HANSARD

NOVA SCOTIA HOUSE OF ASSEMBLY

COMMITTEE

ON

RESOURCES

Thursday, March 24, 2016

COMMITTEE ROOM

Department of Energy
Ocean Technology and Tidal Research

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Resources Committee

Mr. Gordon Wilson (Chairman)
Mr. Terry Farrell (Vice-Chairman)
Mr. Stephen Gough
Mr. Bill Horne
Mr. Derek Mombourquette
Hon. Pat Dunn
Mr. John Lohr
Hon. Sterling Belliveau
Ms. Lenore Zann

[Mr. Allan MacMaster replaced Mr. John Lohr]
[Ms. Marian Mancini replaced Hon. Sterling Belliveau]

In Attendance:

Ms. Monica Morrison
Legislative Committee Clerk

Mr. Gordon Hebb
Legislative Counsel

Ms. Nicole Arsenault
Assistant Clerk, Office of the Speaker

WITNESSES

Department of Energy

Mr. Murray Coolican, Deputy Minister
Ms. Sandra Farwell, Director Sustainable and Renewable Energy
Ms. Sheila Paterson, Special Projects Executive
Mr. Kent Roberts, Managing Director, Sector Development & Entrepreneurship

House of Assembly
Nova Scotia

HALIFAX, THURSDAY, MARCH 24, 2016

STANDING COMMITTEE ON RESOURCES

9:00 A.M.

CHAIRMAN
Mr. Gordon Wilson

MR. CHAIRMAN: I'd like to call the meeting to order. My name is Gordon Wilson, I'm the MLA for Clare-Digby and I am Chairman of the Standing Committee on Resources.

Today we'll be receiving a presentation from the Department of Energy on ocean technology and tidal research, an exciting opportunity in the Province of Nova Scotia right now.

I'd like to start off with the reminder to ask everybody to turn off their cellphones, if they could, or put them on vibrate. The washrooms are outside. We have a mustering area in the event of having to leave here, at the Grand Parade Square. I'd ask everybody, please, for Hansard's sake, to recognize their name before speaking.

Before any further ado, I'd like to ask the committee members now to introduce themselves, starting with Ms. Mancini.

[The committee members introduced themselves.]

MR. CHAIRMAN: So, our witnesses, if you could introduce yourselves. The floor is yours, welcome and thank you.

MR. MURRAY COOLICAN: My name is Murray Coolican, I'm the Deputy Minister of the Department of Energy and I am also the Deputy Minister for the Department of Business, a more recent appointment. The topic for today actually relates to both departments so I'll be talking a little bit about the role of both departments in that.

Joining me today are: Sandra Farwell, immediately to my left, who is the Director of Sustainable and Renewable Energy at the Department of Energy. Sandra has played a critical role for the province in the last number of years on the tidal file. She's a member of the board of FORCE, which plays an important part. She is recognized internationally as one of the leading policy people on tidal energy, among the leading countries. Certainly the reputation that Nova Scotia has is partially due to the work that people like Sandra have been doing in the Department of Energy.

Also, further to the left is Sheila Paterson who is the Business Development Executive, Business and Technology, at the Department of Energy. The role that Sheila plays is to help ensure that the supply chain in Nova Scotia is taking full advantage of the economic development opportunity for the province. I think it's fair to say that the supply chain in Nova Scotia, and Sheila as well, have out-performed our expectations in terms of the economic benefits accruing from the tidal development to date.

To my right - which is fitting, I guess, given it's the Department of Business - is Kent Roberts who is the Managing Director of Sector Development and Entrepreneurship. Among Kent's other responsibilities, he is taking the lead in the department on the COVE site, but is also involved in encouraging innovation and some of the innovation hubs and the entrepreneurial work that we hope will take place at locations like COVE and other locations in the province.

Nova Scotia's proximity to the Atlantic Ocean is a significant and natural competitive and strategic advantage. Our relationship with the ocean has produced a diverse range of industries, which comprise major aspects of our economy. Fisheries, aquaculture, seafood processing, trade and transportation, shipbuilding, the Canadian Navy, tourism, energy, offshore oil and gas, renewable energy development, science and observation - all of these industries have a sole or heavy reliance on the ocean and our proximity to it.

Today I'll talk first about the ocean technology industry broadly, then I'll dive more deeply into the tidal energy sector. The ocean represents 15 per cent of our Gross Domestic Product and by comparison, the same sector comprises 7 to 8 per cent of British Columbia's provincial GDP. It's estimated that we have 400-plus local Ph.D.s in this area contributing to the sector. Our ocean technology supply chain is well developed and includes more than 300 companies.

Continued innovation in ocean technology is central to growing our competitive advantage in the global marketplace - this idea was highlighted in the One Nova Scotia work. The 10-year action plan calls on all partners to work together to build more capacity

in high potential industries and highlights the tremendous potential of this particular sector. We have a clear and distinct ocean advantage. Success in this sector will positively influence 11 of the One Nova Scotia goals.

In March 2015, the government acquired the former Canadian Coast Guard base in Dartmouth to jumpstart plans to create an ocean innovation and commercialization centre called the Centre for Ocean Ventures and Entrepreneurship (COVE) at this site. The property is a rare and unique asset. It's a prime waterfront location on Halifax Harbour across from the Navy dockyard and Irving Shipbuilding. My geography isn't that good, but I know it's not directly across - it is on the other side.

The footprint includes nearly one kilometre of wharf and 30,000 square feet of office space, which can be shared by an incubator, an accelerator for small and medium sized business and a gathering point where the research community meets the business community. COVE holds tremendous potential to become a provincial asset with local and national benefit, and global reach.

Ecosystems bring businesses, governments, communities and other key economic actors together to maximize the advantages of local industries through mutual proximity and connections. By working collaboratively to develop and achieve a shared strategy for development, the entire sector is better positioned to identify and take advantage of the opportunities that co-operation can bring, including economies of scale, pools of specialized expertise and skilled workers, access to suppliers, business attraction and the potential for synergy and innovation.

The fact of the matter is that it takes a focused and strategic approach to bring companies, entrepreneurs, organizations, suppliers and researchers from across the value chain together to form partnerships for funding, research revenue and economic growth opportunities. COVE will serve as a hub for the ocean technology ecosystem in Nova Scotia. It will bring entrepreneurs with new ideas together with established companies from which they can learn. Academics and researchers will work alongside businesses and gain a better understanding of each other's work and needs and be more likely to find opportunities to commercialize those ideas. The next generation of students will learn about all aspects of the field in an interactive environment.

I - and I think there are many others - strongly believe that COVE is an important next step in continuing to create an environment in which the private sector, specifically in this case those in the ocean technology sector, can thrive. It will create critical opportunities to accelerate knowledge transfer, commercialize research, spur innovation and incubate new start-ups. It will promote interrelationships and co-opetition, that is it will encourage companies to be collaborative, but at the same time some of them will be competitors, as they develop and improve their technology offerings and become globally competitive.

I've also at times referred to FORCE as an opportunity for co-opetition, where companies are coming together to develop tidal, and they're working together at the same

time that they are competing with one another. I think the same can be said of our relationships with other countries like the U.K. and France as we seek to develop tidal - we're working together, but we also like to compete with them and win.

COVE is already supported by the private sector, post-secondary system, government, and research communities; many partners - the Waterfront Development Corporation, Innovacorp, the Nova Scotia Community College, our universities, ACOA, and the Department of Labour and Advanced Education - are working together to advance this project in one of Nova Scotia's priority areas of strategic advantage.

Nova Scotia's ocean technology sector and supply chain is spoken about around the globe. At its best it is adaptable, innovative, responsive to shifting market demands and competitive. It employs a skilled and experienced workforce, a value proposition that has appeal across many sectors. Our ocean is a large part of our energy sector and focusing on it will help us reach many of our energy goals. We have a growing offshore oil and gas industry. Our proximity to international markets creates opportunity for LNG export development.

Nova Scotia is at the forefront of our country when it comes to reducing greenhouse gases. Our focus on renewable energy sources is a big part of that success. We are doing the work that we need to do to develop a sustainable marine renewable energy sector.

Developing marine renewable energy, and specifically tidal energy, is a strategic focus, given our world-class resource, the Bay of Fundy. On a rising tide about 160 billion tons of seawater flow into the Bay of Fundy. I think it's well known around here that that's more than the combined flows of all the rivers in the world but I'm always amazed, when you say that, at how many people have not heard that and I think it bears repeating. These currents clock in at a speed as high as five metres per second and that's really critical when everyone talks about the so-called failure of the first turbine that went in the water. One of the discoveries was the amount of energy - they hadn't planned for the amount of energy that they found in the Bay of Fundy. That was an important learning and was actually really good news.

We think there are 2,500 megawatts of commercial potential within the tides and we expect that this industry could generate $1.7 billion in GDP over the next 25 years. Currently tidal energy projects in Nova Scotia are primarily supported through provincial feed-in tariffs, and federal government grants in infrastructure and technology. The feed-in tariff rates for larger tidal devices over 500 kilowatts were set by the URB. They will support the early-stage development of the industry through a set price for tidal energy production. We have committed a policy limitation of a total of 2 per cent impact on electricity rates, which equates to about 22 megawatts. As the industry matures and costs decline, Nova Scotia will focus more on competitive proposals regarding the price per megawatt hour.

Tidal energy has already launched new companies such as Black Rock Tidal Power and Cape Sharp Tidal. It has also created opportunities for existing companies like R.J. MacIsaac Construction in marine operations. Just over a year ago I was in London with Premier McNeil on a trade mission, and R.J. MacIsaac Construction was in London talking about their tidal expertise. I don't think there was anyone more surprised than the people from R.J. MacIsaac Construction that they were getting interest and pick-up from those in the U.K. interested in their tidal experience.

EMO Marine, which focuses on fiber-optic cable is another example. Fabricators like Aecon and Cherubini - that slide shows the fabrication of one of the Cape Sharp tidal turbines at Aecon. Engineers like Allswater, and Strum, and acoustic specialist GeoSpectrum - they are expanding their existing capabilities into tidal projects. It has created hundreds of jobs, attracted millions of dollars of investment for projects and for research and development and it's still developing. We're just at the beginning.

The work involved in this sector is fairly broad. Experience gained working on the water and developing technologies for other applications puts Nova Scotia a step or two ahead in terms of being able to support the tidal energy sector locally. We are excited about the potential as an economic driver, as an expertise builder, and as a way to generate clean, renewable energy for consumers in Canada and beyond. Of course this is also an opportunity to export our knowledge and expertise around the world. A look at what other jurisdictions have accomplished begins to shed light on that potential.

Denmark, for instance, is a pioneer in wind power. Over only a decade, it tripled its production. By 2015 it set a world record for wind production, getting 39 per cent of its overall electricity from this source, but the story doesn't end there. Currently about nine out of every 10 offshore turbines installed around the world are made in Denmark. What's more, Denmark can export this wind power energy. By 2050, the country plans to not only meet 100 per cent of its energy needs with renewables, it will also create jobs and increase its exports to countries like Norway, Germany and Sweden.

So we believe that Nova Scotia has an opportunity both to create renewable electricity that can be used in the province and exported, but also that we will be building an expertise that can be exported as other countries around the world learn from our experience and the experience of France and the U.K. to develop tidal around the world. Even if we get a small fraction of the world developing tidal market, it would be a significant opportunity for Nova Scotia.

I've personally been very impressed to see the success of Nova Scotia companies in these first tidal energy projects. Cape Sharp Tidal is working to become one of the world's first multi-megawatt arrays of interconnected tidal turbines. As part of the project, Cape Sharp has spent more than $33 million with Nova Scotia companies based in Halifax, Chester and Pictou on the two ocean turbines. More than 200 people have been employed on this project.

Overall we expect roughly 70 per cent of the project costs to be spent in Nova Scotia. It's interesting, a couple of years ago when we were first looking at this, if you told me that 70 per cent would be spent locally I would have said, well that's a very aggressive target, I'm not sure we could ever reach that. But Cape Sharp has stepped up, the local supply chain has stepped up and I think they've been extremely successful.

This number we expect will increase for operations and maintenance activities to as much as 80 per cent for larger scale projects and potentially higher for devices that are manufactured locally. Twenty-five megawatts are approved for development in the Bay of Fundy over the next five years. This could result in more than $110 million being spent in our province over the next five years. To date FORCE has used 125 companies for its activities, the majority of which are here in Nova Scotia.

It's important to emphasize that this work was secured through a competitive bid process. Local companies are demonstrating that they have the know-how, the drive, and the professionalism to compete on the world stage. After providing technology and services to projects in the Bay of Fundy, firms will be well-positioned to win business for tidal energy projects in other parts of the world; if you can do it in the Bay of Fundy, people say you can do it just about anywhere.

Over the last 10 years Nova Scotia has made a concerted effort to develop a marine renewable energy sector, one that builds and maintains public trust through science and transparency, as well as competes on a global scale. I'd like to share some key actions.

Nova Scotia, along with the Government of Canada and private partners, established the Fundy Ocean Research Center for Energy in Parrsboro on the shores of the Bay of Fundy. I've already referred to this organization, it's known as FORCE. The projects at FORCE have received approval to demonstrate small arrays of devices up to five megawatts at each berth site. There are currently five berth sites at FORCE and four power cables with a capacity of 16 megawatts at each berth. The cables come to shore at Parrsboro, where the FORCE Visitor Centre is located. Here they connect to a substation and then on to the main transmission line that connects Nova Scotia to the North American grid.

I might add that just the laying of this cable in the Bay of Fundy was an incredible achievement. In the initial planning stages, they were talking about bringing in specialized boats from just about anywhere around the world and when they got the bids, they kind of choked. What they ended up doing was going to local companies that had experience in the Bay of Fundy - they weren't fancy, they weren't big and they didn't have huge day rates - and they accomplished the job for a fraction of the cost. It was a significant achievement that was noticed by tidal players around the world.

The province developed its Marine Renewable Energy Strategy in 2012. It articulated our goal of procuring 300 megawatts of instream tidal energy and provided the framework that continues to guide our work. This work complements our renewable

electricity plan which established feed-in tariff rates for both community-based and developmental tidal array projects. We've gone global with our call for proposals and since 2014 have attracted five key players, representing a mix of local and international interests as berth-holders at FORCE.

Nova Scotia has also jointly sponsored innovative research projects with the United Kingdom to increase our understanding of our tidal environment. The province has MOUs in place with partners in other jurisdictions, like British Columbia, to share information and experiences. We have put significant effort into identifying how Nova Scotia's ports can best meet the needs to tidal energy projects, from manufacturing and assembly to operations and maintenance. Nova Scotia is providing business development support through the Department of Energy and Crown agencies including Nova Scotia Business Inc. and Innovacorp to provide opportunities for local businesses to service local projects and be introduced to new global markets.

Last year the Legislature passed the Maritime Renewable-energy Act, the key legislation governing the development of tidal energy in Nova Scotia. Provincially we have provided funding to FORCE to ensure it has the onshore infrastructure necessary to support the activities of developers who want to test technologies in the Bay. This complements federal grant support for infrastructure and technology.

Established in 2009, FORCE is Canada's leading test centre for in-stream tidal energy technology. It works with developers, regulators and researchers to study the potential for tidal turbines to operate in the Bay of Fundy and it provides a shared observation and meeting facility, submarine cables, connection to the provincial grid and environmental monitoring at its pre-approved test site. I guess I should say, since the Department of Business has some responsibility for tourism, it also provides a pretty good tourism site. I think they've averaged about 5,000 visitors each year.

MS. SANDRA FARWELL: You have to travel down a dirt road.

MR. COOLICAN: It's a little behind the harbour here in Halifax, but I think it's a significant draw for that part of the province.

FORCE receives funding support from the Government of Canada, the province, Encana Corporation and participating developers. It's a catalyst for the safe, responsible development of a new tidal energy sector in our province. Already baseline environmental and site data is monitored and collected.

Just this week the Offshore Energy Research Association of Nova Scotia (OERA) and the Nova Scotia Department of Energy announced it will jointly provide $500,000 in funding to begin a new environmental effects monitoring program at the FORCE site in the Minas Passage. This includes $250,000 from FORCE plus an additional $250,000 from OERA and the Department of Energy. This program is designed to fully understand any effects in-stream tidal technologies may have on the marine ecosystem. Early research in

other jurisdictions suggest the effects of in-stream tidal turbines may not be significant. However, this study will provide developers, researchers and the public with more information in local conditions. It's another important step forward in our plan to build and grow a responsible tidal energy sector in Nova Scotia.

FORCE closely monitors and hosts five leading in-stream tidal technologies. The different technologies are on this slide: Minas Energy is a local project developer; Black Rock Tidal Power; leadership from SCHOTTEL HYDRO which is a propeller manufacturer - you might notice the bottom left hand side there features small propellers instead of larger turbines; Atlantis Operations (Canada) with DP Energy; Lockheed Martin and Irving Shipbuilding; Cape Sharp Tidal, a partnership between OpenHydro and Emera; and finally, DP Energy in partnership with ANDRITZ HYDRO Hammerfest. This Spring, Cape Sharp Tidal will install two megawatt turbines built at Aecon in Pictou in the Bay of Fundy.

Research is a critical part of the province's Marine Renewable Energy Strategy. It helps ensure responsible development, reduces project risk and it informs good public policy. Research and information sharing can give community members peace of mind that developments are occurring in a way that respects them and the local marine environment. We rely on local knowledge - Nova Scotia is home to one of the largest concentrations of marine Ph.D.s anywhere and we are using their expertise to help build this new sector.

The other week I had the pleasure of visiting Acadia University. Their history in tidal energy goes back to at least 1915 - I've heard talk of 1898. I didn't meet any of those people when I was there last week, but I did spend some time with Dr. Anna Redden. Acadia has been focused on tidal energy research, training, education and outreach to support sustainable development in the industry. Anna Redden leads the multi-disciplinary team. As an associate professor of biology and director of the Acadia Centre for Estuarine Research (ACER) which holds several MOUs for collaborative activities in tidal energy research, Dr. Redden has extensive experience in tidal-related research. She is also director of the board for FORCE and a co-founder and co-executive chair of the Fundy Energy Research Network (FERN).

Dr. Redden kindly took the time to walk me through several promising research projects at the Acadia Tidal Energy Institute. Projects to track the distribution, movement and abundance of fish species, as well as monitor marine mammal behaviour and movement in the Minas Passage have already been completed. There are also a number of active projects. For example, Acadia is developing a publicly accessible interactive GIS mapping platform to support Nova Scotia's tidal energy sector.

Dalhousie University is also a recognized leader in ocean technology and is also involved in tidal research. Dal has completed work quantifying how tidal energy extraction could impact on physical and ecological conditions in the Bay of Fundy and the Gulf of Maine. Currently Dal is working on a laboratory study to observe and measure stress levels of fish near a rotating turbine, as well as conducting a numerical modelling to assess turbine

behaviour under turbulent tidal flow conditions. These are only a few of the research projects on the go.

The Offshore Energy Research Association is a key player in funding important marine-related research like this in Nova Scotia. Funded by the province, OERA's membership consists of the province and the research-intensive universities in Nova Scotia. To date OERA has made over $5 million in research expenditures and has invested in about 56 research projects relating to marine renewable energy, the vast majority of which are tidal related. It has invested in, among many things, strategic environmental assessments and economic value proposition for development in the jointly-funded call with the United Kingdom's Innovate UK.

I might just add that OERA was also critical in the management of the Play Fairway Analysis which has made a big contribution to offshore oil and gas development activity in the province.

In 2015 government introduced the Maritime Renewable-energy Act designed to provide a clear regulatory framework in advance of commercial-scale deployments. This new legislation will enable government to plan more effectively for development through reporting and compliance measures. It will also help ensure that transparency, adaptation and science remain at the heart of decision making. The World Wildlife Federation was very supportive in this approach, calling the legislation groundbreaking.

Already Nova Scotia is seeing local benefits from our work on tidal energy. This sector - more broadly ocean technology and specific areas like tidal - hold tremendous potential. But Nova Scotia's domestic market is small. As we move forward government has an important role in creating an environment that allows this industry to achieve its potential. The private sector has an incredible opportunity to grow and capture a larger piece of this expanding global market. Nova Scotia can become a world leader in this sector, but to get there Nova Scotia companies will have to achieve competitiveness on an international scale. Clearly there's a great deal of potential for our energy sector to make a major contribution to our future and our economy, while we ensure that our environment is safeguarded. Thank you.

MR. CHAIRMAN: I'll start with Mr. Dunn.

HON. PAT DUNN: Thank you for the presentation. In some cases it's overwhelming what's happening in the province with regard to the energy sector so it's very pleasing to have you here to talk about it and to go through the explanations of it and so on, because without a background in it, when you're talking to people in Nova Scotia and they're trying to read about it, they're definitely overwhelmed with what's actually happening.

You mentioned the economic driver in renewable energy and so on. I guess my question would be for Ms. Paterson; with regard to the economic driver and the supply

chain - Murray, you mentioned some of the key players - are the supply-chain tentacles going to spread across the province into some other - like from one end of the province to the other, in small businesses, and again outside the province? Can you just make a few comments about that?

MS. SHEILA PATERSON: Yes, absolutely. The community that's supporting tidal energy is active in many of the other sectors so what we tend to see is that those that are working on the oceans might be supporting the fishery, they might be supporting aquaculture, naval capabilities, science and observation. In many cases we have a number of companies that are very diverse in that they have a product that's able to support all of those so I think that really is good for the long-term health and viability of those firms. For instance, you might have a company that has a piece of equipment that's used for deploying something off a vessel and that would be used in all those different sectors, and also something like sensing and acoustics monitoring type of equipment would have a demand in all of those areas, and largely worldwide.

The companies are - there are a number that would be considered small companies and are very much so around the province. Proximity to the site - here we're talking about the Bay of Fundy, so we're talking about companies from Digby and southwest Nova Scotia around through to Parrsboro. They have been successful in winning some of this work through FORCE.

I think Murray mentioned that 125 companies so far have worked in one way or another with FORCE, and many of those would support the fishery or would support fabrication and marine operations. We see fabricators that are typically in rural areas and in the Halifax-Dartmouth area, particularly in Burnside, there tends to be a bit of a concentration of some of those technology companies. But the great thing there is that in large part that is knowledge intensive, so really it can be set up in - its physical location is not necessarily important.

One thing that will be interesting is through COVE we'll see not just the physical space, but that it forms a hub of developing the cluster for Nova Scotia, and that would be communicating amongst those in Nova Scotia and the region. So we see in New Brunswick and Newfoundland and Labrador a lot of strength in the sector as well.

MR. CHAIRMAN: Mr. Mombourquette.

MR. DEREK MOMBOURQUETTE: Thank you for the presentation. You talked in your presentation about the resources and the support you're receiving from around the province, and as one of the representatives from Cape Breton, I'm just curious about the role that CBU is playing in ocean technology or any of the private sector is playing in ocean technology from the Island, whether it's from my side or the western side of the Island. Can you provide any background information?

MR. COOLICAN: I'll start, and then turn it over to Sandra or Sheila who might be able to add some. CBU initially expressed a fair amount of interest in small-scale tidal around the Bras d'Or Lakes. I'm not sure they're as active in that now as they were, but they have been following the tidal industry closely. I'm not aware of any of the companies that have been involved; Sheila may be able to add some to that.

I might just say that I was at a meeting that we were involved in in Port Hawkesbury a few weeks ago, which was co-sponsored, I think, with the Cape Breton Partnership. Sheila mentioned the importance of an incubator like COVE, once we get it up and going. At that meeting, the idea was to help companies prepare themselves to participate in the offshore oil and gas business, as well as in the tidal business, and looking at the kinds of - especially safety standards that some of these companies require.

I met a gentleman who just recently formed a company that helps smaller companies develop the safety systems that are required to bid on offshore oil and gas work. He mentioned to me that he was in the process of developing an app that would help small companies do that. He said, I just recently hired an MBA who had been at the Volta incubator site and there are two great things about this guy: one, he's a bright MBA, and often he knows the answers to questions that I'm asking; the second thing is he has a network at Volta, and if we have a problem we can't solve, he just connects with the people he got to know at Volta and it provides answers.

I hadn't expected to find myself in Port Hawkesbury on an energy issue learning about the importance of an innovation ecosystem. It was just an excellent example of how that kind of ecosystem should start to work and is working to help people create new products and services on which they can build their companies. I'll let Sandra talk a little bit more.

MS. FARWELL: Just to add from what our experience has been with Cape Breton, I know that the Verschuren Centre through Cape Breton University has been interested in looking at tidal at the smaller scale, perhaps. There has been work by Dr. Bruce Hatcher on resource assessment and looking at the sites in the Bras d'Or Lakes. They were involved in the strategic environmental assessment that was done so there's a smaller resource there, and I think the Unama'ki Institute has also been involved in work and would be, in terms of environmental studies and that sort of thing. I don't know if there are any companies based in Cape Breton. Sheila, do you know?

MS. PATERSON: I won't go into naming any, but there are.

MS. FARWELL: So there could be some too.

MR. CHAIRMAN: Mr. Horne.

MR. BILL HORNE: Thank you. It's pretty exciting what you're saying here today. I've had a little bit of knowledge, working at the Bedford Institute, about tidal power and mostly from environmental issues, for fish and marine mammals and so on.

I wanted to get an idea about how you see this blossoming. How quickly is it going to come? I know you're saying five years and you're doing, what, 25-kilowatt projects? There will be a mixture of small companies and larger companies with larger amounts of work in the area. I'm wondering if you could expand on the thoughts of the COMFIT program, as it works with the windmills, how that may work with the tidal.

MR. COOLICAN: It's a good question. When I first started as Deputy Minister of Energy - well, it was probably within a year or two - the first tidal turbine went in the water and we know now what the results were. The public view was that it was a big failure, and I referred to that earlier in my remarks.

Shortly after the turbine was pulled out of the water I went to visit the President of OpenHydro in Ireland, and I thought I would come across someone who was glum and down and not very positive. I walked in and he was up at the ceiling level, he was so excited. He had a number of reasons why he was excited. He said that first of all, we put the tidal turbine into the water on schedule and it went exactly where we wanted it to go, and doing that in the Bay of Fundy was a huge accomplishment. He said the second thing was that when we went to pick up the turbine and take it out again, it was exactly where we left it - a second accomplishment when you think about the power of the water in the Bay of Fundy. He said the third was there was about two and a half times the energy we expected.

Just that fact immediately changed the economics of tidal. If you put a piece of equipment in the water and you're getting two and a half times the energy, that's a big change for the positive.

I said, what about the fact that the turbine didn't last? He said oh, we can fix that, that's an engineering thing that we can fix pretty easily. Now we have the two turbines that are being built at Pictou and they're larger than that first turbine that went in, and I'm pretty sure they're going to be stronger. It has been about three or four years since the first turbine went in the water (Interruption) Five years? It seems like yesterday. I think it has taken them longer to get back in the water than they expected so it's hard to know how quickly these things are going to happen. I think a lot will depend on the results of the different technologies that we're looking at.

I know there were a number of people at the time who were quite critical and there were a couple of other people who said well, if you go back to the Wright brothers and you look at the kind of planes they were flying in and you look at the kind of planes we fly in today, there's a big difference. We're at the stage in tidal turbines of the work first being done by the Wright brothers, so it's really difficult to predict how long it's going to take.

I think one of the keys is going to be which technology proves to be the most efficient and effective in the bay, and also, which technology provides the best economic results because we have to get the costs down. Renewable energy is more valuable than other kinds of energy, but we still have to get the costs down quite considerably to be able to market the electricity and to market the technology around the world that would create electricity.

It is certainly a significant resource here in Nova Scotia, but it's a significant resource around the world. Tidal energy can play an important part in any move to reduce greenhouse gas emissions and to increase renewable energy because it is so reliable. It's not reliable 24 hours a day, but you can predict 10 years from now when the electricity is going to be coming and the times at which it's going to stop because of our understanding of the tides, whereas wind comes and goes and we're not very good at predicting when it's going to come and when it's going to go. So tidal energy in any system is going to be an important component.

MR. CHAIRMAN: Mr. Farrell.

MR. TERRY FARRELL: Is there any way that you can give us an idea of where the generating capacity of the tidal system, if you will, fits into the overall energy needs of the province? Is it going to register on the percentage of requirements of required energy or can you discuss it with respect to one turbine or two turbines? I'm just trying to get a grasp on that.

MR. COOLICAN: In the recent electricity plan that the province did and had a fair amount of public discussion about that, we do not see a need for significant new generation for the province for the next - to 2030, probably. So the tidal energy that is being developed now is not critical to meet the province's needs.

I would say a couple of other things. One, it's hard to predict, given where the country and North America is going on greenhouse gas emissions, that if we get to a situation where our economy becomes more electrified - so people are talking about moving home heating to heat pumps, moving our transportation system to become electrified - that those things could create demand and could change the demand profile that we expect to see and might increase the importance of tidal by that time.

There have also been discussions about helping to meet the needs of New England in terms of renewable electricity and creating a better transmission connection between the Atlantic Region and New England, and perhaps seeing a time when the eastern part of North America is no longer dependent on carbon for its electricity. There would definitely be a role for tidal in achieving that.

MR. FARRELL: I guess maybe I could just put it into a simpler question - what's the generating capacity? What is the generating potential?

MR. COOLICAN: It is 2,500 megawatts.

MR. FARRELL: How much is that of our total consumption in Nova Scotia right now - what percentage?

MR. COOLICAN: Twice.

MR. FARRELL: That's twice what we use, okay.

MR. COOLICAN: In the summer, we only use 700 megawatts.

MR. FARRELL: I guess if I learn to ask a simple question, I get a simple answer. (Laughter)

MR. COOLICAN: At deputy minister school, we're trained to deliver very complicated answers to simple questions.

MR. FARRELL: Well I went to another school that sometimes teaches me to ask complicated questions. What about the feed-in tariff? What are the numbers on that in terms of how it could affect rates in particular as the capacity comes on line?

MR. COOLICAN: We have modelled this that the impact on rates would only be 2 per cent, but you have to keep in mind that Nova Scotia Power in looking at its rates has put some takes, so that doesn't guarantee there's going to be a 2 per cent rate increase. What it says is that the impact of the tidal projects that we have now will create, over the time that they come into play, about a 2 per cent impact on rates.

MR. FARRELL: And that takes into account - okay sorry.

MR. CHAIRMAN: We'll come back to you. Mr. MacMaster.

MR. ALLAN MACMASTER: What about smaller projects, like maybe more so in Nova Scotia, like in rivers in Nova Scotia? Are there challenges with that? Are there incentives for that? Is there any development happening there?

MS. FARWELL: Well in terms of in-stream tidal, we got a report back in 2008 that identified all the different sites of potential in the province. The key sites were the Minas Passage, which has the motherlode of tidal, then there's the smaller lodes. There's some good potential in Petit Passage and Grand Passage in Digby Neck, as well as Digby Gut. Those are the other sites that we've ordered COMFIT projects to - the community scale. The smaller-scaled turbines will be going in there, under 500-kilowatt size, whereas these large ones we're talking about at FORCE are like 2-megawatt size. So the potential for ocean marine renewables is there.

If we talk about rivers, that's a different kind of technology. That's run-of-river, one-way flow, but when you talk about tidal it's both directions with the tides. There are opportunities for the companies that are looking at smaller scale to be used in other parts of Canada and the world so any place where there's a rural community on diesel, to get them off diesel they can use these in-stream, small-scale tidal turbines and they are looking at that in other countries - Asia, for example.

That's the opportunity for some of these companies that want to start off here and get experience, they want to go global and sell themselves to other countries. Also, Chile and South America has a need so there's a potential for that. We just need to get the turbines in the water and see how it works. It's still at the demonstration stage right now but we're hopeful for the Digby projects to go forward.

MR. MACMASTER: So Digby would be sort of an example of the smallest type?

MS. FARWELL: Yes.

MR. MACMASTER: That's still depending on tidal energy, as opposed to just natural flowing water from a river.

MS. FARWELL: Right.

MR. MACMASTER: So there's nothing with rivers at this point.

MS. FARWELL: Not in Nova Scotia but Manitoba is looking at some run-of-river type technologies as well.

MR. CHAIRMAN: Mr. Dunn.

MR. DUNN: Just a quick question. What do you foresee as your immediate or perhaps most difficult challenges going forward?

MR. COOLICAN: I would say there are a number of challenges; one is just operating in the Bay of Fundy. If I go back to the experience of the first turbine that went in the water, one of the reasons the turbine was in the water for so long is that you just can't see what is happening in the water. Once the turbine is there, you can't visually see what's happening. It was six or seven months before they were even able to get a brief photograph of what happened to the turbine. You can't put a diver in the water for safety reasons; it's not advisable.

The challenge of working in the Bay of Fundy is an incredible challenge and it's also part of our opportunity because people say that if you can do it in the Bay of Fundy, you can do it anywhere.

I think the second challenge is the economics and the challenge of getting tidal to a point where it's more competitive with other forms of electricity. That takes experience. I'm told already that the second turbine that was built at Pictou, given the learnings that the workforce gained building the first one, the price of building the second one was less. Plus if you are starting to build more of them, you get economies of scale and that will begin to bring the economics down.

I think the third challenge is making sure we have a good understanding of what the environmental impacts of what we're doing are, and that's partly made more difficult because we can't see what's happening, so we need to develop research devices that will give us a clear idea of what's happening to the marine life in proximity to the turbines. That's not something that - oh, we know how to do that, we'll just do that right away. We're experimenting with different methodologies to measure the impact.

MR. DUNN: With the new turbines going into the Bay of Fundy, are there any entrepreneurs working with technology to be able to actually see what may be happening in the bay?

MR. COOLICAN: Not with your eyes, but with the equipment, yes.

MS. FARWELL: The Cape Sharp project, the first project going in the water, actually has a research project that has been funded through OERA and we're partnering with the U.K. - Innovate UK. As part of that project, they'll be looking at environmental monitoring technologies and sensors that will be able to detect what they need to answer questions for regulators. That's part of that research project. They're also installing monitoring devices around the turbine as well so that they'll be able to see what's in the vicinity of the turbine when they put it in the water.

MR. CHAIRMAN: Ms. Mancini.

MS. MARIAN MANCINI: The question I have I think has already been asked - it's about the amount of the tidal energy that would actually be used here in Nova Scotia. I think you indicated that the amount anticipated is way beyond our need, but I guess I'm just a little bit curious because I thought the idea with this type of energy is to move us into clean energy. That's a big component of it. The energy - the 700-whatever you were talking about, megawatts - is dirty essentially. It's coal-fired and . . .

MR. COOLICAN: No, it's not.

MS. MANCINI: Oh, okay - educate me then. That's where I was going.

MR. COOLICAN: I mentioned earlier in my remarks that Nova Scotia is one of the leaders in reduction in greenhouse gas emissions in the country. I could probably go further than just saying within Canada, but I'm going to stick to within Canada because that's what I know.

Over the last number of years, the Government of Nova Scotia, in the Legislature through the passage of EGSPA, through the setting of targets to reduce greenhouse gas emissions, the province has set very aggressive targets to reduce the amount of GHGs being put into the atmosphere from the generation of electricity in the province.

Other provinces have set targets, but Nova Scotia is on track to meet those targets. The way we've been able to do that is first of all by setting caps on the amount of GHGs that Nova Scotia Power is allowed to release. So we've put hard caps and they're reducing over time.

The second thing that we did was to put in place renewable energy targets, so 25 per cent of our energy had to come from renewables in 2015, and 40 per cent by 2020. We exceeded the 2015 targets and that renewable electricity comes primarily from wind. So we have gone further than almost every other province except for P.E.I. in the per capita creation of electricity from wind.

There are wind projects that are bigger in Alberta or in Ontario, but from a per capita basis, we have done better than those provinces. So as a result, we've reduced the amount of coal being used for electricity from approximately 85 per cent to down around 55 per cent over the last few years, and we're continuing on a downward trajectory.

The other project which gives us the opportunity to meet our 2020 targets, in addition to the wind that we put in place, is also the Maritime Link and the connection to Muskrat Falls hydro power, which will allow us to meet our 2020 targets before 2020. We think there's an opportunity that we could be going beyond those targets for renewables by 2020.

In Nova Scotia it's a very positive story. Have we closed any coal plants? No, we haven't. I would argue that in Ontario where they did close some coal plants, their reliance on coal for their electricity generation was not very high, whereas in Nova Scotia it was 85 per cent. So if we closed coal plants right off the bat, we wouldn't have had electricity, so we put in place a program that has gradually reduced the amount of coal. Maintaining the coal plants open during these years has helped us reach those targets because the wind doesn't blow all the time, you need to have coal as a backup for when the wind isn't blowing - you need firm supplies of energy. So by keeping the coal plants open, we have actually reduced the amount of coal. If we can reduce the amount of coal without necessarily closing a coal plant, from a GHG perspective, I don't understand the difference.

I think the other thing is that as we go further down in our coal use, I expect there will be closures of coal plants. The issue is going to be, how do we do that in the most economical way and how do we do that in a way that does not have a strong negative impact on the workforce? Are we able to do that through attrition, for example?

MS. MANCINI: Basically then I think what I'm getting from what you're saying is that we here in Nova Scotia will not need that tidal energy to achieve the goals we need to achieve, so we can export it to New England?

MR. COOLICAN: I think it's probably too early to say that categorically so it depends on the price of the tidal energy and where we are in terms of the other energy that is available to us. It's quite possible that the tidal energy will be useful to us in helping us to reduce our carbon footprint. I think a certain amount of that depends on potential other uses for electricity that we don't now have.

I drive a Volt, for example, so I drive to and from work on electricity but there aren't many other people who are doing that at this stage, so if that becomes more prevalent, we could need more energy and some of that could come from the Bay of Fundy. But because we don't know yet what the price is going to be and whether the technology would work, it would be wrong for us to depend on tidal energy to meet our goals.

MS. MANCINI: Okay, thank you for your answer to that.

MR. CHAIRMAN: Mr. Farrell.

MR. FARRELL: I'll try to get back to a simple question - this one might be too simple. If we get into an export situation with respect to this tidal energy and we're feeding it into the grid for another market, such as New England, are there measures in place to capitalize on that so that it has a positive effect on ratepayers?

MR. COOLICAN: The first positive impact on other ratepayers would be on the transmission charges. It's hard to know what the example will be at a future date if we have tidal energy going into the United States, but certainly with the Muskrat Falls and the Maritime Link, there will be more electricity flowing through Nova Scotia and it will be flowing on transmission lines that are owned by Nova Scotia Power. The revenue from the increased transmission will benefit Nova Scotia ratepayers because it will reduce the cost. It will increase the revenue from the transmission that's in place and therefore reduce the costs that are there.

As yet, in terms of the export of our electricity to other places, we don't have other measures in place that would create a benefit, although I would argue that the economic benefit from the manufacturing would be considerable.

MR. FARRELL: I guess it would be nice to see. There seems to be a considerable provincial investment in the sector, if you will, through universities and through the work that's being done in the department and Nova Scotia Business Inc. and all of those things. I guess some kind of direct return would be a nice idea there as well. Just my thoughts. Thank you.

MR. CHAIRMAN: Mr. MacMaster.

MR. MACMASTER: What about ocean life? We see people who have concerns about the impact on ocean life with tidal energy. I was looking at some of the turbines up there before and some of them look - especially the one that appears to spin around and anything that might be going by could just go right through the middle of it. That looks like it might be better than perhaps the turbines that are spinning like a propeller. Have we been discovering anything with that? Have the companies that have been experimenting with this technology, are they finding that some have no impact on ocean life or are they finding it does have some impact?

MR. COOLICAN: I'll start off and Sandra may be able to supplement. First of all, in Scotland where the water is clear - they probably use it for making scotch; I wouldn't recommend Bay of Fundy water for scotch - there they can see what's happening and they've monitored sea life around the test turbines that they have in the water there. They find two things. One is that when the tides are running strong, the sea life there head for the hills or go down into crevices and do not want to be in the tides when they're at their peak.

The other thing they've noticed is that if they're around the turbines, they avoid them. We don't know the answer to that in the Bay of Fundy and with the turbidity in the water, we can't see what's happening with sea life - we can't just look. So the test turbines going in the water are going to be really important to learn to understand what the impact is.

In addition to trying to learn from those turbines going in the water, the methodology for figuring out what's efficient and what isn't when you can't see - how we measure that, how we measure where they're going, how we find that out - there's still a fair amount of work that's being done to try to perfect that system so we get a good idea.

That's one of the reasons - it's not the only reason but it's a significant reason we're kind of going slowly. I mentioned 300 megawatts. We're not rushing to a 300-megawatt project that if there's a significant impact then you've invested too much. We're taking small steps so we're planning for the next 22 megawatts to 25 megawatts and these first two turbines are going to go in the water - we're not sure when the next one is going in the water - so we're going to learn from that. In my remarks I talked a fair amount about the different kinds of projects that we're undertaking to try to measure what's happening.

MS. FARWELL: There have been turbines in the water where they've been monitoring the interactions with fish. For instance, the OpenHydro device, as Murray mentioned, has been in the water at the European Marine Energy Centre, which is in northern Scotland in Orkney, since 2008. They've had that machine in the water and they've done a lot of observations of interactions. To date, results have not shown anything significant.

There has been work done in Maine. They had a device - the ORPC, that's the company down in Maine - they've done a lot of studies of actual in-field observations of a

small-scale turbine and fish interactions with that, and again no significant results of any concern.

They've had a device in Strangford Lough in Northern Ireland as well. It's a big, massive device, which they've also carried out work since 2008 on observing marine mammal and seal interactions. So there has been some work - not in the Bay of Fundy, but we can look at the results of those tests and see. Regulators are estimating that interactions with these turbines are going to be minimal.

One thing to note is that the turbines spin very slowly. The rotations per minute are not like a quick propeller on a boat or something. It's very slow and so this is why they're also saying that fish are probably able to avoid.

Also, there's a group called NX4, which involves the U.S. researchers and Canada, and they're working on all of the questions that we have related to noise, fish interactions. All of those questions are being answered. It's an international group of scientists and they've been systematically checking off issues and saying they've seen no impact, so that's off of our list of concerns and they're sort of narrowing down what they do and don't know.

And FORCE - there has been six years of baseline data collected on marine mammals, fish and lobster so we're quite prepared I think, and now we want to get a turbine in the water because we have all this baseline data and now we want to sort of see what the interactions are with an actual turbine in the water. So this ongoing work and now we'll finally be able to get some real in-field observations and it's all going to feed into a big database of research that we can share with other countries. It's all a collaborative effort that's being shared with other countries so we have a full global understanding of this and have a big picture.

MR. CHAIRMAN: Mr. Dunn.

MR. DUNN: Just to follow up on Allan's question - my question is somewhat similar to his. What are the main environmental concerns that have been brought forward toward this project since you have started?

MS. FARWELL: I guess the one is, what the impact is on fish. It's just a general question of - are the fish going to get caught in the turbines or are they going to avoid or is it going to change their patterns of migration? What if they travelled through here and they're not going to anymore because there's something in the way - those kinds of questions. That's why we're focusing on the key questions that concern fish, marine mammals and the key species in the Bay of Fundy that we have and that's mostly lobster and striped bass, I think was another fish of concern.

There's very little marine mammal activity up in the Minas Channel. First of all, it's a very harsh environment so there is not a lot of species crossing through the high currents, but there are some harbour porpoises so we're looking at those as well.

MR. CHAIRMAN: Mr. Horne.

MR. HORNE: I guess a continuation in this vein - there is a generation of power on the Annapolis River and I think it goes both ways, comes in with the tide and gets energy, going back out again with the current of the river, I guess. There must have been a lot of evidence of interaction with fish and how they solved those problems. I'm just wondering if you could comment on that and then I have a follow-up question.

MR. COOLICAN: Could I just make a comment before I turn it over to Sandra specifically? It's important to recognize the very strong difference in the technology between the barrage technology that was used at Annapolis and the kind of in-stream technology that we're putting in place in the Bay of Fundy.

First of all, it created a barrier across the river and there was reputed to be a lot of environmental impacts from that. Although there was an agricultural barrage that was put into the river before the tidal barrage went in there so the environmental impacts are quite different when you get to a barrage as opposed to an in-stream tidal.

It was interesting, I visited the Rance tidal site, which is another site similar to the site in Annapolis, although a much larger scale, and that opened in the late 1960s when President de Gaulle was the President of France. Apparently when he opened it, it wasn't quite ready so they had to have somebody behind the wall to move the dial when he cut the ribbon to open the plant.

I was quite interested in what the environmental impacts were and they were talking about how this plant didn't really have an impact on the environment. I said well what about a barrage that was not 100 per cent across the river estuary but is probably 95 per cent? They said, oh Napoleon dammed that up in 1815 with a bridge upstream. It was amazing to hear that history of Napoleon getting away with a lot of stuff, including environmental impacts that we couldn't get away with today. Sandra, do you want to comment?

MS. FARWELL: I would sort of echo what Murray is saying. They are very different technologies - you can't really even compare them because really I think the impacts that occurred from the barrage were mostly from the barrage itself; not the turbine itself. So with this in-stream tidal, it's one unit. What DFO has told us, sort of estimating, is that you wouldn't even notice it. With all of the noise in the Bay of Fundy, shall I say, one turbine is going to be almost unnoticeable because of how much current activity and the noise and sediment and everything that runs through there. There are boulders rolling around - a lot of activity in the Minas Channel.

They're saying we need to see larger array-scale turbines put in before we can even assess impacts, really.

MR. HORNE: Just to change a little bit, my original question is, what's going forward with the Departments of Energy and Business, as far as what you see in the next four or five years? I notice that in 2011 there was the Tidal Energy Symposium. I don't know what part Nova Scotia took in that. Are there more of these going to be happening? Are they happening around the world? Where are the tidal problems or concerns or interests in the world, besides France, I guess, and the U.K.?

MR. COOLICAN: I'll start and then I'll turn it over to Sandra who has a lot more experience at the international level than I do. First of all, there are continuing meetings at the international level and we probably get invited to five, six, or seven a year. We don't go to all of them.

We find that the international effort around tidal - there's some interest in Asia and the Koreans are probably further ahead than others, but there are interests in other parts of Asia. In Europe there's strong interests in the countries that are furthest ahead - the United Kingdom, primarily in Scotland - although as Sandra mentioned, there's also a tidal site in Northern Island - and then also France. OpenHydro started as an Irish company, but it was bought by DCNS, which is a French, state-owned company that specializes in marine defence construction. They have decided to make marine renewable energy a focus for them.

When we look around the world, we feel that the French and the U.K. and ourselves are probably the leaders in this; we try to spend a lot more time with them. I think there's a certain limit to how much co-operation people will have on the technology area but in terms of regulatory policy and how we regulate the industry, environmental information gets shared considerably. There are some subjects in which we are comparing technological activity as well. Sandra, do you want to comment?

MS. FARWELL: Yes. I would say we have been one of the global leaders in tidal, for sure. In November 2014 we hosted the International Conference on Ocean Energy here in Halifax. Over 600 people came just to meet at a conference on marine renewable energy and that was really huge. It was at the World Trade Centre. We had delegations coming in from all kinds of countries.

We host delegations of countries regularly; China has been here, Scotland a few times, Chile, France - France is coming this Fall to talk about tidal and the opportunities. We collaborate with the U.K., with our research projects and also on regulatory issues. We met with the Minister of Energy in Scotland, in Edinburgh, in the Fall, so we have good government relations with France and the U.K., which were the other sort of global leaders in this. Like the tidal symposium, we actually hosted that - the Department of Energy did. We do have an annual conference of renewables, that Marine Renewables Canada hosts. We have a lot of participation in that.

We also have a research and development forum that we host every two years and it's coming up this May at St. F.X. I don't have the exact date but it's late May. There's a whole stream on - the actual forum is on all energy so we talk about offshore petroleum, as well as sustainable energy and efficiency. We also have a whole stream on marine renewables and there's a workshop the day before on environmental. We're hosting people from other countries who are coming to that as well and we have lots of students involved in that. We have good exchange with students, actually, through Dal, with a Scottish university, Strathclyde University. They're doing an exchange research program, a Ph.D. program through engineering on blade design, for instance, on turbines, so a lot of academics are working well with other countries for sure.

We have to see this as a collaborative effort in order to answer the questions and work globally on developing this. This is the development of a new sector, a new industry, so we work with our partners in those other countries.

MR. CHAIRMAN: Ms. Mancini.

MS. MANCINI: Just about jobs being created with the whole project, there would be the developmental phase and your operational phase. Do you have the sense of what we're looking at with this project?

MR. COOLICAN: I hesitate to get into job prediction. It also depends on the ability of our companies to compete. As I mentioned earlier, the supply chain sector here and the companies that are conducting the bids did much better than we expected in the construction of the turbines at Aecon in Pictou. We didn't expect that local companies would get the business to install the cables in the Bay of Fundy. When they saw the prices that were going to be charged for international vessels to come in, they went to the local market and they outbid the international competitors and they did the work quite well. It's difficult at this stage to predict exactly what's going to happen.

I think the other side of the equation is we've had studies done that estimate the amount of international economic activity that will take place as a result of tidal but we're still at the early stages, so to kind of lay down a number and say there's going to be this much economic activity and Nova Scotia is going to get this much of it, at this time I'd say it's premature. People talk about an industry that is up towards $1 trillion and if Nova Scotia were to get just a small percentage of that, that would be a significant opportunity for us. I think if that does develop, based on the experience we have to date, I think we will get a percentage of that. I hope it will be a bigger percentage but it's really difficult at this stage of the technology and the developments to make a prediction on the exact numbers.

MS. MANCINI: I think the federal government recently allotted a fair bit of funding to ocean-related sectors. Will that have an impact on how this goes forward?

MR. COOLICAN: Yes, it will certainly help. The federal government has been very supportive. I haven't got all the details yet, but there is a good signal that they are

going to continue to be supportive of our activity both in the tidal area and also in ocean technology, and that's very much appreciated.

In addition to that, Mr. Horne mentioned his experience at the Bedford Institute of Oceanography. I think it's fair to say that the ocean technology industry in Nova Scotia is in part due to the people who worked at the Bedford Institute of Oceanography and work they've done has contributed to tidal, but it has also contributed to the creation of the ocean technology industry that we have in the province. It's an incredible amount of expertise that's available to us and some of the people who worked there have created companies - I'm not sure if it was after they retired or before they retired, but that's some of the reason for the significant numbers of Ph.D.s in this region who have an ocean background.

So the role of the federal Department of Fisheries - in the last budget, they're going to be putting more money into fisheries research that should help them support the work that we're doing in the Bay of Fundy. So the co-operation with the federal government and staying in touch with them is very important.

MR. CHAIRMAN: Mr. Horne.

MR. HORNE: Just a question that I think is important to ask is the reflection of the First Nations. I was reading in the Nova Scotia Marine Renewable Strategy a number of places where the Mi'kmaq and the First Nations are engaged in the strategy. I'm just wondering how you see that coming forward and being a very positive thing for Nova Scotians.

MR. COOLICAN: I'll just provide some broader context and then Sandra can answer more specifically. The Department of Energy has a meeting twice a year with KMK, with the chiefs to talk about the energy issue in general. We talked to them about our progress on various projects. It doesn't replace the formal consultation process that is required for a specific project, but we hold those regular meetings to help them stay connected to what is happening in the energy business in Nova Scotia, and also to work with them to identify opportunities where they can participate in the industry.

Just to give you a couple of examples, they formed a co-venture with another company and they have the contract for doing catering on the Stena IceMAX where Shell is drilling. I can't draw a direct line to our work with them, but we certainly made them aware of the activity that Shell was doing and helped them connect with Shell and with other companies.

Efficiency Nova Scotia - there has been efficiency work done in every First Nation community in the province and that was done through a joint venture between the KMK and Efficiency Nova Scotia where they designed the program together and First Nation individuals were trained to provide the efficiency services in communities. The communities reaped the benefit of lower energy costs as a result. I think if any of you know if you've got a house that's not tight, your comfort and living is not that great. So the effort

that was done to plug holes and to have these homes more energy efficient I think also contributed.

Now Efficiency Nova Scotia and the First Nations are looking at potential opportunities to take their experience to other provinces. We have kept them informed about the tidal energy opportunities and looked for opportunities where they can benefit. Sandra, do you know more about this?

MS. FARWELL: It was part of our strategy, we recognized the importance of engaging and working with the Mi'kmaq community in Nova Scotia, so as a requirement with our new Maritime Renewable-energy Act, we require as part of licensing that all developers would engage with First Nations and develop an engagement plan - to have them involved, if possible, with their project. The Mi'kmaq have met with all the key developers at FORCE and have had good discussions about upcoming projects. It's still at the very early stages but I know Cape Sharp Tidal is working with the Mi'kmaq now and all the future developers will have a plan to incorporate them into the work and possibly even partner with them on future projects.

We also early on did a Mi'kmaq ecological study of the Minas Passage and also the Digby area so we can understand the traditional ecological knowledge and incorporate that into our planning for the projects.

MR. HORNE: Just to continue on in that frame, I notice nowhere in our documentation that New Brunswick is involved in tidal. Now the Bay of Fundy is bordered by New Brunswick as well as Nova Scotia - are there any actions from our government trying to work with New Brunswick? I know that as a government, we're trying to work closer with other provincial governments to reduce red tape and stuff like that. I'm just wondering what your thoughts are on that, your comments.

MR. COOLICAN: First of all, we're always open to co-operation with New Brunswick. I'm not sure of the reasons, but they have not demonstrated as much interest as we have in the tidal area but we're always happy to share with them what we're doing.

We, the four Atlantic ministers, continue to meet on a regional basis and we're always sharing information with them about our work on tidal. I think there has been co-operation in this area but for some reason New Brunswick hasn't taken as strong an interest as Nova Scotia.

MS. FARWELL: I'll just add that New Brunswick has shown some interest. Back in 2008, we worked with them and jointly funded a Strategic Environmental Assessment, so we did look at the New Brunswick side as well for that. They were exploring opportunities back in 2008 but they didn't proceed like we did with the sites that we have identified on the Nova Scotia side.

We also work with the Department of Energy in New Brunswick on regulatory issues, so we're still keeping each other informed on what we're doing on the regulatory side of things. We work on a national committee as well with NRCan so they're still participating, sort of, on those types of events.

Also I guess the Saint John port has been involved with some of the recent activities at FORCE. For instance, they had to store the cables, the reels there in Saint John and certain activities like that have been involved outside as well.

MS. PATERSON: Just another avenue of co-operation would be that quite a bit of our international trade and investment development, particularly trade development, is conducted on an Atlantic basis so there are a number of ways in which those of government that are delivering business development activities are co-operating with New Brunswick, P.E.I, Newfoundland and Labrador, and our federal partners - predominantly ACOA, but also Global Affairs Canada, so that would be an area where we have pretty tight communication.

So there are a number of trade missions or it might be hosting of an international delegation or facilitating connections or information-sharing on business opportunities for companies. That's a place where we have pretty tight communication with New Brunswick.

MR. HORNE: Thank you.

MR. CHAIRMAN: If there are no further questions, I guess, as the chairman, I have to ask permission if I could ask a question. It has been difficult for me sitting here - as maybe some of you know, this is very close and near and dear to my riding and I have been involved in this for many years.

First, the one thing that wasn't mentioned that I think - the coolest thing about tidal is we think of it as tidal but really we're harnessing the energy of the moon, and we need to go back to that. That's the most unique, interesting thing - this is the energy that we receive from the moon that we're harnessing in the Bay of Fundy. We call it tidal, but truly it originates outside of our planet.

I'd like to also thank my colleague, Mr. MacMaster, for mentioning the Digby area Fundy Tidal Inc. Although it's not quite as large and as sexy as the big ones, I'm very proud of this group. They're very tenacious and they have a grassroots, interesting business plan and I hope they're successful in the future because there is a niche for them in the world. It's exciting to see that they are now deploying some testing equipment. It wasn't mentioned, but there was an article in the paper this week in regard to that and I wish them all the best.

Thirdly, I also want to thank the province. It's maybe not well known, but there has been a lot of collaboration between the Department of Business and the Department of

Energy, on behalf of both of those ministers - it's interesting now that Mr. Coolican also represents both of those departments. There has been a working group collaborating within government, which I think is tremendous and very important to note that there is a lot of interaction between all the government players from ACOA right straight through, which I think is tremendous to keep this province current and ready for when we need to make a decision and move on that, and everybody is on the same page. I do thank Deputy Minister Coolican and Sandra Farwell, who chairs that working group, and the work that goes on there.

It's interesting - I see this sector as two paths of opportunity. Certainly we've talked on the intellectual property, the R&D that's being developed and that chain that we're going to hopefully harness in supply. The other side of it is the actual physical opportunities of deployment, maintenance and ongoing work to service it - potentially up to 300 megawatts here. I see the two different opportunities, each of them with different challenges.

The one that I'm obviously most interested in is the deployment, the servicing and the long-term maintenance. There are different aspects to that, depending on the technology. So there is an opportunity where there is a wet port need to service these for Nova Scotians, and there is a dry port opportunity. As the technology emerges, it's going to be interesting to see which one wins out. We don't know that right now - a lot of speculation.

My interest is in the wet port side of it. Certainly there have been a lot of studies done in that area. I think we can all understand and believe that this is a Nova Scotian resource. Sometimes I don't think we've done as good a job as we could have as Nova Scotians identifying that the Bay of Fundy is truly Nova Scotian. When it was up for the Seven Wonders of the World, New Brunswick did a better job than we did in promoting that bay. So we need to be cognizant that the Bay of Fundy is a resource. It's an energy source that Nova Scotia is invested in significantly - 2 per cent was mentioned as a cost on our electricity bill that Nova Scotians bear through our COMFIT program.

So my interest is in ensuring that we get the maximum out of our resources for the people of the Province of Nova Scotia. The Maritime Renewable-energy Act was put in place to expand the opportunities - my question is, how are we protecting the future opportunities for jobs through the Maritime Renewable-energy Act for future development to ensure that those jobs are here in Nova Scotia? Sorry about the lengthy preamble, but I've just been sitting here so long waiting.

MR. COOLICAN: Today we've had simple questions, complicated questions and long questions. I think the best way that we protect Nova Scotia jobs from the development of tidal energy is to be competitive on a global basis. One of the down sides of being competitive is that if we're not competitive, we lose out. The advantage of being competitive is that it doesn't matter where the tidal development is happening, if we can

truly be competitive on a global basis we will get more work than just the work we have in this market.

Nova Scotia is a small market. We have a huge tidal resource, which is a positive thing, but on a global scale there's going to be more happening around the world. I think in the long run, as Denmark has shown on the wind side, it's important to develop your industry at home because that gives you experience but then you need to translate that experience into a global opportunity. That's where the larger payoff is.

Our suppliers have an opportunity to get experience and to learn how to be competitive in one of the harshest environments in the world. If we can do that, I think that's the best guarantee of getting jobs and economic benefits from the development of tidal, not just in Nova Scotia but around the world.

MR. CHAIRMAN: Thank you. Any closing remarks?

MR. COOLICAN: I'm reluctant to say this because Kent hasn't had an opportunity to answer a question. I think if he had, you would understand the kind of support I have, both at the Department of Business and at the Department of Energy. I'm always amazed by the quality of the Public Service here in Nova Scotia, particularly in both the Department of Energy and the Department of Business.

When the Premier asked me to take on the Department of Business in addition to the Department of Energy, part of his sales pitch was that there are really good people at both departments so I should be able to handle it. I'm not sure that he's right yet about me being able to handle it but he's certainly right about the quality of the people who work for the province on a regular basis. I think you've seen a demonstration also of the passion that the people in both departments have for this kind of opportunity for Nova Scotia, so thank you very much for your time and your questions.

MR. CHAIRMAN: Thank you very much. We'll take a short recess and come back in about five minutes.

[10:43 a.m. The committee recessed.]

[10:49 a.m. The committee reconvened.]

MR. CHAIRMAN: I call the meeting back to order. I believe we have no correspondence and our only real other committee business would be our April meeting date. I believe everybody realizes that the House is going in on April 14th, so it's our usual practice to put off our committee meetings while the House is sitting. I'm assuming that we're going to continue with that practice.

The other thing that we will probably do then is we'll keep a close eye as best we can to see when the House will be wrapping up. The Opposition might know better than we do on that one. (Laughter) We'll try and set our meeting date as soon as possible.

Do we know who the witnesses are for the next meeting? (Interruption) So that would be the Department of Environment on conservation officers. We will try and get that scheduled as soon as possible.

If there is no other business, I'd like to adjourn the meeting. Thank you all very much.

[The committee adjourned at 10:50 a.m.]