HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Natural Resources

RNNR • NUMBER 047 • 1st SESSION • 42nd PARLIAMENT

EVIDENCE

Tuesday, March 7, 2017

Chair

Mr. James Maloney

Standing Committee on Natural Resources

Tuesday, March 7, 2017

● (1545)

[*English*]

The Chair (Mr. James Maloney (Etobicoke—Lakeshore, Lib.)): Good afternoon, ladies and gentlemen. Thank you for coming today. We're going to start. We apologize for starting a bit late, but we had some votes in the House to deal with before we made our way over here.

The process for today is that we will give each group up to 10 minutes for a presentation. Each presentation will be followed by a series of questions from around the table. This first session will be about an hour long, so I encourage everybody to try to stay within the time limits. I may have to interrupt you and stop you. If I do, I apologize in advance, but we need to do that to make sure that everybody gets their allotted time.

There's an earpiece available to you for translation. You are encouraged to speak either French or English. You will likely be asked questions in both official languages, so if you need the earpiece, it's right underneath the table and available to you.

Again, thank you for joining us this afternoon. With no further ado, I will open it up to Mr. Thorsen. You look as though you're ready to say something, so why don't we start with you?

Mr. Lyle Thorsen (Director of Strategic Planning, MEG Energy Corp.): Thank you.

I'll pass it back over to Mikaela to open.

Ms. Mikaela McQuade (Senior Policy Analyst, MEG Energy Corp.): Thank you, Mr. Chair, and thank you to the committee for the opportunity to appear before you today on a topic that's of particular interest to our company. We're excited to be here and we are unapologetically enthusiastic about what we've been able to accomplish in clean technology in the natural resource sector through our demonstrated commitment to clean technology investments.

My name is Mikaela McQuade. I am a senior policy analyst with MEG Energy. I support our public affairs team and assess and respond to public policy that impacts our business at the provincial, federal, and international levels.

Mr. Lyle Thorsen: I'm Lyle Thorsen, MEG's director of strategic planning. As part of this role, I lead our short- and long-term financial planning to make sure that MEG has the capital required to support our development plans; this role includes funding our efforts on clean technology innovation, development, and deployment.

Ms. Mikaela McQuade: Our presentation today, which you should have in front of you, will outline our experience of leveraging innovation. For the focus of your study, we'll provide some commentary on the current federal clean technology innovation policy system as well as on the opportunities that this government has to accelerate innovation within our industry.

The first slide shows a bit about our company. We're an Alberta company that uses Canadian drilling technologies to sustainably produce in the oil sands. We believe that growing the economy and strong environmental performance go hand in hand, and since our first day of production in 2007 we have worked to ensure that our environmental performance is best in class. MEG Energy's current production level is about 82,000 barrels per day.

I'll ask Lyle to walk you through the in situ production process at a very high level and then detail where we're leveraged and invested in clean technology innovation. We will speak to clean technology as the committee has defined it: as more resource-efficient than equivalent products or processes that don't necessarily have a primary use of environmental protection.

● (1550)

Mr. Lyle Thorsen: For those of you who are unfamiliar with it, I will give a very high-level overview of the in situ oil sands production process MEG uses in its operations, which is steam-assisted gravity drainage, or SAGD. In doing so, you'll quickly understand that our operations are inherently innovative.

In SAGD, horizontal well pairs consisting of a steam injection well and a production well are drilled into the bottom of the reservoir, which at MEG's Christina Lake Project in Alberta is 400 metres below surface. The injected steam heats up and liquefies the solid bitumen, which allows it to flow through the reservoir sands. The liquefied bitumen and condensed steam drain into the producer well by gravity, eventually creating a steam chamber. That's kind of referenced in step one of the diagram that you see.

The hot bitumen, water, and some associated natural gas are then lifted to the surface by downhole pumps and transported by pipeline to the central processing facility. Once at the central processing facility, the gas is separated from the bitumen-water emulsion and reused in operations. That's step two of the diagram.

A light oil, referred to as diluent, is then added to the bitumen-water emulsion to help separate the bitumen from the water, which is step three.

More diluent is subsequently added to the bitumen once it is separated from the water, creating a product called “dilbit”. The dilbit is transported to market via pipeline. The water is treated so that it can be reused to generate steam in both the conventional steam generators and the cogeneration facilities. These are steps four, five, and six.

The steam is injected back into the reservoir via the steam injection wells. A small amount of water, less than 10%, cannot be recycled and is disposed of in deep reservoirs. The makeup water used to replace the disposed volumes is also sourced from deep reservoirs and is non-potable.

As you can see, this is a high-tech business involving sophisticated technologies and the most efficient processes for drilling, reservoir extraction, production, oil treating, water treating, and steam generation.

On slide four, there are two things. The bars on the slide are MEG's production volumes over the last eight years, showing our progression from start-up of operations of our pilot in phase one, which was approximately 3,000 barrels of bitumen a day, up to current production rates of over 80,000 barrels per day in our expansion phases, phase 2 and phase 2B.

Overlaid on the production graph are two lines. The green line shows the industry average of greenhouse gas intensity in tonnes of CO2 equivalent per barrel, and the red line outlines MEG's performance of the same indicator. The graph points to the fact that by integrating cogeneration and proprietary clean technology innovations into our reservoir development, MEG has decreased its steam-oil ratio and has lowered its GHG intensity 30% below the in situ industry average.

Companies like MEG develop and deploy innovative technologies and processes to drive industrial productivity gains and efficiencies, thereby increasing our profitability and achieving superior environmental outcomes, driving further investment into innovation and improving the marketable energy products that bring prosperity to Canada.

I'll provide a quick overview of MEG's existing and emerging clean technology innovation in the hopes of giving you a sense of how to best incent further activity of this nature.

Cogeneration produces electricity and steam from natural gas to power our operations and provide reliable 24-7 base load power to the grid, lowering electricity prices and reducing intermittency. Cogeneration is highly efficient because the waste heat from generating electricity is captured and used to generate steam, maximizing the overall efficiency of natural gas usage at our facilities.

The next two proprietary technologies are implemented into the reservoir and are key to reducing MEG's steam-oil ratio.

● (1555)

Enhanced modified steam and gas push—eMSAGP for short—enables us to replace steam with non-condensable gas and uses infill wells to produce incremental bitumen, increasing resource recovery and reducing operational steam requirements.

The second reservoir technology we're developing is enhanced modified vapour extraction—eMVAPEX for short—a pilot technology that also utilizes infill wells to increase resource recovery and injects condensable gas to replace steam and dilute the bitumen in the reservoir, substantially reducing the amount of steam required for production.

The fourth technology that we're currently developing is HI-Q. MEG has developed and patented the partial upgrading technology that transforms the heavy oil into easily transportable product and eliminates the need for diluent. Compared to traditional upgrading, HI-Q produces 20% less greenhouse gas emissions, uses no water, and occupies less than a third of the land footprint of typical upgrading facilities.

Next is slide 6. Although MEG has demonstrated a successful track record of investing in the research, development, and deployment of innovative processes and technologies that improve operational efficiencies and environmental performance, we believe the Canadian innovation ecosystem could become more efficient. In keeping with the focus of this study, there are opportunities to de-risk these activities, both from a financial perspective and from the perspective of creating an environment of policy certainty.

Ms. Mikaela McQuade: In order to raise investment for the capital-intensive innovation efforts that we find ourselves using, certainty of deployability is required for our operations. As producers, we need to be able to ensure that if we invest in clean technology, the policy and regulatory environment will ensure stability and predictable outcomes, therefore guaranteeing us a return on investment. This requires very well-coordinated and clearly defined policies and regulations that are implemented in an equitable fashion within and across industries. Recognizing that the environmental performance of our operations is highly regulated at the provincial level, it's also very important to ensure that any federal measures reflect subnational circumstances.

As seasoned participants in the Canadian innovation system, we recommend further coordination among departments, funding agencies, and governments, from both a financial and a policy perspective, to realize meaningful progression of the clean technology innovation agenda in the natural resource sector.

Mr. Lyle Thorsen: When oil prices are low, it forces our teams at MEG to do what they do best: innovate and think of new ways to operate and grow the business more efficiently. MEG and our industry peers will always continue to innovate, but reduced cash flow caused by the continued low commodity price environment limits the amount of capital available for investment in innovation projects. Therefore, advancing both economic and environmental goals will require government support of and investment in technological innovation within the sector.

In light of the capital-intensive nature of the innovation process, industry often finds itself in the so-called valley of death, in that there is a significant gap between research and development and its revenue-generating commercialization. This is a key area that deserves further policy support. Governments can invest more patiently, with longer return horizons, than private investors. They have the ability to share the financial risk of new technology development through policy and regulatory intervention to achieve long-term benefits.

For small and medium-sized oil sands companies like MEG Energy that operate only in Canada, this is especially important, because we often raise capital to fund innovation projects from highly competitive financial markets, as opposed to internally generated cash flows sourced from international operations or other business units.

If innovation funding opportunities and the efficiency with which they are delivered are maximized, industry will be well positioned to continue to contribute to Canadian environmental leadership. To that end, we are encouraged by this government's emphasis on driving innovation, productivity, and competitiveness in the natural resource sector, recognizing that our sector is an area of Canadian strength and strategic priority.

Ms. Mikaela McQuade: Further natural resource innovation will position industries like ours to remain competitive and to continue to create more long-term opportunities to grow a thriving and diversified Canadian low-carbon economy. The government has a role in championing innovation uptake to date and encouraging further investment in these activities within the sector. This is what will ultimately allow Canada to remain a globally competitive centre for innovation, while continuing to deliver its natural resources to market and prosperity to Canadians. This will require diligent de-risking from a financial perspective and in the creation of an environment of policy certainty.

We really are innovating to enable our sector to thrive in and drive a low-carbon economy. We're proud of what we've done. We're happy to share it with you today. We're looking forward to partnering with government to accelerate progress towards this goal.

We welcome your questions. Thanks for having us here.

● (1600)

The Chair: Thank you very much.

Ms. Lawrence and Ms. Miner, I won't presume to guess who's going to go first. I'll leave it up to you.

Ms. Leah Lawrence (President and Chief Executive Officer, Sustainable Development Technology Canada): Thank you, Mr. Chairman.

Thank you to the committee members for inviting us here today. It's our pleasure to present alongside MEG Energy, which happens to be one of our funded companies. I'll have to give them a shout-out as we go through this discussion.

Ms. Mikaela McQuade: As we will to you.

Ms. Leah Lawrence: I'd like to introduce Carla Miner. I don't think she was on the witness list, so I apologize for that. I've been with SDTC for only two years, and so for the longevity and the really tough questions, I'll have to defer to her, because she has a breadth and depth of knowledge that I do not.

I hope many of you are familiar with SDTC. We are an arm's-length federal foundation that invests, with your permission, on behalf of Canadian taxpayers. Over the 15-year history of our organization—which I have had the privilege, as I said, of joining quite recently—we've invested in some 300 companies across Canada, or about a third of the clean tech market in general, with about a billion dollars on behalf of Canadians. All of that money is leveraged significantly through other private and sometimes provincial investment. It's my privilege to tell you a little bit about that today.

One thing I would say is that in addition to MEG, those other 299-plus companies are a significant strategic resource for Canada. They really have developed a core set of clean technologies that are, in some cases, already being exported in large numbers. They are poised and ready to expand that. That's an important thing for the committee and for your members to consider, because that strategic resource needs to be leveraged as we go forward. I would say that the opportunity is short, and I think you know that well. The opportunity is short because clean technologies are a strategic directive imperative for many nations across the world right now, and I'll get to that a little bit more in my remarks today.

Before I get started, I want to talk about two things, kind of definitional things. The first is the word “invention” and the second is the word “innovation”.

Invention is the realm of research and development and pre-commercial technology demonstration. The second part is the mandate you've given to us, and both parts are things that are very actively done by Natural Resources Canada and other departments, including Innovation, Science and Economic Development, as well as many of our sister provincial agencies.

Innovation, on the other hand, is really the commercialization of invention. It's the rubber hitting the road. It's actually getting sales, revenues, and, we would hope, profits. When you're in a business such as the one SDTC is in, trying to encourage environmental and economic prosperity, you really don't get there unless you get the innovation. Unless those technologies are deployed and real emission reductions and economic benefits start to accrue, we haven't been as successful as we need to be. I would start with that as a message for you today: if we only get to invention and we don't get to innovation, we really haven't gone far enough.

I'll move to the global context that we're talking about.

As I mentioned, time is short. Countries such as China, the United States, South Korea, and Germany are actively supporting their domestic innovators to get into that innovation space, to commercialize technologies they think will lead in the next 10, 15, 20, or 50 years as we tackle large challenges such as climate change, water security, food security, and the like. They have been in this space for a number of years and they're moving very quickly.

In 2015, clean energy—the topic for this committee—attracted $329 billion in global investment. This compares to about $810 billion for the oil and gas industry in the same year, so it's a significant component of the global economy even today. Given the intense global competition in clean tech, SDTC, along with other partners and a venture capital company in Montreal named Cycle Capital, asked ourselves what Canadian companies can do, where we might be leading, and how we might take advantage of this expanding market globally. I'll draw your attention to slide three in the package we gave to you, because it starts to give you some of the results of the research we've been doing in this area.

When we look at Canadian companies, we see they're very good in a number of areas. We asked ourselves how that looks, where they could expand, and where they sit globally. The first question, then, is in an ideas economy—

Oh, was it not distributed?

● (1605)

Ms. Kim Rudd (Northumberland—Peterborough South, Lib.): Does anyone have one?

Ms. Leah Lawrence: I'm sorry. I thought it was distributed a couple of days ago. Let me not speak to the slide, then; let me just tell you.

We did a study with Cycle Capital, as I said, that looked at this idea of invention and innovation. If we know that the global economy is moving quickly in clean technologies, where might Canadian companies lead, and how might we identify that? What we did was to look at research and patents for both universities and firms in Canada to see—in each of the clean tech sectors or verticals—where they might be leading.

We got some interesting results. The first thing we found out is that on a per capita basis, Canadian researchers are leading the way in clean technology. We are publishing more papers than would be expected in comparison to countries like the United States, Germany, and China, and that's an exciting thing. It means we have a strong base to build upon and an ability to grow. Where we are challenged, though, is when we look at the patentability of that research; there, we aren't doing quite so well.

Research converted into patents in academic settings lags the world on a per capita basis, behind the United States and, more importantly, China, which is really leading the way, and I'll get to that in a second.

In industrial patenting of clean technologies, we're a bit better than we are in the academic conversion, but we're still not where we'd like to be. What we see in that realm is a lot of multinationals that have offices here in Canada leading the way, but we don't see a robust mid-term and smaller company sector providing a lot of leaders in all the clean tech verticals, which would allow for a more robust, competitive market to be able to function. What we have is a lot of small companies—often the ones that deal with us—and a lot of large companies, but very few—like, for example, MEG Energy Corp.—that are operating in the in-between. That's what we see.

An interesting thing that I'm sure you might have heard from some other presenters is that since about 2010-2011, we really started to see the might of China in clean tech. What you see is a really strong surge in the expansion of patenting, particularly in the academic sectors. In fact, I'm told there was a policy put forth by the Chinese government that encouraged academic researchers to patent and that actually gave monetary incentives to do that. You see translation from academic to patents in academic settings, and you're also seeing it in industrial patenting.

What's interesting there is you also start to see gaps in other places. I can provide this at a later date, but in clean technologies related to agriculture, there is very strong patenting by both academia and industry in China and some of the other Asian nations, while in Germany, the United States, and Canada, that patenting is less frequent. That's not an area where we're necessarily making a lot of headway in patenting.

You might say, “So what? Why does patenting matter?” It matters because when we're trying to go beyond selling resources in their primary state to selling the valuated technologies associated with those productions in a more environmentally friendly way than might have been done historically, the ownership of the ideas related to those technologies is only paid for if you own the patents or the licensing. As we try to grow into that space, we want to make sure we expand in that area.

A key and important thing there, a second message, is that we're doing very well in research and probably leading in many sectors, but we need to convert that into patenting, both in the academic and the industrial sectors.

The next thing I would say—and this gets to a little of what MEG said already—is that we've been really good at getting those 300 companies to a certain point of pre-commercial demonstration and then saying “Go, run. Be free,” and they're not quite ready to run and be free.

What we know from experience in other countries—the United States, Germany, and others—is that the first, second, third commercial applications are really challenging. First of all, it takes a long time to get to that point and do those first, second, third commercial applications, so companies with SDTC are with us for eight to 10 years on average. Then they go to their first commercial application. If you're pre-revenue or low revenue because you haven't quite got to commercial sales, translating to commercial is very challenging. Patient capital that can wait around for eight, 10, or 15 years is something that's missing in our market.

That's not clean tech alone. McKinsey did a study a little while ago that looked at oil and gas in general, and it found that from idea to commercialization, on average, can take 31 years for any technology in that sector.

● (1610)

It's because it's high capital, hard to do, and hard to finance.

To close, then, as the chairman has asked me to do, I think there are some key things we need to think about when we think about clean technologies. We know that we are doing really well in creating research and ideas and in financing that research and development in early-stage pre-commercial demonstration. The next step is to think about the tools for commercialization.

I'll give you a couple of things here. The first is that government has a very strong ability to think about procurement, both in terms of its own procurement and in terms of the incentives it can provide to other people in the industry in their procurement. Someone told me a while ago—and this is ancillary to natural resources, but it relies on natural resources at its base—that some 60% of construction materials are procured by some municipal, provincial, or federal government. If you think about where the resources come from for those construction materials and the life cycle of those materials, you can see that it is quite key for government to encourage environmental procurement along that value chain.

The second thing is that we need to think about strategic and intellectual property management and how government and these companies that are developing it can work together to make sure that, as Canada, we are benefiting from the public investment we're making into strategic IP.

I'll give you an example. The Standards Council of Canada came to see us recently to talk about the different committees at the international standards organization that are focused on clean technologies and to look at the membership of Canadian companies on those technology committees. Now, why does that matter? It matters because any international standard often comes down into national standards and then allows for companies to sell within any kind of jurisdiction. We found again that China is leading in those spaces, but Canada less so. As a result, we're working with the Standards Council to think about how we move forward on strategic regulation. That's just a first example that you could consider as you think about the day-to-day and long-term regulatory vision and strategic regulations that you're debating in this committee.

To close, SDTC thanks you very much for the privilege and the honour of working on your behalf and getting to work with companies like MEG Energy and the other companies we've invested in across the country. We look forward to continuing that work and we look forward to supporting them, with you, as we think about how we can help them to accelerate and scale and get from just invention to innovation as well.

The Chair: Thank you very much.

First is Mr. Lemieux.

[*Translation*]

Mr. Denis Lemieux (Chicoutimi—Le Fjord, Lib.): Thank you, Mr. Chair.

I want to thank the witnesses for their presentations.

Ms. Lawrence, your organization is helping to bring clean technology to market. You invest in world-class Canadian businesses whose work benefits the environment in a tangible way and benefits Canada's economy.

How is the Canadian industry faring when it comes to the development and deployment of new environmentally friendly technology in the forestry sector?

[*English*]

Ms. Leah Lawrence: In the forestry sector there are a number of key technologies that we have been looking at and that are important. In a second I'll give you some examples that we're quite a bit excited about in Ontario and in Quebec, and in British Columbia as well.

As you will see when we are able to distribute our slides for you, SDTC has invested about $50 million over our life in the forestry sector, and that's been leveraged with private sector monies. It has in many cases gone to projects that look at how you might improve energy efficiencies at existing facilities or to develop biofuels from waste forest residue or other things. I think of a specific example, AE Côte-Nord, which is in Port-Cartier. It is a project by Ensyn in Renfrew, Ontario, just outside of Ottawa here. They take waste wood materials and they transfer them into a bio-oil, which is being sold into the northeastern United States to municipal infrastructure such as hospitals. They're just expanding that facility to, I think, 1.5 times more output. They're just finishing the construction. This is a facility that we're very excited about, and it should go online here in about nine months from now.

The exciting thing about that facility is that already sales are quite successful in the United States. They want to see if they can work with CanmetENERGY and with other federal agencies here in Canada to see if they can displace diesel and other products. It's a great Canadian example that has potential to sell globally.

We have several others. Carla, did you want to add any that you can think of?

● (1615)

Ms. Carla Miner (Senior Manager, Sustainable Development Technology Canada): I'm just going to take the question in a different direction.

There are opportunities to use forest products in areas that aren't what you would have thought of in advance. An example would be the creation of nanocrystalline cellulose, a nanoparticle derived from the lignin in wood. It is finding applications in a number of different fields, whether it's in a biocomposite or in fluids that are used in drilling oil wells. This is a case of a resource being turned into something that's quite unexpected. This is just one example of that sort of opportunity.

[*Translation*]

Mr. Denis Lemieux: Mr. Chair, my next question is for the two groups of witnesses.

How are you dealing with the new prices that the government has implemented for carbon credits in Canada?

[*English*]

Ms. Mikaela McQuade: Sure. Regardless of the policy or regulatory design of carbon pricing or emissions reduction regulations in Canada, we're supportive of regulations that incent what we're speaking to today, that incent those industrial productivity gains that allow for our sector to reinvest in the efforts that have gotten us to where we are today with respect to our greenhouse gas emissions intensity.

Any policy design, as we said earlier with policy certainty and investment certainty, has to guarantee that we can deploy whatever we are developing so that all the efforts that we're undertaking today as we continue to innovate will basically pay back the Canadian economy and continue to drive towards that low-carbon economy.

Ms. Leah Lawrence: In terms of public policy, for our companies, it's important to think about not just the macroeconomic policies that might encourage transition to a low-carbon future but also those micropolicies that might encourage the adoption of technologies. Those might not be evident at first, because they might not necessarily be environmental.

I'll give you an example. Most of the companies we deal with make less than $10 million in revenue, but they often will have interprovincial activities. They might manufacture their pressure vessels and have their head office in Montreal and in the Montreal region, and they might have a site facility in Lloydminster, Alberta, for example, or in Fort Saskatchewan, Alberta. By the nature of the clean tech industry, they're already interprovincial, and they're already dealing with the challenges of working interprovincially.

I remember one company gave the example that just the transportation of the vessels and being able to site them in the Alberta jurisdiction was much more challenging than it first envisioned because it hadn't done it before, although you guys would probably know much better about that than this company. One thing is to be able to have information to understand in advance what the barriers might be and to be able to deal with them. This helps in terms of the overall prosperity of that company and its ability to deliver on its clean technologies versus other things.

I think I'll just leave it at that. When thinking about the deployment of these technologies, it's important to talk to the companies directly and actually hear what their barriers are. What are their challenges to business and deployment? Then we can try to think about what might be done in that regard.

The Chair: Thank you.

Mr. Barlow is next.

● (1620)

Mr. John Barlow (Foothills, CPC): Thank you very much, Mr. Chair.

[*Translation*]

Thank you, Mr. Lemieux.

[*English*]

Thank you to the witnesses for being here.

We have a great committee here. We work very well together, and I don't want this to come across as the perception of the committee members, but I think all of us would accept that the perception of the oil and gas sector by many Canadians is that it's dirty, it's behind the times, and it's not innovating unless it's forced to.

Mr. Lemieux brought up the carbon tax, but, Mr. Thorsen and Ms. McQuade, that's what you've been talking about with HI-Q, and your GHG emissions are 30% lower than the industry average. You've been doing these things without a carbon tax in place. You've been innovating since day one without punitive taxes, when people say that without these taxes, you would not innovate. That's obviously not the case.

What has been driving your innovative decisions to invest in research and technology? You've been doing this until now without any influence or without government getting in the way, so what has been the driving force behind that within MEG up until now?

I want to pick up on some questions he was asking as well.

Mr. Lyle Thorsen: The way I look at it, my career spanned about 20 years in the oil sands industry. As a young engineer, I was working on one of the first pilots of the technology 20 years ago, so my entire career has been innovating and developing technology. When you look at SAGD in general, it has only been about 20 years since this technology has come to market and operators have been implementing it. There came a time from moving beyond the AOSTRA, an underground test facility, an Alberta-supported initiative, to piloting within industry, and then beyond that, probably in the last 15 years it's become commercial.

That's the way I look at it. It's been continual innovation, and we're very proud of what we've been able to accomplish from that. Even just figuring out how to get the bitumen out of the reservoir has been a huge thing, unlocking billions of dollars in value for Albertans and Canadians. Especially on our oil sands part, I think it's inherent that we're continuing to innovate just to get the bitumen out of the resource most efficiently, and we want to do things right as well. I think that's the other thing here. As well, it's an energy-intensive industry, so doing things energy efficiently also helps reduce our costs.

That's probably one of the nice fits that we have here. We're continuing to strive to reduce our steam-oil ratios so we can use less natural gas to produce each barrel of bitumen. There's a lot of innovation in the reservoir technologies. That helps reduce our costs and also helps reduce energy intensity. I think it's a natural fit out there as well. There's a combination of multiple things, but we're innovating to keep driving our costs down and get better as well.

Mr. John Barlow: In what you're saying, Lyle, a couple of things stuck out. It's cost-effective for you to try to find these efficiencies through innovation, but also you guys have some skin in the game in terms of the environment. You want to make sure your partners get the perception that you are doing everything you can to not only do things more efficiently but also use less water and be more environmentally friendly. Those are things you've been doing up until this point anyway.

Mr. Lyle Thorsen: Absolutely, yes. Speaking for MEG, we always want to go above and beyond, do the right thing, and continue to get better in all aspects, whether it's the energy intensities —and you pointed out some of the stuff—or water usage. We've been continuing to use less and less water and going to non-potable water sources so that we're not taking water out of the current ecosystem. We're using stuff that really isn't useful for other purposes to reduce our footprint. Lots of work is going on with our pad facilities there to continue to reduce even the size of our pads that we're drilling our wells on.

I think everybody is concerned in how we get better and how we utilize all our resources more efficiently. It's one of those things that we're proud of doing. Generally you want to do the right thing.

● (1625)

Mr. John Barlow: I appreciate that you've been doing those things without government intervention.

I've had an opportunity to learn a bit about the HI-Q program, and I know maybe some of my colleagues haven't had a chance. I'd just like you, as briefly as you can, to give us an overview of the accomplishments that could be achieved. Will that be able to go to commercialization?

Mr. Lyle Thorsen: HI-Q is something that MEG has been developing. We've been playing around for probably almost 15 years. It is a partial upgrading technology. When we looked at things, we saw upgraders are expensive. You can see that now the economics of them just aren't making sense, and we haven't seen a new upgrader built in northern Alberta for numerous years.

One of the things that HI-Q does a little differently is we don't upgrade the barrel as far as conventionally has been done in the past. We're able to remove some of the capital costs for doing that. That helps. I guess it's the economics of it.

What we're doing is upgrading the barrel just enough to eliminate the need for diluent to be mixed with the bitumen to put it into the pipeline. That reduces our cost significantly. It's about access to that lighter oil. There's a risk that it may not be there as production continues to come up, and diluent is a big cost to our business. That's a very big thing for us. Eliminating the diluent that's mixed in with the bitumen to go into the export pipelines is very important. For the diluent that MEG Energy uses, we use a light condensate, and we add approximately half a barrel of that condensate for every barrel of bitumen that we're putting into the pipeline. Other companies are using synthetic oil to blend that in a one-to-one ratio. When you think of how much diluent is going down the export pipelines alone, if we can remove that, that frees up pipeline space. That's very important for us as well as we move forward, because it does free up pipe space.

The marketability of our crude is also increased when it's partially upgraded. It increases the number of refiners that can actually take our crude. It helps us get better value for the product. From that aspect, it helps increase taxes and royalties, and everything is staying in Alberta, in Canada. That's another big piece that helps us among differentiating markets—

The Chair: I'm going to have to interrupt you, Mr. Thorsen. I'm sorry. Thank you.

Mr. Cannings, it's over to you.

Mr. Richard Cannings (South Okanagan—West Kootenay, NDP): Thank you.

Thank you all for being here today. I'll start with MEG.

Specifically regarding the nice graph that you have showing your GHG intensities versus the industry, I'm wondering how many other operators in the oil sands use a SAGD-type technology. How common is that technology, approximately?

Mr. Lyle Thorsen: It's become a more common technology. I don't know how many others there are. There are about a dozen or so.

Mr. Richard Cannings: Are you part of COSIA?

Mr. Lyle Thorsen: MEG Energy isn't part of COSIA.

Mr. Richard Cannings: We see that you are operating, as you say, about a third below the industry in general. How do you see this technology moving in to become the norm and everybody is doing it? Is that going to happen in the near term, or is it only going to be implemented in new projects? How does that work? How can we get the industry lying down?

● (1630)

Ms. Mikaela McQuade: The ability to use steam-assisted gravity drainage is very specific to geology. Some parts of the oil sands can only be mined, because the resource is too close to the surface. We can't build up the pressure and heat that we need to actually get the oil to flow to the surface.

With respect to MEG Energy's environmental performance and competitive advantage, there are quite a few SAGD users across industry. The in situ industry is kind of the industry of the future. The vast majority of the oil sands resource will be developed with steam-assisted gravity drainage. We've been able to drive that line below the industry average through our use of cogeneration. We've made upfront capital-intensive investments in cogeneration—in eMSAGP, enhanced modified steam and gas push, and in eMVAPEX, the enhanced modified vapour extraction.

We're seeing more and more of those downhole technologies come into play, be it through solvent or non-condensable gas usage. A lot of our industry peers are starting to use those. Those are proprietary, so they're not necessarily shared in groups like COSIA, but we are seeing each of us individually develop those technologies and try to maximize resource extraction so that we can get as much as possible from the resource with as little environmental impact as possible.

Mr. Richard Cannings: Perhaps I can quickly follow up on the carbon pricing questions.

With regard to the cap that Alberta is putting on GHG emissions from the oil sands and how different projects are affected by that, I assume that you'll fare very well under that scheme. How does that affect you?

Ms. Mikaela McQuade: It absolutely depends on implementation and design. For a company like MEG Energy, as we alluded to earlier, our ability to develop our resources—I believe in the regulatory approval process we have up to 500,000 barrels per day in process—in such a way that they are developed at 30% below industry average depends on our ability to attract investment to Alberta and to Canada.

When there is a hard emissions limit, however that's designed—we don't necessarily know as of yet, because the implementation details have yet to be released—we need to be able to see a clear pathway to compliance for our operations to be able to develop under that limit. For us, we have to convince international investors to come to Alberta and we have to convince them that our projects will be able to be developed under such a limit. Until such time as we have that policy clarity, I don't believe we could necessarily comment.

Mr. Richard Cannings: Okay.

Ms. Lawrence, you were starting to go somewhere I thought you were going to go—namely, what's the low-hanging fruit for clean technology in Canada? You talked about how Canada is ahead in research, but maybe not in patents. What particular parts of the clean tech industry is Canada really good at? Where should we be investing our time and money, from a Canadian perspective, to be world leaders?

Ms. Leah Lawrence: This is a really important question that we're trying to think about a lot at SDTC right now, just from the perspective of where our company is moving and starting to become larger.

I'll first say that this is what we think so far. We will continually refine this, because this is an area that we should understand better.

When we look at the research in patenting, it points to five or six areas where we seem to have a concentration of interest and human capital, if I could put it that way. One is fuel cells and hydrogen. The Vancouver region is a very important hub for that. In agriculture, it shouldn't be a surprise that there are some interesting things happening in many areas, including in Saskatchewan, Alberta, and the Guelph region. In recycling and waste there's strong talent there as well, and in water and waste management it's probably no surprise that industrial water handling is something that many of our industries in the natural resource sector do a lot of. It shouldn't be much of a surprise that we're good at it and have already been exporting. That's an area where we already have mid-sized firms all across the country. It's probably one of our leading sectors because of some of the good public and private work that's been done there. There are also energy efficiency and air quality-related areas. I think those would be key.

That's what we see so far, if I had to pick the areas that I think we're strongest at, and we'll continue to try to home in on them.

● (1635)

Mr. Richard Cannings: Okay.

The Chair: You have 40 seconds.

Mr. Richard Cannings: You just mentioned government procurement. Do you see any concentration in Canada in that regard, let's say with buildings and energy efficiency?

Ms. Leah Lawrence: I think it's possible.

There's one thing that I have not seen, and perhaps the committee members might have seen it if I haven't. As you would know, federally, provincially, and municipally there have been many years of green procurement in the country. I have not seen any studies to show what works and what doesn't. If we could get some consultants to look at that or have a better understanding, that would be something that I think would be of benefit.

At SDTC, we're seeing lots of interest in LED lighting in buildings and in control systems for buildings and that kind of thing. We would see some companies there that could really benefit if that kind of procurement would happen.

One of our board members, Geoff Cape, who is in Toronto but who has been doing a lot in terms of trying to do community-based sustainable city innovation, is working on exactly this kind of thing. If there were some leadership at the municipal, provincial, and federal levels to think about green building procurement or to think about the building stock they have and the life cycle of elements that you put into renovating or managing a building, I think government could definitely make some headway there.

Mr. Richard Cannings: Okay. Thank you.

The Chair: Thank you, Mr. Cannings.

Mr. Harvey is next.

Mr. T.J. Harvey (Tobique—Mactaquac, Lib.): Thank you, Mr. Chair.

First, for Mr. Thorsen and Ms. McQuade, with this type of SAGD process that you use—and I recognize that it's proprietary, so there are variations in the process from company to company—what percentage of the industry that uses in situ technology in Alberta would use this process or a process similar to this now, and what do you feel the overall development potential is for this type of process in Alberta as a percentage of the total industry?

Mr. Lyle Thorsen: When you break down the total bitumen resource in Alberta, I think about 20% is mineable and about 80% is too deep to mine and is going to be developed with different in situ techniques. I think the bigger prize, for sure, is using these in situ technologies.

I think the oil sands production in Alberta is 2.3 million barrels a day, give or take. I could be wrong on that, but it's in that range. A little over a million barrels of that is mining, and then the other two million or so would be in situ production. Of the in situ, probably close to a million barrels of that now is SAGD.

Then there are a couple of other projects that are using the cyclic steam technologies. They are in the range of 250,000 barrels a day. That's in a little different reservoir than what the SAGD producers are using. That's geared more to the Cold Lake area, with some different formations. The way you develop the McMurray sands, which is the bulk of the resource, is more of a SAGD way.

That will be the technology for the future for the bulk of the resources. We see that growing significantly as we move forward. A lot of the current approvals and new development schemes are focused more on the SAGD technology in the McMurray sands. There is definitely a lot of future in this one here.

Mikaela, you might be more familiar with what the proven number is for SAGD projects and some of the stuff pending. I'm not familiar with that, but it's—

Ms. Mikaela McQuade: On a macro sector sense, I'm not, unfortunately. I apologize.

Also, due more to the capital-intensive nature of mining operations than to the geography and the limitations of the geology, we'll see in situ projects. Because of their productivity, because of their environmental efficiency, those are the projects they are gravitating toward.

I'm only aware of one mining project that's in the approval process, and the rest, in terms of oil sands growth, are all in situ. In terms of adding processes like EM VAPEX and EM SAGD on top of those, why wouldn't you? In one shape or form, most SAGD operators or in situ sector players will be investing in technologies like ours.

● (1640)

Mr. Lyle Thorsen: You had a good point there.

SAGD projects are typically smaller in nature than mining projects. You see the mining projects with their 100,000 barrel-a-day-plus projects. You're in multiple billions of dollars for each project. With the SAGD, you can break it into smaller expansion phases more efficiently, so we're into hundreds of millions of dollars, and you can start expanding and growing that. In light of today's commodity price environment, it seems a little more appealing for companies to be investing in smaller, more scalable types of operations.

Mr. T.J. Harvey: You mentioned during your opening remarks about the collaborative relationship that you've had with SDTC and the important role that it played in allowing MEG to explore and grow that technology to the point where you are today. I was just wondering if both you and SDTC would like to offer some comments on the importance of having that type of funding arm through the federal government to allow the development of new technologies, and the importance of that role in that development, and ways that it could be improved upon.

Ms. Mikaela McQuade: As I mentioned, coordination is a big part of it. We work with a number of provincial organizations, be it Emissions Reductions Alberta, which was formerly CCEMC, or Alberta Innovates. We've had huge success with all of our partners in that regard. We will voice our strong support for those programs repeatedly, as often and as loudly as we need to, because they've been able to help us cross those critical investment gaps that we find ourselves in.

Obviously they're capital-intensive efforts. Obviously our industry is facing some pretty difficult circumstances with respect to commodity pricing. Those are the programs with further coordination, with further investment, with dedicated large-scale, long-term funding for these projects. These are what will continue to help us change the face of the in situ sector and how we develop these resources and contribute to not only Alberta's economy but also to the Canadian economy as a whole, and the social and economic benefits that come with that.

Ms. Leah Lawrence: Thank you for the question. Over the past 18 months, we've been thinking a lot about how we coordinate as federal and provincial agencies like the ones Mikaela just mentioned to provide a one-window application, to provide a shared federal-provincial approach to due diligence and contracting so that we can free up time and effort for companies like MEG to get busy on their technology demonstration and deployment. We've made significant strides in that regard and shortened our processes.

We're looking at being more proactive. In that regard, I think the agencies, both federally and provincially, work.... That was with Alberta. We also have a relationship with Ontario that's similar, and in one in Atlantic Canada as well, through Innovacorp, and we are just looking at ones in B.C. and Quebec.

I think a big part of what the public agencies and departments can do is look at how we can support the companies, make it easier for them to accelerate what they're doing and get it deployed more quickly, while obviously still holding them to milestones of delivery, because that's what we all want to see. It's really about trying to be a facilitator in that regard.

The Chair: Thank you.

That takes us to the end of our time, so thank you all very much for joining us this afternoon and providing very helpful information to our committee for our study. It will prove very valuable going down the road.

We will suspend for two minutes, and then we'll resume at 4:46 p. m.

● (1640)

(Pause)

● (1645)

The Chair: We'll get started again with this second hour. Thank you, everybody, for being so quick to get back in your seats.

This hour we are joined by the Canadian Solar Industries Association. We have Mr. Bateman with us. From BFH Corp. we have Cal Broder and not Mr. Popko, I understand. By video conference, we have Clean Energy Canada's Sarah Petrevan. Can you hear us okay?

● (1650)

Ms. Sarah Petrevan (Senior Policy Advisor, Clean Energy Canada): Yes, I can. Can you hear me?

The Chair: Perfectly.

I'm going to give each group up to 10 minutes to do their presentation, and then we're going to open the floor to questions. You will be asked questions in French and English. You're welcome to provide answers in either official language. You have translation devices available to you, and I encourage you to use them.

I will turn the floor over to Mr. Bateman.

[*Translation*]

Mr. Patrick Bateman (Policy and Research Advisor, Canadian Solar Industries Association): Good afternoon, Mr. Chair and committee members. First, I want to thank you for inviting me to speak here today.

I also want to thank the clerk for his excellent work.

My name is Patrick Bateman, and I'm the director of policy and market development at the Canadian Solar Industries Association, or CanSIA.

[*English*]

I have worked with CanSIA for almost eight years. Prior to joining CanSIA, I worked in the clean technology sector in Europe. I am very pleased to be speaking with you all today about the role of solar energy technology in our natural resources sectors.

To begin with, Canada's pan-Canadian framework on climate change and clean growth charts our national course to reduce our greenhouse gas emissions by 30% by 2030, and by 80% by 2050. These are ambitious targets. They are consistent with the level of effort that is required to meet our obligations under the Paris agreement.

Numerous analyses have demonstrated that emissions reductions of this scale can be achieved only through the decarbonization of the electricity system and the subsequent use of that electricity to replace fossil fuels across a wide variety of end uses, including transportation, buildings, and industrial processes. In other words, deep decarbonization requires deep electrification and fuel switching. Furthermore, if we are to expand economic activity in emissions-intensive sectors, we will need to decarbonize, electrify, and fuel-switch even more across our economy to balance our national carbon budget.

The industry whose focus includes the clean technologies that decarbonize, electrify, and fuel-switch is Canada's first new industry of the 21st century. These companies directly employ over 55,000 people in almost 800 firms. It's a highly competitive and innovation-led industry. These companies are at a stage where they plow back revenues into hiring Canadians to build competitive positions in a fast-growing global market. These companies are creating, commercializing, and deploying technologies that protect our environment while growing and diversifying our economy.

Clean technologies that harness solar energy to produce electricity or heat or that integrate that energy into broader energy systems are among the fastest-growing in the clean technology space. The opportunity to position Canada for clean growth with these technologies is massive, as evidenced by the current global marketplace.

Globally, the solar energy industry employed three million people last year, more than any other renewable energy sector. In recent years, Canada's solar industry has been approaching 10,000 jobs, with plenty of potential for growth.

Globally, the solar energy industry also attracts more investment than any other electricity generation space. Solar energy captures the lion's share of that, about $300 billion annually, which for the last several years has been consistently twice that of investment in fossil fuel electricity generation.

In recent years, the solar industry in Canada has been making capital investments of about $1 billion per year. As this investment soars, our prices continue to decline. Estimates place the cost of producing solar electricity in Canada having decreased four or fivefold in the last five years, and continued price declines are not only expected but inevitable with the innovation and progress that's being made.

Despite our impressive progress in recent years and the growth in our clean technology industry, it has been stalling. We need to rise to several challenges to ensure the opportunity to grow and diversify our economy and meet our commitments under the Paris agreement. For this reason, we commend the committee for undertaking this study.

The remainder of my remarks will focus on several areas where regulation and investment from the federal government would support Canada in claiming a position in the leading pack globally.

The federal regulatory framework that will guide Canada's long-term transition toward an increasingly lower carbon energy future at the federal level is under development. Starting in 2018, there will be a financial cost attributed to atmospheric pollution throughout Canada. By 2025, alongside our G7 counterparts, we will have eliminated inefficient fossil fuel subsidies. By 2030, we have a goal of having 90% of our electricity produced from non-emitting sources, due largely to the federally mandated coal phase-out. Currently, there are also consultations under way on performance standards for natural gas electricity generation, and also to lower the emissions intensity of all fuels in transport, buildings, and industrial processes.

Each of these measures is tremendously important for the medium and long term. We laud the federal government's approach and encourage continued action on all of these files.

● (1655)

However, in order to attract the private sector investment that's needed in the short term to create the clean growth that the federal government is seeking, additional investment is going to be required from the federal government, and I will present a small number of areas through which this investment could be channelled.

First of all, the commitment to becoming 100% renewably powered by 2025 demonstrates strong leadership from the federal government that's consistent with the types of commitments that are being made around the world by other national and subnational governments, as well as by many major multinationals, including household names such as Google, IKEA, Coca-Cola, and many more.

Fulfilling this commitment from new renewable electricity generation facilities would lead to new private sector investment, new jobs, new emissions displacement, and support of each of the provinces' targets and goals. The experience of the federal government in achieving this goal could also be used as teachings for other major power consumers that also want to become either more renewable or 100% renewable, as the case may be, in Canada.

The pan-Canadian framework on clean growth and climate change identifies both the green infrastructure initiative and the Low Carbon Economy Trust as opportunities to support the deployment of renewable energy. We are engaging with the relevant departments to explore prioritization and implementation on those fronts.

On tax policy, Minister Carr's mandate letter includes the priority, working with the Minister of Finance, to explore opportunities to enhance existing tax measures to generate more clean technology investments and to engage with the provinces and territories to make Canada the world's most competitive tax jurisdiction.

CanSIA has submitted some comprehensive recommendations to the Standing Committee on Finance as well, including identification of a 30% investment tax credit, which is a mechanism that's demonstrated significant impact and success in the United States, and the absence of which places Canada at a significant competitive disadvantage in North America.

Finally, as previously mentioned, expansion in emissions-intensive natural resources sectors will lead to a need for additional decarbonization, electrification, and fuel switching in other sectors. We would encourage the necessary flexibility in alternative compliance mechanisms that would permit large emitters from one natural resource sector to achieve regulatory compliance by purchasing credits from other renewable energy generators. This is an area where there will need to be a lot of cohesion between federal and provincial policy and regulatory development.

This concludes my remarks.

[*Translation*]

Again, thank you for giving me the opportunity to speak before the committee.

[*English*]

I look forward to any questions that you may have.

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

Please go ahead, Mr. Broder.

Mr. Cal Broder (Chairman, BFH Corp.): Thank you, Mr. Chair.

Good evening, ladies and gentlemen.

My name is Cal Broder. I represent a company I have called BFH Corporation. I struggled with coming here today, not in the sense that it's not an honour to be here but in the sense of what to talk about, because it's such a broad area. What was presented to me was to look for ways to de-risk.

First of all I'm a businessman, but I'm also an innovator and an inventor, as was pointed out previously by SDTC. They're different. I'm also a risk-taker, and risk-takers are kind of unique for the resource industry, because they're de-risking and de-risking. They're not risk-takers anymore. There is nothing wrong with that; it's just an evolution.

What I'm looking to do is to show that we can do things differently through innovation. One of the things that we do is show that we can transport our crude oil. I'll pass it around. This is bitumen, if anyone hasn't seen it before. Bitumen is not a conventional crude oil. It's unconventional. It's not meant to be in a pipeline, quite ironically. It's meant to be a solid.

The point is to move an unconventional crude oil in a pipeline, and I have no problem with doing that, but there is a safer, better, more cost-effective way, and that's as a solid.

When we look at innovation, the challenge we have as innovators involves three things, in my mind.

One is that we have a difficult time getting through the doors of the users, of the producers, of the suppliers, of the customers.

Second, we have a problem with technology. We've talked briefly about that, and I've heard the previous conversations. An innovator wants to protect his technology. A producer and a user want to be able to use it. I've had numerous discussions and disagreements on how we would move forward with technology, because there is incongruence. They want me to share technology openly; I can't possibly share technology openly, because that would release all the proprietary information.

As a result, we have step two, which are the challenges of dealing with that confidentiality. Confidentiality is the key part, because I can sometimes get through the door, but if I can't get through confidentiality, I'm finished, and we're stuck, and that's where we've been for some time.

Step three is the demonstration.

Just to give you some background with the industry, I need to go out and find somebody from industry, one of the producers, to say, “I've got a new way to do it”, but I have to find a way to get through that door first and I have to find a way to get through the legal complications of that. Then, once I finally do that—and we've done that with some—we can finally look at a demonstration. However, we have a new technology, a new process that nobody understands. Now the law will get in, the human resources, and everybody gets in, and it again complicates and compounds everything.

What I'm trying to get across is that it's not a simple process to ask how we can de-risk the industry. How can we de-risk any innovator? You have the facilities, you have the programs, and you have the institutions in place. In my opinion, from my perspective, they might just not be that congruent to get through.

I'll give you a couple of examples. Western Economic Diversification says that we can apply for funding, and we can, but when we applied in the past, we would have to set aside money at the time of the application and wait almost18 months. SDTC is much the same. The programs are designed in such a way that they exclude a small firm, small innovators, because we have to set aside the funds at the beginning and wait 16 to 18 months in order to get approval to be able to then start our project.

We have a number of these challenges out there, but the greatest challenge is that we have a product, a service in Alberta, a product that is unique, and it's not solid oil. We've done some testing with solid oil. Even the product in the bag we've had subjected to what we call an LC50 test. We take that oil, put it into a fish tank, and see what the mortality rate is. If you do that with crude oil, any crude oil, you have great mortality, almost 100% in most cases, very quickly. When we had it done, there was no mortality, so we're looking at a safe way to move it, a safe product. We have the same product in the end; it's just a different way to move it.

● (1700)

The issues I see may be slightly different from what others see, and that's probably why we have the process we have. We have a patented process that shows we can move this product in a very safe way, but it is more than that. It allows us to transition from being an exporter of a crude oil to being an exporter of refined products, because our process, our technology, is a refining process that is scalable.

Earlier Mr. Thorsen from MEG said their costs to get oil out of the ground, their capital costs, are about $30,000 per flowing barrel. The cost to Suncor, which has that new Fort Hills mine, is about $84,000 a flowing barrel. It costs a lot of money.

We also look at the issue of transportation to a market. Everybody thinks the pipeline is the way to go, but our product isn't made for that. We can actually move product to the gulf coast in this format cheaper than pipeline, because for every barrel they have to ship by pipeline, they have to add half a barrel in the summertime. That adds huge costs.

Also, when we look at the landed cost of Alberta's heavy oil to the gulf coast, we see it's being landed in the refineries for very close to world prices, plus or minus 5%. That tells me we're not being shorted. It's our transportation costs that are causing the problem.

There are a lot of issues. That's why, when I came here, I didn't know where to focus, but I wanted to just throw out some points to you, because it is a very complicated process of extraction. I think what you're tasked with may be even more difficult. It sounds as though we're trying to de-risk something that we haven't been able to define, and we haven't defined what it is we want as a result. We want to be able to help the industry, but are we truly helping them the way it is, or do we look at doing different things?

● (1705)

The Chair: Thank you, Mr. Broder.

Go ahead, Ms. Petrevan.

Ms. Sarah Petrevan: Good afternoon. Thank you to members of the committee for inviting me to present today. Thank you for letting me do this remotely.

I'm Sarah Petrevan. I'm a senior policy adviser for Clean Energy Canada, which is a climate and energy think tank based out of the Centre for Dialogue at Simon Fraser University.

While we view clean energy as that which is derived from renewable sources, we view clean technology as having a much broader application. It's equally relevant and can provide many benefits to the natural resource sector.

As the committee studies how to de-risk technology adoption in the natural resources sector, I would like to begin my comments by saying that I believe that Canada is starting this conversation from a position of strength.

First, we have a notable clean technology sector, with more than 700 companies employing greater than 55,000 people, and with revenue estimated at $11.5 billion in 2014 alone, we find opportunity not just for new innovations such as energy storage and solar panels, but for the industries that supply the inputs required to make and/or manufacture those technologies—for example, mining and forestry.

The second point I would like to make is that Canada is an export-driven economy. It makes up more than 30% of our global domestic product, which is good news, given that the international clean technology export market is valued at more than $1 trillion.

Canada has started down the right path by putting a price on carbon. In doing so, we've joined close to half of the world's economy, which is either pricing carbon or is committed to pricing it. Now we need to focus on the necessary second step, which is unlocking our technology potential so that we can play a role in an increasingly competitive global marketplace. One of the ways we can do this is by taking a strategic approach to procurement, one that focuses us in on the solution we want, which is building a prosperous economy based on clean growth.

Governments are major economic actors. For example, public procurement expenditures amount to a minimum of 13% of OECD countries' gross domestic products, and Canada is no exception. Government procurement of goods and services is worth $16 billion every year, or close to 10% of our national GDP. Governments can therefore leverage this economic heft to stimulate markets to meet economic and social objectives, effectively pulling innovative solutions into the marketplace. It is in this way that procurement can be a powerful tool to de-risk and support the adoption of clean technologies.

This approach is different from what we're used to. Typically in the past we have relied on tax credits and grant programs to stimulate the development of new approaches. While that has provided numerous benefits, it also comes with challenges. First, it's difficult to sustain consistent levels of funding over the long term. Second, what we produce isn't necessarily linked to the needs of the marketplace. While funding multiple projects can help foster many great ideas, historically this approach hasn't always considered the commercialization potential of grantee projects. In the most extreme example, this approach has eliminated our ability to export our innovations because we supplied too much funding and made the technology too heavily subsidized. These are lessons we should keep in mind as we move forward, but they can also be remedied through a considered approach.

Leveraging procurement to drive innovation isn't new. The OECD is a supportive resource, having conducted substantial research and provided education on the subject, while countries such as Finland, Australia, the U.S., and the U.K. and emerging economies such as China and Brazil have all been looking at more targeted policies to support innovation by using procurement to meet the needs of the growing market.

We've also talked about this idea in Canada. A recent report from the federal Minister of Finance's advisory council on economic growth, which was led by Dominic Barton, recommended that strategic procurement be used in Canada to support innovation and help small companies scale up and gain credibility to become integrated in global supply chains.

Further, a 2010 expert review panel on research and development also strongly recommended the use of procurement to support business innovation, looking at the Department of Defence as a good place to start.

At an introductory level, a strategic approach to procurement to leverage Canadian innovations includes the following.

First, it focuses on solutions. The role of government should be to broadly define a problem and award contracts based on a proponent's ability to meet or exceed defined program outcomes, rather than simply awarding a contract to a proponent for their ability to accomplish tasks on a list. By not predetermining the outcome, governments create opportunity for innovators to respond to tenders and allow new technologies and services to be deployed.

● (1710)

Second, it adopts best practices from the private sector and seeks to apply comprehensive life-cycle costing to all projects, including the long-term implications of carbon. Leading private sector firms have adopted procurement policies to support low-carbon goals with direct impacts across the supply chain. For example, Walmart was able to reduce GHG emissions from its global supply chain by 28.2 million metric tons by the end of 2015. Other multinationals, including IBM and Procter & Gamble, have introduced their own supplier assessment tools and standards, featuring requirements for energy conservation and GHG monitoring and reductions.

The third recommendation is to encourage the creation of jobs and economic activity by creating a role for SMEs in procurement. According to the Business Development Bank of Canada, 99.8% of businesses in Canada qualify as being SMEs—that is, small to medium-sized enterprises that comprise 500 or fewer employees. Not surprisingly, the overwhelming majority of Canada's clean tech companies are also SMEs.

The U.S. is the international leader in SME procurement. The U.S. federal government allocates 23% of all of its contracts to SMEs, and many U.S. state governments have procurement policies that support SMEs. By supporting a level playing field for these companies to engage, they are also providing support for domestic jobs, investment, and innovation.

The final point is to always consider commercialization. It's vital that the government acknowledge that clean technology is an export-oriented sector, with more than 87% of companies self-identifying as export-focused. Oftentimes in the past there was a tendency to provide additional funds or to pay more for an innovation to get it off the ground. While financial resources are certainly important and can play a role at the right time in getting a project off the ground, we need to be mindful of our goal and not do anything to undermine it, including paying too much for too long, because doing so greatly reduces a technology's export potential.

In conclusion, new federal procurement policies that focus on the solution, consider the true cost of a project, and encourage the participation of Canada's SMEs would deliver significant benefits to our country. These benefits include job creation, both in the clean tech sector and in the industries and services those companies use, including mining, agriculture, financial services, and others; increased export potential, as other jurisdictions gain the opportunity to witness technology applied in a real-world setting; support for Canadian innovations by pulling new technologies into the marketplace; and spurring the commercialization of clean technologies as demand for them increases.

I want to thank you for your time. I would be pleased to answer questions should the committee choose to pose them.

The Chair: I would like to thank all three of you. You kept well within the time limits, and we're grateful for that.

Mr. Tan, you're first up.

Mr. Geng Tan (Don Valley North, Lib.): Thank you, Mr. Chair.

Mr. Bateman, the solar industry relies heavily on significant government subsidies. What can the industry do or what plans does the industry have to reduce the industry's reliance on subsidies? There might be a scenario in which solar technology is clean and renewable but the industry itself is no longer sustainable.

Mr. Patrick Bateman: Thank you, Mr. Tan.

I think the crux of the answer is the rate at which our costs are declining, and as a result of that there will be reduced need for subsidies in the future. In 2009, when Canada began with the utility-scale solar, for example, prices were in excess of $400 per megawatt hour. Last year Canada held its first competitive procurement for utility-scale solar, and the prices that were realized were approximately $150 per megawatt hour, almost three times less.

In Alberta and Saskatchewan later this year there will be competitive procurements, and we expect to see those costs possibly hitting double digits per megawatt hour. I'd say there was a fourfold decline in five years. We expect the decline to continue, though perhaps not at the same rate, and we're rapidly achieving cost competitiveness.

● (1715)

Mr. Geng Tan: Okay.

Where are those solar panels manufactured? Are they made in Canada or imported from other countries?

Mr. Patrick Bateman: Canada has three of the most highly automated module manufacturers in North America. The United States also has several, and then Asia and Germany would make up the remainder of the module manufacturing. Canada's manufacturers are very high quality and display a number of competitive advantages that aren't present with other markets in the world.

Mr. Geng Tan: Where are the major ones located?

Mr. Patrick Bateman: They are in Ontario at this time.

Mr. Geng Tan: Okay, they are in Ontario. Once the panels have reached the end of their lifespan or have become worn out, what happens to them? Are those panels recycled or stored, or are you going to ship them to somewhere in Canada or outside?

Mr. Patrick Bateman: It's a very important question that the industry is dealing with globally. Germany is one of the key markets that's been installing at scale for many years, and it's beginning to come to a stage where there are large volumes of modules being decommissioned. In Canada we expect it won't be until 17 or 18 years from now before there is a large volume of modules to be dealt with.

The good news is that the majority of materials that go into a module are recyclable, and when you have a waste stream of scale, a profitable business model can be created around it. Our industry is committed to working toward having all of the recycling in place. It's not there now, and we would welcome partnership from the federal government and the provinces as well to ensure it is done responsibly in future.

Mr. Geng Tan: I guess some of the material in solar panels is polluted or even toxic to human beings. In your opinion, how big is this impact to the environment or to local people?

Mr. Patrick Bateman: There are some materials that are hazardous. It depends on the module type used. For most modules, it's not negligible—because it's important that we deal with this appropriately—but it is quite insignificant. Some types of modules, for instance, use cadmium telluride. It is important that we deal with those appropriately. I would say that if we have responsible measures in place, it's not a major issue, but it's something that is important nonetheless.

Mr. Geng Tan: Okay. Thank you.

I have another question for Mr. Broder.

It is very innovative for your company to change the state of crude oil or bitumen from liquid into a solid form and then change it back to liquid before processing it or refining it, but I'm sure there is a cost associated with changing it from a liquid—for evaporating or whatever—into a solid, and there should be energy needed to make this change.

How do you compare your technology and the conventional technology in terms of the extra cost or the environmental impact because of the extra use of energy?

Mr. Cal Broder: Thank you, Mr. Tan.

Yes, with every process there are going to be extra costs. Just to give you a bit of background on myself, I was an accountant in a previous career for 20 years, so I looked at numbers day in and day out. Going into this process, I looked at the numbers, because if it didn't make sense economically, I wasn't going to waste my time or spend my time on it.

We have two components to our process that are unique. One is that when we run our process, it's strictly 100% electricity with no emissions. That allows us to do two things. We can utilize the process on our heavy oil in Canada, while we can't on anybody else's in the world. At the same time, when we process it with this....

The only way you can do it is by heating it and distilling it and pulling off light ends. Industry has focused on using and burning fossil fuels. We have focused on being electricity-driven, which is a very efficient way to do it, although the industry doesn't believe it because they've used other forms of electricity. That's the extensiveness of our patent. It uses an energy source that becomes much cleaner, and we don't have emissions from it. If we were to run a process, a modified version of this, and become a refining process, which it is capable of doing, it would be the first refinery in the world that would have zero emissions on its production. It would have emissions from the source, which is, say, hydroelectric dams. It could be coal. It doesn't matter. It's the source that's causing the emissions, not our process, so that's the uniqueness.

When I looked at the cost structure and I looked at what industry's is—because I like to look at numbers, obviously—the numbers we can show are substantially lower than what the industry currently has. We're prepared to share those numbers because we're not looking to protect the numbers; we're looking to protect our technology.

● (1720)

The Chair: Thank you.

Go ahead, Mr. Barlow and/or Mr. Weber.

Mr. John Barlow: Thank you very much, Mr. Chair. I'm going to split my time with my colleague from Calgary.

I want to pick up where Mr. Tan had started. I've talked about this before.

Mr. Bateman, you talked about the potential of solar energy. I don't argue that fact. I think there is potential somewhere down the road, but I think it's a long way off. You talked about how much the costs have come down, but for the costs as of right now, I just checked Gridwatch for Ontario. It's 0.3% of Ontario's power source as of right now. It's 10 times more expensive than nuclear and more than 100 times more expensive than hydro.

What is the timeline in terms of getting it to be...? How is it going to help us when we continue to pour billions of dollars into it in Ontario? What is the timeline for solar to became an affordable, reliable option as a Canadian energy source?

Mr. Patrick Bateman: At the utility scale, the largest scale, we see a time in the next few years when it will be competitive on costs with new natural gas and new wind, for example. Literally it's as good as here now, today.

At smaller scales, we're a few years out for commercial and maybe five, seven, or eight years for residential, depending on which province we're looking at.

When we look at more distributed forms of generation, it becomes increasingly difficult to compare on a levelized cost—the price on your bill to the price on your roof—because when it's on your roof, you don't have to pay for any of the wires to transmit it and so on, so it's a little bit of a different value proposition.

To make a long story short, it's becoming increasingly more cost-competitive than I think anybody would have imagined several years ago. Because the time at which it is so cost competitive is so close, it's really time to start preparing with our utilities, with our power infrastructure, and so on, so we don't end up with redundant infrastructure that's not appropriate for the supply mix of the future.

Mr. John Barlow: Thank you.

I'm going to give Mr. Webber as much time as possible.

Thank you, Mr. Chair.

Mr. Len Webber (Calgary Confederation, CPC): Thank you, Mr. Chair.

Thank you for your presentations today. It's an honour to be here; my first time on this committee. I tried to get on this committee, but I ended up on health, which is just as nice, but this is sort of my background. I was the parliamentary assistant for energy for a number of years in the Alberta government. Sitting here with my two colleagues from Alberta, we're very familiar with SAGD, in situ, diluent, and things like that, but I'm really quite interested in this solid oil.

Mr. Broder, you passed around the bitumen. Of course that is something that needs diluent to push through the pipelines. The fact that you don't need a pipeline to transport it is very interesting. It's something that is apparently environmentally okay. If there were a spill, it wouldn't kill the fish. It's easy to clean up.

I just need a little bit more detail and clarification on what exactly.... Maybe you can share with us. You have a way of turning this into a solid oil, and Mr. Tan asked about the costs and environmental impact. You say there are zero emissions from converting this to a solid oil. Maybe you could just clarify a little bit more with respect to the process of going from bitumen to solid oil and then back to bitumen again at the other end.

● (1725)

Mr. Cal Broder: Thank you, Mr. Webber. Thank you, Mr. Chair.

The process has been used for 130 years. It's a distillation process of hydrocarbon, pure and simple. It was invented by the Rockefellers. We take hydrocarbon and we boil it. We add heat to it and we pull off hydrocarbons, light carbons.

What we have found is a way to do it much more efficiently, with no emissions. That process they invented 130 years ago is, for all intents and purposes, being used today. They take hydrocarbon, use natural gas to heat up water, boil the water to create steam, heat up the bitumen or heavy oil, and drive off light product.

We have a process not a whole lot different from that, because ours wouldn't look any different, ultimately, except you wouldn't see anything being burned. We don't burn any gas. We use an electricity form and take our heavy oil and focus on our diluted bitumen, the one that's going through the pipeline. All we need to do—and they do that to a certain extent right now—is pull off the light ends, what's called diluent, the highly volatile chemicals, the light hydrocarbons that are essentially a carbon chain of five or less, pentanes and stuff like that. That product is what creates the problem of transportation, because we have to add so much of it to a barrel. We have to watch out for it when it goes into a tank car.

What we've done is taken a process that was invented 130 years ago and put some New Age technology to it. That New Age technology is strictly 100% electricity. That electricity creates the energy to drive off the light products, which we collect. It's contained within a vessel, so we don't need to lose anything to the environment and we don't need to burn anything in order to make it happen. We're relying on people who are creating that energy for us, and it doesn't matter to us who it comes from. It should be coming from clean sources, because then it will reduce the footprint for us all, but the process was invented 130 years ago.

Mr. Webber, we have really focused on the transportation now. I'll give you an analogy I like to use. You take a pound of butter out of the fridge. You want to use it, so you cut off a piece, melt it, and do whatever you want with it. If you take that piece that you just melted and either put it back into the fridge or back onto the counter, you'll find it goes back to a solid. That butter really is a liquid or a solid.

That's what our products are from Alberta. They've chosen to take a different approach and make them totally liquid all the time. In my opinion, that's wrong, but that's just my opinion. We focus on the product, which is a solid in the ground, and keep it a solid above the ground and for transportation and storage and only turn it into a liquid when we need to put it into a liquid—like that butter—at the refinery.

With that whole transportation nightmare we have right now of moving liquid hydrocarbon, I don't care whose hydrocarbon it is and whose pipeline, there is the potential for a leak, and we have to recognize that. It's the risk that they've taken. However, do we need to take the risk when we have this different product? This is a different product, and it can be a safer product, and we've shown that it is a safer—

Mr. Len Webber: Mr. Broder, what is your barrier, then, to the next stage, to commercialization?

Mr. Cal Broder: Commercialization is a challenge for us because we're a small entity, a small organization. As alluded to by one of the speakers, small and medium-sized enterprises have been the backbone of our economy. They are the growth, but we face different and unique challenges. For instance, you heard from MEG, which is—

The Chair: I'm going to have to ask you to wrap up very quickly.

Mr. Cal Broder: Sure.

You heard from MEG, which has the funds to be able to fund these things, and they can utilize and set aside the funds within the SDTCs and the Western Economic Diversifications. Small firms cannot. We can't do that, so we have a different challenge. Our biggest challenge is funding, bar none.

● (1730)

The Chair: Thank you.

Mr. Cannings is next.

Mr. Richard Cannings: Thank you all for being here.

I would perhaps let Mr. Broder continue a bit. It strikes me that there is some inertia in the industry because we're used to liquid oil, so that's how we move it and that's how we refine it. Where is the inertia the biggest? Is it in the process when we take it out of the ground, in the transportation, at the refinery, or is it all of the above?

Mr. Cal Broder: I think it's a combination. The biggest inertia is we have innovation and we have change, and they're really the same word for the same thing, but the industry I'm trying to get into, the oil and gas industry, is not receptive to change. Change is frightening to people, and that's in all industries. That's where the inertia resides in showing something new.

It was no different from 1903 when the Wright Brothers said they were going to fly tomorrow and everybody said no, they weren't going to. That's the challenge. It's change, and that's what we face, and they do. Everybody faces challenge.

In my speech I alerted you that we have within our government the necessary resources to deal with this. The biggest challenge that we have, and anybody has, is getting through the door to verify and validate our processes. Then once we're through the door, it's how we manage the technology from a security and a protection standpoint, and then how we demonstrate it.

Those are the three challenges we have, and those are the only three challenges I see. Once we can step through some of those doors, the whole thing starts to work. What we face, and probably other industries do, is that getting through the doors to be able to have the conversations on a more intimate and drawn-out basis is difficult, and until we get to that point, we're not going to see the advances and the de-risking that we hope to see as an innovator.

Mr. Richard Cannings: Okay, thank you.

Mr. Bateman, you talked about the grid and how we needed to plan for the future in how we build that grid.

This government is all about infrastructure. I'm wondering if you could perhaps comment quickly on how this government should be working toward a better grid for the future that could include solar and wind and those types of energy.

Mr. Patrick Bateman: Thank you, Mr. Cannings.

I think to make it brief, a lot of investments in our electricity distribution infrastructure are heavily regulated with the public interest in mind. Quite frequently that leads to managing costs in the short term, potentially at the risk and expense of longer-term costs.

I think a role for the federal government could be to use your convening powers and potentially some investment to help to bridge that gap in the near term and to demonstrate some of this unfamiliar technology and demonstrate some of the operability that will be required with more renewables on the grid to help to bring us to the next stage. The cost of sensors in the Internet of things has come down equally or more than solar technology costs in recent years. In terms of cost-effectiveness, we're there today, but taking the next step and forming the partnerships to deliver it, I think, could be the most important next step.

Mr. Richard Cannings: You mentioned some disadvantages we had in Canada in a North American context. I think it was tax structures or other measures.

Mr. Patrick Bateman: That's correct, Mr. Cannings.

Canada had a number of tax measures intended to attract investment in renewable energy, including accelerated depreciation and other ways for junior development companies to offset development expenses. They pale in contrast to what is in existence south of the border. For a decade, they've had an investment tax credit for solar and a production tax credit for wind. They were recently extended for several years as well, and as a result, while companies are taking advantage and while there is some limited success from the existing measures here, they pale in comparison to what's south of the border.

● (1735)

Mr. Richard Cannings: Ms. Petrevan, you talked about procurement and what the government could do in that regard. We've heard from others about how easy it would be to make strides in energy efficiency in new buildings and in retrofitting buildings. Could you perhaps expand on that idea of how the government could become more efficient when it is building new buildings or using its stock of buildings right now?

Ms. Sarah Petrevan: The government has made one notable commitment to greening its operations. When we're talking about it in a carbon framework, it's slightly different from just a general greening, because the government has had a policy on greening procurement for a number of years, I believe since 2006. It's mostly applied to operational procurements, the supplies that government takes in, such as paper, etc., just for its daily operation. However, you can look at buildings and the ability to apply energy efficiency and clean technologies in buildings. You can essentially do it through procurement.

You can say building X. Pick a building on Sparks Street or wherever and say you want to make this building as efficient as possible. You can set out some requirements around budgeting and a few other things. Then you can ask the marketplace to tell you the most effective way to do this. The marketplace will come back to you and say that if your objective is to reduce GHGs in this building as much as possible, they believe it can be done by using these technologies, and this is how much it's going to cost. In that way government can be a demonstration case for new technologies, and if you do it by allowing SMEs to play a role in the procurement process, chances are you will also be capturing a lot of those technologies as Canadian.

When I talk about public procurement, a question that I often get asked about SMEs is if it is trade compliant, and it is. On a number of occasions, both the OECD and the WTO have done presentations on how doing an SME set-aside or allowing them to participate is a great trade-compliant way to spur domestic participation.

I hope that answers your question.

Mr. Richard Cannings: Yes. Thank you.

The Chair: Thank you, Mr. Cannings.

I believe we have Mr. Harvey and/or Mr. McLeod.

Mr. McLeod, you only have a few minutes left anyway.

Mr. Michael McLeod (Northwest Territories, Lib.): Thank you, Mr. Chair. I do have a couple of questions.

Thank you for your presentations.

I had a couple of questions pop up when listening to your presentations. The first one is to Mr. Bateman, regarding your comment that additional investments from the federal government are required.

In our last budget, I think we had over $350 million earmarked for this area. Could you give us a general idea of what you think should be the actual number that needs to be included to top up this budget?

Mr. Patrick Bateman: Thank you for the question, Mr. McLeod.

I would follow up with the committee with further information on that. My comments in my opening remarks were largely with reference to the need to work with industry to focus on programs, design, and implementation. I'd be pleased to bring back some ideas on that front, and also what the associated costs to the federal government would be.

Mr. Michael McLeod: What emerging technologies show the most potential for natural resource development in the future, and for what applications?

Mr. Patrick Bateman: Within solar industry, we're seeing continued refinements of its existing technologies, driving down manufacturing costs and improving performance. A lot of potential exists within improving what we already have.

A number of new photovoltaic materials are in the early stages of development. These are things that, for instance, can be made into paints or can be printed with 3-D printers. These things hold a great deal of potential but are several years away from being commercialized. Those are both with regard to power conversion or power harnessing.

Also there's power electronics, which forms the interface between the generation, the grid, and the network. We've got things like energy storage, which can lend a lot of services to the grid, and then other technologies that do voltage regulation, frequency regulation, grid stability. They take what currently is a generation technology and make it an integral part of how the grid operates and provide services that are required today, even in the absence of these technologies.

● (1740)

Mr. Michael McLeod: Mr. Chairman, I also want to ask a question to Mr. Broder about his comment that we should first define what we're trying to de-risk. We are now studying this issue and we will be making recommendations at the end when we conclude. What would you suggest that we put in as a recommendation in the area that you were talking about?

Mr. Cal Broder: Thank you, Mr. McLeod.

I made some allusion to three things that are really difficult processes for a small innovator. One is to get through the door of who might use that product. For instance, I have a challenge of getting through the door of oil sands companies. I have the challenge of getting through their door because they don't understand what I'm talking about, but I usually don't know who's on the other side of the door, so I need somebody who knows who's on the other side of the door to let me through, and that's very difficult, first of all.

When I do find the means of getting through that door, we have a conversation on what it is that I do. The first thing is that it is a technology. Therefore, there needs to be an intellectual property discussion. The discussion quite often breaks down from the standpoint of their not wanting to sign a confidentiality agreement, but they want me to tell them what it is and how I do it. Well, I can't possibly do that, so that's the second challenge.

The third challenge is really in conjunction with that one, and it is that we need to be able to show that we can do what we say we can do. This industry is really interesting, because 3.2 million barrels a day of bitumen are coming out of the province, going through pipelines, and being exported. We're a small company. We want to buy 100 barrels of bitumen. It's next to impossible for me to buy 100 barrels of bitumen, right? It's next to impossible, so I can't even display and show my process without that association with an oil sands producer.

That leads also into SDTC. I'm not pointing at that, I'm not blaming them, and I'm not making any adverse comments. It's just the way it functions. We go to them and we apply for a loan or a funding mechanism. We can apply for up to, in some cases, 50% if we have a partner as well.

Now we have to set aside that money for up to 18 months, right? We set it aside in a bank account, because we have to show them that we have it at the beginning and we have to show them that at end when they approve it 18 months later. We can't possibly do that as a small or medium-sized enterprise. It's impossible. Others can.

These are some of the challenges we have as SMEs, absolutely. SME innovation is even more difficult because, as I pointed out, it could be 10 or 20 years before there's any income generated. As an SME, that's next to impossible to do.

I was fortunate enough that in my previous life I was an accountant, so I sold my practice, I retired nicely, and I took this on and carried on. I was able to do that differently, but it's a challenge. That's the biggest challenge we have as SMEs: we don't have that unlimited bank account that others do.

Those are four issues that really are the biggest challenge for us. I would suggest that the government, within their group of organizations, start looking at helping SME innovators by at least allowing us through your door to your people to say, “Here's what we have.” Once we show that, sign a confidentiality agreement, because you're not commercializing it. You have no interest in it. That's step two done. I could have that done in a day. On the third day I could have a demonstration with NRCan in Devon. I could have a demonstration with anyone, right?

Those mechanisms are there, but it's just a very convoluted process to deal with. I don't think you need to change anything. We just have to evolve and change how we're doing things and be more active with it.

I hope that answers your question, Mr. McLeod.

● (1745)

Mr. Michael McLeod: Thank you.

The Chair: I have one quick question for you, Mr. Broder. How do you propose to transport the bitumen in solid form from Alberta to either coast?

Mr. Cal Broder: Thank you, Mr. Chair.

It's a very easy process, actually. We have two vessels out there. One is called a DOT-111, which is now prohibited from using hydrocarbon transportation, right? Because of the incidents that we've had with rail in transporting hydrocarbons in North America, we now have the DOT-117s, which are a heavier, bigger product, but our DOT-111s that are out there are safe for this product. There's no flashpoint—

The Chair: Sorry—what is a DOT-111?

Mr. Cal Broder: A DOT-111 is a railcar that you see on pretty much every rail track that transports crude oil. It's a cylinder vessel that they fill up with oil. They move it from one location to another.

The Chair: So the answer is rail.

Mr. Cal Broder: The answer is rail, absolutely.

The Chair: All right—or a truck, I suppose.

Mr. Cal Broder: We can also move it in a shipping container, because that shipping container becomes that new transport vessel as well. We have the ability to take that product, bitumen, put it into a shipping container as a liquid, let it set up as a solid, and move it to the west coast. We've talked to Minister Carr's office. We don't fall within that new mandate.

The Chair: But the shipping container would have to go by rail or truck as well.

Mr. Cal Broder: Correct.

The Chair: Okay, so the answer is rail or truck.

Mr. Cal Broder: In the end, yes.

The Chair: All right. Thank you.

Unfortunately, we're out of time. As you can see, we could go on for some length. We're very grateful to all three of you for taking the time to be here or to participate, as the case may be. Thank you.

The meeting is adjourned.