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Chair

Mr. Leon Benoit

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• (1140)

[English]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)):
I call the meeting to order.

Good morning, everyone.

We're here this morning on a delayed basis, owing to a vote, to start our study on innovation in the energy sector. As usual for studies like this we have officials, in this case from the Department of Natural Resources.

We have witnesses today from the Department of Natural Resources. They are Dr. Marc D'Iorio, director general, office of energy research and development, energy sector, and Martin Aubé, director general, strategic science technology branch, innovation and energy technology sector.

Welcome very much, gentlemen. You have a presentation to make, so go ahead with the presentation, and then we'll go to questions and comments.

Dr. Marc D'Iorio (Director General, Office of Energy Research and Development, Energy Sector, Department of Natural Resources): Thank you, Mr. Chair. I'll be giving the presentation.

Thank you for the opportunity to talk about innovation and energy today, with a focus on energy supply. It's an area where Canada does a lot of very good work and work we can be proud of.

For opening remarks I'd like to talk a bit about the global context of the energy outlook, and talk as well about energy and the Canadian economy, because that really sets the frame for what we do in innovation and R and D in the programs that we run.

We'll talk about science innovation activities and some international comparisons, as well as public expenditures in energy research.

To wrap up, I'll talk about some of the technologies that we're focusing on in renewable energy, as well as what we do with respect to oil and gas.

On slide 3 you see the global outlook produced by the International Energy Agency going forward to 2035. What you see is that energy demand is expected to grow by 40% and that fossil fuel will remain the dominant type of fuel being used, about 80% of the total.

Ninety per cent of the growth is in the non-OECD countries, and by 2035 we expect China to be consuming about 20% of all energy

produced at that point in time, which will be at that point about 70% more than the U.S.

One note from the IEA as well is that as we go forward, the U.S. is becoming less dependent on energy imports. That will certainly be true by that timeframe.

Slide 4 is a busy slide, but it's really trying to show that energy in Canada is much more than oil and gas. There are other resources such as coal mines and uranium. There is quite a lot of potential for renewable energy in Canada. There is a lot of tidal energy potential, there is nuclear, and there are some refineries, so there is quite an infrastructure right from coast to coast to coast in Canada.

There are also other things that do not fall on this map but are required for energy going forward, things like rare earth minerals, which will be an important part for energy technology going forward.

Slide 5 shows that Canada is a global player in energy. The oil sands are currently estimated at about 180 billion recoverable barrels. This is expected to grow to over 300 billion barrels as technology improves.

For shale gas, 6% of the world's technical recoverable resources are in Canada, and for uranium it's 9% of the known recoverable resources.

Canada has a very clean electricity supply already. Over 75% of our electricity is generated from non-emitting sources, consisting mostly of hydro but also including nuclear and other renewables.

Renewable wind power installed capacity could reach 12,000 megawatts by 2015.

There is also significant potential in a number of areas, both in traditional resources such as oil and gas in the north as well as quite a lot of potential for energy in wind, solar, bio, marine, and geothermal sources.

What Canada does with these resources has significant impact on Canada's economy. As I mentioned, we're third in the world in hydroelectricity production; second in uranium production; third in natural gas production; third in oil reserves, behind Saudi Arabia and Venezuela; and sixth in oil production.

You can see the raw numbers of the contribution to GDP, to employment, and to exports, and 24% of total public and private investments in Canada are related to energy.

In terms of science and innovation in Canada and how we perform in this area, a chart from the OECD on page 7 maps out how Canada does. It's not specific to energy: this is all science and innovation. The graph indicates where Canada is above or below the OECD average.

Canada actually does very well in scientific publication, does well in the number of degrees in science and engineering, in the percentage of researchers employed per thousand employed, and it does well with patent, with foreign co-investors, and with the number of firms with new-to-market products.

Where Canada lags behind is in the business expenditures in R and D, in venture capital as a percentage of GDP, and in what's called GERD, which is the gross expenditures in R and D.

When you then look specifically at what Canada does in energy R and D, Canada ranks third in the world in expenditures with respect to the per cent of national GDP. These are numbers that are derived from the IEA and from the OECD.

The federal government, in this capacity, is a key investor in energy research and development.

We show what percentage of federal investments go towards cleaner fossil fuel, which is about 29%; renewable and clean energy, which is about 43%; distribution, including a pipeline and grids, which is about 12%; and energy efficiency related to transport, buildings, communities, and industry, which is about 16% of our expenditures.

Who else contributes to R and D in Canada? On the supply side, the federal government invests about \$468 million per year. The provinces invest about \$400 million in energy R and D. The private sector invests \$1.2 billion in energy R and D, mostly on the fossil fuel side. This is one place where energy R and D differs from some other S and T areas in Canada, in that industry is contributing quite a lot to the R and D being performed in Canada.

Natural Resources Canada manages a number of key clean energy programs. One is called the program of energy research and development. It has been in place since the mid-1970s. It was put in place after the oil embargo. It has been investing in federal laboratories and driving clean energy development, and invested in energy security in the early days. It has a core funding of around \$45 million per year. It has four federal departments. On the supply side, there's work on unconventional oil and gas and frontier oil and gas; clean coal and carbon capture and storage, CCS; Generation IV nuclear; and renewables and clean bioenergy. The focus of this program is to minimize the environmental footprint of energy developments, not on finding more oil or gas.

The clean energy fund was a budget 2009 initiative, and its investments are in large-scale CCS demonstrations. There is significant leverage of investments by provinces and industry in this project. There is also a small-scale demonstration component focusing on renewable energy and integration of renewable energy into the grid. Again, there is significant leverage: for every dollar we put in, two dollars are invested by industry.

Budget 2011 had the ecoENERGY innovation initiative, which has two components to it, one of demonstrations looking at

integration of renewable energy and one of R and D in clean electricity and conventional oil and gas and bioenergy on the supply side.

Where fossil fuel energy is concerned, the key objectives are cleaner fossil fuel, with few or no adverse environmental impacts in terms of greenhouse gas, air contaminants, water quality, and water quantity used in fossil fuel developments. The highlights would be the number of CCS projects that have gone ahead and have been applied to coal-fired power plants and to bitumen upgraders. There was a recent announcement by Shell about their facility in Alberta, and it reduces emissions in that particular facility by 35%.

There has been development and testing of technologies that reduce water use by increasing recycling and reuse of water and air emission by improving process efficiency and by improving tailings management through reduced tailings inventories. A lot of the work contributes to standards and regulations that mitigate environmental issues and safety, particularly offshore and in northern Canada. There are a number of key performers, including universities and provinces, and the private sector is a major performer of R and D in this area.

Under renewable energy supply, the goal is really to develop and demonstrate clean, renewable energy sources and to get to a point where they will be cost-competitive with other traditional sources of energy. In our highlights, there are 35 demonstration projects going ahead conducted by the private sector that integrate technologies into their operations for renewable power. We are demonstrating technologies in harsh climates and environments, whether it's in Canada's north or in the Bay of Fundy with marine demonstrations.

We have a number of projects looking at gasification technology using biomass to provide heat and power. There is also mapping of industrial waste sources, food waste, and yard waste that can be converted into power, and scaling up a number of technologies from buildings to communities. Key performers involve a very broad range of performers, from federal and provincial governments to power authorities and a number of technology companies, as well as a number of aboriginal groups that are looking, in off-grid communities, to integrate renewable power into the community to displace things like diesel.

• (1145)

The end goal is to position Canada in the global energy technology market. There are a number of areas where we have leading-edge, competitive technology, including heavy oil, shale gas, traditional hydro, bioenergy, and nuclear. There's been a lot of work done by Canada. It's a market that we see will be large in the future and where Canada is well positioned.

There are a number of emerging competitive technologies, such as carbon capture and storage, in which Canada is a world leader. We are a leader in natural gas, biofuels, and solar. There are a number of areas where Canada does not have a competitive advantage, such as gasification and geothermal. There is a large potential for geothermal in western Canada, but it has not been developed to date. We also have a considerable potential in wind energy.

In conclusion, globally we see the energy demand growing significantly, with much of that growth being in developing countries. Canada has abundant fossil fuels, which are expected to be 80% of the supply, and a clear advantage in many technologies. We have a vast and diversified energy endowment and we're a key global player in a number of different resources.

We provided to you a document that we use within NRCan. It's an energy fact book. It's available in both French and English. It gives you some basic facts about where Canada is situated in a number of resources and what this means for the Canadian economy.

With respect to R and D, Canada ranks third among OECD countries in energy R and D investments and expenditures as a percentage of GDP, and 43% of our R and D money is spent on renewable and clean energy supply.

We have leading-edge and emerging exportable technologies in a number of areas, and these are areas we're pursuing and looking at for future investments.

• (1150)

The Chair: Thank you very much, Dr. D'Iorio, for your presentation.

Before we go to questions and comments, I want to let committee members know that there are other experts from the department at the back. If one of the questions you ask is on a subject that can be best handled by one of them, they'll come to the table at that time.

We are dealing with innovation on the supply side of the energy landscape. Later we'll go to innovation in distribution, and after that innovation in use.

Starting off questioning on our study, we have Mr. Trost.

Mr. Brad Trost (Saskatoon—Humboldt, CPC): Thank you, Mr. Chair, and my thanks to the witnesses for being here today.

I found it interesting to listen to your discussion of the government energy initiatives. How much of our energy program initiatives are tied up in environmental endeavours? I want to get a bit of a grasp on what energy initiatives the federal government is involved in.

Would you say that most of our energy efforts have to do with the environment? You mentioned fossil fuels. You mentioned improving renewable technologies, and there was some talk about waste. Am I correct in my understanding of that? If so, why are those the areas—and I'm not asking in a political sense—where federal innovation in energy has tended to specialize?

Dr. Marc D'Iorio: It's an area where there is a lot of investment by private industry, which looks to increasing the supply and being efficient about how resources are used. Industry will tend to concentrate on production. It's in their best interests to do so. Federal investments are often in minimizing the environmental footprint. It's part of the social licence to operate and affects our ability to export, so a lot of the focus has been on the environment or on the offshore and the Arctic. That's more on the geology side, meaning understanding the nature and scope of the resource before exploration takes place.

Mr. Brad Trost: That wouldn't just be with the fossil fuels. That would be a whole gamut of programs.

You were talking about some of the renewable programs. Are those being pursued because of their environmental footprint, or are they being looked at and supported because of the potential commercial value in those programs?

Dr. Marc D'Iorio: On the renewable side, there is an opportunity for an export market that is growing, that is nascent in some of the technology areas. It's being able to identify which ones are the right areas for Canada to invest in.

One of the contexts that we work in, whether it's fossil fuels or renewable energy, is the issue of provincial jurisdiction in all these areas and being respectful of our mandate with respect to the broader issues and the province's mandate with respect to managing the resource. It's providing a regulatory framework for the development and protection of the resource. As well, when it comes to electricity generation, it's about their responsibility with respect to providing electricity to their citizens.

• (1155)

Mr. Brad Trost: We're starting out at the beginning of this report and trying to get a grasp on what is innovative in the energy sector and how we can improve. That's the idea behind the committee report.

How do you benchmark the success of your programs? From an outsider's perspective, this could be fairly difficult to do. If you're a business, you have an economic payback, your return on investment, but as you know, this has to do with social licence. I understand, as a politician, that I will evaluate the political payback of a particular issue, but when you look at the programs the government's doing, be it for R and D or research on fossil fuels, how do you set up your benchmarks? If we come to you as a committee and ask if this is a success or not, what are you going to say? How do we look at it to benchmark it?

Dr. Marc D'Iorio: Every program we have has a set of benchmarks and performance indicators right from the onset. The ones that are more focused on R and D have benchmarks, including what you would see as a bibliometric type of benchmark: the number of publications, the number of codes that we've influenced, the number of regulations that have been influenced by the research that's been done, and often the number of participants in these projects.

One of the key issues in innovation is to make sure we make the best use we can of the innovation system. The innovation system has three main performers: industry, academia, and government laboratories. We try to foster these types of collaborations, so that innovation can move along the chain from a discovery point to adoption and commercialization at the end.

Depending on the program, we have different types of benchmarks. On the economic payback, it's one that's more delicate. On carbon capture and storage, for example, a company cannot make a profit off a project that's been financed partly by government. In fact, if there's revenue generated from that project, it must pay back the contributions received from government. The framework for each program, then, is slightly different, depending on the objective of the program.

We could provide a set of the type of performance indicators, should you be interested, for specific programs, whether they be on the ones that are more research-oriented, like the program of energy R and D, or the clean energy fund.

Mr. Brad Trost: Personally, I don't know about other committee members, but I'd be interested in seeing some examples so that I get a better understanding of what it is. I've never worked in the civil service, so this would be of interest.

Dr. Marc D'Iorio: Perhaps I could turn to my colleague Martin Aubé on this matter.

Mr. Martin Aubé (Director General, Strategic Science-Technology Branch, Innovation and Energy Technology Sector, Department of Natural Resources): I would just add one little thing. Probably one of the performance indicators that Marc referred to in his presentation is leverage. I think it shows how important research investment is to the private sector or to the university partner. It's clearly one of our main indicators that we try to track.

The other thing, too, that we try to look at is how the technologies are moving along the innovation chain, R and D being a very long-term process. Within the span of a program of three, four, or five years, you may not see that final impact, but you will see the technology progressing from maybe an early stage of development to an applied stage and then to a demonstration stage.

Mr. Brad Trost: In the 34 seconds we have left here in my time, where would be some areas that we as the committee should look at? Again, you have the privilege of being the first witnesses for this study. Particularly on innovation, we're starting on the supply side. Do you have any suggestions on areas of particular interest that we should look at?

Mr. Martin Aubé: Is it specific areas?

Mr. Brad Trost: Take it away; you're the experts here.

Mr. Martin Aubé: Well, I think there are a series of different types of innovations that you'll want to look at. We're only looking at supply right now. I think I would ask the question after you've looked at the three segments, because they're all very interrelated. You'll notice that issues that are occurring in supply are also issues with distribution.

Mr. Brad Trost: Once we're done looking at it in segments, are you saying maybe we should come back and find a way to integrate and tie them together?

Mr. Martin Aubé: I think that would be a good thing, because the systems are very integrated. You'll see renewable issues also come out in end use, for example, when you look at integrated communities or you look at net-zero housing, so I would recommend more of a holistic look when you take a look at the three elements.

•(1200)

The Chair: Thank you, Mr. Trost.

We go now to the official opposition and to Mr. Julian for up to seven minutes. Go ahead, please.

Mr. Peter Julian (Burnaby—New Westminster, NDP): Thank you very much, Mr. Chair.

Thank you to our witnesses for being here today.

I wanted to start by looking at the rankings. They were very helpful in your presentation. I'd like to know where Canada ranks worldwide in terms of solar power production, tidal power production, geothermal production, and wind energy production.

Dr. Marc D'Iorio: We could look up that information; we don't have it with us.

I could answer the one on geothermal: Canada's not producing electricity from geothermal at this point.

Mr. Peter Julian: Okay. That would be very helpful, because I think there has been a lot of criticism in those four areas. Canada is among the worst among industrialized countries, so I think it would be very helpful for the committee to know exactly how far down we rank in those areas, particularly in light of the fact that renewable energy is such a huge market; it's a trillion dollars in Canada. GDP investment is far below other industrialized countries, so I think that would be very helpful for our study.

The second point I wanted to touch on was the overall funding. Again, the table is very helpful for the overall funding in terms of R and D spending, but as you noted, only about 23% of that total comes from the federal government.

Do you know where Canada is on this list in terms of our ranking in federal government expenditures on energy R and D? Just ballparking it with a lot of these other industrialized countries where we know the national governments are actively involved in funding, Canada, presumably with that 23%, would be one of the worst of the industrialized countries. Do you have figures comparing the federal government expenditures to other industrialized countries?

Dr. Marc D'Iorio: The IEA does produce gross expenditures by governments, and we can secure those and provide them to the clerk.

Mr. Peter Julian: I'm just looking at the federal government, though.

Dr. Marc D'Iorio: Yes, I understand.

Mr. Peter Julian: Yes, that would be very helpful. The federal government expenditure compared to other national governments or other federal governments is comparing apples to apples, of course. I think that would give us a fair indication of how far down Canada is.

To follow up on that, I wanted to get a sense of the overall federal government spending. This is very helpful here: it's \$468 million in terms of R and D, if I'm reading this correctly. How does that compare in terms of other grants, subsidies, and tax credits that go to the non-renewable sector?

There's been a lot of debate around the grants and subsidies given to oil and gas companies. How does the federal expenditure on energy R and D compare with the overall spending by the federal government to support the oil and gas industry?

Dr. Marc D'Iorio: Again, I'm not a finance person. I work on the R and D side, so I don't have the numbers on tax credits or other incentives that might be in place and directed to renewable or non-renewable energy.

Mr. Peter Julian: Are those figures you could provide to the committee? I think that would be very helpful as well.

Dr. Marc D'Iorio: I think the Department of Finance would probably be the right department to provide these types of figures.

Mr. Martin Aubé: Yes, and I also would refer to the Jenkins report, which did quite an extensive analysis of government support to business R and D. It looked at both direct and indirect measures of support for research development.

Mr. Peter Julian: Yes, I understand that. What we need, though, as a committee is the percentage that's spent on R and D compared to all other grants and tax credits to the industry, because, of course, we want to maximize the taxpayers' value.

You're suggesting to us that we talk to the finance department about that. Okay, duly noted, and we'll ask the clerk to follow up.

You've mentioned in this presentation that we spend approximately \$795 million largely for CCS. What would be the overall budget allotted to CCS?

• (1205)

Dr. Marc D'Iorio: It's in the clean energy sum; of the \$795 million, approximately \$600 million was for CCS and \$150 million for small-scale demonstration of renewable energy. Then the balance was for R and D and administrative costs.

Mr. Peter Julian: Do you have any evaluation on that investment? I'll explain why I'm mentioning that.

Lorraine Mitchelmore, who's president of Shell Canada, has said that we absolutely need to put in place a price on carbon, a cap and trade system. As she says, carbon management has to be part of the plan for CCS. Of course, Conservatives promised in 2008 to bring in a cap and trade system, and that's the NDP policy as well.

We're spending a considerable amount of taxpayers' dollars and we have people from the industry telling us very clearly that we need a cap and trade system, a price on carbon, so that the huge taxpayer investment \$600 million is actually well used. I'm wondering to what extent within the ministry you're evaluating that cost, which is enormous—hundreds of millions of dollars—and to what extent there is discussion within NRCan about doing what the Conservatives promised to do and what industry is pushing us all to do: put in place a price on carbon, put in place a cap and trade system.

Dr. Marc D'Iorio: On carbon capture and storage, the demonstrations, such as they are right now, are early days. It's an early investment. The IEA expects that by 2050 CCS could account for a reduction of 20% of the reduction required in global GHG emissions. In Canada and Alberta, it could be much greater than that. Investment by the government is in very early-day demonstrations of that type of technology to see what the barriers are from a technology perspective while working with provinces as well. The provinces are looking at their regulatory framework. That's how they adopt that type of technology.

Again, this would be a policy question. We're working on the demonstration side, trying to make sure that this is a technology that will work as it gets deployed on a much broader scale.

The Chair: Thank you, Mr. Julian. Your time's up.

We go now to Mr. McGuinty. You have up to seven minutes.

Go ahead, please.

Mr. David McGuinty (Ottawa South, Lib.): Thanks, Chair.

Thank you very much, gentlemen, for being here this morning.

Could I just go to 10,000 feet per second? We are indeed looking at a study here on innovation in the energy sector. Would you agree that globally there's a race on right now to become the most efficient economy in the world? I don't mean efficient just in terms of energy use but also in terms of materials use and, for example, water use.

Dr. Marc D'Iorio: I think every country is looking at its own resources and the best way to manage resources and use them effectively. From that point of view, countries are looking at how they'll use their resources and water. Canada is well endowed. It has 20% of the water resources in the world and has quite a large proportion of the energy resources as well, as we talked about earlier.

Mr. David McGuinty: We talk about innovation, right? Why are we trying to innovate? What's it all about? Isn't it about becoming better at using either less energy or less material and water input? Isn't that what innovation's really all about?

Dr. Marc D'Iorio: Innovation is, as well, sustainable development. There's an economic side to it and there's an environmental side to it, while respecting the social side of the development. It's really a balance of things. From my perspective, when you invest in innovation, you have different purposes. Clearly there's an economic side to what you're doing and there's an environmental side to what you're doing, and often the two are very much linked.

Mr. David McGuinty: But if we just narrow into innovation in an energy context, we're trying to innovate because we're trying to use less energy to do either more things or the same number of things we're doing. Isn't that right?

Dr. Marc D'Iorio: Using less energy also means emitting fewer pollutants and producing fewer tailings, so again they're very much linked.

Mr. David McGuinty: I understand.

Would you agree with me, then, that there is a global race on right now on the energy innovation side, a race to be able to use energy as efficiently as possible?

Dr. Marc D'Iorio: I think all innovation is a competitive process, whether it be done in universities or industry.

Mr. David McGuinty: In your deck, Mr. D'Iorio, there's an awful lot of reference to spending. That's not an unimportant thing. You talk a lot about how much the government is spending. However, I want to get some indication from you where Canada ranks in energy efficiency and what metrics we are using.

• (1210)

Dr. Marc D'Iorio: We often look at efficiency as an end-use type of a process, so looking at whether it's industry, buildings, communities, or transport—

Mr. David McGuinty: Let's look at energy efficiency in terms of energy inputs in the oil sands, as an example. There are massive energy inputs to get the bitumen out of the ground and transform it. That's not at the back end and it's not at the consumption end; it's at the production end, the beginning of the cycle.

Is there an internationally accepted efficiency metric that Canada is participating in? Where do we rank? On page 6 of your deck, you say that we're third in hydro, second in uranium, third in natural gas, but where are we ranked in efficiency, or more specifically, where are we ranked in innovation?

Dr. Marc D'Iorio: It all depends which metric you want to use for innovation.

Efficiency again depends on the type of resource you're looking at. It's clear that heavy oil will always be more difficult to extract, and most of the oil reserves globally, going forward, will be produced increasingly from heavy oil. It all depends on the geological context where you extract this; it depends on whether you're dealing with oil sands or other types of host rock. It becomes very difficult to adopt a single metric for efficiency of production, depending upon what your end product is.

A lot of work has been done trying to identify it specifically by taking measures such as how much you produce in GHGs to produce a certain type of oil, how much in fugitive emissions you have, how much flaring you do in gas production. Again, the metrics are very dependent on the context—

Mr. David McGuinty: We have a chart here, on page 8, that talks about how much we're spending on public energy R, D and D.

Are you saying to me that there is no international comparison, with acceptable metrics across countries, on, for example, efficiency?

Dr. Marc D'Iorio: There are a number of metrics that people can look at, depending again upon the context, if you're looking at oil and gas production.

Mr. David McGuinty: Okay; it depends on the energy source.

Dr. Marc D'Iorio: Beyond the source, it's also a question of the host rock. It also depends on some regulations, in some cases.

Mr. David McGuinty: Okay.

Several years ago, Canada produced the world's first set of acceptable eco-efficiency metrics. It developed a water intensity metric, a materials intensity metric, and an energy intensity metric. These were developed with the Canadian Institute of Chartered Accountants and became the baseline of measurement for the entire OECD.

Where is Canada now, having developed these metrics—not just, for example, in terms of competitiveness in the marketplace, so that we could compare Procter & Gamble's performance against Monsanto's performance, but also because the financial services markets in Canada have been screaming for metrics to allow investors to make decisions based on real metrics? For example, they would want to invest in this company versus that company because its eco-efficiency performance is higher or lower.

Where are we now? Are these metrics being used by your team internally within the department, or have you seen this development move forward?

Mr. Martin Aubé: I'm not knowledgeable on that subject. We could definitely find out more information. I don't know whether my colleague Marc is aware of it, but I am not.

Mr. David McGuinty: So to your knowledge, we're not using these metrics, which we developed together as a country and which are now being used, by the way, widely across the OECD? We're not playing in that?

Mr. Martin Aubé: I'm saying I'm not aware of it, but we can definitely find out; we can go back to the department and get back to you on how these are being used within Natural Resources Canada.

Mr. David McGuinty: That would be really helpful. Thank you.

Can I take one step back on the financing side, on innovation? Is there anybody on your team or in your department who can help us understand some of the really creative and new financing innovation that's going on? This is before supply; these are choices being made either by private sector investors or by the national government in fiscal instruments, and they are the fiscal signals being sent to the marketplace.

Do you have a team inside the department that is helping think through creativity and innovation in that context?

Dr. Marc D'Iorio: Again focusing on the energy supply side right now and the innovation side, it's not something we do internally with financing. What we're really trying to promote right now is collaboration, both nationally among different elements of the innovation system as well as internationally.

Most of the innovation in the world occurs outside Canadian borders. It's how you tap into that best expertise and try to put in place the right types of partnership with respect to being able to....

•(1215)

Mr. David McGuinty: Mr. Chair, it would be helpful if we could get some indication of whether there is more information inside the department that connects this question of the supply side and the fiscal measures that are in place, because they're integrally connected. I think people often make choices and become innovative on the basis of the tax or fiscal measures that are in place.

I'm not sure whether our witnesses can help us figure that out by getting us a briefing of some kind, but I leave it in your good hands.

The Chair: We've noted that, and Monsieur Aubé has agreed to try to put that together, I think.

We go now to the five-minute round, starting with Mr. Allen.

Mr. Mike Allen (Tobique—Mactaquac, CPC): Thank you, Mr. Chair.

Thank you to our witnesses for being here.

I'd like to start with slide 8. I'm going to follow up a little on Mr. Julian's request for further information.

This one is all public R and D spending. If you use the U.S. as an example, would that include federal and state spending? in the U.S. there are a lot of municipal utilities as well. Would this include their investment too?

Dr. Marc D'Iorio: Yes, it's meant to include all public investments, whether municipal, provincial or state, or—

Mr. Mike Allen: Okay. If you're going to provide information that will break this out nationally and everything else, we should make sure it is normalized for the same things, because there could be a higher percentage of responsibility in some countries. For example, as you have correctly pointed out, the provincial governments have the majority responsibility for energy in Canada. I'd like to see the numbers normalized for that a little bit.

Dr. Marc D'Iorio: What happens is that what is reported to the IEA is reported as an aggregate number for public spending, because different federations have different mechanisms. In some countries, states or provinces do not invest to the extent of producing a public investment number.

Mr. Mike Allen: Exactly. For example, in some countries in Europe it would be much higher on a national basis, because there wouldn't be provincial and state spending, so that might be a fishing expedition.

Anyway, slide 9 talks a little bit about private investment. When you talked about private investment, you said it was mostly in the fossil fuel area. I think I heard that right.

Can you tell us why there might be a lag in other sectors in terms of what they're matching from our government funding and public spending?

Dr. Marc D'Iorio: As you know, the fossil fuel area is a very active area economically. It contributes a lot directly to GDP. It's an area in which industry has to meet increasingly stringent regulations. Industry is investing a lot; it is also reorganizing itself a bit differently. The Canadian oil sands industry alliance is a good example of how industry is trying to mobilize itself to address some of the challenges it faces in environmental performance.

A number of companies have not only agreed to pool some funding for the research but to pool their IP as well. There are a large number of contracts being put in place, and actually some economists at Harvard are now looking at this model to see how well it is going to do in achieving environmental performance through pooling industrial funding. Because of the pressures now to do better as far as environmental impact goes, we see much more investment by the private sector, but also more innovative models for their ways of working together.

Mr. Mike Allen: Mr. Aubé, do you have a comment?

Mr. Martin Aubé: Yes. I want to add a little bit on the clean technology side, which includes renewable energy and energy efficiency companies and all that.

There is a lot of R and D happening. The latest report by Analytica Advisors estimated that the industry is worth about \$9 billion, and they're investing almost \$1 billion in R and D, which is about 11%, so there are some pockets of these industries that are still quite active on the R and D side.

Mr. Mike Allen: That's helpful, because it leads me to my next question.

We're starting to see that even in the clean tech area—wind and other things—we're getting a “not in my back yard” syndrome happening. When you consider that and look at shale gas and other types of initiatives—even small micro-hydro, which seems to be making a little bit of a recovery now—are such organizations as wind power groups pooling together? I can see that some of these initiatives are going to have a significant impact on their ability to expand, if they're not innovative in coming up with ways to lower the anxiety of the public.

Are you seeing continuing investment in those areas related to some of the health issues that are perceived to be present in the wind industry?

Dr. Marc D'Iorio: Broadly, yes, we are. The question of public acceptance of any development, whether it be of fossil fuel or shale gas or a large-scale deployment of renewable technologies, is increasingly present. Work being performed now increasingly tries to look at the social science side of things as well as the physical science side of things, to become able to better communicate with the public and understand what the concerns are and address them effectively, not only with respect to where something is situated but also with respect to what the real risks are and what choices one has to make.

Shale gas is definitely a good example of that.

● (1220)

Mr. Mike Allen: Continuing with that, the U.S. is going extensively into shale gas, and they have tremendous reserves that they are talking about. These are reducing their dependence on imports into the U.S.

We have tremendous reserves in Canada as well. Are we taking an initiative in the department, working with the agencies with respect to water usage, fracking chemicals, and things such as that? How much work is going on in that area right now?

Dr. Marc D'Iorio: It's a provincial jurisdiction in most cases. We do work with the provinces. The role of the federal government is often to provide science to inform decisions on regulations and policy.

Under the new ecoENERGY innovation initiative, seven different projects are being performed that look at the impact of fracking, the impact on groundwater, and the potential impact on seismicity. These studies use a lot of departmental assets to understand the real impacts of these developments.

Mr. Mike Allen: Okay, thank you.

The Chair: Thank you, Mr. Allen.

We go now to Mr. Leef.

Mr. Ryan Leef (Yukon, CPC): Thank you, Mr. Chair, and my thanks to our witnesses for appearing.

A little earlier you talked about collaboration between government and industry. Some of these projects tie nicely into investments that Environment Canada makes as well. They manage the Green Infrastructure Fund, correct?

Mr. Martin Aubé: I think that's through the Federation of Canadian Municipalities, but I'm not sure.

Mr. Ryan Leef: How closely does Natural Resources Canada work with Environment Canada on projects in the energy sector?

Dr. Marc D'Iorio: Within the federal government, aside from Natural Resources Canada there are a couple of key performers in energy research and development.

The National Research Council is one and Environment Canada is another. Fisheries and Oceans also does some work with energy development in the offshore, so there's close work and it's organized through a certain governance process with assistant deputy ministers and directors general. Environment Canada and a number of other departments are involved in the coordination of these programs and in the selection of projects.

Mr. Ryan Leef: You mentioned energy R and D, the clean energy fund, and the ecoENERGY innovation initiative. You say there are 35 demonstration projects currently under way. Do you know the total number of projects?

When I look at the clean energy fund in the budget, I see \$795 million, leveraged at 1:16. That must lend itself to a lot of projects. That money must really stretch out. Do you have an idea of the total number?

Dr. Marc D'Iorio: On CCS, it's actually a small number of projects, because they are expensive. The Shell Quest project is over \$1 billion. The federal contribution is \$120 million to that project. Those are large-scale projects, so there are fewer of them.

On the small scale, for the \$150 million, there are about 20 projects. Those are smaller-scale projects with less investment from the federal government.

Mr. Martin Aubé: In addition to the funding programs, we have laboratories. These laboratories work directly with universities or industry, and industry pays for the collaborative research, so we have even more projects going on outside the funding envelopes that Marc D'Iorio described.

Mr. Ryan Leef: Okay, super.

You mentioned some leading-edge technologies in shale gas, heavy oil, traditional hydro, bioenergy, and nuclear. Do you have some specific examples of leading-edge competitive technology in heavy oil?

Dr. Marc D'Iorio: The work that Canada has done over the last 30 years in heavy oil, going back to the 1970s, is now being adopted fairly broadly under the Energy and Climate Partnership of the Americas in which all countries in the hemisphere work together. There's a heavy oil working group, and Canadian innovations in heavy oil are now being adopted in countries like Brazil, Venezuela, Trinidad and Tobago, and Colombia. There are a lot of small companies and there is a lot of innovation in these areas. There are also a number of geophysical firms involved in this type of work.

Mr. Ryan Leef: Perfect.

Can you talk a bit about what benefits Canada would get from these competitive technologies? You're saying other countries and other industries are adopting some of this leading-edge technology. How does that benefit Canada?

•(1225)

Dr. Marc D'Iorio: It can directly benefit through employment if it's technologies that we export. As well, it can have a positive influence as the processes we are using are getting cleaner and cleaner. It can really influence international developments following in the same track by having technologies that minimize the environmental impact. For example, as we go towards production—a non-aqueous process, for example, for oil sands, when that comes to be—will have a much smaller impact on the environment. It's directly a benefit, and indirectly I think we influence a lot what other countries can do.

Mr. Ryan Leef: I appreciate that. Thank you.

The Chair: Thank you, Mr. Leef.

We go now to Mr. Gravelle, followed by Mr. Sopuk and Ms. Liu. Please go ahead.

Mr. Claude Gravelle (Nickel Belt, NDP): Thank you, Mr. Chair.

Thank you to the witnesses for being here.

We talked a little bit a while ago about cap and trade and a price on carbon. We know it's been part of the Conservative agenda since 2008. Has an evaluation ever been done on putting a price on carbon?

Dr. Marc D'Iorio: Again, this is outside my area of expertise. I work in the S and T area and I'm not a policy person or a politician.

Mr. Claude Gravelle: If it's outside your expertise, who could we ask that question to?

Dr. Marc D'Iorio: It would be to policy folks, whether they are in our department or in Environment Canada....

Mr. Claude Gravelle: So you don't know if an evaluation has ever been done on cap and trade.

Dr. Marc D'Iorio: Again, it's not my area of expertise.

Mr. Claude Gravelle: Thank you.

I want to move on to something you talked about, eco-energy innovation. We know that the ecoENERGY program was a very good program and it's been cut. It was a good program because it saved on electricity and it created a lot of jobs. Has an evaluation ever been done on the ecoENERGY program?

Dr. Marc D'Iorio: There's a suite of ecoENERGY programs. This one, which is the ecoENERGY innovation initiative, is a follow-on to the ecoENERGY technology initiative. It was really restructured in order to look at specific challenges on the integration of clean energy. That's on the demonstration side.

On the R and D side, it was looking at a number of areas, including energy efficiency, bioenergy, unconventional oil and gas, and transport, specifically in the lightweighting of vehicles. It was basically energy efficiency applied more broadly than in communities and buildings. There were five areas of focus for that particular program.

Again, ecoENERGY is a very broad suite of programs. There were some on energy efficiency for retrofit and others that were technology-based.

Mr. Claude Gravelle: Are you telling me that no, no evaluation has been done, or no, you don't know?

Dr. Marc D'Iorio: We evaluate our own programs, such as the energy and technology initiative. We've looked at what was performed under that and did an evaluation of that particular program.

Mr. Claude Gravelle: Can you table that report?

Dr. Marc D'Iorio: I can certainly provide the chair with our evaluation of the program.

Mr. Claude Gravelle: Mr. Chair, it was brought to our attention by Mr. McGuinty at the last meeting that we had requested tabling of some reports that were never forwarded to the committee. Can the clerk keep track of this report and make sure it comes to the committee and let us know when we have it?

• (1230)

The Chair: That's the normal process.

Mr. Claude Gravelle: The other thing I want to talk about is geothermal energy. It's not a big part of the systems that are used in Canada, but we could heat or cool our homes with geothermal energy. Is that correct?

Dr. Marc D'Iorio: Yes, there are two types of geothermal you can look at. You can either look at geothermal to produce electricity or geothermal more in a heat exchange—

Mr. Claude Gravelle: Is that a very, very clean form of energy?

Dr. Marc D'Iorio: It is a clean form of energy as you are using the ground, basically, to heat water.

Mr. Claude Gravelle: As well, it's renewable. It's always going to be there.

Dr. Marc D'Iorio: It's a question of circulating the water through....

Mr. Claude Gravelle: Why aren't we doing more for geothermal energy?

Dr. Marc D'Iorio: The technologies do exist for geothermal. Some provinces have programs specifically to encourage this type of local system for geothermal. This is much less of a technology challenge, so it's not an R and D problem per se. It's a question of how you implement technologies, how you encourage adoption in an area of provincial responsibility.

Mr. Claude Gravelle: If we were to use more geothermal energy and if every new house that was built was heated with geothermal energy, would that save a lot of money and a lot of hydro?

Dr. Marc D'Iorio: It could cost a lot of money. It depends where your house is built. These systems tend to be fairly expensive compared to traditional systems of furnaces. It's the type of system that could be applied more to a community than to a single house.

The Chair: Mr. Gravelle, your time is up.

We go now to Mr. Sopuck for up to five minutes. Go ahead, please. Welcome to our committee.

Mr. Robert Sopuck (Dauphin—Swan River—Marquette, CPC): Perhaps I could help Mr. Gravelle. There was a report put out by the National Round Table on the Environment and the Economy called "Achieving 2050". I happened to be on the national round table at the time this report was put out, and it did an evaluation of cap and trade. One of the things I found most interesting about that particular report was that it showed rural people and low-income people would be the hardest hit by cap and trade, so it's a very strange position for a political party to advocate hurting low-income people.

I would like to ask a question on environmental performance. Would you say that our natural resources and energy industries are getting cleaner and cleaner as the decades go on?

Dr. Marc D'Iorio: Definitely. This is why these investments are going in: so that the industry does become cleaner and the amount of water used is reduced.

Perhaps I could call on one of our colleagues here who has done a lot of work in the performance of the oil sands, in particular, to say a bit more about this.

Mr. Robert Sopuck: Yes, I would be especially interested in how that relates to environmental indicators. We talk about inputs all the time—water use, energy use—but I'm also interested in the outputs, emissions and so on, and the environmental indicators, because I find in these discussions there's never enough talk about environmental indicators and what's happening in the environment itself.

The Chair: Doctor D'Iorio, if you would like to call someone forth, go ahead and do that, please.

Go ahead, Mr. McGuinty.

Mr. David McGuinty: It sounds like an issue for the environment committee, Mr. Chair.

The Chair: You would recognize that, Mr. McGuinty, I'm sure.

Dr. Marc D'Iorio: Mr. Chair, I'd like to invite Kim Kasperski from our research laboratories in Devon.

Dr. Kim Kasperski (Manager, Water Management, Department of Natural Resources): Is the question how much the efficiency is improving in certain supply-side industries?

Mr. Robert Sopuck: As well, I'd like a relationship between that and environmental indicators, the actual environment itself—air quality, water quality.

Dr. Kim Kasperski: Hopefully, this addresses your question.

There are two sides to that. One side is that if you are looking at it in terms of per-barrel production, how much better is the industry doing versus overall gross impacts?

On per-barrel production, I can speak to oil sands. They are improving in terms of water use. In terms of air emissions, that's not my area of expertise, but, for example, Shell is instituting that carbon capture and storage on their upgrader.

For air contaminant releases, again they're trying to improve that, because it improves their economic side if they can get better at recovering the valuable things that also impact air quality.

In terms of the impact of water use on land, they are improving, but overall, because of the expansion of industry, the overall impact is increasing.

• (1235)

Mr. Robert Sopuck: Okay.

I'd like to ask a slightly different question now relating to biomass energy.

What kind of research is being done on the use of wood and forest products that produce energy in Canada? The context of my question relates to a significant decrease in the amount of forest that Canada is harvesting because of the collapse of the newsprint industry and so on. A lot of what is called "annual allowable cut" out there is not being harvested. What research is being done to look at the use of wood as an energy source?

For example, in Wisconsin there are electrical generating plants that are powered by wood. Is there anything like that going on in Canada?

Dr. Marc D'Iorio: There are a number of areas of research. Some of our colleagues in the Canadian Forest Service might be in a better position to talk about some of the programs with biorefineries and what you do in moving the pulp and paper industry forward to one that produces diverse products.

With respect to wood as biomass, there are a number of coal-firing biomass-type projects and demonstrations with regard to increasing the efficiency of that process that are ongoing as part of the clean energy fund projects that have been performed. A number of demonstration programs are ongoing in this particular area right now.

Mr. Robert Sopuck: Okay.

I assume I have time for only one last question.

What is the future for hydrogen energy in Canada in relation to hydroelectric production, which during off-peak hours could perhaps be used for hydrogen production? What's going on in that area?

Dr. Marc D'Iorio: There have been two tracks for hydrogen. One, which I think has been a longer-term type of proposition, has been looking at hydrogen as a storage mechanism for energy. It's about being able to use renewables more efficiently, maybe generating electricity when you don't necessarily need it and being able to store that energy in that form. It's kind of large-scale storage.

That was one area of research, and the other one, of course, was looking at certain types of niche markets for transportation with respect to hydrogen.

Mr. Robert Sopuck: Thank you very much.

The Chair: Thank you, Mr. Sopuck.

Just before we go to our next questioner, I want to thank Dr. Kasperski, the manager of water management for the Devon Research Centre, for answering questions. I hadn't properly identified her.

Please go ahead, Ms. Liu.

[*Translation*]

Ms. Laurin Liu (Rivière-des-Mille-Îles, NDP): Good afternoon. I would like to thank everyone for coming here.

According to the Natural Resources Canada Strategy for science and technology, the department has a staff of 3,000 employees supporting scientific and technological activities.

How many research and development employees at Natural Resources Canada work in the energy sector, in particular?

Mr. Martin Aubé: These employees work primarily in the CanmetENERGY laboratories. Approximately 450 employees work in our three laboratories, namely in the one located in Ottawa, the one in Varennes, situated across from Montreal, in the South Shore region, and the one in Devon, Alberta. In addition, fifty or so people work in program management. We therefore have approximately 500 individuals working in the scientific field.

Mr. Marc D'Iorio: In addition to these employees, we have people working at the Geological Survey of Canada, especially in the area of geological formations, in the energy sector. The survey has a staff of approximately 500 employees, with about 10% working on energy-related questions in the laboratories located in Calgary and Dartmouth, Nova Scotia.

Mr. Martin Aubé: We also have many employees at Forestry Canada who work in the bioenergy sector. Some of our researchers in Hamilton are working on materials in energy-related fields, such as transportation or pipelines.

Ms. Laurin Liu: So we have more than 500 employees.

Mr. Martin Aubé: Yes. Approximately 500 employees are working in the energy field, but a hundred or so are working outside of this field.

Ms. Laurin Liu: According to the 2012 budget, cuts to the tune of \$68 million will be made to Natural Resources Canada for the fiscal year 2012-2013. We know that a further \$85 million will be cut the following year.

According to the Public Service Alliance of Canada, some 200 unionized jobs will be eliminated. The Professional Institute of the Public Service of Canada estimates that 156 professional and scientific positions in Natural Resources Canada will be affected by these federal budget cutbacks.

In all, how many professionals working in your branch to support energy innovation will be transferred or laid off?

• (1240)

Mr. Martin Aubé: Unfortunately, I do not have this information.

Ms. Laurin Liu: Would it be possible to obtain this information and send it to the committee?

Mr. Martin Aubé: We will find out whether or not this information is available and can be made public.

Ms. Laurin Liu: Are you aware of the impact of these cutbacks? Are there any projects that you will have to abandon?

Mr. Marc D'Iorio: We review our research and development priorities on a regular basis. That does not always fit in to this type of exercise. Over the years, we are always changing the research and development areas on which we want to focus.

We have started working in areas which we did not cover a dozen years ago, such as carbon capture and storage. Over the past five years, we have reduced our investments in certain sectors that used to be given higher priority, such as hydrogen. It all depends on the way technologies evolve. It also depends on emerging priorities or on economical or environmental opportunities that occur, depending on the type of research that we are conducting.

So we do many things with the resources we have been allocated. We set priorities with respect to the research undertaken and funded by the department, basically.

Ms. Laurin Liu: In setting your priorities, have you started to determine which sectors will be affected next year by the forecast \$85-million cutback? We know that there will be a \$107-million reduction the following year. Do you have any idea which sectors will be affected?

Mr. Martin Aubé: We do not have this information. As Mr. D'Iorio said, we review priorities on a regular basis, and not in conjunction with budget cutbacks.

If we obtain this information, we will submit it to the committee clerk.

Ms. Laurin Liu: Thank you.

My last question is related to page 9 of your presentation. Earlier this week, I was reading a Senate report published in July 2012 that stated that, in 2010, the non-renewable fuel industry received the largest proportion of public R&D subsidies. The results of this study were based on the data provided by Canada to the International Energy Agency, and show that about three out of four dollars invested by the federal government went to R&D for non-renewable energy sources. I know that this definitely does not correspond to the table you presented on page 9.

However, I believe the information in the Senate report included carbon capture and storage in the fossil fuels category. Are the numbers closer to what is actually happening if we include R&D investments for fossil fuels in carbon capture funding?

Mr. Marc D'Iorio: For 2010, the numbers do not seem to match. In fact, according to the numbers published in the report by the National Round Table on the Environment and the Economy, in 2010, 21% of the funding was spent on fossil fuels and 17% on carbon capture and storage. Even added together, these numbers do not correspond with the data showing that three-quarters of the money is allocated to this type of energy.

[English]

The Chair: Thank you, Ms. Liu.

We'll go now to Monsieur Galipeau, and if there's time left, Mr. Anderson will use it.

Go ahead, please, Mr. Galipeau.

Mr. Royal Galipeau (Ottawa—Orléans, CPC): Thank you very much, Mr. Chairman.

[Translation]

I would like to thank the witnesses for their testimony today.

For the edification of Mr. Julian, he may wish to look at the briefing binder on his desk provided by the Department of Natural Resources. The answers to his questions are on pages 63 and 64.

Mr. D'Iorio, what would you say in response to the accusations that the non-renewable energy sector is not innovative enough and that those involved in the sector are acting like hewers of wood and drawers of water?

• (1245)

Mr. Marc D'Iorio: According to what I can see from the data Statistics Canada has collected for the International Energy Agency, the private sector invests more in energy than the federal and provincial governments combined.

Again, without saying anything about the various accusations, we can simply look at the facts and see that the industry is spending a lot of money in this sector, compared with some other science and technology sectors, in order to achieve its goals. It is trying to have energy production accepted in Canada.

Mr. Royal Galipeau: I think Mr. Aubé would like to add something.

Mr. Martin Aubé: Yes, I would like to give an example. Canada's oil sands producers have created a new alliance, COSIA, which focuses on R&D co-operation in finding solutions to environmental problems related to oil sands mining. There are many examples of very positive things being done right now within the industry.

Mr. Royal Galipeau: Thank you very much, Mr. Chair.

I will give my time to my colleague, Mr. Anderson.

[English]

The Chair: Mr. Anderson, you have about three minutes. Go ahead, please.

Mr. David Anderson (Cypress Hills—Grasslands, CPC): Mr. Chair, I'd like to contrast the NDP's half-empty glass approach here.

I want to ask you where, as you're working in your job, you see the brightest lights in energy innovation today.

Dr. Marc D'Iorio: There are quite a few examples. I think we did mention them already a few times on this issue of how industry can actually work together. For the energy industry to work together and put aside and figure a way to deal with IP in a fairly competitive area is really significant. From the point of view of system of innovation, that to me is quite the significant piece.

We've seen universities and network centres of excellence being able to progress and become better at addressing key issues and at targeting the research to address the issues that are of importance, from the basic research piece all the way to business-led network centres of excellence. I think the system piece is a good example of some of the bright lights.

I believe there have been a number of successes that we've had on clean energy as well. Some of the work done within NRCan has led to internationally acclaimed projects, such as Drake Landing in south Calgary, where solar energy is used and stored and then fed to an entire community. This type of development, as one example of many, has been one of the real bright lights in innovation that has led to adoption and commercialization.

Mr. Martin Aubé: On international collaboration, I would add that the clean energy dialogue or some of the programs put in place by foreign affairs to promote science technology collaboration between ourselves and China or ourselves and India are all also bright lights.

Mr. David Anderson: If I asked that same question in the future context, would you give the same answer? Do you see other areas in the future, five or 10 years down the road, or would it be pretty much the same answer that you've given for the present?

Mr. Martin Aubé: I think so. The technologies may change, but I think the way we do things and driving the partnerships deeper and stronger among business, government, and universities is the way to go.

Mr. David Anderson: Where on the supply side do you see the strongest commitment to innovation? Dealing with the supply side right now, you've talked about the collaboration. Is that where you would say it was strongest, or do you see sectors that are much more strongly committed to innovation than others?

You mentioned the oil sands and the groups gathering together to try to find new technologies, but are there other places that stand out where you would see a strong commitment on the supply side to innovation for the future?

Mr. Martin Aubé: I think I'm going to go back to my example earlier of clean tech, which includes renewable energy and bioenergy companies. These companies are noticing that innovation and developing new technologies and accessing new markets is the only way for survival, especially for Canadian companies with a very small domestic market. Investing nearly 11% of their revenues into R and D is a significant feat, if you want, because I think most companies—I don't know the number offhand—do not invest that much into their R and D. As an industry, it's quite significant.

• (1250)

The Chair: Thank you, Mr. Anderson.

We go now to Monsieur Choquette, for up to five minutes. Go ahead, please.

[*Translation*]

Mr. François Choquette (Drummond, NDP): Thank you, Mr. Chair.

Thank you to our witnesses.

My first question is about the ecoENERGY program, which has come under heavy criticism. It has been called a disguised subsidy for oil companies instead of a subsidy for renewable energy projects.

My question is very simple: what percentage of the funds from the ecoENERGY program were allocated to fossil fuel businesses?

Mr. Marc D'Iorio: I don't have the numbers here—

Mr. François Choquette: I will stop you right now because I have a lot of questions but very little time.

I would like you to send this information to the committee through the chair.

Mr. Marc D'Iorio: I just want to add that most of the investments do not go towards fossil fuels.

Mr. François Choquette: It would be interesting to know the percentage, because a general term like "the vast majority" or "the narrow majority", is not—

Dr. Marc D'Iorio: It is less than 10%. In any case, we could provide you with the exact figure.

Mr. François Choquette: Thank you very much.

We would also like to know how much money or what percentage of the funds were invested in carbon storage.

Mr. Marc D'Iorio: Are you talking about the federal government?

Mr. François Choquette: Of course.

Dr. Marc D'Iorio: More than \$500 million are being directed at carbon storage. This includes the development of technologies for the capture and study of watersheds where carbon storage could be achieved. This also includes large-scale demonstration projects, particularly Shell's Quest project, which we were discussing a few minutes ago.

There are also factors that involve international cooperation, particularly with the United States, but also through certain international mechanisms. The goal here is to move research forward. We have invested a great deal in research to ensure the monitoring of carbon dioxide storage sites, in the Weyburn-Midale region, where almost 20 megatonnes have already been permanently stored in old oil and gas reservoirs.

Mr. François Choquette: In my humble opinion, this initiative is moving too quickly. In fact, we seriously criticize carbon storage for environmental reasons. We particularly fear this causing small earthquakes.

Before further expanding on this carbon storage initiative, have you done any research to see if this technology is mature?

Dr. Marc D'Iorio: The first pilot projects started a dozen years ago and those in Weyburn-Midale began in 2000. At that time we did a number of things. In particular, we took the basic steps before filling the reservoirs with CO₂. We wanted to be certain that we understood the physical soil parameters, for example the acidity, before even adding the CO₂. There were also seismic programs to check if the CO₂ stayed in place and did not move outside the targeted area.

Programs are ongoing, through which we seek to ensure that there are no long-term consequences linked to seismicity or to potential leaks.

Mr. François Choquette: The National Round Table on the Environment and the Economy is an organization that will cease to exist, unfortunately, because of federal cutbacks. It is unfortunate because it was totally independent and allowed for an exchange of views between the economy and the environment. Recently, it produced a final report entitled "Framing the Future: Embracing the Low-Carbon Economy". Unfortunately, since 2008, the Conservative government has not had the courage to put a price on carbon.

The National Round Table on the Environment and the Economy therefore tells us that the longer we wait, the more costly it will be for future generations. People say that putting a price on carbon now will be expensive for the Canadian people, but that is not true. In fact, the longer we wait, the more future generations will pay the bill, which is never mentioned enough.

Did you take this report into account when creating innovation programs? Were the recommendations that were made submitted to you? Have you had time to study them?

Dr. Marc D'Iorio: I believe the report was published last week.

As far as the policies on carbon pricing or mechanisms to give carbon a value are concerned, that is a political and not a technological issue. What is clearly a technological aspect is that we can really see things over the long term and do projections for the next 20 to 50 years. The carbon capture and storage projects, for example, can be deployed on a very large scale.

We therefore want to ensure that we are ready to deploy such projects on a major scale and that we understand the parameters well, within the context of seeking to minimize greenhouse gases.

• (1255)

The Chair: Thank you, Mr. Choquette.

[English]

Mr. Anderson, you have up to five minutes. Go ahead, please.

Mr. David Anderson: Just as an observation, Mr. Chair, it's interesting that the NDP are denying their own election platform in the House, but I'm glad to hear Mr. Choquette so enthusiastically embrace it. It's good to see.

Some hon. members: Oh, oh!

The Chair: Order.

Mr. David Anderson: If we had wanted to put a cap and trade program in place, it would be in place. We obviously don't; it's part of your election platform.

I would like to get a comment from you.

We have talked about a number of different things here. My question is this: where can the government best commit to innovation? We've talked a bit about regulation, and a little bit earlier we talked about funding and leverage, international promotion, taxation policy, and working with academia. Do you have any thoughts on where government can best commit to innovation?

I suppose there's another option too, which is to stay out of the way and let the industry innovate, but I'm interested in hearing your comments on this subject.

Dr. Marc D'Iorio: Innovation is a system that has quite a few performers as far as R and D is concerned, but it goes beyond simply the R and D component and has to consider other instruments, so as to make sure, for example, that as technologies are developed, they get to market. I think a broader look at the innovation system is required—not just a look at the performers, but at how technology moves along as well.

I believe the OECD figures also show areas on which the government has been focusing to understand what the gaps and business expenditures are in R and D on a very broad scale, and what mechanisms there are for venture capital to come into play more broadly in Canada.

Mr. Martin Aubé: In terms of innovation, the federal government has a role to support industry in some of its activities as well as a role to generate knowledge for standards and to develop regulations and ensure that the best evidence possible is out there.

Just letting industry do their own thing might not be totally appropriate in the context of a broader discussion of innovation, because all the players have a specific role. Some of them are interconnected, but there are also independent roles.

Mr. David Anderson: Let's just talk about a couple of the roles that Natural Resources plays. I think Ms. Liu brought up the CANMET labs, but you talked about the geological commission and the forestry service.

I'd like you to talk a little bit about the Office of Energy Research and Development, CanmetENERGY, and the Office of Energy Efficiency in terms of how they contribute to innovation in the energy industry.

Where does Natural Resources insert itself? How do these units within Natural Resources contribute to energy?

Dr. Marc D'Iorio: The Office of Energy Research and Development is the coordinator of R and D and in a broad sense represents Canada in energy matters in a number of international fora, such as the International Energy Agency's committee on energy research and technology or the carbon sequestration leadership forum. It basically manages programs. It does not perform R and D; it is a funder of R and D, very broadly, not just for government labs but also for industry and for academia.

We work closely with other groups, such as NSERC, and work closely with the performers, such as the CANMET laboratories and the Geological Survey, and with the mining and metals sector in looking at lightweight material, for example, for transport, and we look at forestry as well.

With respect to the roles of the CANMET labs, I'll turn to Mr. Aubé.

Mr. Martin Aubé: CANMET labs are definitely the core energy performers of R and D for Natural Resources Canada. As I said before, we count about 415 employees, and that number is complemented by other parts of the department that do research in energy.

We deliver on a lot of the funding that's provided by the Office of Energy Research and Development. We receive approximately \$40 million per year to undertake research and development within our labs, much of it in conjunction with industry, and as I mentioned before, we work directly with industry. Industry, seeing us as a key performer, requests our research services and our technical expertise to undertake their own private research and development.

More on the public goods side, there is a lot of knowledge being generated from the labs, especially in terms of input into regulations and standards. That's where you're getting a lot of the knowledge and the scientific evidence.

• (1300)

Mr. David Anderson: Do you want to say anything specifically about what you see as the main challenges and barriers to innovation on the supply side of this equation? We're going to be talking later about the two other sectors, but what are the barriers and challenges to innovation in this sector, or are there any?

Dr. Marc D'Iorio: It is a very large area, the supply side. There are quite a few companies with very different perspectives. In some provinces there are utilities that belong to the crown. We have to work with very different proponents in all of these types of projects.

One of the real challenges has always been trying to get various performers to work together and to bring the best minds together to address the issues we're trying to solve. Finding the best ways to collaborate, when government labs and the external stakeholders are included, is always a challenge, but it's absolutely essential.

I think other jurisdictions have found ways to have programs that allow performers in different areas to work together to address the issues and solve the problems that we face—on anything, whether it's on the supply side or—

Mr. David Anderson: There's strength in funding programs with other jurisdictions, and that is one of them: it brings people together to collaborate. Mr. Julian wanted to split the funding out, but there is strength in funding together on these projects.

Dr. Marc D'Iorio: Oh, there is very much strength in having a unified type of process to fund single projects that have many proponents. In fact, it's something we tried to do under the ecoENERGY innovation initiative; we went through regional workshops using regional development agencies, but also through webinars and putting online collaboration tools in place whereby proponents or researchers could identify themselves.

It led to real results. For each of our demo projects we had an average of nine different proponents working together on a demonstration project, and on the R and D, about five different proponents per project teamed from different groups. That's real success, as far as being able to pull the best out of our innovation system in Canada is concerned.

The Chair: Thank you, Mr. Anderson.

Thank you to all members of the committee for their questions to the departmental officials in this first meeting of our study on innovation in the energy sector.

I would like to thank our witnesses today, Dr. D'Iorio and Monsieur Aubé, and also all the officials at the back, for being here and for giving us information to start our study.

Go ahead, Mr. McGuinty.

Mr. David McGuinty: Very quickly, I have a point of order, Mr. Chair.

I think both Mr. Aubé and Mr. D'Iorio did a heroic job today trying to answer questions that were put to them.

I'm wondering if it would be helpful for us to approach the department again and bring in either the ADM of policy or...

There are a number of economic angles and fiduciary questions that were raised today. Mr. Anderson raised two or three times some sort of prioritization of what sectors we are being most innovative in, and I think it put both Mr. D'Iorio and Mr. Aubé in a somewhat difficult spot.

Is it not possible for us to go back to the department and bring in another round, perhaps, of senior witnesses from the department to help us understand some of those questions? I know also Mr. D'Iorio and Mr. Aubé are going to struggle as they go back to find all kinds of answers to requests for additional information.

I think it would be important for us, Mr. Chair, at this early stage of the study to get a more global perspective on energy comparatively—what's going on in other countries, what's going on in Canada, what's going on in some provinces. I think it would be very helpful for all of us to get more information in that regard.

My suggestion is we go back to the department and perhaps get the ADM of policy and anybody in charge of economic analysis in the department.

The Chair: Thank you, Mr. McGuinty.

I will say that all members and parties were asked to have their witness lists in for this part of the study. I don't know if anybody has other officials on the list. It is something we could discuss briefly at the next meeting, if you want to have a bit of discussion on that and see what the committee wants on that. Can we do that?

Mr. David McGuinty: Yes, we could.

Just to clarify, I don't think any members had any say in which witnesses were coming from the department. Is that right, Mr. Chair?

The Chair: Yes, that's true.

Mr. Anderson, you want to speak on the same thing. It's not a point of order, I don't think.

Mr. David Anderson: It's just on the same comment.

I think our witnesses did an excellent job of answering the questions. I'd like to point that out. I didn't see that frustration that Mr. McGuinty talked about. I thought they did an excellent job. Certainly any discussion of our future agenda probably should be at a meeting dealing with future business.

The Chair: Yes.

Thank you, everyone. Thank you again.

The meeting is adjourned.

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