they have to stay on the cutting edge, and that research and development allows them to do that for future technology, products, and then ultimately sales.

They do most of the stuff themselves. They do work sometimes with public institutions such as DRDC, BIO, NRC, and then sometimes with universities - relatively little with the universities, given the amount of public resources devoted to universities. It is a point that Jim and I will harp on as we go forward. They receive relatively little funding to conduct research and development, apart from what they get from SR&ED credits, which is a federal government program, which is in the process of change at the moment - not sure where that one is going to go.

We think that there is a new paradigm required, given the fact that these companies, as I say, have done very well. They could do a great deal more if there was a different approach to the way that they fund and support their research and development. When we talk to these companies they say it's a very frustrating business to try to get funding support from the government, whether it's at the provincial level or at the federal level. One of the reasons is there is such a host - it's an alphabet soup of programs. Every one of those programs requires a different application process, whether it's at the federal level or the provincial level. Every program has a different set of requirements in terms of providing data, so that frustrates them and a lot of guys say, I just haven't got the time to bother with it at that stage in the game. So that's a bit frustrating.

In the past the federal government, which of course buys a great deal of the output of this, used to have policies in place to encourage the adoption of locally developed technologies. Companies such as Ultra, other companies here in Nova Scotia and the rest of Canada actually ended up selling their - (a) they would develop with government assistance, working closely with the labs; (b) they were trialed by the Navy or by the Coast Guard; and (c) they were adopted by the Coast Guard or the Navy. If you take a look at the original Canadian patrol frigate, a great deal of that technology was developed by Canadian companies in conjunction with the federal government.

Now with the change in policies in terms of compete, compete, compete, you have to prove yourself outside the country, so they do not encourage the adoption of local technologies. It's a real issue now. That is changing as a result of the Jenkins report and as a result of some of the latest changes in defence procurement. We'll have to see how that all works out.

Human resource planning's real issue - I mean, these people employ highly skilled, highly trained, well educated people and our universities produce a lot of them, but it's hard to keep them and many of them leave. Many of them are come-from-away in the first place and don't necessarily stay here, so human resource planning going forward is a real issue and that affects every sub-sector in this particular sector and I think the economy as a whole.

One of the reasons we've done well here is that we've had a company around here - it used to be Hermes and then it was Ultra - it is Ultra at this stage in the game - they've been around since 1947. As an anchor company, they have spawned a number of other companies that have either sold to them or developed their own technology and then have moved on into the export world. So if we had another company of that calibre, of that size working in the sector in Nova Scotia, it would be a very good thing because it comes then with its own value chain, with its own supply chain, et cetera. That would be a great thing to do.

Now how do we get something like that going? That's another question altogether. There would have to be programs to support it.

Where we live is actually not an impediment to growth. The fact is that we're relatively close to Europe, we're very close to the United States, and we're not all that far from South America. So being here, surrounded by the ocean and being relatively close to Europe, particularly to the U.K. as an entry into Europe, it is really a strategic asset for us. We are sort of halfway between the U.K. and California, and that works very well from our perspective.

I'm going to move on to the next one. We need to do things that sustain the innovation. I think that was one of the key messages that came out of the Ivany report yesterday about innovation and the development of new products and services, because that's the lifeblood of the industry, in the face of very, very fierce competition.

There are problems, of course. Government funding is being reduced, it's getting more expensive to do business - and Jim will talk about this in a little bit more detail - and companies have a great deal of difficulty in accessing the huge amounts of intellectual property generated within our universities. Companies get frustrated in trying to deal with university researchers who have their own agenda, driven by different requirements, et cetera, so it becomes very, very difficult for companies to go to universities and say, I want your help in solving a particular problem. It happens, obviously, so we are looking at a different approach.

The Germans a long, long time ago, after World War II, set up something called Fraunhofer institutes, funded by the federal government in Germany and with industry, which were focused on research and development into industry-generated requirements and problems. We think the time has come to do something like that in Nova Scotia as a pilot project. We've recommended it to the federal government, I've recommended it to the provincial government, and I'm now recommending it to you because I think of it as a very good way of nurturing this requirement for new products, new research and development, and applied research and development.

It's evident in looking at the way government is organized that government is focused. If I take a look at the Department of Agriculture, the Department of Fisheries and Aquaculture, the Department of Natural Resources and forestries, all of which are focused on what I would consider to be yesterday's industries, although obviously it is underpinned by a great deal of technology today, there's no department within government, or a section within government, that is focused on science and technology, advanced manufacturing, which is the key to the knowledge economy of tomorrow.

There are very few bureaucratic resources devoted to the sector that we've been talking about. Some would say that's great because they don't have to worry about it but, on the other hand, it would help if there was a focus inside government on the science and technology requirements that underpin this particular sector.

There's also a need for a government procurement model that helps in the commercialization that technology develops within companies, as well as within the universities. There are some programs that are out there right now - the federal Department of Public Works and Government Services has a small program to support the commercialization of technology, and it does work. That's just one instance that has only come into place in the last three years or so, so we need to have a model that supports that. I'm going to skip my next chart, you can read it.

The last message I'd like to leave with you: this sector is robust, export-oriented, and focused on innovation, which is the key to the sector's future. It's an asset for this province. We are well positioned to be able to take advantage of it and to grow as a major component of what we hope becomes the new paradigm for the Nova Scotia economy: a knowledge-based economy going forward, utilizing science and technology. To do that, you've got to have the active involvement of government at all levels, academia, and industry acting as partners to move this ahead, working in concert with each other.

That concludes my charts and I look forward to any questions that you may have when we get into the question-and-answer session.

MR. CHAIRMAN: Thank you very much. Mr. Hanlon.

MR. JIM HANLON: As Tony said, it's my honour to be here. I have a great deal of passion for this industry and its value to the Nova Scotia economy. Thank you again for having us, I really do appreciate the opportunity. A bit of a bait and switch, I introduced myself as the CEO of the Halifax Marine Research Institute. At a board meeting in December, we actually agreed to change our name and I think it's important to talk about that for a moment. What was the Halifax Marine Research Institute is now the Institute for Ocean Research Enterprise. It's a very appropriate name given what our charge is and, in fact, that charge is to develop economic value from ocean research, hence the name. So I think it really is a very appropriate name and, in many ways, more appropriate than our previous name, so henceforth we're going to be known as the Institute for Ocean Research Enterprise.

A real quick synopsis on me, not just because I want to tell you about me, but it puts it in context. I'm a serial entrepreneur. I've been on the ownership teams of two ocean tech companies here in Nova Scotia. I'm an electrical engineer with an M.B.A., a product of the local university system. I've spent most of my 35 years in ocean tech here in Nova Scotia and also in New England, and have also had the opportunity to sell my company - in two cases to large multinationals and in both cases then was the local managing director or president. My last role in industry was as the president of Ultra Electronics Maritime Systems in Dartmouth that Tony mentioned earlier. So I've got some certain perspective and a great deal of passion about the value of this industry as we go through this. Without further ado, I'm going to tell you a little bit about my perspective on the industry and its potential.

As Tony said, there are a multitude of sectors or sub-sectors within the ocean industry at large. It's like saying land industry - it's a very broad definition - everything from shipbuilding to fisheries to security and defence to oil and gas to transportation, recreation and leisure, et cetera. Underpinning all of those, increasingly, is ocean technology, so what we historically would know as low tech industries or low knowledge-based industries, the old fishing industry is no more. Those industries are now all very high tech. They're all based on technology and it's that ocean technology that provides the competitive advantage for all these industries that speak to the ocean.

To put that in perspective, I want to sort of speak to the global statistics. The ocean industry at large is growing. It's not in retraction in any sense - it's growing at a global level. As a couple of examples, in resource extraction, in ocean oil and gas, the big growth in that area is in deep-water drilling. If you look at the statistics that come out, the vast majority of the new exploration that's going on in the world is in deep ocean. A lot of that is coming into play off of Brazil. Interestingly, our new leases that are approved off the Shelburne shelf are in deep water, so we're at play in an area that is very much at the vanguard of offshore oil and gas, which is really interesting from a future economic value point of view.

In fisheries and aquaculture, we can debate at length the merits of aquaculture and how it should be conducted properly or at all, but fundamentally at a global level that is no longer an argument. Aquaculture will surpass capture-fishery as a food source in terms of landed gross tonnage by 2018, so it is, in fact, the growth industry with feeding the world. There is no question at all that we are dependent on that source of protein to feed the six billion and seven billion people that are in the world, so it's sort of a non-issue other than at a local level, to be very blunt about it.

Marine transportation - this is a statistic that folks in the marine industry know, but maybe the public in general doesn't - 90 per cent of the world's goods travel by sea so that is the route of commerce for virtually the whole world. On the basis of green, it actually on a per-ton/per-kilometre basis is the most green way to transport goods. It's a very, very efficient way in terms of its carbon footprint. It has its imperfections and there's certainly a lot of research and development going on to even improving that, but on a delivered ton per kilometre basis, it is the greenest way of transporting this, bar none.

Because it's such a huge conduit for commerce, it has certain vulnerabilities, so security and defence remains a hugely important part of the ocean. It's over-written large here in Halifax because it's a large Navy base for the country. In general, people do under-appreciate the risks of the open seas, from the point of view of security and defence, so that's very much an element of the ocean economy.

Going forward, the Europeans have just done a study looking at what are the new industries emerging in the ocean. Some of them are, interestingly, areas where we in Nova Scotia are already at play, so I think we're well positioned for future growth in some of these newly emerging markets. I would say that they don't represent currently large percentages of the total GDP of the ocean but they are growing, they are definitely on the ascendency. Things like marine renewable energy, for a whole bunch of God-given reasons - we have the Bay of Fundy, it's the Mount Everest of that, it's singularly the largest tidal energy resource in the world, so we are, in fact, taking advantage of that through organizations like FORCE, among others.

In marine biotechnology there's a trend towards extracting biofuels and ocean nutrients from the ocean. We have some significant players there, both in the public sector in our National Research Council facilities and also in private sector companies like Acadian Seaplants and Ocean Nutrition, so we're in play on that.

Offshore aquaculture, Cooke is very active in the province. I was really gratified to hear they have a new Industrial Research Chair established at Dalhousie, looking at improving aquaculture practices. As I talked to them - we had a wonderful discussion with them the other night - they are, among others, looking further towards offshore aquaculture where it even raises the bar further on the need for good engineering and good science to make that viable, so we're well positioned for the future.

Underpinning all this is a really rich ecosystem of companies here in Nova Scotia that are globally very competitive, as Tony alluded to earlier. I just want to throw some names around. I know for a fact that I will be leaving some out and I'm sure I'll get calls tomorrow from some of my friends in other companies that are not on the list so I'll pre-apologize for that, but these are just some examples. In the case of ocean monitoring, when I travel - and I travel a lot - to Europe, to Asia, to the rest of the Americas and people say where are you from, I don't need to explain beyond just saying "Halifax" in this market because we're already on the world scene. It is a known centre of excellence in ocean

science and technology. I don't need to explain where Halifax is; unlike in other industries where you might, Halifax is on that map.

We are second to none in things to do with ocean monitoring. The sensing of the ocean is a really deep, rich capability here in this province. Using a variety of physics, acoustics, underwater sound, optics, underwater light, the chemical sensing of the ocean and tracking and locating - I won't list all of these but there's a large number of companies here. Interestingly, just to highlight it, a number of these are not here in metro, they are outside, in the outlying regions. Ocean Sonics, for instance, is resident in Great Village - who would have known? This is a world-class company producing smart hydrophones that are being used by Navies around the world and by ocean researchers around the world, in a place in Great Village, Nova Scotia.

Another example, Pro-Oceanus, on the chemical side, Bruce Johnson is a Ph.D. graduate from Dalhousie. He runs a company out of the old courthouse in Bridgewater, producing chemical sensors, CO_2 sensors that are used around the world in ocean research. I think there's a really good example of this industry being viable, certainly in metro, because you do need the strong ties to the research infrastructure but, because it's so value-add, it's not limited by transportation and large material costs. You can really run these businesses in most places around the province.

The point I would make, and Tony and I have had a long debate and we were in violent agreement on this, is that fundamentally these are knowledge-based industries. The goods in trade on this are intelligence and expertise and experience, not material advantage. It really matters not that you are close to your market as it might in other more traditional industries. This is a high value-added industry and it is based on how smart you are and can you outsmart your competition on a global basis. We're really, really quite good at that.

To support that contention, if you look at the statistics, the business enterprise R&D rate within this sector is the highest of any sector in Nova Scotia. You measure that by scientific research and development tax credit claims, you can measure it by employment of degreed engineers and scientists. By any metric, these folks spend a huge amount of their retained revenues, their profits, in research and development, which makes them highly productive, which makes them highly globally competitive. That's really the key to why they're successful.

They are highly export-based, Tony has already alluded to that, and they are globally competitive. These folks - I think not to be disparaging to my friends within some of the provincial government - I think we often fail to recognize that these are highly sophisticated business people who have stood the test of international competition. They are not neophytes; they are different in some respects from the stereotypical "mom and pop" operation of an SME, these are very sophisticated small businesses, very, very globally competitive. A high percentage of them have university and college graduates.

In the two companies that I was proud to be an owner of the statistics ran in the high 90s in terms of percentage with community college and university degrees, and a great percentage of those actually had graduate degrees so it's very knowledge intensive and those are trending up. Even in the traditional manufacturing operations like the operation I ran in Dartmouth, Hermes Electronics or then Ultra Electronics, over time that transitioned from being dominantly low-skill labour or mid-skill labour to highly-skilled labour, engineers and scientists. So that statistic, even in those bigger manufacturing operations is trending toward this direction. As a result, higher median salaries, long-term employees, a very resilient workforce, and they stay here so it's really quite an attractive proposition.

To my point, this is not aspirational, we are already very good at this on a global basis, so this is not something we aspire to be, we are currently in the lead. I would put us in the top 10 centres in the world in terms of excellence in ocean science and technology. That would be supported if you were to go to some of the other centres like Woods Hole, like Scripps, like Kiel, Germany, or Brest, France, they would not dispute that. I think that's a well acknowledged fact.

Much of that strength - now to go to the sort of threat issues - has come from the large federal government labs that are resident here in town. Bedford Institute of Oceanography, the Defence research lab, and the National Research Council have been a great source of intellectual property, of capitalization, of customer requirement definition, of partnership, and of people that have really underpinned the robust ocean technology cluster that we have here in Nova Scotia.

I've just come off a one-year stint with an expert panel with the Council of Canadian Academies looking at the future of ocean science and it is very clear that those labs are down-trending in terms of their science budgets, they are not in growth mode, they are retrenching for a variety of policy and economic reasons. The challenge for us is to recognize that and make sure that we don't lose that engine that really does underpin our ocean tech industry here in Nova Scotia. I have some ideas on what we need to do about that.

The universities by contrast have fundamentally been the source of well-trained graduates as opposed to the source of the intellectual property for the most part. There are exceptions that would sort of prove the rule and some of them are really quite spectacular, but in general that has not been a tech-transfer play, a royalty-based tech transfer, they've been just the source of the talent for the industry. As I've said, the shift is no question toward more federal government investment in science activity in universities and colleges and less within the walls of the federal government. We need to recognize that trend and take full advantage of that shift here in Nova Scotia.

I want to lay down a couple of tracks and talk to the positive things that are going on here because it is a spectacularly positive story, it's not negative in any stretch, and then I'll finish with some comments about how we can go even further.

A couple of things that you need to be aware of, if you're not already, Dalhousie this past September has just launched its new four-year undergraduate degree in ocean science. One of very few in North America, there are not very many undergrad degrees in ocean science in the world, most of them are graduate degrees. This is speaking to a market that I think is very interesting because those young people will come out of those degrees well equipped to enter industry, as we've just described, to start their own businesses or to go to grad schools, so I think this is a really good step in the right direction by Dalhousie.

Two of the largest-funded science programs in Canada and, in fact, ocean tracking network in the world, are based here in Halifax. MEOPAR, the Marine Environmental Observation Prediction and Response Network, is a network of centres of excellence funded by the federal government. It's a $25 million program over five years, renewable twice, so $75 million worth of ocean research, looking at novel ways of predicting and accommodating ocean change, what's going on in the ocean in terms of more severe storms, changes in sea level and how do we adjust our infrastructure to accommodate all that. It's very profound work and it involves scientists from across the country.

The Ocean Tracking Network is funded to the tune of about $150 million over the life of the program and involves researchers throughout the world, headquartered here in Halifax and it's basically doing a census of marine life in the ocean. They're using acoustic tags manufactured by a Nova Scotia company called Vemco. Biologists are attaching these to fish and marine mammals around the world and then picking up those tags as they pass certain locations and doing an inventory, doing an assessment of where are the fish, where are they moving from and to, and how do we better manage that resource. That is one of the largest ocean science projects, bar none, in the world going on right now and it's headquartered here in Nova Scotia.

It's very gratifying for me to see the new advanced diploma in ocean technology that's launching this coming September at the Waterfront Campus of the Nova Scotia Community College, I think that's a wonderful move. It's going to be run by a gentleman named Brian Beanlands, who is a real veteran of the whole ocean tech scene, he has worked at Bedford Institute for decades and brings a huge expertise to bear, so that's a very exciting move.

OERA and FORCE are very active in marine renewable energy on the R&D level and I think are very forceful in insisting that we get our full industrial value out of that, as opposed to just kilowatt hours. I work with those folks a lot and I'm gratified to see that they are doing a great job there.

Just to make it clear, all the universities in Nova Scotia are members or participants in my organization, in IORE, and there's work going on at all the schools, not just at Dalhousie. Dalhousie, because of its size, is certainly a major Canadian research university, no question. Interestingly, there's very interesting work going on at Acadia around the ecology of the Bay of Fundy; at Cape Breton University with their new Verschuren Centre, doing some amazing work on environmental remediation in the Bras d'Or Lakes and in Sydney; St. F.X. working on some really interesting chemistry work around non-biocide-based biofouling paints, amazing stuff. At Saint Mary's the Sobey School has just joined my organization, hoping to bring their wonderful, deep, entrepreneurial capability of their business school to bear on this sector. As an M.B.A. graduate from Saint Mary's, I'm really proud to have them part of the organization as well.

I'm going to throw this slide up and then leave it for your analysis; you've probably seen it in your package. This came from a presentation made by the chief economist of CIBC World Markets that I attended last week. Basically the chart on the left says that we, as a country, graduate a larger percentage of our population with diplomas, community college diplomas and university degrees, than our peers within the OECD. By far, we stand out, so more than 50 per cent end up with a diploma or a degree.

The slide on the right is the more perplexing and the concerning one, which is then we basically under-employ or under-wage those people in the economy. You can draw a variety of conclusions from that. I'll mention a funny one, in passing. I debated this with my colleague David Klassen, who is a lawyer; he works with me at our organization. He said, well, one of the conclusions is you can have a really rich, interesting dialogue with your barista when you are getting your coffee in the morning, which I suppose is true.

I think it's a concerning statistic and I think it speaks to the fact that we need to find appropriate use of that talent and skill. Certainly the ocean tech industry is one of those areas.

My final slide is some suggestions from me, the person, the individual, Jim. I would say I run the risk of sort of offending some folks with this but I think not so much, it's really self-evident to a degree. We need to get more ocean tech start-ups coming out of our universities and colleges. My view is that that tech transfer happens by leaving the university, not by licensing agreements or movements of paper. My experience as a tech entrepreneur is that intellectual property is in people. It certainly needs to be protected in forms of patents and copyrights, but I think that movement of technology happens by people, young people being trained and equipped in the tools of entrepreneurial behaviour in the universities and then leaving to start their own businesses. I think that's imperative for the growth of the economy in Nova Scotia.

Tony alluded to this and I'll come back to it, there is a gap, there is an R to D gap that exists here in Nova Scotia and I think more broadly, we have some very powerful research universities in Nova Scotia, including Dalhousie. There tends to be a gap in moving that through development into the economy. Other jurisdictions - Tony alluded to the Fraunhofer model in Germany, and in the U.S. it's generically applied research labs. What you have in general is an organization that is often attached to a major research university but outside of the faculty tenure structure that's applied. What their purpose is is to take that low-level intellectual property, that early publication stuff, and distill it down, to drive it up the TRL curve, as we call it in the industry - the technical readiness curve - to make it more readily acceptable by industry. I think we need that.

I would argue that historically we've had those sorts of things in the old Nova Scotia Research Foundation, if those in the audience are old enough to remember that. It has mutated into Innovacorp, and I think Innovacorp serves a really useful purpose in terms of financing and capital movement. The old NSRF was actually a common-use lab facility and research facility that underpinned Nova Scotia ocean tech industry and other industries in a way that is no longer available to them. I think it's an interesting concept.

We need a tighter coupling between our community college, our engineering faculties, and our ocean science faculties. I call it the Woods Hole model. I lived for a period of my career in Massachusetts, which arguably is one of the pre-eminent clusters in the world in terms of ocean science and technology. The value that they get out of that tight interaction between science, engineering, and technology is undisputable. That drives their economy; their economy is hugely dependent on the ocean and they play at the highest echelon, globally, as a result of that.

So more connectivity, I think there's goodwill there but there are impediments in terms of funding formulas and articulation agreements between the various schools that we do need to address.

Lastly, my last soapbox issue is to do with STEM - science, technology, engineering, and math - and I do think that our public schools need to bring more of that to the table. The folks that are getting into the engineering science programs and business programs at the universities need to be well-equipped in terms of math literacy or numeracy. I think we need to step up to that issue in our public schools.

I'll bring to the table, just in parting, a model - something called the Gulf of Maine Research Institute, based in Portland, Maine. I've had the joy of visiting that facility a couple of times. It's a very interesting model. It was built on an old Coast Guard base that was decommissioned in the City of Portland right on the waterfront. It was built as a facility for doing active ocean research, so resident there on secondment are researchers from the University of Maine and the University of Massachusetts doing actual real-life research.

The interesting part is that the State of Maine has decided that all of their middle school students - I believe in Grade 7 - will spend two days at this facility being exposed to science, technology, engineering, and math in the form of an ocean experiential learning facility, touching on everything from pure ocean science and ecology to how you make money as a lobster fisherman. So it's a really profound way that they've engaged their young people and recognize the value of that to their ocean-based economy which, incidentally, is not far different from ours in scale, makeup, and population. There are a lot of parallels there. Thanks for your attention.

MR. CHAIRMAN: Thank you very much. I would like to open up the floor to questions now. We'll start with one from each Party. We'll start down on our end. Ms. Lohnes-Croft, would you like to go first?

MS. SUZANNE LOHNES-CROFT: I was glad to hear you speak of the education component because we have an abundance of universities in this area - Dalhousie being the only one with a four-year degree. Is there any movement for other institutions to bring in a four-year degree program?

MR. HANLON: In ocean science?

MS. LOHNES-CROFT: In ocean science.

MR. HANLON: A lot of the universities have biology programs and certainly the associated university program of the engineering faculties brings all of the universities in, culminating in the final couple of years at Dalhousie, so there is something there. I would say there is probably not enough market to have a multitude of four-year undergrad marine science programs. To put it in perspective, there might only be one or two others across Canada and maybe only a dozen across North America. I think there is a market, but I don't think there is a market for an infinite number of them. I think that's probably appropriate for right now.

MS. LOHNES-CROFT: I was curious about that STEM program in Maine, where I think we don't take advantage here in eastern Canada of our natural resources and the ocean being a natural resource. Being from Lunenburg, the ocean is very important for our way of life. I don't see much focus on oceans in our school curriculum at all - oceanography, ocean sciences. Do you see a way of bringing this forth into the curriculum in our public school system?

MR. GOODE: The Aerospace & Defence Industries Association of Nova Scotia, which has an ocean tech council, has been working over the past few years in general to get the message out to parents and students that there are careers available - highly-paid jobs, skilled jobs, jobs that are sustainable over a long time - in this sector, writ large: aerospace defence, marine industries, you name it. They're all related because they all require the similar science and technology, mathematics-based education. It's enormously difficult to get there.

There is still a hangover in the schools from the tech bust of about 10 or 15 years ago, whenever that was. Their parents said, "Donald stay out of that - there are no jobs there." Well, the fact of the matter is there were a huge number of jobs available within this sector at large, but to get to guidance counsellors - and I'm the chair of the Defence and Security Exhibition, which is the second largest in Canada and we've tried everything we can to devote one afternoon to get high school students and middle school students to come down, meet the companies, see what's going on out there - can't do it.

There are bureaucratic impediments, insurance issues and all the rest of it to get these young people to come down and start to realize what a huge opportunity there is in Nova Scotia, working in this sector, either at the technician/technologist level or at the undergrad, graduate engineer, or scientist level. It's very hard to penetrate the schools and let them know what's going on.

We've been racking our brains and we keep going back to the trough to see what we can do to get that message out there because if we don't, the workforce is aging rapidly, even though in my previous company I think the average age of our workforce was in the mid-30s. Ten years later it has gone up and it is aging very quickly and we're having trouble getting youngsters to come in behind.

So we understand the issue and the industry understands the issue. It's got to be a whole of government, industry, and academic approach to address the problem, in my humble opinion.

MS. LOHNES-CROFT: As someone who has worked in the education system, guidance has changed. Guidance is more about social and behavioural issues in elementary and junior high; and in high school it's more about applying for scholarships, so there isn't much career direction for students. Perhaps that is where we need to have the focus.

MR. HANLON: I think the State of Maine recognized the problem. They had the same issue with STEM. I think over the long term you can embed it in your curriculum through changes in the way you educate teachers and the curriculum change, but that does take a long time - those don't happen quickly. In the State of Maine they've recognized that and so this is an attempt to sort of fast-track these sorts of things by taking them a little bit extracurricular and making them in addition to the baseline curriculum.

I just got back from Scotland where they have something called primary engineer, where they actually have working engineers going back and doing projects with students; in this case, in primary schools. You can actually fast-track that because you don't need to make monumental changes to the whole education infrastructure - you can just supplement that with some external things. I think we need to do both - I really do.

MR. CHAIRMAN: Mr. Lohr.

MR. JOHN LOHR: Thank you for your presentation. I have two questions. One is, I was just curious to know - we did hear a little bit about Mr. Hanlon's background. I'm just interested to know maybe a bit more about your CV, but my question - maybe you can do that and answer my question - about 15 per cent of our province's GDP is derived from ocean-related industries. I know both of you touched on this, but what are the key examples of things that are hindering the expansion of the industry? What in your opinions are the key things that are hindering expansion?

MR. GOODE: I had a full career in the Navy and retired as a captain and then went into industry and worked in the aerospace defence industry, managing, manufacturing, and then business development for a large multinational here in Halifax - before that in Toronto. Then I was invited to go into the consulting business. I now work with small and medium-size enterprises, sometimes larger companies, in terms of business development and strategic development, strategic advice - where they're going, how to navigate the bureaucracy of procurement, and then some of the security issues. That's my background. I've been at this for my entire life in one sense or another.

In terms of impediments to expansion, we've touched on one of them and I think it is really critical, and that is the whole issue of human resources. As I said earlier on, we need an integrated approach to this human resources tsunami of retirements that are coming down the road. I think every statistic you read shows that the Nova Scotia population is aging, and aging quicker than many other jurisdictions. That is affecting every industry that we have at the moment because the baby boomers are starting to retire and will be retiring in large numbers in the near future, and there just aren't the numbers of people in succeeding generations coming into the industry to support them. Obviously they are and they're getting out there, but not in the kinds of numbers that are going to support the expansion.

We need technicians - educated, trained technicians from the community colleges, the military, from the Coast Guard. We need technologists with diplomas, exactly the same thing. We need engineers, project managers, logistics experts, you name it. Across the board, these people are needed in order to allow for expansion. If a company such as Lockheed Martin should end up as the systems integrator for the Canadian surface combatant, they're going to have to double or triple their workforce in order to sustain and support that huge intellectual effort. Where are they going to get them from? They're going to need engineers and technologists and technicians, plus all the project managing that goes along with it. That is, in my view, a huge issue.

The second thing is defence procurement and government procurement - whether it's in the Coast Guard or whether it's in the military - drives a great deal of the internal marketing inside Canada. As we've heard, that sector is subject to significant government spending restraint, in order to make sure that the budget deficit at the federal level is addressed in relatively short order. That's going to have an impact.

We have heard, though, that the National Shipbuilding Procurement Strategy side of that is not going to be affected, so we in Nova Scotia should be reasonably insulated from that, but it may affect some other aspects because a lot of procurement activities, day-to-day, year-to-year, ordinary "sustain the forces" activity, has been cut back as they've suffered budget cuts. That's going to be a potential restraint.

Another restraint is what I call the certification gaps. If you are going to participate in, say, Irving supply chain or Lockheed Martin supply chain or Ultra supply chain, increasingly they are requiring the companies, their suppliers - tier two, three, four - to be certified, at least to ISO 9002 standards. They are looking now to something called AS9100, which is an aerospace specialized side. They are looking to ISO 14000, which is for environmental purposes. So they are insisting that you have this as the entry level, to get in through the door, to say okay, I'll get an RFP from you, or I'll get a quote from you at this stage of the game. Yet the latest studies have shown it's a relatively low level of penetration of certification in the province.

There are programs at the provincial level to help companies get there but that's a barrier, as well, to expansion because internationally it's that they insist upon it at this stage of the game. It's expensive and it is time-consuming and you've got to go through - it's about an eight to 10-month process to become certified the first time and you've got to do a lot of work, homework, in order to get to that level. So it's expensive, it's an opportunity cost, particularly if you are working in a small or medium-size enterprise, where the boss virtually does everything, he hasn't got the time to be able to focus on that, so that's another area.

The fourth one is the whole issue of government support, productivity improvement, and these kinds of things, and I alluded to the fact that it's so difficult to penetrate some of these things because there are so many programs out there. We did work for the Department of Economic and Rural Development and Tourism on one particular grant program, which was a very efficient one. It took you maybe 10 or 15 minutes to fill out the form, et cetera, and within three weeks you got an answer back. It was fantastic. If all the government programs were like that - it is called a voucher program - that would be great but they are not. Companies are in need of capital support to help them expand, et cetera.

I'll make one last point, again on the government support side. We in Nova Scotia, whether they are large companies or small companies, there's always a constraint when you're going to compete for large contracts, et cetera, and that's a significant, non-recurring engineering component, which is very expensive. There are no programs in either NSBI or the ERDT to support non-recurring, or underwrite help, to get through non-recurring engineering costs. Without that kind of support, you end up having to swallow it, increase your prices, or spread it across the product, but if it's a one-off it becomes very expensive. A lot of the suppliers say, guys, we're not going to absorb that. We want you to figure out how to fund it. So some of these smaller companies don't have

the money to do that, or even the larger ones; their bosses in Toronto, New York, or wherever say no, we're not doing that. See what else you can do.

I know it's a long-winded answer, but there are a lot of things that are constraining our growth. Having said that, look at the stats; we've grown significantly over the space of the last 10 to 12 years, despite these constraints that I've been talking about.

MR. CHAIRMAN: Would Mr. Hanlon want to comment on the question?

MR. HANLON: I would. I don't disagree with anything Tony said, but I'd maybe just put a bit of emphasis on this. The histogram that Tony showed of the makeup of the companies, the small versus medium, versus large, I think you could go to just about any place in the world and find a similar shaped curve. The ocean industry in general has that same makeup of a lot of SMEs. I sometimes feel that folks in economic development worlds would just wish they would band together and become one, it's a lot easier for them to deal with, but that's the reality of the industry - lots of SMEs.

I think the way to drive that industry to be bigger is to create more SMEs, to get that incubation thing going, to get more young people with that entrepreneurial spark to start their own companies and then to really nurture them at the start, where unlike the IT sector we hear a lot about the Jenkins report, but Mr. Jenkins is an IT guy. The incubation play in the IT world is you put a coffee machine in a room and you build software. This business is different, it's more capital-intensive, it's more test-intensive and so the start-up costs can be prohibitive for the young entrepreneur.

I go back to that shared infrastructure question I raised earlier. I think one of the things we could do to nurture that would be to provide a public-private academic partnership around test facilities, labs and access to waterfront and those sorts of things. There are some wonderful dialogues going on around those very issues as we speak, just to be aware, it's not a new idea. I think it's all good because those are very delicate times for those young entrepreneurs. There's a lot of money to be spent on putting your stuff in the water and making sure it works, so helping them out would be great, and frankly, everyone else does it. We are at a disadvantage vis-à-vis our American colleagues and our European colleagues in that respect because they do that.

MR. CHAIRMAN: Ms. Peterson-Rafuse.

HON. DENISE PETERSON-RAFUSE: Thank you for a very informative presentation this morning. I want to ask about, as you're probably aware, in 2011 the province did release documentation called *Defined by the sea*, and it was with Nova Scotia's technology sector present and future and at that time made a five-year investment of $1.75 million into what now your name is, the Institute for Ocean Research Entreprise.

From your presentation this morning you can really grasp on the fact that many things intertwine together and that you can't do one thing without strategizing to do another thing, and so forth, which can make it very challenging because there are so many different players involved. I have sort of a two-part question. The first one is in terms of funding: have you done research on what type of funding you would require over the next five to 10 years on an annual basis and what that overall amount would be to put the whole industry in a much better competitive edge than we are today? So if you look at where we are today and the goal is to be here on the competition hierarchy, what type of investment would the province need to be looking at? Do you have any idea?

MR. HANLON: I don't have a number at the top of my mind, to be honest, but to put some balance on that question, I think there are lots of ways to leverage the province's investment in those sorts of things. Things like the value proposition requirement under the Irving Shipbuilding contract, which I'm very actively involved with, is a wonderful opportunity for the province to make sure that they're using that investment to maximum advantage here in Nova Scotia, and they are.

I would say similarly there is work going on with the European Union right now on the Horizon 2020 program where they've thrown down the gauntlet and said, if you Canadians want to play with us, here is our research agenda, we would dearly love to have you involved, but you do need to bring your own funding, at least partially. I think there's a lot of opportunity to engage with relatively small amounts of money and get high leverage, both in terms of the partnering funding but also in terms of the return on investment as we saw earlier. It's a really good investment.

I would say the other investment that we as a province already make is in the universities and the community colleges, and so liberating that investment and making maximum use of it is one of the things I spend a lot of time working on - in very specific ways like having more, what I call, porosity around the infrastructure. So Dalhousie University has a world-class research laboratory called Aquatron - the tank facility - it's second to none. I mean, it's a wonderful facility. Not many people outside of the small community I work with are even aware of that and what else it could be doing to support SMEs in this sector. It is public investment and so opening that up to making that publicly accessible is the kind of thing I think we need to do.

MS. PETERSON-RAFUSE: One of the challenges that you're faced with is the lack of knowledge in terms of government departments - the civil servants in the government departments understanding exactly how to leverage those dollars and how to coordinate the effort. Do you see your organization better positioned, rather than - I noticed in the document there was a suggestion of perhaps having a department that focuses on ocean technology, but one of the concerns would be then you create more levels of bureaucracy, more red tape. Do you have a vision and a manner that your organization could take that role on for the province because you have the knowledge base, you have the contact with all the industry and even be involved in disseminating any funding that would come through to the appropriate businesses?

MR. HANLON: I understand where you're going and it's a topic of much of our strategic planning at IORE right now. I think there is a greater role for my organization. I don't think it fulfills the whole need. As you said, it's a very complicated problem - a lot of interconnections. The part that I'm focused on is extracting the maximum value out of the research and development end of it - not the marketing, not that side of it, but the research and development end of it.

I do think that a slightly bigger organization than mine, but in the same model, could get that done a little more effectively and we have discussions around that. There are ongoing discussions around seconding people into my organization, for instance, and I think that's wonderful.

I will say I have a very open discussion frequently with the folks within ERDT. We have a lot of interplay with them. Frankly, they don't come with my specific background and expertise, but they talk to me and so I think there is a really open dialogue there, which is really very useful, I think.

My problem is that it's a very wide agenda. You saw the breadth of the ocean industry. I go home at the end of a day tired because it can just be flitting. It can be just jumping from topic A to B to C and not actually getting enough engagement on A or B or C, so having a few more program officers with solid industry experience would definitely help, no question.

MR. CHAIRMAN: Ms. Eyking.

MS. PAM EYKING: Thank you, gentlemen, for a very informative presentation. Other than offshore oil and gas exploration and defence, are there any other domestic markets that you see that we could take advantage of and future explore?

MR. GOODE: Obviously defence is a crucial part of the Nova Scotia economy. The fact that the Navy and the Air Force are so strong here has helped spawn a number of supporting industries, which is only natural. If you take a look at the number of companies involved in it here and the amount of money that they actually generate in terms of revenue, Nova Scotia could be considered the fourth or fifth largest hub of the aerospace defence industry in Canada. But the aerospace side of it is an area that we do not spend - or at least have a great deal of resources in. I'm talking civilian side of it.

If you go to Montreal, Montreal is considered to be the cluster, the heart of the cluster or the hub of civilian aerospace development in Canada. They've got Bombardier there, they've got Pratt & Whitney there, and they've got a huge number of other supporting companies, and they've made it a deliberate policy of supporting that, both at the municipal level - something called Aéro Montreal - and then there's also at the provincial level where there is a similar organization. They support research and development, they support business development, and they support the companies from a financial perspective when it comes to expansion. It's a deliberate, provincial-municipal

strategic approach to the aerospace sector. They recognize how important it is to them so they marshal limited resources to make that happen.

That's an area that we do not spend, or at least that we don't have a whole pile of assets working, so that is a potential because we have airfields scattered around the province that could provide the location for particular activities.

We're just in the process of completing a study for the Yarmouth International Airport to utilize its very underutilized resources at the moment, in terms of establishing a new industry in Nova Scotia. In order to make that happen we're going to need the province, the federal government, and the municipal jurisdictions around Yarmouth to all come together to support that to make it all happen, utilizing that model, as I say, that they do in Quebec exceptionally well, so that's another sector.

Going back to both Jim's presentation and mine, the ocean tech sector, which is across the board, I think there's enough there, there's a nucleus, and we've got a really good base on which we can expand that both nationally and internationally and we've been doing very well, but again, it would take a coordinated, strategic approach to it, particularly at the provincial and, to a lesser extent, the federal government, in terms of where we want to go. So we need to look at that in terms of having - I hate to say it but maybe an ocean strategy in which we leverage what we've already accomplished and use that as a base, as a springboard, to go even further.

There's a lot of shipbuilding which is starting because that's our history. Back in the 1880s, 1890s or so, something like 60 per cent or 70 per cent of the shipping in the British Empire was built here in Nova Scotia. That was all in the transition from sail to steam and, unfortunately, we didn't take advantage of that.

With the requirements of those kinds of industries, I think we've got the opportunity to springboard something here, going forward; in other words, build on our existing strengths. Those are the two areas. I hope that answered your question.

MS. EYKING: Yes, that's good. I'm just wondering, geographically speaking, where we're situated in the world, do you see that we have an advantage over other provinces or regions, and how far does that advantage spread as far as the sector goes? Do we have an advantage over one sector because we're here? I know we have an ideal time zone for doing business in the world but being on the Atlantic Ocean, being here in Nova Scotia, connected to the rest of the country, do you see that being an advantage for us?

MR. GOODE: I think it's a huge strategic advantage in terms of our location. We are about 100 nautical miles off the great circle route from New York to Europe for shipping, so we're very close from that perspective. It's very easy to get from here down to the Caribbean and down to South America. Those are the kinds of trading routes that we used to have some time ago and a variety of tariff barriers sort of stopped that. We need to get back to that and start looking at the ocean as being a huge strategic asset and stop

turning our backs on it in everything that we do, just taking it for granted and look at it and say okay, how can we exploit that for our own economic growth? It involves transportation, it involves logistics.

We've got great opportunities for intermodal transportation because we've got the airport which is connected around the world, we've got the rail, and we've got trucking routes, et cetera. Again, it takes an integrated approach and I know that the Gateway project is looking at that as an initiative.

I think we need to look at the ocean around us as a strategic asset in every sense, in terms of informing what we do all the way into the schools, which Jim talked about earlier on, and getting that message out that our oceans can be our future, we're surrounded by it. At one time when people came here that's what they looked at. It was very difficult to farm here so what did you do? You went to sea. We need to start going back to that and then that starts to spawn its own supporting infrastructure all the way from, as I said, the shipbuilding and everything else that's associated with that and the technology that goes into that. I think there's an opportunity if we have vision and leadership to say, let's start looking at that.

Then it all feeds into this other very important factor and that is that the knowledge economy is our future. In order to take advantage of that strategic asset, you have to have education and science and technology assets that come from folks in the knowledge-based economy. With all due respect to those people who make their living out of the resources of the world, that is going to be an ever-decreasing part of our economy going forward, I don't care what anybody says, it's a fact of life, accept it, and then move on from that, and stop saying - those are yesterday's industries, give them some support obviously, but we need to start looking and focusing to the future and that is in knowledge-based economies which, by the way, underscores some of the traditionally extracted industries, as well, in terms of the application of technologies.

I'm not trying to dis those industries, I'm just trying to say we focus so much on those, they get all of the political attention, and the stuff that we're talking about seems to get relatively little. So I'm hopeful that our appearance here today will maybe start creating a few ideas about how we can go forward, so it's a very, very important strategic asset.

MR. HANLON: Can I add one comment? I had a discussion with Dr. Martha Crago, who's the vice-president of research at Dalhousie, about a year and a half ago. After the discussion, she came up with the idea that we should consider changing the byline on our licence plates from Canada's Ocean Playground to Canada's Ocean Innovators. I think it speaks to this sort of an issue that we need to take full, assertive business advantage of what we're given. We are a powerhouse when it comes to ocean technology and ocean business. I think a little more bravado around that would be appropriate.

MR. CHAIRMAN: Ms. MacFarlane.

MS. KARLA MACFARLANE: Thank you for being here, it's very informative and I really like what I'm hearing. We know that the Ivany report was just released and they put a lot of emphasis on research and development. I'm just wondering, what can Nova Scotia do to encourage research and development within the OT sector and, as well, maybe you can answer, what can Nova Scotia do to support the OT in exports?

MR. HANLON: I think on the R & D side, a little bit of spend gets you a lot of return. All of the statistics that you look at in terms of scientific research and development investment, it does pay back. I think you have to be a bit patient with it, but as Tony said, there really are no programs existing right now in Nova Scotia at the provincial level that would support R & D as such, at the industrial level. A small amount of investment would be a very strong signal, I think, to some of the SMEs in that regard. That either could be a cash investment or an investment in kind by way of available infrastructure for tests and certification. So I think that would be an extremely strong message if there was an investment of those sorts of things.

The other thing is to sort of look back into the higher education institutions, like community colleges and universities, and come up with crosscutting programs to kind of inculcate sort of an entrepreneurial thinking in those places. I look at the Industry Liaison and Innovation office at Dalhousie and the equivalent in all of the other universities. Primarily, historically, the role of those organizations has been to develop a royalty stream from intellectual property in the universities. Increasingly, the creative universities and other places, particularly in the U.S., are turning that around to making those centres of teaching excellence in entrepreneurial behaviour as opposed to sort of a royalty stream generator. Trying to crosscut through the graduate students, the undergrad students and the faculty saying look, you're working on something here that might be a really cool business idea, how can I help you start a business - I think that would be really interesting.

MS. MACFARLANE: In saying that, you say small investments, do you think there is a way, or do you have any suggestions on how we could encourage maybe private investors for R & D?

MR. GOODE: People who generate their own IP are really concerned about angel investors. I talked to some of our clients and they've spent 10 or 15 years in building up this core of technology and intellectual property that underpins their businesses and allows them to keep going and going forward. When you talk about angel investors and things like that, all they can think about is the angel investor coming in, buying 30 per cent of the business, and owning the whole thing in five years or two years or whatever.

These people have managed to create their businesses without a whole pile of support in moving ahead. As Jim said, they do need capital because it's a capital-intensive business. If there are programs in place, either loan programs or programs that would give them support for the investment in this high technology from the government perspective, those would be very, very useful.

The money you are looking at is not huge when you compare the significant investments that the province has made over the space of the past four or five years, in other extractive industries, et cetera. We're not talking about the hundreds of millions of dollars, you're talking about a much smaller amount of funding to support these kinds of activities that we've been talking about.

Again, to support what Jim says, I think there's a need - I've said it before - about industry-focused research and development that needs to be funded by industry as well as by government. I recognize, and I think all of us recognize the fact that all governments are constrained at the moment in terms of the resources. What we're talking about is reprogramming existing resources to tomorrow's requirements, as opposed to yesterday's requirements.

I'm not talking about new programs in terms of new streams of money, which we know do not exist, but there are significant resources within government that can be reprogrammed if you've got this vision going forward to support the kinds of things that we've been talking about here. If that ends up robbing Peter to pay Paul, well, so be it because there's only one taxpayer, there's only so much you can do. So where do you get it from? From within those existing resources, which I realize, I know, I've worked within the government, I know how difficult it is to do that, but it takes leadership and a certain amount of being ornery to make those kinds of things happen.

MR. CHAIRMAN: Ms. Zann.

MS. LENORE ZANN: Thank you and good morning. Thank you so much for your presentation. Sorry I missed the first part of it. I have to agree with you about the future of the knowledge-based economy. I've been talking for the last four and a half years about the creative economy and the knowledge-based economy and how that is the way forward for all governments and all countries, really.

That said, I was on one of the committees - the jobs and economic development committee here - for the past four years where we did get a presentation about this industry. We did come up with the *Nova Scotia's Oceans Technology Sector Present and Future*, which was fantastic. We put money into that but we also continued to, I believe, invest through the Nova Scotia Jobs Fund, through the Capital Investment Incentive program, the Workplace Innovation and Productivity Skills Incentive, and also programs like the Graduate Placement Program and Student Employment Program.

Now my question for you is, I know that at the time you were involved with the successful $25 million Networks of Centres of Excellence bid, which led to the creation of the Marine Environmental, Observation, Prediction and Response Network, MEOPAR, which is hosted at Dalhousie University. A partnership was created with researchers in Germany - I remember that - with their scientific organization, the Helmholtz Association. Also, I believe that former Premier Dexter went over to Israel and we had people from Israel, scientists from Israel come who were very impressed with what we're already doing here.

I have two parts to my question. One is, are those collaborations continuing? What has happened since then? Could you maybe enlighten us a bit about that?

MR. HANLON: Thank you for bringing that up, Ms. Zann; it's good you did. The Helmholtz relationship is flowering, I would say. Just for those who are not aware of what she is alluding to, about a year and a half ago we had a visit by Angela Merkel here in Halifax, the German Chancellor. She signed an MOU between the Helmholtz institutes in northern Germany and my organization. What has come out of that is really quite interesting. There's a joint Ph.D. program that has been established between Christian-Albrechts-Universität - the University of Kiel - and Dalhousie University that creates a cohort of 12 Germans and 12 Canadians who will do Ph.D.s in exchange in ocean science and technology, and that launched last September. The first cohort came here for a residential program in the late Fall.

The beauty of it, from my entrepreneurial point of view, is that these are very skilled science people, but a strong component of this is technology and industry exposure. While they were here, they did a round-robin tour of, I think, 12 different Nova Scotia ocean tech companies during their visit. So now you have 24 world-class scientists who drank the Kool-Aid in terms of what we do here in Nova Scotia with industry, so that continues.

The Israeli connection is really fascinating and there's late-breaking news on that. There has been a recent mission to Israel that the Prime Minister led, actually. Richard Florizone and Martha Crago from Dalhousie were there and there is a budding relationship with a cluster of about five universities in Israel right now where, again, there will be an exchange opportunity for students there with here. There's a similar discussion in a slightly earlier stage with the Scottish universities around some ocean science and technology programs. I was actually over there the week before last.

I look at these as what I call research pipelines. You establish collegial relationships between high-end researchers, and invariably commerce follows because the researcher here says I've got this really cool company that I buy my stuff from in Halifax, do you know about them? That results in more business so I think it's all good. I think those sorts of investments in establishing those partnerships do pay off, they really do.

MS. ZANN: Good, I'm glad you said that because I think we should continue to do that type of thing and go in that direction.

One other thing was when you talked about the young people in universities who are studying this and helping to get them out of the universities and get them away, are you talking about getting them set up with incubators and things like that once they graduate?

MR. HANLON: Yes, well, there's no better incubator than - maybe the only better one is your parents' basement, which I can relate to as a parent. (Laughter)

MS. ZANN: Or your mother's womb. (Laughter)

MR. HANLON: Yes, maybe the womb. The next best one is probably a university. By definition, that's an incubator almost. I think we do need those external things - the Volta Labs of the ocean sector. The Sandbox is the term that's talked about a lot around town right now. But I think the capability for a lot of that does exist inside the infrastructure of universities and colleges as well. I think it's really the train-the-trainer element there that sort of says, let's look for those folks that have that spark and find the right resources to nurture them inside the universities and afterwards.

MS. ZANN: Just one last question. I know that the federal government has been cutting back on their scientific research and scientists, and you did allude to some of that again with some of these things where you're getting less federal funding now. Is there any talk between your people and the federal government about trying to get more money from them for your research and development?

MR. HANLON: It's interesting, I was on a national committee that was looking at the statistics of this. They use this very analytical bibliometric analysis and budget analysis to say, where is the money going in ocean science? It's clear that there's less ocean science funding going into the federal government, but interesting that there's more going into the universities as a whole. The real trick is to follow the money, as I would say as an entrepreneur. If it's going into the universities, how well equipped are they to make full use of it? It's a very different paradigm. What happens in a federal lab is fairly structured and objective focused - they're going to try to do something. In a university, it really is meant to be fairly unstructured and relies on serendipity to end up with new developments.

I think there's a middle ground, and I'll come back to that, which is this applied research lab model that's sort of ancillary to a university, but a bit more focused on task. You find them around big-use research universities - like MIT in Boston has about three of them. These are billion dollar organizations - they're massive. Nothing that big needs to be here, but their whole purpose is to sort of look into the university in the unstructured, wonderful way they work and extract little nuggets and then put them on a timeline and a schedule, and bring engineers and business guys in and bring that to market - not compete with the private sector, but get it to a point where you can turn it over to the private sector.

MS. ZANN: Exactly, thank you so much.

MR. CHAIRMAN: Mr. Wilson, do you have a question?

MR. GORDON WILSON: Thank you both very much. This is something that's near and dear to my heart. Clare-Digby is my riding, by the way, so you touched on quite a few interesting partners that we have down in our area, and that's what I think is most exciting about this, from my view, are the opportunities for expansion into the rural areas that we see - Acadian Seaplants, an awesome opportunity.

I'll mention another - A.F. Theriault & Son, which you well know, with the 250th Hammerhead drone that they just built for a company in Alberta, by the way, that came to Nova Scotia looking for people, which is just the opposite of what we see. It's exciting for me in rural Nova Scotia to hear these things. I'll make another plug for them; I know a little bit about the work that's going on in the aerospace side. I was involved with the airport in Digby. We were trying to lobby to have us picked over Yarmouth but Yarmouth is good for us also. So A.F. Theriault brings a lot to the table in that area for any kind of unmanned drone research that's going to go on.

In saying that, we are also very fortunate to have a very large aquaculture industry in our community, probably the largest in Nova Scotia, employing a lot of people. I'd fail to do my job if I didn't mention what you did right off the bat - the Bay of Fundy and the tides that we have there. That's where my question comes in - not only on the sector itself but you made one comment, and I think the comment was "full industrial value". FORCE is looking to get out of the tidal. Can you explain to me - two things - how we can take opportunities of this tidal opportunity in rural Nova Scotia to get full industrial value; what should be in place, what are the barriers, what are the opportunities?

Then also, just the sector itself, obviously it works all across Nova Scotia, it isn't something that just has to be huddled around a university. What do we need in rural Nova Scotia to be able to take opportunities of this? Is it infrastructure? Is it people?

MR. GOODE: If you take the oil and gas sector as a model for the renewable energy sector from the point of view of industrial, if you take jurisdictions around the world, many of them, particularly in the United Kingdom, Norway, Spain, Brazil, those kinds of places - Newfoundland and Labrador more locally - they put in place contracts that require those companies to buy locally where it makes sense economically, et cetera.

If you take a look at the Deep Panuke issues they've been having with SBM at that stage of the game, I venture to suggest that had that been built in Nova Scotia - and the technology and the companies and the capabilities exist to do it in Nova Scotia - they would not have had those kinds of problems because they would have been able to address them during the build as they go forward.

Putting in place regulations along those lines that require an industrial regional benefit basis or something like that, says you must, if you're going to invest in our sector as you go forward and you're going to take advantage of our natural resources, which happens to be the Bay of Fundy, then you are going to be required to buy and access, create a facility - and we'll help you move forward on this, and that could be done in the Annapolis Basin, it could be done down along the southwest shore. There's any number of places where that could be done and there are a lot of people who would be able to work in that particular sector. There are the skills - it's challenging to get them, as I said earlier on, but the basic skills exist.

If you applied that model into the renewable sector, because you're going to have to have large structures in order to take advantage of the forces of nature in the Bay of Fundy, why not build them in Nova Scotia? Now, the technology may come from elsewhere, bring it in, but also, we've got research institutes that are able to put their intellectual efforts into doing those kinds of things. That's one aspect I would think that we need to look at, how we manage that resource and manage it for the benefit of Nova Scotians and Canada. So that would be my first - you could say, I want to source that locally down in your neck of the woods. Why not?

I think the second part of your question is what can we do to get local businesses, to set them up and all the rest of it? You need an entrepreneur who happens to live in southwestern Nova Scotia who wants to stay in southwestern Nova Scotia. The case of Gilles Theriault's father, and I think Gilles is the third or second generation now - he's the third generation, right? - well, A.F. Theriault who started in the late 1930s, they're still there today because they like being there. They could be anywhere. They like being there and they've got the right kind of people. You need an entrepreneur who is going to set himself up in that neck of the woods, stay there and then grow the infrastructure locally, get the people locally. You've got a community college down in Yarmouth. Is there another one in Digby?

MR. HANLON: There is a satellite in Digby.

MR. GOODE: You've got one in Yarmouth - utilize that in terms of getting the trained workers that you need - work closely with whatever that industry is. As I said, we're just completing a study for the Yarmouth International Airport about aircraft recycling. We're recommending that they work closely with the community college in terms of getting the kinds of technicians they need for that kind of thing, but you need an entrepreneur working in a welcoming environment from the point of view of government regulation, taxation, education, training, and infrastructure - a welcoming government environment. Open arms to an entrepreneur who wants to invest his resources in that neck of the woods.

MR. HANLON: I think we've sort of conceded the space to the Europeans in terms of the core technology around MRE - the turbines - and I'm not sure that's long term the right solution. I think we might want to punch back a little harder on that one, in my opinion. I think we need to have a long-term industrial strategy around marine renewable energy. It's not about creating kilowatt hours at a price. I think that's a hard one to play, but I do think you can create a whole rich industrial policy on sort of the five, 10-year horizon that says, we aspire to be the world's biggest supplier of this kind of kit in 10 years. I think there is a concern that we will scare away the big European players by doing that, but every other country in the world - every jurisdiction in the world - states their intent up front and I think it would be okay to do that.

Maybe in 10 years it's appropriate, through tech transfer or understanding better, that we have the position where we can actually supply the full kit. There are some interesting things going on in Digby and you've got some really good spokespeople down there in favour of all that and I think there is a node of activity there. There is a node of activity at Acadia. There's another really interesting group working up at Cape Breton University in Sydney around small-scale tidal. Their view of the universe is that there is one Bay of Fundy and it's the Mount Everest, but there is a large market for smaller scale tidal in lower current regimes and that's a huge market. So in the full breadth and depth of Nova Scotia, we're attacking this in a whole multitude of really productive ways. Most of it is not Halifax-centred; it's coming from other locations, to be very honest.

MR. GOODE: We do have Irving working closely with Lockheed Martin in this sector. They could be that catalyst - that hub industry or company that is needed to make this happen. Both of them have deep pockets. You just say, guys, industrial policy says I want you to go and start building some of this stuff out in rural Nova Scotia. Irving happens to have a yard in Shelburne. Why not? Why not go and build the big turbines - or there may be a different technology at that stage. Go and build them in Shelburne. Why not? Halifax is absolutely chock-a-block. There is going to be chock-a-block in the near future. There's not going to be a whole pile of space left around the waterfront, so go build them in Shelburne. Why not? Build them in A.F. Theriault - again, why not?

MR. GORDON WILSON: It's encouraging, thank you.

MR. CHAIRMAN: Are there any more questions? Mr. Lohr.

MR. LOHR: I'll just change the topic a little bit. We know that the tax regime in Nova Scotia is less competitive than in competing areas. Are there negative ramifications due to the high taxes in the area? I guess as a second part to that - does having the highest HST in the province hurt your industry?

MR. GOODE: When we have gone out and surveyed industry, there is no doubt about it that general taxation levels are an irritant. There's no doubt about that - whether it's business taxes, which are coming down; HST, which is on all supplies, which affects everything that they buy; personal income taxes, which are huge. Obviously, for an

entrepreneur who starts to make a lot of money, his income tax burden is going to be quite significant. That does start to become a negative factor on them. It's an irritant. Is it a defining factor in terms of whether they're going to locate here? I don't think so because a lot of people locate in Nova Scotia because they love the location, they like the people that they work with, it's strategically the right place to be, there's an infrastructure to support them. As we know, we've got an ecosystem of ocean tech companies and that helps to nurture the other guys working with the sector.

Certainly, the taxation levels are considered as an irritant that we've had in our surveys, they mention it, but it's not the factor that says no, I'm not going to stay here; there are a lot of other very important reasons why you're here. But anything that could be done to (a) reduce the size of the debt, because they worry about that, and then (b) reduce the general levels of taxation - whether it's at the municipal or the provincial level - certainly, that's enormously helpful.

MR. CHAIRMAN: Mr. Hanlon.

MR. HANLON: I have a personal one, if I'm able. As a successfully-exited entrepreneur times two, one of the things that I find frustrating is the cap on the capital gains exemption for disposal of small, Canadian-controlled corporations. Basically as someone who is capped out at $750,000 of capital gains exemption, I'm not incented to go back in again. Really, I think the behaviour you want to encourage - this is mostly a CRA issue at the federal level, but proportionately it's so at the provincial level - is somebody who has capped out and demonstrated success in small business entrepreneurial behaviour, you kind of want them back in the pool. Putting a cap on that and saying, thanks very much, you're done, doesn't make a lot of policy sense to me. I think the cost of doing that from sort of a revenue point of view would be miniscule, but it's a very strong message that says, way to go, come back and do that some more because you're helping the economy.

MR. GOODE: And that comes back to the whole welcoming atmosphere for entrepreneurs that I mentioned a little while ago and it's the whole of government that needs to be looking at entrepreneurs as being the engines that drive the economy and not being the people who fund all kinds of government operations at whatever level because of taxation.

MR. CHAIRMAN: Ms. Peterson-Rafuse.

MS. PETERSON-RAFUSE: I have a question with respect to public awareness. You made a comment about having a welcoming government environment, which I agree with, but I'm just wondering about a welcoming public awareness environment.

As you know we live in the political world and that political world encompasses the public's awareness knowledge and the amount of information that they have and often a great deal of misinformation that develops their perception of what's taking place in the province. Therefore, when you're talking about future investments, although you will hear

from the public, oh I wish that the politicians of the day would be looking at investments in the future, et cetera, but when you make those moves toward those future investments it's our immediate needs that we're dealing with in our everyday lives, plus the immediate scare that a local, rural business, for instance, may go under and lose 200 or 300 jobs. It's like you're the hamster on the wheel, you keep going on and on, but everybody is scared to jump off and go in a new direction.

The public's perception, of course, has a great deal of power, the same as the knowledge that you have has a great deal of power. Does your organization look at that and get involved? I know you talked about trying to get into the school, penetrate the school system and you're having a lot of struggle there, but to look at a variety of target markets and opinion leaders in communities and the general public in providing a communications strategy and it will take time, that people hear over and over, it's all that repetition that they need to hear. It's a message of how important it is to actually invest in ocean technology, we're surrounded by ocean, that's what we live and breathe.

Many of us have histories of fishers in our families who lived and made a life on the ocean, so there's also a fondness for the ocean. So what do you do in that area and do you have a long-term communications strategy that you're trying to get this information out? A lot of this I've had the privilege of sitting here and getting your presentation and, of course, some of this information was new to me and I'm going wow, oh gee, I wish I would have known.

I'm just wondering about the general public out there going on with their daily lives to help your industry to support.

MR. GOODE: It's all about the constituency. When was the last time you heard an ocean tech entrepreneur complaining publicly about X, Y and Z? You don't - well, I mean apart from Jim, here, right? When was the last time you heard about a group of fishermen complaining bitterly? When was the last time you heard about woodcutters complaining bitterly - farmers complaining bitterly about X, Y and Z? You go on and on about the extractive industries, traditional industries if I would, who seem to have this ability to capture the media and the political interest, et cetera, and make a huge fuss about it and political animals have to respond to that. I understand that at this stage of the game.

Speaking to a deputy minister years ago about why there's not more focus on the industry that I work in and have worked in for the last 40, 50 years, he said there's no constituency out there. I said yet we, this industry, depending on the numbers you use and what you include in it, is 15 per cent to 20 per cent of the provincial GDP and that's not a constituency? He said we never hear from them. So that's the starting point.

The profound ignorance or lack of awareness on the part of the body politic and the public in Nova Scotia about the high tech industries in this province is shocking, to be honest. That's probably the fault of the industry, to a certain extent, but it's also the way that, as I say, the body politic, you know, writ large, is structured and because most of what

we do is good news, not bad news, it's high-paying jobs that last a long time, that operate beneath everybody's horizon, their level of awareness.

MS. PETERSON-RAFUSE: Even when it's good news it's turned into bad news.

MR. GOODE: Exactly. So that's the starting place, the starting base that we have to deal with and it goes back into the schools, et cetera, and trying to get them interested in this industry. It's a real uphill struggle, despite the fact that we have this immense resource, economic and technological resource within the province that is out there providing jobs for a lot of hard-working people.

MS. PETERSON-RAFUSE: So what do you recommend? Do you have a specific strategy to look at sort of the general populous and get the message out? But that takes resources too. If you're going to be putting ads on the TV - and we know it's all about repetition, repetition, repetition, before it even starts to filtrate through in people's minds.

MR. GOODE: It goes back to a vision and a vision that is articulated at the political level and the industrial level and the educational level that this is what we are in this province.

MS. PETERSON-RAFUSE: So that's what you feel is needed first, the big step?

MR. GOODE: That is the starting point. Jim, I know you've got a lot to say.

MR. HANLON: I'm participating with Sandra McKenzie's workforce of the future program. As sort of early days and nebulous as that is right now, I think there's a power there that's really quite important. She's very aware, as is the rest of that committee, of the importance of the ocean message in that greater message.

I'm a marketing guy and you're absolutely right, you can't do this for free, you have to repeat the message in many places, in many times, in many venues, and you run out of hours, for sure.

I think my organization does need to own part of that problem and it's something that we're investing in. We've just hired a young person, a BPR graduate from Mount Saint Vincent as a communications specialist. It's important; our board has felt that's something we need to up our ante on, in terms of getting that message out.

One person won't solve the problem but engaging with Sandra's group on those issues and making sure that - Kevin McCoy, the new president of the shipyard, he has made some very bold statements about when I am done this will be the most advanced shipyard in North America. That's a very powerful statement. Those things need to be said again and again, and loudly.

There's some magic, as well, about telling other people so that you can tell yourself, so I think that marketing message - I often talk about - and I apologize to the tourism people in the room but when people come off the cruise ships in Halifax, I worry that they get a view of Nova Scotia that has a lot to do with lobster and tartan - nothing against lobster and tartan, but in addition to that, they ought to walk away saying, that's a really cool centre of excellence in ocean science and technology, they have some really cool stuff going on.

Those folks on the cruise ships are often high net-worth business people and they go back to Baltimore, or wherever they came from, and say I just visited this really interesting place called Halifax, or Nova Scotia. So there are lots of interesting discussions around that. I don't think it can be done by one organization so I talk a lot to the Waterfront Development people and to ERDT and the Sanders group. As you said, I think it's unanimity of a purpose: we have to all agree that this is a good thing to do, and we'll get there.

MS. PETERSON-RAFUSE: Thank you. I had to ask the question because I'm actually a graduate from the BPR program.

MR. HANLON: That's a good program. That's another case of a world-class capability; it's unique, second to none.

MS. PETERSON-RAFUSE: That's right. Thank you.

MR. CHAIRMAN: Mr. Jessome.

MR. BEN JESSOME: I'll just start by saying thank you for being here and frankly, to everybody I guess, thanks for the valuable discussion that has gone on here today. I had a number of questions and I really had a number of them answered so it was good to see that the dialogue went in such a way.

Just to touch on a couple of points you made that really kind of hit home for me. You focused, I guess, on a knowledge-based economy, industry-focused, research and development, and kind of this incubator mentality and its importance in our school systems. I say that not individually around the university level, but in addition, the public school system, I think there's a lot of potential in focusing that incubator mentality in how we restructure our curriculum and how we engage people in extracurriculars.

While we're talking about ocean technology, I think that mentality is valuable, and let's identify provincially what we do well and how we sustain those things properly. I just wanted to reiterate that and let you know it hit home.

My question - and it's more clarification - you kind of talked about relationships with universities in the province. In one regard you have what you called research pipelines between countries and the sharing of doctorate degrees and bringing people in and sending

people out to expand their capacities. You also talked about a solid portion of funding that goes into the universities to enhance the research that gets done around ocean tech.

There was a comment made earlier by Mr. Goode, I think. You indicated there was an issue around universities having their own agenda at times. I'm wondering if you could kind of elaborate on that and if there's an opportunity for the government to step in and foster a better - help out with a relationship between private industry and universities, and grease the wheel a little bit. What does it look like?

MR. GOODE: Well, I guess in my dealings with the university - and I don't want this to appear to be university bashing but NSERC, which is the Natural Sciences and Engineering Research Council at the federal level, invests well over $1 billion in research and development across this country in universities.

I don't know what the budget of NRC is but it's probably a couple hundred million dollars or perhaps even more than that; I'm not sure what it is but it's a significant chunk of change. The National Defence Department invests at least $0.25 billion a year in terms of research and development. The Nova Scotia Government invests well over $300 million or $400 million a year in its universities, of which half goes to support the research that is done within the universities. I'm not sure of the exact stats but let's say it's over $100 million or more.

Given the focus within universities on their own agenda and their own agenda is as a result of the structure of the universities - it's the publish-or-perish syndrome. Obviously teaching is a significant part of what they do, but it's also the publish-or-perish. So when a business goes into a university and says I need assistance because I have this particular problem - and being director of project management, you're always working to a timeline, you're always working to a budget, and you have to have the outcome defined before you start - I have a problem and these are my constraints.

You go to a university researcher who says, well, I might be able to fit it in in the summertime, and I don't know yet because I've actually got three other big research projects that are underway at this stage of the game, which as far as I'm concerned are much more important because I could publish the results of those and I don't think you're going to let me publish the results of the particular problem that you're asking me to research, et cetera. So their agendas don't necessarily coincide, and after a while businesses say, I'm not going to do it.

That's why I made this recommendation in several reports to set up an industry-focused, industry-led research institute with the same kind of Ph.D.s in it, but with business people involved in it and business people on their board saying, these are the kinds of things that we need support for within our industry, and I can see something in ocean tech - a specific part of ocean tech working in that regard. That's what I'm saying about the actual agendas not necessarily matching.

The other thing is that given the billions of dollars - or let's say a billion that the feds invest with NSERC - the return on that investment in terms of ideas that go from the technical readiness level up to 7, 8 or 9, which is getting close to actually going to market, is almost miniscule. I think the federal government is now looking at: we have to transform this because we invest a lot of money, but we don't get much out of it in terms of creating jobs and creating technology, which allows us to compete on the world market.

We have an incredible number of bright people in this country working in universities, working in industry and all the rest of it. But I venture to suggest that in comparison to the United States, where there are universities like MIT and Caltech and places like that, which have an entrepreneurial spirit, which encourage the guys to get out and start creating incubator companies . . .

MR. CHAIRMAN: Mr. Goode, I'm sorry to interrupt. Due to our time constraints, I would ask that if you have any closing comments, either of you, to share them now. Please go ahead.

MR. HANLON: I think just to follow on that as my closing comment - I think the universities are a potential resource in sort of solving our problem going forward. I now work at a university - I'm not an academic, I'm not part of that priesthood, but I do live closely with them. I think there also has to be an expectation setting there, as well, in terms of what you can and cannot get out of a university. They function fundamentally on the basis of academic independence and serendipity, so the whole idea is that you put smart people in a room and you let them explore, and I think at some level that has value. I mean, I think you need to support that, but there is a middle ground. There is this Fraunhofer model or the applied research lab model that, as we've both said, lives adjacent to but not inside of that structure, where you can go in surgically and pull out some real good nuggets and say, I want to capitalize on that, I want to bring that one to business.

I don't think you're going to change the ways of academia. That was invented in 1300 and it has been that way for a long time, but you can go in and sort of wander along the side of that and pull out some really good stuff. That's done in other places.

MR. GOODE: The only thing I'd like to say is to express our appreciation for your listening to us this morning. I hope that we've planted a few seeds that might come to fruition as you go forward with your report. As you can tell, we're both very passionate about this industry and about the capability that exists in Nova Scotia, which is not known either inside Nova Scotia or outside Nova Scotia, which is even more frustrating, apart from the fact that the research community knows that Dalhousie is a very good place to be. That's very frustrating, because all people look at is that we're hewers of wood, drawers of water, and spenders of welfare cheques. That's not the Nova Scotia that I know, and I'm a come-from-away so I can say that legitimately.

So thank you, again, for listening to us and for your penetrating questions today; we enjoyed it very much.

MR. CHAIRMAN: Mr. Lohr.

MR. LOHR: I just have one more question and we still have five minutes.

MR. CHAIRMAN: We have some agenda-setting stuff and issues, sorry. (Interruption) You're more than welcome to hang around outside if members have questions for you, that would be great. We just have some stuff to discuss quickly, thank you very much.

As you guys all know, the Ivany report came out three months ahead of schedule, which is very exciting and I think there's a lot of stuff in there. We're proposing at the next meeting, which is supposed to be a topic that you guys picked on the statistics within the NSBI area - we're asking that maybe we could postpone that to a later date and have this report presented at the next meeting instead, the Ivany report. (Interruption)

It's pushed down, but one of the things that we talked about was the importance of this report and then setting an agenda based on this report. All the topics are still on the table, but I think we would like to - as this is calling for an urgent action plan that we take this seriously and that the next meeting be that. So I ask that someone put a motion forward to put this as the next topic. Ms. Lohnes-Croft.

MS. LOHNES-CROFT: Some of us were at PAC yesterday and we weren't able to enjoy the Ivany report. Would it be possible for the people on this committee to all receive copies of it?

MR. CHAIRMAN: We can look at that, it's all on-line at One Nova Scotia. You can download it there, it's all available. The idea is to have Ray Ivany come in to share this whole report in detail with us for the period of time that we have. (Interruption) March 6th would be the date. Can I have a motion from someone to put this forward? (Interruptions)

Perfect - moved by Ms. Lohnes-Croft, seconded by Ms. Zann.

Would all those in favour of the motion please say Aye. Contrary minded, Nay?

The motion is carried.

Perfect - thank you for your support on this matter. The meeting is adjourned.

[The committee adjourned at 11:57 a.m.]