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Chair

Mr. Leon Benoit

Standing Committee on Natural Resources

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● (1105)

[*English*]

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

We'll go to Mr. Calkins.

Mr. Blaine Calkins (Wetaskiwin, CPC): Mr. Chair, last meeting we were in the middle of a debate on an amendment proposed by my colleague Mr. McKay, and we didn't have an opportunity to hear from witnesses. I don't want to see that happen again at this meeting. To ensure that we're able to hear from witnesses who have come here today, I move that the debate on the motion to study the economic impact of Alberta's energy sector be suspended until 12:45 today.

The Chair: Let's go to a vote on that motion.

Go ahead, Mr. McKay.

Hon. John McKay (Scarborough—Guildwood, Lib.): I appreciate the earnestness of the honourable member in respecting witnesses. It's a pity it didn't apply to last week, when I believe Mr. Julian wished to have the debate on the original motion moved to the end of committee business. That was apparently not such a good idea on Tuesday. Actually, I thought Mr. Julian was right.

In light of my respect for the witnesses and not wishing to expose them to the circus that occurred last Tuesday, I support Mr. Calkins' motion.

The Chair: Thank you, Mr. McKay.

Is there any debate on the motion?

Go ahead, Mr. Julian.

Mr. Peter Julian (Burnaby—New Westminster, NDP): I just want to compliment Mr. Calkins for finally seeing that what we thought on Tuesday was the logical course of action, which is that motions be brought at the end and not at the beginning of a committee meeting. We flagged it in the NDP official opposition. I know that my Liberal colleague flagged it as well. We asked why you were bringing it forward right at the beginning of the meeting, because we had to hear the witnesses.

It turns out, Mr. Chair, that the two-hour debate was kind of pointless. Now Mr. Calkins, I understand, has understood that motions like this should be discussed at the end, out of respect for the witnesses. I certainly appreciate that he's seen the light. It would have been better, Mr. Chair, if he'd seen the light on Tuesday. We would have been able to hear from those terrific witnesses we had before us, but I compliment him on finally understanding what the logical course of action was on Tuesday, and it certainly is the logical course of action today. We'll certainly be supporting his motion.

The Chair: Can we get to the vote so we can hear the witnesses?

We'll go to Mr. Anderson.

Mr. David Anderson (Cypress Hills—Grasslands, CPC): I have just one more point, Chair.

Notwithstanding the fact that multiple motions have come forth at the start of meetings, we're ready to go to the vote, Mr. Chair.

The Chair: Go ahead, Mr. McKay.

Hon. John McKay: I sincerely hope that 15 minutes will be sufficient to cover off all the motions I have in my hand. I'm quite looking forward to that 15 minutes.

Thank you.

The Chair: Go ahead, Monsieur Gravelle.

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

I also have a motion I'd like to discuss at the end of the meeting.

The Chair: Mr. Gravelle, you won't get to your motion if we're debating the other motion.

Mr. Claude Gravelle: Maybe we can get lucky and debate two.

The Chair: I hope so.

Go ahead, Mr. Anderson.

Mr. David Anderson: It's just a point of order.

We can't be studying two motions at the same time, so let's just go to a vote.

The Chair: Let's go to the vote, then.

(Motion agreed to)

The Chair: Let's get to the witnesses.

Thank you all very much for that.

We're continuing our study on innovation in the energy sector. We have with us today here in the room, from Gradek Energy, Thomas Gradek, president. From Titanium Corporation we have Scott Nelson, president and chief executive officer.

By video conference we have, from Edmonton, Alberta, from Alberta Innovates Technology Futures, Brent Lakeman, general manager, and Mary Pat Barry, vice-president of communications. Welcome to you.

Also by video conference, from Paris, France, from the International Energy Agency, we have Keisuke Sadamori, director of energy markets and security; Adam Brown, energy analyst, renewable energy division; and Anne-Sophie Corbeau, gas analyst. Welcome to all of you from Paris, as well.

One of the witnesses isn't at the table yet. Often we have delays getting into the building, so we will start with the second witness on the list today, who is Scott Nelson, president and chief executive officer of Titanium Corporation.

Would you go ahead with your presentation, sir, for up to 10 minutes? Again, thank you very much for being here today.

Mr. Scott Nelson (President and Chief Executive Officer, Titanium Corporation): First of all, thank you, Mr. Chairman and committee members, for the opportunity to appear today to describe a “made in Canada” solution to one area of oil sands tailings. Our technology will dramatically reduce emissions and recover bitumen, solvents, and valuable minerals currently being lost in tailings ponds.

Canada has a unique opportunity to create a new minerals export industry. Our company, Titanium Corporation, is federally incorporated and listed on the Toronto Stock Exchange. Our people hold advanced degrees and have deep experience in the oil sands and mineral sands industries.

Over the past seven years, our team of scientists has developed innovative technology solutions that remediate one of the most complex oil sands tailings streams, called froth treatment tailings. Our company holds six patents, and our technology has been prioritized and ranked in the top 20 technologies in the recent oil sands industry COSIA technology road map. The Alberta government is developing a new fiscal regime to support the production of minerals from oil sands and the recovery of bitumen from tailings.

Our shareholders have invested more than $50 million in developing these technologies, and government has invested more than $10 million, including $6.3 million of Canadian government Sustainable Development Technology Canada grant funding. Over the past three years, SDTC support has been highly valuable and instrumental in our success.

Our scientists have worked with the leading research and testing firms in Canada and the United States to find solutions, rigorously test them, and bring these technologies to commercial readiness. We have followed a highly disciplined program, involving more than 20 R and D projects with 12 expert organizations.

Before I describe the outcomes and benefits, I would like to briefly explain the oil sands tailings area we are dealing with.

We are working in the mining oil sands sector, in which large volumes of ore are truck-and-shovel mined. A hot water process separates the bitumen from the ore and creates large volumes of fluid tailings—sand, water, and bitumen. This process produces an intermediate product called bitumen froth.

After the extraction process, the bitumen froth is sent to another process, called froth treatment. In this process, a hydrocarbon solvent such as naphtha or condensate is mixed with the froth to remove the remaining bitumen and sand, creating a final bitumen product for upgrading on-site to light synthetic crude oil or for dilution and pipelining to refineries that can accept heavy crudes.

As in any large industrial process, there are small percentage losses after processing. However, due to the massive volumes of material processed by the oil sands, even small percentages amount to very significant values. The tailings from the froth treatment process contain losses of 2% to 3% of the original bitumen, lost solvent, and valuable heavy minerals. Today, all of the tailings streams discharge to tailings ponds, where the solvents and bitumen cause VOCs—volatile organic compound air emissions—and GHGs. The minerals are lost in the tailings ponds.

Our primary interest in the oil sands has been recovering minerals and creating a new minerals export industry for Canada. Along the way, we saw the opportunity to also recover hydrocarbons, which would reduce environmental impacts and create another value chain.

The benefits of implementing our technology at the oil sands mining sites, based on today's production volumes, are very significant for Canada. We would create a new minerals industry exporting 170,000 tonnes per year of zircon to Asian markets, valued at $425 million annually at today's prices. Some 28,000 barrels per day of bitumen that are being lost in tailings ponds would be recovered, at a value of $700 million per year. In total, this means more than $1 billion of additional resource recovery and more than $400 million of associated taxes and royalties to governments.

In the next decade, at projected growth rates for the mining sector, the annual value of additional resource recovery with our technology would surpass $3 billion per year. The environmental benefits are equally impressive. Recovering lost bitumen and solvents would eliminate 80% or 60 kilotonnes per year of volatile organic compound emissions from oil sands extraction and would reduce GHGs by 5.6%, or almost one megatonne per year of GHGs.

● (1110)

After our technology removes the hydrocarbons and minerals, the water from these tailings streams can be used for other services in the oil sands that currently use fresh river water. River water usage could be reduced by a further 25%. All of these outcomes have been validated by independent analytical and engineering firms.

Following recovery of commodities by our technology, the residual tailings will thicken much faster than at present, and the requirements for thickeners or polymers are less than for the other thickening methods.

Titanium Corporation has become expert in heavy minerals, and we see an exciting opportunity for Canada to enter international markets. Our management team has made numerous visits to Asia and to the world's largest and most rapidly growing markets in China. We have a vice-president stationed in Brisbane, Australia, the heart of the minerals production and technology industry, where we conduct our minerals testing with expert partners. We plan to first produce zircon, due to its relative higher value, and later on produce titanium. Zircon is primarily used to make ceramic tiles and other products that we use in everyday life. Zircon currently sells for $2,400 per tonne versus mined titanium, called ilmenite, which is valued at $300 per tonne.

We have completed the detailed R and D and demonstration piloting required to commercialize the three naphtha-based oil sands operations: Syncrude, Suncor, and CNRL. Over the past two years we conducted a $15 million demonstration pilot at CanmetENERGY for these firms.

Based on third party engineering cost estimates, facilities to recover minerals and lost bitumen at a large oil sands site are approximately $400 million. At these cost levels, the capital and operating costs of recovering lost tailings bitumen are one-third the cost of newly mined bitumen of similar volumes. The conclusion here is that innovative technology that recovers products from waste is highly efficient. This is the low-hanging fruit that many industries are harvesting.

We have a unique opportunity to move Canada's oil sands to the forefront, from a widely criticized and defensive position to a leader in innovation and recovery of value from waste.

Following the completion of our demonstration pilot last year, we have provided detailed technical reports to all of the participating oil sands firms, government agencies, third party independent experts, and other stakeholders. All agree that together with our industry, research, and independent partners, we have taken all measures to demonstrate the strong performance of our technology.

Despite the compelling benefits, industry has not moved forward with the first project, and we are concerned with the delays. The reasons for delays can vary, including regulations that focus on tailings volume reduction but not on recovery of any valuable products, no regulations around VOC emissions, concerns about the risks of new technologies, lack of resources in the oil sands for new projects, and a focus on operational reliability.

We fully understand these business pressures. However, there is a window of opportunity to create a minerals industry for Canada, to resolve an area of environmental concern, and to improve resource recovery.

In light of delays, we have been reaching out to stakeholders to inform you of our work, our success, and the opportunities that are now available. We have developed relationships with large international mining markets and customers for minerals, bringing them to Canada and the oil sands. They are keen to participate, but need to see willingness here in Canada by stakeholders to move forward.

Canada's energy sector is facing serious challenges, including growing new oil and gas supplies in the United States, opposition to pipeline projects to export markets, and price discounts affecting higher-cost crudes, particularly the oil sands. Canada's oil sands industry is the subject of widespread environmental concerns, threatening the industry's social licence to operate.

These issues combine to threaten Canada's future development of our energy resources and the country's economic prosperity. Projects like Titanium's address a number of these issues and must be moved ahead rapidly with support by government stakeholders.

We appeal to government, already invested in our successful R and D and demonstration piloting as a stakeholder, to lend your support to develop a collaborative venture to move the first project forward.

We believe there is a role for the ministries of natural resources, environment, and perhaps international trade to facilitate a new industry for Canada for the benefit of all Canadians.

● (1115)

I'd like to thank you for the opportunity to appear before the committee, and I look forward to any questions you may have.

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

While we're waiting for the first witness on the agenda to get here, we will go by video conference to Edmonton, Alberta, and to Alberta Innovates Technology Futures.

Brent Lakeman is the general manager, and Mary Pat Barry is vice-president of communications.

Go ahead with your presentation, please, for up to 10 minutes.

Thank you very much for being with us today to give us this information.

Mr. Brent Lakeman (General Manager, Alberta Innovates Technology Futures): Good morning, committee members.

I would like to thank the standing committee for inviting Alberta Innovates Technology Futures to present before the standing committee. I would like to send the regrets of our president and CEO, Mr. Stephen Lougheed, who is unable to be here today due to other commitments.

I'm pleased to see that the standing committee is reviewing the topic of innovation in Canada’s energy sector. This is a very important topic for my organization and for the Alberta government. While I will be speaking today on the topic of CO_2 capture and storage, Alberta Innovates Technology Futures, or AITF, is actively advancing a wide range of technologies to support environmentally sustainable energy production.

Briefly, part of the Alberta Innovates system, Technology Futures, comprises over 600 staff in five research facilities in Alberta. We undertake technical services and strategic research as well as the development and commercialization of technologies. We also administer programs designed to attract technical and scientific talent to Alberta and fund other academic institutions to stimulate research in emerging areas, including nanotechnologies, information and communication technologies, and “omics”.

AITF currently manages over $160 million in total revenue. We provide grants to universities and other institutions, undertake contract research work, and work with a wide range of clients, including industry, government organizations, and not-for-profit institutions.

Technological innovation has been a fundamental component of Alberta’s energy sector for over a century. The province’s early investments in science and research resulted in Dr. Karl Clark's developing the hot water process for oil sands extraction in 1921, a process that became the foundation for the first commercial oil sands project in 1967.

After commercializing the hot water process, Alberta recognized the need to invest in technologies to unlock the remaining oil potential found in Canada’s oil sands resource. In 1974 the Alberta Oil Sands Technology and Research Authority, AOSTRA, was created. AOSTRA pursued a range of technologies, including steam-assisted gravity drainage or SAGD, that have been instrumental in developing deeper in situ oil sands resources.

SAGD had marked advantages over earlier technologies. It enhanced bitumen recovery rates by up to 45%, significantly lowered natural gas—

● (1120)

The Chair: Mr. Lakeman, unfortunately we've lost the link to you. I don't know whether you can hear me, but we can't hear or see you.

We will go to the next group of witnesses and come back to you when we get the technology fixed. Speaking of new innovation and technology, we have glitches from time to time.

We will go now by video conference to Paris, France. From the International— Just put that on hold.

Can you hear me now, Mr. Lakeman?

Mr. Brent Lakeman: I can hear you. I am not sure when you lost us.

The Chair: It was about one minute ago, probably.

We will let you continue. Go ahead, please, Mr. Lakeman, with your presentation.

Mr. Brent Lakeman: Sure.

I'll move to carbon management.

Just as the province was a champion and an investor in oil sands technologies, Alberta has also been a leader in advancing the global adoption of carbon management technologies, including CO_2 capture and storage. It was through the innovation and foresight of scientists in Alberta that CCS, or CO_2 capture and storage, was identified as a key technology for carbon management and value-added resource recovery. As other nations started to investigate this option, the International Energy Agency estimated in 2008 that CCS could lead to approximately 17% of the global emission reductions necessary to prevent dangerous levels of greenhouse gases in our atmosphere. Alberta's work in this area, which dates back to the late 1980s, contributed to building the base of support in industry and government that has led to significantly larger-scale demonstrations, complemented by a supportive regulatory framework.

Currently, Alberta and Canada are regarded internationally as the leading jurisdictions for advancing CCS technologies in a timely and effective manner. What do these two examples have in common? They demonstrate the value of early investments in key technical capabilities; a collaborative approach involving industry, government, academia, and other stakeholders; and the wisdom of a clear road map and vision in unlocking the potential of these resources and technologies.

Before I get into the specific innovation topics the committee is exploring, I would like to summarize the process known as CO_2 capture and storage, or CCS.

While the focus is typically on the capture, transport, and storage of carbon dioxide associated with industrial facilities, it is important to remember that the process for converting the resource—coal, bitumen, oil, or natural gas—into useful energy, such as electricity, greatly influences the technologies and costs of CO_2 capture.

For example, a coal gasification process will result in a high-purity and high-pressure stream of CO_2 that can be captured relatively easily. Conventional coal combustion technologies used for power generation, while lower cost, result in low-purity and low-pressure CO_2 streams that require more expensive CO_2 capture systems.

Depending on the nature of the CO_2stream, different technologies can be used to capture it, including conventional amine chemical-based systems. Emerging capture technologies include the use of membranes and solid absorption, and other technologies. Over the past decade there has been a global effort to develop new approaches for CO_2 capture that are less costly and less energy-intensive than the current amine processes.

The CO_2 enters a pipeline, where it is transported for storage in a geological formation or utilized for value-added resource recovery. Formations where CO_2 is injected are at least one kilometre underground, beneath several layers of non-permeable caprock. The formation may be a deep brine formation or a depleted oil and gas well, an underground coal seam, or an existing oil reservoir. Each formation will have undergone a detailed geological characterization. As with other similar industrial practices, companies model the expected behaviour of the CO_2 and undertake surface and subsurface monitoring to verify that the CO_2 is behaving as predicted.

It is important to recognize that in addition to the technological issues related to CCS, there are a variety of important socio-economic factors that must be taken into consideration, including public and stakeholder perspectives and financial and economic analysis, all of which can be as important to a project as the technical details.

Canada has built its leadership in CCS literally from the ground up. Recognizing that one can't import geology, Canada has based its leadership on the country's significant geological endowment. The western Canadian sedimentary basin, spanning the four western provinces, is truly a world-class location for CO_2 storage. The same geological forces that have provided Canada with vast amounts of oil and natural gas and coal also provide value-added opportunities for using CO_2 as well as for storing it in a safe and permanent manner. Our geological expertise around CO_2 storage and other similar applications is sought out from around the world, with our experts collaborating with leading international organizations in advancing CCS technologies.

Our leadership is also a reflection of the extensive regulatory framework that has been established to manage oil and gas development in Alberta. Because Alberta has had the foresight to develop regulatory expectations related to applications such as CO_2 enhanced oil recovery and acid gas injection, the province has been able to move forward in a clear and logical manner in the regulation of future CCS projects. Alberta's CCS regulatory framework assessment process, which will soon be delivering recommendations back to government, is providing leadership to other jurisdictions from around the world that are now starting to advance their own CCS projects. As well, Alberta experts have made contributions to a new CCS standard recently developed through the Canadian Standards Association.

Alberta's leadership comes from the collaborative approach the province has taken in engaging industry, the academic sector, and government. This approach has been used by organizations such as Carbon Management Canada, which pulls together 27 research institutions from across Canada to pursue interdisciplinary research related to CCS.

● (1125)

Much of our focus is on key industry sectors, such as oil sands producers searching for carbon management solutions. While the costs of CCS technologies will be higher in the oil sands sector due to the dilute nature of much of its CO_2 emissions, reducing capture costs will result in an acceleration of the deployment of CCS technology in this sector.

Where should we focus our efforts? With respect to CCS, the issue is not necessarily one of research but of accelerating commercial deployment of integrated CCS systems to reduce costs for greater economy of scale deployment. Globally this has been challenging, as the focus has been on integrating CCS into the coal-based power generation sector, a typically risk-averse sector. The situation is further complicated in North America, where low-cost natural gas resources have deferred investment in CCS demonstration projects.

Since 2008 there has been a global effort to acquire practical experience with CCS through commercial or near-commercial demonstrations. In Alberta, the Quest project at the Shell Scotford upgrader and the Alberta Carbon Trunk Line that will take CO_2 from the proposed North West upgrader in Fort Saskatchewan are being closely watched. In Saskatchewan, the Weyburn CO_2 EOR project has been a leading example of CO_2 injection for over a decade, and the proposed aquastore project will allow for CO_2 capture and storage associated with SaskPower's coal-fired power generation facility at Boundary Dam.

CO_2 capture costs remain significantly higher than costs of CO_2 compliance. For example, while Alberta has a CO_2 charge of $15 per tonne for CO_2 emissions above regulated levels, the cost to implement CCS at an in situ oil sands project may be more than $150 per tonne of CO_2. I put together a chart that's prepared by Alberta's CCS Development Council, which shows the gap between CCS costs and the benefits of action, including avoided compliance costs and the sale of CO_2 for value-added activities.

Industry and governments are investing in a range of alternative technologies for CO_2 capture, and some of them will ultimately drive down capture costs, but the challenge is enormous. In Alberta, organizations such as the province's Climate Change and Emissions Management Corporation, known as CCEMC, have recently invested in several projects aimed at driving down CO_2 capture costs.

In the short to medium term, what is required is an economic driver encouraging CO_2 use, such as the production of more oil from depleted formations or the production of new products with existing markets. While CCS represents a backstop technology that can be turned to when no other options are available, it would be preferable to find ways to make use of CO_2 so that it ultimately does not need to be captured at a high cost and stored in geological formations.

Finally, we should not forget about building greater public understanding and confidence. In certain jurisdictions like Alberta, there is a strong history and good understanding of subsurface operations such as oil and gas operations. In many other jurisdictions, however, there is a degree of public fear and distrust about this technology. For example, the Netherlands has recently seen public opposition result in the cancellation of several industrial CCS projects.

● (1130)

The Chair: Excuse me, Mr. Lakeman.

Mr. Lakeman, your 10 minutes are up. You're passed that time. If you could wrap up in 30 seconds or so, it would be very much appreciated.

Mr. Brent Lakeman: Sure, okay.

In conclusion, it must be remembered that while CCS is viewed by the research community as a key approach for reducing global greenhouse gas emissions, it should not be regarded as a silver bullet for all sectors or all jurisdictions. CCS needs to be viewed as part of a larger set of greenhouse gas management tools. Without having CCS in the tool box, the cost of the other tools becomes significantly higher. Lowering overall carbon management costs and increasing overall system effectiveness ultimately require an approach whereby biomass and other renewable energy sources, coupled with innovative energy storage technologies, are integrated with CCS systems.

In conclusion, we have seen great progress in advancing CCS technologies over the past 20 years. While progress has slowed since 2008, Canada remains a leader, with three to five major demonstration projects planned over the coming years. It is important to continue and enhance our leadership role to realize further economic benefits as we help other nations advance the technology and as we continue to drive down costs and ultimately identify more opportunities for CO_2 utilization.

Thank you very much.

The Chair: Thank you, Mr. Lakeman and Ms. Barry, from Alberta Innovates Technology Futures.

We will go now by video conference to Paris, France, to the International Energy Agency and Keisuke Sadamori, director, directorate of energy markets and security; Adam Brown, energy analyst, renewable energy division; and Anne-Sophie Corbeau, gas analyst.

If you would, go ahead, please, with your presentation of up to 10 minutes, and again thank you very much for being here with us today and giving us the information that you have.

Mr. Keisuke Sadamori (Director, Directorate of Energy Markets and Security, International Energy Agency): Thank you, Chairman, for giving us the opportunity to talk about natural gas, oil, energy efficiency, carbon capture and storage, and renewables.

First let me focus on the natural gas. Canada has been exporting natural gas to its southern neighbour for decades, and until the end of the last decade, nobody expected that trend to change. On the contrary, U.S. gas production was seen by many as stagnating and ultimately declining. Mexico was slowly turning into an LNG importer.

Then the shale gas output in the United States was multiplied by a factor of 10 between 2005 and 2011, and this changed everything. Canada's gas exports to the United States declined abruptly, leading to a 30-bcm drop in production from 2005 to 2011, to 160 bcm. More important, since 2011 the United States has been pushing more gas towards its two neighbours because of the oversupply in its own market.

Mexico is importing less LNG and more Henry Hub indexed gas from the United States. The worst may still be coming as Marcellus, the prolific shale player in the northeast of the United States, is just at the beginning of its development.

But Canada has gas, conventional and unconventional. Tight gas has been produced for a long time, while shale gas is still in its infancy. The only problem is that this gas, once the transport costs to bring it to the United States are added, may no longer be competitive enough against U.S. natural gas production.

Additionally, there are concerns regarding the environmental impacts of developing shale gas, but shale gas can be produced in a way that respects the environment, as our recent report, "Golden Rules for a Golden Age of Gas", demonstrated.

In order to stabilize gas production and revenues from gas exports, Canada should look at other markets. There is only one solution—LNG exports. Japanese, Korean, and Chinese companies have been acquiring assets on the west coast of Canada to bring the gas back home. Two of these projects have been given authorization to export.

These projects have one crucial advantage: they are better located than the U.S. projects, most of which are located in the Gulf of Mexico. Many U.S. LNG projects are based on existing LNG import facilities, so the investment costs will be lower. The U.S. greenfield projects, however, will not benefit from this advantage. Similarly, most new planned LNG projects in the world in Australia, Papua New Guinea, Africa, and Russia will be greenfield projects, and their development costs will depend on the specificities of the LNG projects.

Finally, there is the question of the price at which this gas will be exported, or rather of the indexation, oil or spot. The only LNG project recently sanctioned in North America, Sabine Pass, will be based on Henry Hub indexation, but it is sourcing its supply on the wider U.S. gas market, while the Canadian LNG projects will depend on the more dedicated—and still to be developed—sources of gas supply in western Canada.

International oil companies involved in these LNG export projects may prefer the traditional oil indexation, similar to what has taken place in Australia, but if Asian buyers are involved in the project, they may push towards spot indexation, either Henry Hub or its Canadian brother, AECO. Unlike in North America and Europe, there is no spot price in Asia. The IEA has been recently working on a report looking at how a spot market could be developed in Asia. This report will be issued in early 2013.

Second, there is oil. Canada is also an oil-rich country. Let us now have a look at the development of oil resources, notably oil sands.

In the medium term, the production of oil sands is expected to increase by 1.1 million barrels per day to 4.6 million barrels per day by 2017. Increasing volumes of Canadian bitumen production will still find their way to U.S. markets as heavy oil refining capacity is added, but Canadian producers will have to seek new markets and new transport solutions.

Looking forward, there are clearly political and local constraints to expanding, reversing, and/or building new pipelines. It is clear that Canada, along with the provinces, is looking for new options, but in the meantime output is rising quickly. Tight pipeline capacity is one of the major reasons that Canadian crudes are priced at a discount to WTI, but the spike in the discounts has hurt Canadian producers' bottom line this year, and companies are now openly questioning to what extent they will remain a fixture in the market in 2013 and the medium term.

● (1135)

Canadian oil sands are set to play a key role in the medium term by raising the non-OPEC supplies by an additional 1.1 million barrels per day. That's the second-largest source of growth among the non-OPEC countries besides the United States, but Canada's projects will compete for financing, labour, and takeaway capacity with the rising output of tight light oil in the United States. As a result, these constraints and market dynamics are expected to delay around 200,000 to 300,000 barrels per day of Canadian oil sands output to beyond the 2017 timeframe.

Canada should be commended for its proactive approach to improving the social licence to produce from world-class oil sands resources. Now the challenge moves outside Alberta. The solutions of minimizing environmental and social impacts are based on technological and process innovation, and I want to recognize and commend the efforts industry is making in these areas, especially through such collaborative efforts as COSIA, but I urge industry to redouble those efforts and I remind you that the onus is on producers.

My point with regard to responsible unconventional oil and gas production is simple. This is not just good PR, it is good business. It is in all our interests that these industries remain healthy and welcome to operate.

Third, let me turn to energy efficiency. The release of the *World Energy Outlook* this month highlights the vast scale of what we call “the hidden fuel”, the energy efficiency. Despite the vast scale and high economic returns, it's not always easy to engage all the different consumers and decision-makers in the imperative to improve energy efficiency.

Canada has higher energy intensity, adjusted for PPP, than any IEA member country. This is largely due to its concentration of output in energy-intensive sectors: cold climate, large distances, and high standard of living. Final energy consumption has grown continuously over the past decade, though at a lower rate than the economy as a whole.

Canada's energy intensity, adjusted for PPP, has declined on average by 1.4% between 1990 and 2009 due mainly to the energy efficiency improvements, and this improvement in energy efficiency, led by the Office of Energy Efficiency at Natural Resources Canada, is the progress IEA is delighted to see.

Canada has strengthened energy efficiency policies across all sectors—industry, buildings, transport, and utilities—in the past two years. In July 2011 Canada’s energy ministers agreed to a collaborative approach to energy with a companion action plan. Specific areas covered by the plan include a more stringent model energy code for buildings, a next-generation energy rating system for homes, project financing tools, transportation, product regulation, and industrial energy management standards.

Fourth, let me turn to carbon capture and storage, CCS.

Canada has been actively supporting and developing carbon capture and storage technologies, both on a federal and a provincial level. The provinces of Alberta and Saskatchewan especially have been at the forefront of development. Saskatchewan is host to one of the best-known CCS projects in the world in Weyburn, successfully combining the long-term storage of CO_2 and enhanced oil recovery with CO_2. The main power utility in the province, SaskPower, also has a large power sector CCS project under construction. Furthermore, with significant financial support from the Province of Alberta, Shell has recently announced its investment decision on a new CCS project called Quest, linked with oil sands development at a large upgrader facility. Alberta has also put a lot of effort into developing a comprehensive legal framework to cover various aspects of storing CO_2. The IEA welcomes Canada’s leading efforts in the field of CCS.

● (1140)

Fifth is renewable energy.

Renewable energy is playing a large and growing role in Canada's energy mix. Canada's power system already relies to a great extent on hydro power and accounted for almost 59% of total generation in 2011. This large hydro power potential should be further developed over the medium term. Known hydro power renewable developments are expected to take place mostly in solar PV and onshore winds, with Ontario and Quebec providing the largest growth. In 2011, cumulative installed capacity in Canada stood at 560 megawatts for solar PV and 5.3 gigawatts for onshore winds, mostly located in these two provinces. From 2011 to 2017, growth in these two technologies is expected at 3 gigawatts and 9 gigawatts respectively.

The IEA's 2009 in-depth review recommended that Canada develop a long-term policy that integrates renewable energy into the overall national energy strategy while taking into account the geographic, geological, and resource differences between the provinces and territories. It stressed the need to remove and overcome non-economic barriers as a first priority to improve policy and market functioning while having regard to Canada's unique national circumstances. The IDR called on Canada to commit to long-term, effective, and predictable support mechanisms in order to provide developers and investors with a stable regulatory framework. It also urged the government to develop more ambitious programs to facilitate the use of renewable electricity generation, microgeneration, and heating in geographically isolated regions in order to offer an alternative to the consumption of petroleum products. Many of these messages are still relevant today and for the outlook over the medium term.

Thank you very much.

● (1145)

The Chair: Thank you, Mr. Sadamori, for your presentation.

Again from the International Energy Agency, we go to our final presenter today so we can get to questions and comments from members of the committee.

From Gradek Energy Incorporated, we have Thomas Gradek, president. Welcome, sir, to our committee.

Go ahead with your presentation. You have up to 10 minutes.

Mr. Thomas Gradek (President, Gradek Energy Inc.): Thank you, Mr. Chair, Hon. Mr. McKay, and distinguished members of Parliament.

I thank you for inviting me to make a presentation on Gradek Energy Inc.'s technology.

Imagine if we had the technology to clean up tailings ponds. Imagine if Canada could extract oil sands without creating a tailings pond. What if we had a new technology?

Gradek Energy Inc. is an innovative cleantech company that has designed an energy-efficient, reusable, environmentally responsible, hydrocarbon separation technology that can be used to assist the Canadian oil sands industry achieve its ultimate goal, which is sustainable production growth, together with reclamation and restoration of operating sites in a timely and cost-efficient manner.

Gradek Energy Inc.'s pilot plant has proven that its proprietary RHS process is capable of treating tailings by separating hydrocarbons from solids while recovering valuable bitumen and recycling warm process water.

According to an independent study conducted in July 2010, the Oil Sands Research and Information Network estimated that in 2008, about 750 million cubic metres of tailings existed within Alberta's tailings ponds. The study predicts that if there is no change in tailings management, the inventory of fluid tailings is forecast to reach one billion cubic metres in 2014 and two billion cubic metres in 2034. The growth in tailings volumes attest that current technologies have not been successful in meeting the criteria and objectives as outlined by directive 074 of the Energy Resources Conservation Board and by the Canadian Environmental Assessment Agency.

The criteria and objectives can be summarized as follows: to minimize and eventually eliminate long-term storage of fluid tailings in the reclamation landscape; to maximize intermediate process water, recycling it to increase energy efficiency and to reduce freshwater import; to minimize loss of valuable resource associated with tailings ponds; to create a trafficable landscape at the earliest opportunity to facilitate progressive reclamation; to eliminate or reduce containment of fluid tailings in an external tailings disposal area during operations; to reduce stored process-affected waste water volumes on site; and to ensure that the liability for tailings is managed through reclamation of tailings ponds.

The Pembina Institute and the Water Matters Society of Alberta conducted a review of the submitted tailings plans. They found that only two of the nine mine projects would meet the requirements for the regulations to reduce toxic tailings starting in 2011. The proposals for the other seven projects would not meet the targets for reducing tailings by 2011. Furthermore, a number of project proposals indicated that they would not meet reductions until 2023, and would not meet rules for developing solid surfaces for over 40 years.

This reality will have a direct negative impact on the perception of sustainable energy development in the Canadian oil sands. Gradek Energy Inc. can mitigate this by deployment of its technology to help Canadian oil sands operators meet criteria and objectives as outlined by directive 074, the Energy Resources Conservation Board, and the Canadian Environmental Assessment Agency.

The reusable hydrocarbon sorbent technology is an organic bipolymer bead that allows instantaneous hydrocarbon recovery upon direct physical contact without the need for any catalyst or chemical reaction. I have brought with me some samples in order to show you the process. The attraction of hydrocarbons to the RHS beads is strictly a physical attraction, causing no alteration to the absorbed hydrocarbons, thereby providing the perfect transport medium to extract hydrocarbons from any stream with minimal energy requirements.

In June 2010 Gradek Energy Inc. commissioned, in collaboration with a major Canadian oil sands operator, a three-and-a-half tonne per hour pilot plant to test the proprietary bitumen recovery process using RHS bipolymer beads. The pilot plant is located in the heart of the Montreal East petrochemical refinery district. The pilot plant benefits from access to qualified petrochemical expertise and a full-scale bitumen laboratory, including monitored security and established best safety practices. The facility currently employs seven full-time specialized workers and carries out research and development for advanced testing and process improvement.

The pilot plant is currently processing over 300 cubic metres of Alberta oil sands tailings. Based on pilot plant test results to date, Gradek Energy Inc.'s bitumen recovery process has achieved the following results: greater than 98% bitumen and total petroleum hydrocarbon recovery; 95% naphthenic acid reduction; over 60% of process-affected water is recyclable, and at a high temperature; high confidence of the economic viability of the business model; and feasible scale-up designs and performance.

On conclusion of the pilot test protocol, Gradek Energy Inc. will build a 500-ton-per-hour commercial prototype of the RHS bitumen recovery process in Alberta. Gradek Energy Inc. has attracted international recognition, and, in pursuit of a bold vision, has formed a strategic collaboration with Veolia Water Solutions and Technologies North America and BASF Global, which are keen to contribute their extensive expertise in engineering, testing and design, project management, and construction and operating experience to ensure operational success of the commercial prototype.

● (1150)

BASF is the world’s leading chemical company, employing over 111,000 employees in 370 production sites worldwide and serving customers and partners in almost all countries of the world. Veolia is a wholly owned subsidiary of Veolia Environnement, a publicly listed company on the New York and Paris stock exchanges with a $5 billion capital market, operating in 69 countries with 96,650 employees.

In summary, Gradek strives to become the partner of choice to the Canadian oil sands industry for the provision of tailings management services. The near-term objective is to offer a sustainable solution for tailings management that will favourably position the Canadian oil sands on the international scene. Gradek’s hydrocarbon recovery process translates into significant value added by allowing Canadian oil sands operators to increase bitumen production in an environmentally sustainable manner by transforming tailing stream waste into a clean and alternative energy source.

The main challenges and barriers to innovation, development, and deployment of Gradek technology have been determined to be access to necessary financial and human resources to bridge technology from development stage to commercial deployment, collaboration and alignment between industry operators and technology providers, and timely access to tailing ponds. As well, the Canadian renewable and conservation expenses program has not evolved to consider the growing importance and visibility of the Canadian oil sands industry and does not encourage innovation regarding waste heat recovery, water conservation, and resource maximization.

The role of the federal government to foster innovation and deployment would be to adapt the CRCE to incorporate investments in innovation regarding Canadian oil sands tailings reclamation; to formulate policy and metrics to recognize the transformation of extracted bitumen from Canadian oil sands waste tailings into a clean alternative energy source; to play a proactive role in promoting the adoption of innovation to achieve internationally recognized low carbon fuel standards; to level the playing field for the competitive benefit of the Canadian oil sands industry by permitting the expansion of production in an environmentally sustainable manner without increasing the carbon footprint, using Gradek's technology; and to facilitate the collaboration from a Canadian oil sands operator by providing incentives to implement the commercial prototype on a small-scale settling pond and conduct temporary and/or permanent reclamation testing.

Thank you very much.

The Chair: Thank you very much, Mr. Gradek, from Gradek Energy Inc.

We're ready now to go to questions and comments.

Mr. Allen, you have up to seven minutes.

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

Thank you to our witnesses for being here today.

It's very interesting. I think there are maybe some pretty good lead-ins between our International Energy Agency comments and some of the comments that we have heard from our witnesses with respect to some of the good work that is being done on reducing energy intensity and some other things.

My first question is to Mr. Sadamori.

Your chief economist has made a couple of statements with respect to global demand for crude growing so quickly that the world needs every single drop of Canadian oil and, in addition, talked about the really small significance in terms of the impact on the CO_2 in comparing Canada to other major emitting countries. This is just peanuts. It's a small fraction of peanuts, actually.

With the demand growing for natural gas and the development growing for natural gas, both in the U.S. and through exploration in China and other places, including in Canada, do you still see that huge growing oil demand for Canadian oil in the foreseeable future?

The Chair: Mr. Sadamori, go ahead, please.

Mr. Keisuke Sadamori: Thank you very much for your question.

Last month we released the Medium-Term Oil Market Report, and in the report we have estimated the oil demand and supply structure in the coming six years, from 2011 to 2017. In this, we expect that we'll see substantial growth of oil demand. By the way, that is mostly coming from the non-OECD countries, the growth in demand in China, India, and also in the Middle East.

We expect that we'll see the continuation of substantial growth, but at the same time, we are seeing somewhat slower growth compared with the forecast that we made last year. That is due to slower growth. Immediately before we released the Medium-Term Oil Market Report, IMF revised downward the global economic growth forecast. That is the fundamental picture of the growth.

On the other hand, in terms of the supply, we'll see somewhat comfortable growth in supply all over the world. First, about half of the world supply capacity of growth will be coming from North America. The biggest factor is obviously the light type oil from the United States, but at the same time we expect a substantial contribution by the Canadian oil sands. Also, we expect supply growth will be coming from the deepwater resources in Brazil as well.

That is the non-OPEC supply capacity. On the other hand, we have the OPEC growth as well. That is mostly led by Iraq. That is something that we looked at in detail in the World Energy Outlook that we released very recently for this year.

Mr. Mike Allen: Thank you very much.

Mr. Keisuke Sadamori: Yes, so that's the— [*Inaudible—Editor*]

● (1155)

Mr. Mike Allen: Thank you. That leads me to a question. One of the other statements made was that it's good PR and good business to be able to do this in the most environmentally sustainable way.

Mr. Nelson, when you were talking about your technology, you said you'd been working on this for, I think you said, the last seven years, predominantly working your technology to get it more value-added in the supply chain in terms of just dumping the stuff in tailings ponds as opposed to getting other products out of it. You've done the demonstration projects, but you're slow to get adoption.

It seems to me there's a tremendous business case in this, with the billions of dollars that could be added with the zircon and the extra bitumen that we're getting out of the oil sands. Is it just a matter of lack of resources? The business case seems to be there. What are the other major stumbling blocks to the adoption of these technologies?

The Chair: Mr. Nelson, go ahead, please.

Mr. Scott Nelson: Thank you.

We feel the technology is ready to commercialize. The industry is very much aware of it. They have participated in its demonstration. They have all the results. They haven't said no. They're just moving very slowly, coping with all the other issues that you've heard here, such as thickening tailings and uncertainty about their businesses.

It is new technology. There is always concern about risks, but we wouldn't have a lot of the modern things we have today if people didn't take the risk. I think the barrier is simply quite a conservative industry and something that's new, but we've literally done everything we can to ensure that the risks are minimized and the advantages are there.

Nobody likes to go first with new things. We need someone to do that. I think the COSIA organization was designed to share the risks. That would be one avenue. The other one is governments. It's clear that when new things happen, government often has to participate in the first implementation of those things; otherwise, these things drag on and on, and that's the unfortunate part.

We think it's urgent. We've done this a long time. We've spent a lot of money, and it's time to move ahead.

Mr. Mike Allen: One of the things is we've been captive to the U. S. market a little bit in that perspective, and because of that I think the discount on our oil right now is about $30 a barrel.

Do you see additional markets and being able to go to other markets as the impetus for that because of the additional revenue? At the same time, because of additional development in the resource, it's going to be even more important to do technologies like yours to make sure that we're doing it in a sustainable fashion and getting every value out of this.

● (1200)

Mr. Scott Nelson: The short answer is yes. It improves the social licence to operate. It shows that we're getting every drop of oil and every bit of value that we can out of the resource before we produce more of it, and that we're reducing the environmental impact. Some of the barriers to our oil in both U.S. and international markets relate to its reputation in the industry, so it improves that. It makes the projects more economical even if we don't expand, and it shows that we're extracting more from what we have, which is responsible and sustainable development.

Finally, this minerals industry can be the first export industry from the oil sands to China. We don't need a pipeline. It goes into containers and onto ships. It's a nice clean resource going off to China. It paves the way for this relationship that I think is important to all Canadians, and that's new exports.

The Chair: Thank you very much, and thank you, Mr. Allen.

We go now to Mr. Julian for up to seven minutes. Go ahead, please.

Mr. Peter Julian: Thanks to all our witnesses. What you told us today is very interesting.

I have a quick question for Mr. Gradek to start off.

You mentioned a survey of nine sites in the oil sands, seven of which were not meeting targets around tailings management. Is it possible for you to table that survey with the committee?

Mr. Thomas Gradek: I will be able to obtain that information from the review on water matters outside of Alberta that was submitted by the Pembina Institute. This was conducted in 2009. That is public information that is available.

Mr. Peter Julian: Okay, thank you for clarifying that. It's much appreciated.

I'd like to come back both to you and to Mr. Nelson, because what you're speaking about is very intriguing. I'm very interested in the costs, and I've been up to the oil sands more times than I can count this year. I've been up with our national leader, Tom Mulcair, with the NDP members of this committee, and a couple of times on my own, all the way from Fort McMurray right up to Fort Chipewyan. One of the things I've been asking every time I've toured an oil sands site is the cost of reclamation.

To date, even though I've asked CAPP and I've asked the companies, we have not had any estimate of reclamation costs for any part of the pilot projects that are currently under way. Of course, that's extremely important for public policy. We need to understand what the costs are for reclamation in order to understand how public policy can best be oriented toward that reclamation.

Mr. Nelson, you were talking about moving to implementation from the pilot project that you've said has been successful. I'm wondering if you can give us an idea of the cost of implementation at one oil sands plant.

Mr. Gradek, you've mentioned having incentives in place to put in place a pilot project. Could you give us some sense of what the overall cost of that might be, and then in both cases, what you're looking for in terms of support from the federal government for these initiatives?

The Chair: Mr. Nelson, could you start, please?

Mr. Scott Nelson: Yes, thank you very much. It's a very good question.

At any large mature site like Syncrude or Suncor, the facilities we would need to put in place, given the volumes of tailings we would handle, cost in the range of $400 million, which you then divide. This sounds like a big number, but bear in mind these oil sands sites have cost tens of billions of dollars to build. When you look at the amount of oil we could recover, which is 6,000 to 7,000 barrels a day for a very long period of time, the capital cost is about $30,000 per flowing barrel to recapture this oil that's going into the tailings ponds. That's versus the costs of building a new mining site and getting that amount of bitumen: $80,000 to $100,000 per flowing barrel.

The point is that if you can recover something from a waste stream efficiently, then it's going to be very attractive in economics, so we're proposing that this be done. The operating costs per barrel are around $10 for that barrel of bitumen that we're going to capture before it goes into the tailings ponds, and that's versus about $23 a barrel for bitumen that's mined and then put into an upgrader. Those are quite common numbers you would find in the public domain. It's about one-third of the cost of getting another barrel on a new project.

We're saying this is the low-hanging fruit, as I mentioned, and throughout the world you will find mining projects that are now going back in with better technologies, attacking their tailings and their dumps because of the higher prices of commodities, and reworking them. We believe that should be done here.

● (1205)

The Chair: Mr. Gradek, go ahead.

Mr. Thomas Gradek: We have a proposed business model whereby we offer a service, and the service is free for the oil sands operator. They provide us their tailings, and we would be cleaning up their tailings, extracting bitumen that they would buy back and providing them with clean water that is warm because it's end-of-pipe. The tailings that come out from the plant are very warm, and there is a lot of dissipated heat that ends up in the tailing ponds, which is estimated at about $1.47 per barrel of bitumen in production.

Industry has also evaluated the cost for reclamation that they intend to put aside under a qualifying environmental trust at $1.33 per barrel of bitumen produced, so in terms of the cost that they have to bear and put aside or that they're losing because of their inefficiency, it's quite substantial.

Mr. Peter Julian: Sorry, I'll just come back to the issue, because you flagged having incentives in place for a pilot project. We're assuming that you mean incentives from the federal government or federal government agencies. How much in incentives are you looking for? What's the cost of putting that pilot project in place?

Mr. Thomas Gradek: The incentives would be to attract investors in the public domain to relieve some of the risk exposure of implementing a new technology for the first unit. This could be easily achieved in using CRCE, which is the Canadian renewable and conservation expenses program, put in place in 1984, whereby we're able to go ahead and recover waste heat. Because the tailings streams coming out of the plant are warm and they're exiting at about 85 to 90 degrees Celsius, we'd be able to recover that heat at approximately 85% of that heat value.

Mr. Peter Julian: This is very interesting, but I will be cut off in a minute or so. I just want to get an understanding of what kind of financial incentives you're looking for. For the pilot project itself, how much would it cost to set this up?

I certainly understand; you've been very eloquent about the benefits, but how much are you looking for? How much money?

Mr. Thomas Gradek: The pilot plan cost is about $17,000 per flowing barrel per day in terms of capital expenditure, so you're looking for a 500-tonne unit, which is about $85 million. That is the total cost.

The water is able to be recycled back within 15 minutes of operation, completely free of bitumen, and it's suitable for agriculture. It could be used not only for reuse in their process, but it could be used for agriculture. We've done tests with hydroponic studies and we've had extremely good results.

Mr. Peter Julian: How much of that $85 million would you be asking for from the federal government?

Mr. Thomas Gradek: That would be 20% in terms of a CRCE project.

The Chair: Thank you, Mr. Julian.

We'll go now to Mr. McKay for up to seven minutes.

Hon. John McKay: Thank you, Chair.

Thank you, witnesses.

My first question is to Mr. Sadamori. Clearly one of the most interesting developments—and it's a rather recent development—has been the move of the United States from energy dependency to a potential of energy self-sufficiency, with possibly even the potential to energy export.

Up until now the public policy has been to provide heavy subsidies to green technologies. In light of these developments, do you anticipate that the move to green technologies will actually be under pressure or be diminished, or that the subsidies will be removed?

The Chair: Go ahead, Mr. Sadamori.

We can't hear you again, Mr. Sadamori. Could you turn the mike on?

Mr. Keisuke Sadamori: Can you hear me?

The Chair: Now we can hear you. Go ahead, please.

Mr. Keisuke Sadamori: I'm sorry.

It's a somewhat difficult question because it's up to the U.S. government what they will do with respect to the current subsidy to renewable energy and various projects for sustainable energy use.

Also, you are right that they will see an increase in the production of gas and oil, fossil fuels, so yes, there may be pressure for more use of fossil fuels instead of building up the renewable capacities. That might be a matter of concern, but I would like to refrain from making any comments on the possible U.S. renewable energy policy. It's up to the U.S. government.

Thank you.

● (1210)

Hon. John McKay: It does seem, intuitively at least, that the enthusiasm for green technologies may well be diminished in the short term. Given that a buck is a buck is a buck and cheap gas is cheap gas, why bother with windmills, solar farms, and things of that nature, which are all heavily subsidized at the cost of taxpayer dollars?

Thank you for that. It was an invitation to speculate.

Turning to Mr. Nelson, I won't pretend to understand your process, but it strikes me as a very interesting process to get all of this stuff out.

What frequently happens in Canada is that we have some very formidable brains—such as yours, possibly—who invent these technologies, but then they run into a brick wall to move it from what is really an interesting kind of technology to a market-based solution for the technology.

I can see that Mr. Gradek is nodding his head.

Can you give me some details? What is the market part of this wall? Is it Canadian investors? Is it foreign investors? Where is your wall at this point?

Mr. Scott Nelson: The wall is the oil sands industry—the operators. We've been very successful in raising financing for this project publicly. We're a public company. We raised more than $50 million, which is a lot of money in the research world when you don't have any revenues and it's high-risk stuff.

I have been in Asia seven times. I can certainly get investors in that part of the world to invest in Canada to access our minerals. In Australia, there are minerals companies, which I have brought over, that are very interested in this new resource because of its huge size and length. The barrier at this point is just getting the oil sands industry moving on something like this.

Hon. John McKay: What is the hesitation? Is it purely financial, is it a cultural mentality, or is it that they need a swift kick in a regulatory framework?

Mr. Scott Nelson: I could observe that not a lot happened with oil sands tailings at the pace it is now occurring until directive 074 came out a few years ago. Now, literally hundreds of millions of dollars are being spent.

Hon. John McKay: So it's a regulatory gun to the head.

Mr. Scott Nelson: We'd rather not do it that way. This took years to develop. We see a win-win-win situation here for ourselves, the oil sands industry, and the public. We'd like to see it move ahead more rapidly than that.

Hon. John McKay: As you've described it, it is a potential win-win-win, but one of the wins is not moving.

Mr. Scott Nelson: Yes. They're just a little distracted right now. Our job here was to communicate this to, we felt, everyone in Canada. We had our head down for about seven years; we put it up when we were very confident that we had a solution, and everyone we work with is confident that we have a solution.

Now, maybe we did ourselves a disservice, because here it is, ready to go, and it's not happening as quickly as it should, so we're thinking that stakeholders' being aware of it is our number one priority. I've met with Minister Oliver and with everyone in Alberta, right up to the Premier, and everyone thinks it's a good idea, so let's get together and get it done.

Hon. John McKay: On your wish list, what would you want Mr. Oliver to do in terms of prodding the industry?

Mr. Scott Nelson: This has to be made a priority in the discussions that occur between Alberta, the Canadian government, and the oil sands industry. We'd certainly be happy to be a part of them.

● (1215)

Hon. John McKay: Mr. Gradek, I assume that you basically endorse what Mr. Nelson has just said. I assume that you too have run into a wall of some kind or other. What's your wall, where is it, and who is it?

Mr. Thomas Gradek: The oil sands industry has a prerogative, which is production. That's the only thing that is on stream. Everything else is off stream, it's offline. All of their efforts are geared to increasing production. That's the revenue stream.

If you look at their R and D expenditures over the last 20 years, you'll notice that it hasn't been geared towards environmental issues; it's geared towards production.

Hon. John McKay: But your model isn't just purely environmental issues. You're not just some sort of left-wing social flake.

Some hon. members: Oh, oh!

Mr. Thomas Gradek: No.

I could demonstrate to you. In the graphic I am showing you, on the right side is the tailings water subjected to five minutes of our process. What's on the left side is a control, which is after 24 hours. In order to get this fine result after five minutes and be able to send back over 75% of the water completely clean—it's cleaner than the Athabaska River water—

An hon. member: It's not as clear as tap water.

Mr. Thomas Gradek: Well, it's very clean. We have it down to drinkable water levels.

This is not what they're looking for; they are thinking, "Give me water that's suitable to go ahead and increase my production. If you can give me warm water, all the better."

The Chair: Thank you, Mr. Gradek and Mr. McKay.

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

Mr. Brad Trost (Saskatoon—Humboldt, CPC): Thank you, Mr. Chair.

One thing I find curious—and I hope I didn't misunderstand anyone here—is that we frequently hear from people in my office, etc, who say they have a great money-making idea "if only the government would give me money".

You have to understand that from an MP's perspective, if it's such a great money-making idea, why do you need someone to give you money? I'm not necessarily implying that you gentlemen were going in that direction, but if these ideas are commercially very viable, with great margins, etc., does the government need to give projects money for those sorts of things through subsidies, backdoor tax credits, etc.?

This is to both of you gentlemen.

The Chair: Mr. Nelson, start it.

Mr. Scott Nelson: Okay.

It's a very good question. I get the same reaction: "Scott, if it makes money, why does government need to become involved?" It's because it's new, because there's risk. Everyone is a stakeholder and everyone is going to benefit, so they should have some skin in the game.

We've suggested fiscal regimes are needed—perhaps some royalty holidays for periods of time until these things are built and making money—but not massive amounts of taxpayers' subsidies or anything like that, just the normal things that are done throughout the world. In Australia, if you're bringing on a new project, you're going to have a period of time to make your investment and recover your costs before you start paying royalties, and in some cases taxes.

That puts skin in the game by the government. That's really all we're looking for.

Mr. Brad Trost: So for you, it's about risk management.

Mr. Gradek, your response to my question...?

Mr. Thomas Gradek: There's an article in *The Globe and Mail* today by the retiring president of Total that makes a very good statement concerning the oil patch's philosophy on new technologies. His comments are extremely good.

Second, what we're looking for from the government side is.... There is policy in place—and I've raised it in regard to CRCE,—whereby the metrics of evaluating the benefits of the policy, or a process that has been put in place, lag behind the times. CRCE was put into regulation in 1984; the metrics for evaluating innovative technologies that would be complying to conserve and recover waste heat are based on 1984 designs. If I can decontaminate a water stream and conserve 90% or 85% of the waste heat rather than put it through a heat exchanger and lose 50% of that heat, I have a much more efficient process, yet it's not recognized.

Therefore, metrics must be further in tune with new technologies being developed today.

● (1220)

Mr. Brad Trost: Let me then ask my second question. It is somewhat similar in direction to where Mr. McKay was going.

Back when the natural resources committee was part of the industry committee in the 2004 Parliament, we heard a lot of about Canadians being pretty good with the initial technology and with the tail end, but in between, in that connection piece to get from the genius in the basement to the company out there, we tend to be a little weak.

Could you gentlemen very quickly give me the stages you have to go through to get from "Hey, we have an idea"—in the basement, on the napkin—to the end? Where do the blockages tend to be in the Canadian system? Is it that we don't have enough, for example, venture capitalists in this country? Is it that we aren't collaborative enough with our scientists?

Just give me a quick history, start to finish, saying where the blockages tend to be in Canada.

The Chair: Mr. Gradek, would you start this time?

Mr. Thomas Gradek: We've been at this technology development for 20 years. It's a very disruptive and innovative technology, and so you won't have any industry stakeholders look at it and embrace it with open arms. They'll come to you and say, "Show me that it works; prove it." They'll try to look at it from every standpoint whereby it might impact upon their efficiency or upon their bottom line in a negative way.

Among the programs available for research and development, the government is taking a stand whereby it has made some changes and cut down on what expenditures are eligible to be reimbursed through the SR and ED programs. That stance is going to have a marked effect on new technologies being developed and brought forward. There's a lot of—

Mr. Brad Trost: Can you walk me through your process very quickly, start to finish, showing where the—

Mr. Thomas Gradek: Do you mean the process, or the development stages over the last 20 years?

Mr. Brad Trost: Just make it quick, because we have to split about a minute and a half here.

Mr. Thomas Gradek: Well, we've had to come up and understand exactly what we're dealing with. You have to analyze what are tailings, what's involved, and from there how you approach it. You have to look at it from the standpoint of a life-cycle analysis in terms of thermodynamics and energy recovery, with the smallest carbon footprint possible, and take that into effect.

There are many iterations that have to come into play. You're looking at possibly designing new equipment that is not on the shelf, so you have a lot of engineering costs. You have to look at academia. You have to look at bringing in specialized engineering firms. You have to bring industry in as a partner, and such research institutions as NSERC and the National Research Council.

It has to be a collaborative effort. You can be the visionary; you can go ahead and be the orchestra leader. As long as you are able to provide the details and direction for that vision, you may end up with a possible solution. From there, you have to have partners who will come with you who bring expertise for scaling up.

The Chair: Okay, Mr. Gradek.

Thank you, Mr. Trost.

Unfortunately, Mr. Nelson, you don't have time to answer this now. Maybe somebody will steer things back to you, but I can't prejudge.

Mr. Calkins, you have up to five minutes.

Mr. Blaine Calkins: I can't imagine how we would get directed back to Mr. Nelson other than by my asking him whether he'd like to answer Mr. Trost's question.

Mr. Scott Nelson: Yes. Thank you very much, and I'll do it quickly.

In our case, it was putting together a team of people with the right backgrounds and expertise to tackle the oil sands industry. We attracted those people from, in our case, Syncrude Research and organizations such as that, folks who had a vision that more could be done in these areas.

I had to get the money together; that's important. It's the same with the minerals; we had to hire minerals experts, who generally aren't in Canada. Then you align yourself with the best organizations you can find. We established our first research centre in Regina, Saskatchewan, at the Saskatchewan Research Council. We've now moved to Alberta, to CANMET.

So it's a question of getting the right partners together, which is a lot of what Tom was saying. In our case, it was people such as SGS: we did a tremendous amount of work here in Ontario at Lakefield Research, of all places, on the oil sands, and had some breakthroughs there. We went down to Chicago and worked with the Gas Technology Institute on solvent recovery.

You need to be flexible, and you're not going to solve these things on your own; you're going to pull together the talent that we have in Canada and certainly throughout North America to solve these problems. That's the challenge through that visionary R and D stage —lab scale to small pilots.

Then once you have solutions—and in our case we applied for patents and headed into that process—you're going to have to do a demonstration. For that you're going to need a lot of money, so you're going to have to convince investors that something is getting closer here—we went through about three years of demonstrations—and you have to get the oil sands people onside to provide you with tailings, to review results. That's where we brought in SDTC, on the federal government side; it is very helpful in getting you through that pre-commercial stage.

I would agree with you that Canadians are very good at doing all those things. What we're not good at, as a country and perhaps as an industry, is commercializing things. As compared with the U.S., Germany, Scandinavia, and so on, we're a little bit on the conservative side from a business point of view. We have all the skills and all the resources; we just have to finish them off. The whole business of the U.S. companies we dealt with is around commercial applications.

That's the challenge we're in now, and there we're not as competitive. It's maddening, to be honest, but we're not giving up. Don't run out of money, and don't run out of tenacity to get these through to the finish line.

● (1225)

Mr. Blaine Calkins: Given the obvious, from the discussions that I've had at committee and other places....

I've been on the environment committee and I met Mr. Gradek before several years ago. You're still in the same place you were a couple of years ago, it seems to me, but these things do evolve over time. Sometimes they take a long time. The oil sands are only 40 years old, and it's amazing to see how far we've come already, which is going to segue to my question to Edmonton for Mr. Lakeman.

Can you give us an indication right now of what's in the hopper? We have not just the surface mining components as far as research and development go, but if you look at the developments in SAGD and toe-to-heel air injection, how many different projects do you have? You outlined the staff. You outlined your large budget. How many more projects are you working on right now, and what can we expect in the next medium to long term insofar as research breakthroughs, so that we can take the next step and go to the applied routes and get these technologies commercialized and in the field?

The Chair: Mr. Lakeman, you have about a minute and a half to do all that.

Go ahead, please.

Mr. Brent Lakeman: Sure.

I can't speak that effectively to the production technologies. That's not part of my group at Alberta Innovates, but we do have major consortia that involve pretty well every major oil sands producer looking at new production technologies.

There's the AACI consortium, and I believe there are approximately 20 members from both Canadian companies and companies from around the world, so we're always investigating new technologies for SAGD, primarily, and how to unlock further resources. That consortium is a great way to do that preliminary investigation around technologies and get them to the point where some of the companies will decide to pursue those through their own further research and demonstration projects, either with our scientists or with other organizations in Canada or from around the world.

There is clearly lots of interest working with groups like COSIA and the former OSLI organization, which is focused on technology breakthroughs and provides new mechanisms to disseminate those technologies to either individual companies or groups of companies that would like to pursue them through joint projects. It continues to receive a lot of interest. Certainly there is a recognition that improvements in production can also result in significant improvements in environmental impacts, such as looking at solvent technologies for production, which recent reports have shown may be the place where the greatest improvements can actually occur from the CO_2 perspective.

The Chair: Thank you.

Thank you, Mr. Calkins.

We go now to Mr. Nicholls.

Mr. Jamie Nicholls (Vaudreuil-Soulanges, NDP): Thank you, Mr. Chair.

Thank you to the witnesses for appearing.

Mr. Trost asked a question: if a business is profitable, why does it need a subsidy? I think it's a valid question.

We see that the federal government has given $500 million in subsidies that have gone to CCS technologies, $1.3 billion in oil industry subsidies. I could redirect the question to Mr. Trost. If these businesses are profitable, why do they need subsidies?

Following that, in the 2011 joint report of the IEA, OPEC, OECD, and World Bank on fossil fuel and energy subsidies, there was a recommendation made to Canada to rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption.

As you said, there can be signals given to industry. Subsidies can act as signals.

I would ask Mr. Gradek and Mr. Nelson this: you mentioned before that the oil sands seemed to be focused solely on increasing production, so what does a no-strings-attached $1.3 billion subsidy to the oil industry give as a signal from the federal government to the oil sands? Do you think it tells them without the environmental piece in place, “Go ahead, increase production, increase growth. We're going to let you go ahead and do what you want”, and we lose that value-added piece that you too could add to that industry?

● (1230)

Mr. Scott Nelson: I can't speak to $1.3 billion. I would just love to have a small piece of that, quite frankly.

Some of those things are not economic. Carbon capture and storage is a vision that is going to take decades. No one yet knows how it's going to make money. That's a whole different situation. Canada is a leader, but a leader in something that is going to take a long time and be extremely expensive. This is the tip of the iceberg on what it is going to cost. That's my understanding of it.

In terms of these other things, industries do need signals—from regulators, government, the other stakeholders, and the public—that these things are important. By and large, having spent my whole life in the oil industry—although I was with IBM before I took on this project—I think industry will do the right thing, but there is a role in public policy to send those signals. If they are not happening, then regulation is the ultimate answer.

We obviously don't like to go there unless we have to. It's more of a sharing; everyone is going to get something here. Hundreds of millions of dollars of taxes and so on will come back. A lot of jobs will be created, and so on. It's fair for all stakeholders to put some skin in the game, so it's up to all stakeholders—our company, the industry, and the government—to sit down and say, “Okay, we want this to happen”, just as they did with the petrochemical industry created in Alberta years and years ago. For whatever reason, normal commerce does not necessarily make them happen.

The Chair: Mr. Gradek, can you answer the same question?

Mr. Thomas Gradek: Again, as Mr. Nelson mentioned, on the $1.4 billion, I don't know where it went.

The oil sands industry has an approach with side issues whereby, since they are not generating revenue, they are left on a schedule that is not very short. This is where government should come in and impose a timeline.

Luckily, in 2009 Alberta put through directive 074. If you look at the oil sands expansion and what they are deemed to be going for by 2030, there is not much space left to build tailings ponds. Suncor presently has an issue in where a plant can be set up on its lease, because tailings ponds take up so much area. The world's largest man-made dam is the Mildred Lake dam, which is holding back toxic waters. It's unfortunate that engineers conceive to go ahead and build structures as such rather than treat those wastes and eliminate them.

There is potential to go ahead and eliminate waste. The way to incite it, if the government wants to put a timeframe, would be to say, “Listen, you are going to clean up your image. You are going to be more efficient. You are not going to be producing waste. You are going to be generating a revenue stream and maximizing a resource out of that waste.”

That's the focus where government should go ahead and be involved. They should look very seriously at innovative technologies, assist them, and take a role whereby they would collaborate and coordinate all of the effort for the industry. The bottom line is that we can export low-carbon fuel, not dirty oil, into the United States. The way to do it is to recover the waste heat, increase our efficiency, eliminate waste, and demonstrate that we are socially responsible with our resources for future generations.

● (1235)

The Chair: Thank you, Mr. Nichols.

We go now to Mr. Leef for up to five minutes.

Mr. Ryan Leef (Yukon, CPC): Thank you, Mr. Chair, and to all of the witnesses for attending today. I'm going to build a bit on what we're talking about there.

We had some past presentations from the department. The department provided some information on the investment from the federal government in research and development. From the departmental perspective, Canada is ranking about third in R and D. Some of the numbers they provided were $102 million in energy efficiency, and a cleaner fossil fuel investment of $187 million, which made up about 29% of the total investment.

Have your companies accessed any of that to get where you are at this point? Is there potential that you see to continue to access those sorts of funding as you move forward? Are there plans to do that, and have you in the past?

The Chair: Go ahead, Mr. Nelson.

Mr. Scott Nelson: Yes, we look at all the programs. We have people and lawyers who advise us on what we should be applying for. Sometimes you're successful, sometimes you're not.

Our first program was in Alberta; it was an energy innovation fund whereby we got $3.5 million when we were at the R and D stage. We then moved to SDTC, which we thought was an ideal fund for pre-commercialization demonstration. Initially we got $5 million and recently another $1.5 million. We've got a small grant from something called IRAP, which is the National Research Council's industrial research fund.

We try to target these things, but they're not all that big. You need to get private financing along with it, which is a healthy thing. I think for every dollar we've brought in from government funding, we've put $5 of our own money on the table, so that's okay. It's not massive, but it's helpful. I'd be the last to say it isn't.

Is enough done? In the statistics I see Canada is not ranked all that high in R and D in the G-20 and so on in terms of either our investment or our spending or our outcomes.

I guess other countries are doing a somewhat better job than we are. When I travel around the world, they don't immediately see Canada as innovative and exporters of innovative things, unfortunately, but I think we can be. We've got the best universities in the world and some of the smartest and best-educated people; why can't we be a leader here? I think we can be.

Mr. Ryan Leef: You're not familiar, then, with what the department talked about, the expenditures as a percentage of national GDP in 2010, with Canada being ranked third only to Denmark and Japan, ahead of Norway, Sweden, Switzerland, Hungary, Austria, Korea, the U.K., U.S.A., and Germany? We outspent them by a considerable percentage.

Mr. Scott Nelson: That's interesting. No, I haven't seen those statistics. I'd like to see them.

Mr. Ryan Leef: Okay.

Mr. Gradek, I'll give you an opportunity to talk about whether you've been able to use some of those program funds and what your intentions are with them, and maybe what we can even do to make that a little bigger, as Mr. Nelson said, or a little more accessible to promote these innovations.

Mr. Thomas Gradek: We haven't been able to access very much in terms of government funding. Less than 5% of our funding is from government. However, the metrics with regard to policy and regulations for programs such as renewable or clean energy are not there.

I can pick a waste stream composed of wood chips, and burn it; I've got a biofuel. If I can remove bitumen from a tailings pond, which is a waste stream, and it will displace a conventional source of fossil fuel, it should be classified as an alternative fuel.

That's what we lack here in Canada. Metrics for the policies are not up to standard. They're not there, and it's inhibiting Canadian exports.

● (1240)

Mr. Ryan Leef: You mentioned Suncor, I think it was. You said the tailings are growing to a point where they're limiting production.

In my mind, that would absolutely necessitate looking at this kind of thing. What's the alternative? As you said, sites are getting more limited, so they can't just go anywhere else. By virtue of that, it would seem to me they're going to have to look at some of these technologies.

Do you see that being the picture versus, as Mr. Nelson was saying, a reluctance to push a regulation? Do you not see they're almost going to get to a tipping point whereby they're going to have to move toward the technology you've got? Also, it might be timed nicely with your project proof of this, being ready to roll at that perfect timing stage.

Mr. Thomas Gradek: Suncor has been trying to make a go of CTT, consolidated tailings technology, which CANMET and the University of Alberta developed and promoted. They tried for 15 years and were never able to pass the 20% threshold—

The Chair: Thank you, Mr. Leef.

We go now to Ms. Liu for about five minutes.

[*Translation*]

Ms. Laurin Liu (Rivière-des-Mille-Îles, NDP): I want to thank the witnesses for their contribution. My first question is for Mr. Gradeck.

You have answered Mr. Frost's questions but I would like you to comment on the criteria for accessing the scientific research and experimental development tax credit, and what the impact is for your own company.

Mr. Thomas Gradek: Would you like me to answer in French or in English?

Ms. Laurin Liu: As you wish.

Mr. Thomas Gradek: A major change was implemented in 2013, relating to the treatment of eligible expenditures in the SR&ED program. Since then, not all capital expenditures are eligible. This is a major change, especially in the case of a project where big expenditures are required, and especially at a stage when there is a jump in expenditures. When you go from a pilot project to a precommercialization plan, your expenditures increase by a factor of 20. Your capital requirements become extremely high and, if there is no system to facilitate this development, it will not happen. So, it is very important.

Look at what happened with the pharmaceutical industry. Companies are leaving Montréal by the hundreds because the program has been changed. They have no incentive anymore to develop new products.

Ms. Laurin Liu: Thank you.

This is a concern that we have heard from companies such as Rim as well as from the Canadian Association of Petroleum Producers and the Canadian Manufacturers and Exporters. It is a concern shared by many sectors of industry.

At our last meeting, we were supposed to have a presentation from Écotech Québec. Unfortunately, they were unable to appear before the committee but they sent us a brief in which they suggest creating a tax credit for the commercialization of products. What do you think of that suggestion?

Mr. Nelson can also answer if he so wishes.

[*English*]

Mr. Scott Nelson: I think that would be a good idea. That's where we fall down, commercializing.

One thing I should mention—and I think it's a good thing—is that in Alberta, once you have qualified for your SR and ED credits, particularly for companies like ours that don't have revenue yet, the Alberta government pays you those in cash. There is a maximum on it, but you can do this each year. That's certainly a great help to small companies that don't have a revenue stream and can't really use tax credits for some period of time. That is a good thing.

There is a gap, though, in this commercialization area, and I think that idea is a very good one.

Thank you.

Mr. Thomas Gradek: The U.S. has the Small Business Act, whereby the government will go ahead and guarantee, to the bank or the financial institution, 85% of the funds required to commercialize a technology, so we're not exactly on an equal footing with U.S. technologies or green technologies, and it's hurting Canadian industry enormously.

● (1245)

Ms. Laurin Liu: Thank you.

I would like to ask my last question.

I was wondering if you could comment on some propositions made by the president of Shell recently, who spoke about CCS, which we talked about earlier. She said that CCS would be viable only under a regulatory system, such as cap and trade, regarding carbon emissions.

What are your comments on her comments?

The Chair: Mr. Gradek, go ahead.

Mr. Thomas Gradek: Ms. Liu, CCS, if you look at it from a holistic point of view.... The Society of Petroleum Engineers put out a paper in 2008. They disclosed in that paper that CCS is not a viable economical solution for reducing greenhouse gas emissions, the reason being that total volume of sequestered CO_2 that would be retained in a formation would be approximately 1% of the total volume of fluids that would have been recovered through EOR.

Presently we're using CO_2 injection for enhanced oil recovery. It's a benefit. By subsidizing CO_2 sequestration, you're subsidizing the production of an oil company.

Does the taxpayer benefit with reduced costs at the pump? I don't think so. That's an issue.

The Chair: Thank you, Mr. Gradek. We are out of time, and we have to go to our other business of the committee.

I'd like to thank all of the witnesses very much for their presentations today and for answering questions.

We have other business to go to. I will suspend for just a minute while the witnesses clear the table, and then we'll get back to the other business of the meeting.

● (1245)

(Pause)

● (1245)

The Chair: We are reconvening the meeting. We are continuing the business of the last meeting.

Mr. Calkins, you had the floor. There is nobody else on the list.

Mr. Blaine Calkins: As we normally do when discussing these types of motions dealing with committee business, I move that the committee now go in camera.

The Chair: Okay. That's non-debatable.

(Motion agreed to)

The Chair: We will suspend for just a minute or so to move the meeting in camera.

[Proceedings continue in camera]

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