HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Natural Resources

RNNR • NUMBER 083 • 1st SESSION • 42nd PARLIAMENT

EVIDENCE

Tuesday, February 6, 2018

Chair

Mr. James Maloney

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● (0850)

[*English*]

The Chair (Mr. James Maloney (Etobicoke—Lakeshore, Lib.)): Good morning, everybody, and thank you for joining us today.

We have three witnesses in the first hour. From Bioindustrial Innovation Canada, we have Alexander Marshall. From Ensyn Technologies Inc., we have David Boulard. From Whitesand First Nation, we have David Mackett and Craig Toset.

Gentlemen, thank you very much for joining us today.

The format is for three presentations of up to 10 minutes for each group. Following the presentations, I will then open the floor to the members around the table to ask questions. We do have some tight time constraints, so if you could keep your opening remarks to under 10 minutes, I would be very grateful. If you don't, I may have to interrupt you, and I'll apologize now.

Mr. Marshall, we will begin with you.

Mr. Alexander Marshall (Executive Director, Bioindustrial Innovation Canada): Thank you, honourable Chair, vice-chairs, and committee members for the opportunity to speak to you today on the very important topic of industrial bioeconomy in Canada, and the opportunity it provides for Canada.

BIC is a not-for-profit business accelerator based in Sarnia, Ontario. Our vision is to create jobs and economic values sustainably in Canada. We accomplish this by providing critical investment advice and services to early-stage business developers in the clean, green, and sustainable chemistry space. Our expertise is commercialization.

Our management team has over 100 years of industrial experience in a wide variety of technical development, commercialization, and business operations from the traditional petrochemical industry. I personally came from the petrochemical industry, and retired out of that about five years ago.

Our board brings a strong governance and executive mandate to the vision. The board members play an active role supporting BIC's strategic plan by leveraging their knowledge and experience of strength and due diligence processes and the potential investments. In addition, board members use their experience and extensive network of professional contacts to provide advice, communicate successes, and identify resources to enable start-ups and SMEs in the early stages working toward commercialization.

We're focused on enabling Canada to become a globally recognized leader in converting renewable resources, such as agricultural and forestry bioproducts and residues into value-added bioenergy, biofuels, biochemicals, and biomaterials for the use in a wide range of commercial applications along the chemistry value chain to advance manufacturing, including automotive and aerospace.

Our initial efforts have been targeted in Sarnia-Lambton, home of Canada's first petrochemical cluster. Sarnia-Lambton is well positioned to diversify its petrochemical industrial base, and become North America's leader in industrial bioproducts manufacturing in an emerging hybrid chemistry cluster.

BIC has played a critical role in attracting anchor industry biochemical companies to the region, which form key assets in the assets along the chemistry value chain. Securing the location of these anchor companies in Canada is attracting significant follow-on investment in the region.

Canada has a global competitive advantage. Canada has the most abundant, sustainable and economically important biomass resources, and is highly adept at generating value from them. Our traditional bioeconomy sectors, forestry and agriculture, currently comprise over 900 processing companies, support two million employees, and generate sales of over $300 billion per year.

Canada's commitment to climate change mitigation is best addressed by extending the capacities of these sectors to produce biogenic carbon into biobase alternatives that offset fossil carbon emissions. By leveraging Canada's natural carbon storage capacity in its forests, along with residues from forestry, agriculture, and municipal waste, over 120 million tonnes of biomass are available annually to create additional economic growth, and directly offset carbon emissions.

Biomass supply chains exist within the traditional forestry industry including the lumber and pulp and paper industries. Biomass supply chains are emerging for industrial or agricultural residues. These biomass supply chains are available to support the first transformations to sugars, lignins, and thermochemical intermediates. Companies such as Comet Biorefining Inc., West Fraser, and Resolute are actively commercializing these types of technologies.

Canada's forestry industry maintains significant assets for the production of traditional products, such as lumber and pulp and paper. Maintaining and repositioning these existing assets as biorefineries can enable the transformation of this industry. Forestry companies such as CelluForce, Kruger, Domtar, Resolute, and Performance BioFilaments have established world-leading IP positions in the production and application of advanced hygiene products, biocomposites, cellulose nanocrystals, and filaments.

Ontario's chemical industry is the largest in Canada driven by economic advantages provided by the petrochemical cluster ecosystem and the global green chemical market. A number of bioproduct companies are leveraging these biomass supplies—oils, grains, and residues—to produce low-carbon biofuels, biochemicals, and biomaterials to create high value-added manufacturing products.

Companies such as BioAmber, Origin Materials, and Woodbridge are working with the automotive industry to provide lightweight biocomposite and natural fibre materials, low-volatile materials for healthier interiors in automobiles, and components containing sustainable and renewable materials. Additionally, the natural alliance of Origin Materials, Nestlé Waters, and Danone are commercializing bioplastics for use in water bottles and food packaging applications. Renewable fuel producers are focused on developing the lower carbon intensity biofuels for the Canadian market.

Leveraging Canada's abundant natural resources and linking innovative Canadian-based bioproducts and forestry companies to the existing chemical industry and value chains provides a competitive advantage that must be exploited for the benefit of Canadians.

I'll talk a bit about the opportunity. The chemistry industry is on the cusp of a transformation. Traditional petroleum-derived chemicals and products will increasingly be substituted and blended with more sustainable resources derived from biomass. The potential market size is staggering, as bio-based products are expected to make up 50% of consumer products by 2050. Countries and companies with the right policy framework, the desire to foster innovation, and the ability to deploy technologies are poised to take market share in these areas and experience explosive growth.

The focus on value chain creation, expansion and growth, and building regional clusters creates jobs and transforms existing sectors. Advancing the bioeconomy through value chain enhancements with the focus on decarbonizing will enable Canada to be a global leader in sustainable bio-based products.

With the growing international demand for sustainable low-carbon goods and services, and the vast biomass resources available across Canada, the economic potential is enormous. Multiple industries such as health, agriculture, forestry, and natural resources, as well as rural and urban communities, stand to benefit from the bioeconomy. The net result is the creation of new businesses, revitalization of old businesses, regional diversification, and most important, jobs.

For a sector with such high growth potential and access to vast resources, our bioeconomy is lagging. In 2018, the sector was valued at 6% of GDP, on a per-capita basis, whereas in the U.S. it's over 8%. Furthermore, Sweden is considered to be a leader in the bioeconomy, with 30% of its natural energy supply fed from biomass, compared to 1% in Canada.

Canada's slow emergence in the bioeconomy is explained by the lack of a clear strategic direction and the fragmentation of programs, which does not support all types of bioproducts and policy initiatives, as outlined in the Canadian Council of Forest Ministers' discussion paper, “A Forest Bioeconomy Framework for Canada”.

This framework is a very excellent piece of work. It includes tax measures that de-risk commercialization as one of the six key policy areas that should be addressed. There are a number of others, such as efficient standards, collaborative research and development, public sector procurement, outreach to attract investment, accessible comprehensive investment-grade data, and workforce and training development.

The key way to succeed in the bioeconomy is to address these policy areas in an integrated and coordinated effort, involving government, industry, investors, and academia. For example, at the national level, the forestry industry is seen as the key bio-based resource, and Natural Resources Canada is leading support for the industry.

Activities occurring in silos must be avoided. A comprehensive approach is required. Canada needs the Department of Innovation, Science and Economic Development coordinating the development of an all-encompassing framework of public policies in partnerships with the provinces, territories, and relevant federal ministries. This includes Natural Resources Canada, Agriculture and Agri-Food Canada, and Environment Canada. Input from private stakeholders is also essential for this framework.

Canada can leverage its strength in advanced manufacturing and resource development to lead the way on a national bioeconomy strategy. A comprehensive bioeconomy framework will create new business, high-quality and long-term jobs, and stable growth, while reducing carbon emissions.

Thank you.

● (0855)

The Chair: Thank you, Mr. Marshall.

Go ahead, Mr. Boulard.

Mr. David Boulard (President, Ensyn Technologies Inc.): Thank you, honourable Chair, vice-chairs, and members. I am excited to present here today. You'll notice I don't have any briefing notes. The story I have today is a success story in Canada about innovation in the traditional forest industry. It directly falls within your mandate of how to tie in the traditional forest industry to innovation, new products, new markets, and new demands. Today it's a case study of a company called Ensyn that represents itself as a new engineered wood products business in a traditional industry.

For example, it's just 45 minutes up the road, and there's an open invitation to the committee—I don't know if you guys do field trips, or the individual members do field trips—and I'd be happy to host you, 45 minutes away, at our facility at some later point in time.

What we do there is we receive approximately 50,000 tonnes of sawmill residue annually at that facility. There are about 1,000 trucks, so it's not a huge facility. Instead of using these residuals to make MDF boards, mouldings, or even pellets and other engineered wood products, we make liquid wood. Of anything today, think of me as the liquid wood guy. We produce about 13 million litres of liquid wood every year. That's roughly 500 tanker trucks going down the highway and delivering to customers.

I should note that we're synergistic to the existing forestry industry. We don't offer a competitive environment to fibre. We are synergistic with the mills where they are challenged by the transition in the forest industry with respect to what we are doing with all our residues. We have to make sure we have a home. There's an ecosystem for a local mill, and if that ecosystem is interrupted with respect to supply in different areas, it challenges the survival of the mill as a whole. We offer a solution by taking those residuals and working into the synergy—again, we have application throughout Canada—of these mills.

We've run this technology for over 30 years. It's a Canadian technology out of western Ontario. Our founders are Canadian. We're proudly Canadian. In effect, the technology is relatively simple. We take wood, and we expose it to heat in the absence of oxygen. Of course if you have oxygen, you have combustion. In the absence of oxygen, it vapourizes the organic chemicals. We take the vapour and condense it into a liquid barrel of wood. By yield, we achieve 70% by weight of the original wood to the liquid wood product.

Now you might quickly determine that the liquid wood represents a carbon-neutral renewable fuel. We don't have to talk about the importance of carbon neutrality and carbon reduction here, recognizing its value to the Canadian people and to the sustainable future of Canada, but it has the benefits of liquid fossil fuel. You can imagine a liquid wood, comparing it to a liquid fossil fuel. You can store it in a tank, you can pump it in a pump, you can burn it in traditional types of burners.

For example, the production of the liquid wood we produce here just 45 minutes up the Ottawa valley from Ottawa Valley Wood is delivered to hospitals, schools, and city and district energy centres. All renewable customers for the liquid wood energy product, however, are U.S. customers. The U.S. renewable fuel standard creates an economic environment where liquid wood can economically compete with fossil fuels in that environment.

The use of liquid wood by these customers is credited to the U.S., however. It's produced in Canada. The carbon reduction credits, however, go to the jurisdiction where it's consumed. Despite being produced in Ottawa and being produced in Canada, the credit for the carbon reduction aspects of the use of that fuel goes to where the customer is located. It all goes to the United States for it to meet its renewable energy and carbon reduction commitments.

Now you might say, David, you've got 13 million litres. We're oversold. I can't produce enough product to meet customer demand out of our facility in Renfrew. I'm pleased to say that, together with the support of NRCan's SDTC, we are just completing construction of a $100-million facility in Port-Cartier, Quebec, which is just outside of Sept-Îles. That facility will generate approximately 42 million litres of additional product, bringing our total Canadian production capacity to roughly 55 million litres a year.

● (0900)

Again, that's a significant impact for a carbon-neutral fuel. Again, we're integrated into a forestry company in that region called Arbec; also Groupe Rémabec, just out of the Lac Saint-Jean region, is part of that ownership structure. We integrate with the mills synergistically into that marketplace, recognizing again that the mills are threatened by the inability to get rid of residual fibre.

Unfortunately I also have to say that 100% of that production is destined for the United States. The markets and the renewable fuel standard in the U.S. creates a global economic environment for the competition of renewable fuels so that in effect it's just as if you made a two-by-four you'd sell it to the highest market. Our liquid wood product is no different. We make sure we get the maximum value, maximum return, for that gallon. Right now it's in the United States.

We are very thankful for the capital support we've had from the Canadian government, and the Province of Ontario, as well as the Province of Quebec in building those capital facilities and facilitating that to happen. The challenge we have now is how do we take that capital and allow that product that's developed by that capital to be used in Canada?

I'm happy to announce that our first installation of a boiler for district heating will happen on Heron Road in a federal government complex. It's a demonstration facility at this point, but we hope it's a start of many things to come, whereby our liquid fuel from our Renfrew facility, our Ottawa valley facility, will stop in Ottawa where some of the product can be used, instead of driving through Ottawa, and hopefully lend a mandate to the federal government to expand on these things. We provide for rural economic deployment of our resources and our facilities. We have a tremendous socio-economic impact as well as our carbon reduction impact in this area.

Again we're very thankful for this committee. I don't need to tell you the state of the forest industry, that innovation is required, and again as a case study it's happening. I hold an open invitation to be able to share more about what we do, how we do it, our customer base, our solutions, and our partnerships.

I thank you for your support, and I continue to look at opportunities by which our product can be used in Canada.

● (0905)

The Chair: Thank you very much.

Mr. Mackett.

Mr. David Mackett (Community Development, Whitesand First Nation): Thank you, Mr. Chair, and thank you, committee members.

Craig and I are here today representing Whitesand First Nation. We're here to tell a story of one community's vision of the bioeconomy. Craig and I are the community leads on this project since 2009. It's been a very challenging journey that we've travelled to get this project to where it is today.

Before I begin, I should note that in 1992, Whitesand and the hamlet of Armstrong proposed a new way of forestry that included a bio-cogeneration plant to help displace diesel use in our community. That never went forward, and that's a million litres of diesel fuel a year, just for electricity. We've kept this vision alive, and we thought the best way to talk about it was to provide a presentation. I don't know if we'll get to all the slides, because we could talk about this for days.

We'll begin with the presentation. If a picture says a thousand words, our cover slide says ten thousand, and we really believe the approach we put together meets the need for energy independence, environmental integrity, and economic development all through the bioeconomy.

We came together in 2009, Craig and I, and developed the community sustainability initiative. It's five pillars of sustainability, it recognizes all the issues we face as a community, and it recognizes how we can look at a new future by developing a different approach through the bioeconomy.

Today we're just going to talk a bit about where we began, where we are, where we are heading as a community, and how Natural Resources Canada has played a significant role in getting us to where we are today.

Whitesand is 250 kilometres north of Thunder Bay. We're not on the electricity grid, and we will never be connected to the grid. We were identified in the long-term energy plan as never being connected. Of course, we also don't have natural gas, so we're a fully diesel-dependent community for both electricity and home heating. We have a population of about 1,200, with 400 currently on reserve.

I'll be quite blunt about this current reality we're in. We're on diesel fuel, we're in the middle of the boreal forest, we're nearing max power for housing, and we can't do anything for economic development because there isn't enough power. Past industry use was to take the trees and take them to Thunder Bay for processing. That process failed; the industry collapsed. It was horrible for a lot of people, but it opened the wood supply for us through a competitive wood competition. That really was the window that moved us forward.

We also have a very high unemployment rate—70% to 80%—so we're always in recession. Social assistance is the bulk of family income.

Many are without grade 12. They leave public school in Armstrong and go to Thunder Bay; many drop out, which just continues the cycle, including drug dependencies. We don't shy away from that. It's something we have to deal with, and this project has been designed to help do that.

What is our project? It's everything. It's a five-megawatt combined heat and power plant from biomass, which will replace diesel electricity. It's a 60,000- to 90,000-tonne wood pellet plant, so we can convert our homes to wood pellets from diesel and ship pellets elsewhere throughout Canada. It will support other industry as we get full stand utilization—as we're using hardwoods, primarily—and it will reduce GHG emissions.

Currently, through partnership funding from Canada, Ontario, and Whitesand, we have prepared the site for construction. We've done all our road layouts, we've got the pads ready for concrete, lighting is in, and all the roadwork is in. Our plan is to go to full construction next year. This project cost us $4 million in total, but again it was a partnership approach, and Whitesand has put in a lot of money through the years in the project.

We've had to do many complex things. We had to get the Ontario renewable energy approval. For a five-megawatt biomass plant? We're not burning tires, but it cost us almost a million dollars to do. We had the environment minister come to us and apologize that he was talking about the green, low-carbon economy and making us do a REA.

● (0910)

We didn't fight it. We figured out a way to do it, and we've done it. It's the first of its kind in Ontario. All of our engineering is completed, and we have the first-of-its-kind power purchase agreement in Ontario, which is a 20-year renewable revenue stream for the electricity we're producing. It actually gave us an economic development adder, which recognized the social, economic, and environmental benefits of our project. It's a unique way of looking at the bioeconomy and, if you're going to produce power, how provincial governments can support that type of initiative.

We've completed negotiations. Even though we had a directive, which is public knowledge, it still took us over two years to negotiate with IESO for those contracts, but it's the first of its kind.

What does that mean to us? It means 60 full-time jobs. If you think 400 people and what 60 jobs does at $3.5 million in annual wages, it's significant. If you move that over to Toronto or Ottawa, what type of plant would we be talking about? It's all through the bioeconomy.

How did we get this far? Craig and I sometimes look at ourselves and we say we don't know how. We've lived fiscally...writing funding proposals, looking for support. It's not a traditional project in the forestry industry where a bigger company could come and say, we see an opportunity, let's do our feasibility study, let's do our engineering, and let's build the thing. We haven't been able to do it that way. It's been very difficult, but we've kept this going based on the need of the community. What we're trying to show in Canada is a completely different way of looking at things.

Without NRCan, especially the indigenous forestry initiative, we would not be here today. That support has helped us at all of these steps, along with Ontario funding, and both FedNor and INAC have been involved. However, Natural Resources Canada has been our mainstay and our main helper. We've even used some of the scientific research reports to help move the project forward.

This rather complex-looking slide is about looking forward to 2025. What does the sustainable bioeconomy look like? We're now having the local forest for a local community maximizing benefits from it. We're creating our own electricity. We're producing economic development of a wood pellet plant. We're going to use waste heat for a greenhouse for fresh vegetables for the community.

It's full circular. We're going to look at new housing and using some of the wood for our own houses. All of our circles and community sustainability are within it now. As a special note, by the year 2050—and this was an analysis done by both Canada and Ontario—we will be reducing 488,000 tonnes, or 163 tonnes per person, of GHG, compared to Ontario's target of 26 tonnes per person. It is revolutionary. It's something that is based on Swedish and Finnish models. It's a bioeconomy village.

To close, I think what drives me and Craig in this project is the notion that if you're on social assistance in Canada, you're living in poverty. I don't believe that with the wealth and resources from our forests, from all of our natural resources, and from our innovation in Canada, anybody should be living in poverty.

For the committee, we're not here to get more or do more. We're here just to let you know that the bioeconomy is something special. It needs any type of support, as these gentlemen have said, that can help it flourish. What does it mean for social growth, economic development and environmental responsibility? In a community like Whitesand, carbon reduction through the bioeconomy is poverty reduction, and to me that is one of the loftiest goals anybody can try to do.

We want to thank you for your time, and today is a very big day for us. At the Treasury Board Secretariat of Ontario this morning, the Minister of Natural Resources and Forestry is presenting our project to the Ontario greenhouse gas reduction account for $30 million in capital funding.

● (0915)

That is hand in hand with Canada's low carbon economy leadership fund, which Ontario nominated us for as their priority project. That would also give us $20 million. That $50 million in capital funding has allowed us to secure $22 million in financing as a small first nation.

We're very confident that this is going through and that we'll be beginning construction this year. We extend an invitation to this committee to have a meeting up there in two years' time when we're built, to see what the bioeconomy looks like.

Thank you.

The Chair: Thank you very much.

Mr. Harvey, you're going to start us off.

Mr. T.J. Harvey (Tobique—Mactaquac, Lib.): I'll start with David and Craig.

First of all, thank you very much, everybody, for coming. Thank you for presenting such an impassioned speech on your project and the effects it's going to have on your community, both short term and long term.

You answered part of my question in your closing comments, but I was curious. That $70 million, roughly, what does that entail? The cogeneration plant won't be $70 million. You're going to produce five megawatts, right?

Mr. David Mackett: Right. It's both the CHP, the wood pellet facility, and a wood merchandising yard.

We're doing something rather unique. It's not done in Ontario. MNR has agreed to allow us to bring all the wood onto our site, both hardwood and softwood, full stand utilization. That will optimize that wood for other primary users such as Resolute Forest Products, and we're looking at a hardwood-softwood exchange. They have lots of hardwood that they can't do anything with. They can't get into stands because they're mixed, so they're going to bring us a trailer full of hardwood, and they're going to take softwood. The total projected is about $72 million capex for the entire project.

Mr. T.J. Harvey: Okay.

You looked at doing additional projects based on your waste steam and....

Mr. David Mackett: That's what's unique about it. Having the CHP provides us efficiencies in the wood pellet plant for drying biomass and the pellets, and with the waste steam from those situations, we want to do a greenhouse. The price of vegetables in these communities.... Further north, it's even more than us.

Everything we've done in our project is to maximize benefit for the community, for jobs, and that's very challenging. We have some skills issues. We're working with a bunch of funders. Ryerson University has come in and provided us with an incredible amount of funding to hire a workforce coordinator.

It has been so hard. There are so many pieces to the project. Now we have a plant, but do we have a workforce? We have so many people who have dropped out of high school based on no hope and no jobs. It's a very hard thing to describe unless you've been in it and live in it.

I think Craig could even talk about the drug treatment program. It's part of our project. I know the bioeconomy is why we're here today, but everything is related in an indigenous community like ours. We started our own community-based drug treatment program with our own funding, and it ended up being ranked one of the highest in Canada, and then it actually secured funding.

I think you have 36 or so people in there now, right?

● (0920)

Mr. Craig Toset (Business Development, Whitesand First Nation): Well, I don't have 36 people in there, but I believe the last number I was told indicated about 55 people enrolled in the program. They're not all on the drug treatment program. Some are just taking some counselling.

We're four years into the program. There are a couple big statistics that I like to talk about. Since the program has started, I believe there are eight clean people now who are totally off drugs, not requiring Suboxone. I think nine people have jobs, five of which are full-time and four of which are part-time. Three child and family services cases have been closed with children returning to their parents. I believe that's the biggest one. This whole program was all started because of our project, the CSI project.

Mr. T.J. Harvey: David, I'm going to run out of time, but you touched on your second facility. I believe you said Sept-Îles.

Mr. David Boulard: It's in Port-Cartier, Quebec, near Sept-Îles.

Mr. T.J. Harvey: Was that location chosen because of proximity to wood supply ? What was the driving force behind that location? It's not really a common....

Mr. David Boulard: That's a good point. It is on a deepwater port, so it allows access to the St. Lawrence to loop around to the U. S. northeastern seaboard, but it was really about partnerships. Our business is really focused on partnerships. We know what we do really well. We make liquid wood really well.

As far as markets are concerned for biomass security, security of supply, harvesting, accumulation, transfer points, that's not our expertise so we were able to do a joint venture with an innovative forest products company called Arbec, which is a Quebec regional firm, and Rémabec. They look after the security of supply because, again, in order to get financing in the forestry industry, security of supply is key.

We were able to knot that through a partnership, and that partnership was there. Because of its remote location, that mill is susceptible to the inability to get rid of residual fibre. There are not a lot of local exits for it, so they looked at our opportunity to become very synergistic to support the sustainability of the mill and its customary products, and at the same time, to remove the threat of excess residual, which ultimately if you can't exit it, you lose it.

Mr. T.J. Harvey: Mr. Marshall, where do you see the biggest opportunity for the federal government to build on what's already being done to help foster growth and innovation in the sector?

Mr. Alexander Marshall: I think when it gets into the bioeconomy, it's taking a broader perspective. I think NRCan and the forestry side have done a really good job of developing their framework, and it works well for forestry, but I think we need an all-encompassing approach here in Canada, which is broader. It's one thing to have the forests and the raw materials and do a supply push and try to put products out into the market. You need market pull, and where is the market pull going to come from? It's going to come from downstream, down these value chains, whether that be automotive, aerospace, furniture, construction materials, or whatever. Linking those all together and getting them all working together, pulling and pushing together in Canada, will help us to be successful in this space.

When you start looking at it from that perspective, you need all of the supply side groups, which is forestry and ag, and you need the market pull side, which is economic development, and you need the capability to do it, which means environment, to work together with industry to be able to make these things happen in a coordinated way. If it stays fragmented, you won't get maximized value out of it, and we will lose out to other jurisdictions, which are getting much more coordinated.

The Chair: Mr. Van Kesteren, you're up next.

Mr. Dave Van Kesteren (Chatham-Kent—Leamington, CPC): I have just a few short questions for you, Mr. Boulard. I'm a guest here, so they are being kind to me. I just want some clarification.

How hot do you have to heat this sawdust before it turns to liquid?

Mr. David Boulard: We vaporize it, so it's about 400 degrees.

Mr. Dave Van Kesteren: What fuel do you use to do that?

Mr. David Boulard: There are three products for our process. I will get to it, but we use two of the by-products to generate the heat, so when we hit steady state it's all internal use of the feedstock. There's no external requirement for heat energy.

● (0925)

Mr. Dave Van Kesteren: This fuel stays in liquid form?

Mr. David Boulard: It does.

Mr. Dave Van Kesteren: What's the trade-off? What are the gigajoules, for instance, on that?

Mr. David Boulard: We're at approximately 55% of the heating value of diesel.

The Chair: Thank you.

Mr. Schmale.

Mr. Jamie Schmale (Haliburton—Kawartha Lakes—Brock, CPC): Thank you, everyone, for being here.

Just so you know where my line of questioning is from, we've had a series of meetings on this topic for I don't know how many weeks now. I can't speak for everyone, but I think we understand the value that groups like yours bring to the forestry sector. However, as we go through this, we've noticed something that we might want to take a round at. We're trying to understand the role of government, and that has been a normal question we all have here. We're wondering if the traditional way government has been involved is working for everyone.

Some of the witnesses beforehand have come up with some different ideas. Each one of you has mentioned it, kind of. This isn't Liberal versus Conservative, because some of this funding was under the former Conservative government. This is basically to find out if what the government is doing is the right thing, or if we can maybe make some changes to it. That's where our line of questioning is coming from, just so you know. These questions aren't to badger. It's to get more information.

I will start with you two gentlemen. You're absolutely right. I couldn't agree with you more. The biggest way to solve the issue of poverty is a job. It sounds as if you have a well-paying job, not a government program, and that's what you want to do for your citizens. That is remarkable. That's one of the reasons socialism doesn't work.

Sorry, Richard.

Mr. Richard Cannings (South Okanagan—West Kootenay, NDP): So you don't want the government to give them money?

Mr. Jamie Schmale: No that's not what I said. What they did say, which was very interesting, was that they were forced to spend about $1 million, they said, to fight government, or go through their process.

Because of where you are in your funding you were forced to use $1 million of taxpayer dollars to fight government for a project that seemed to hit all the right cylinders on what another level of government was looking for. There has to be a better way.

Mr. David Mackett: Exactly. What happened here for our project is the project is ahead of policy. We've had to go through things because nobody had done it before. Craig and I were told we'd never get the wood or we'd never get a power purchase. Were we kidding, we thought they were going to give us a power purchase agreement? Then Environment came along and said we had to do a renewable energy approval for a five-megawatt biomass. It made no sense; they're all over Europe.

Mr. Jamie Schmale: That's going to create jobs. There's precedent, there is opportunity.

Mr. David Mackett: It's going to create jobs. That's why the Minister of Environment...they're talking about a fast track. If you have a project that clearly shows benefits to the environment likes ours does, plus socio-economic gain, why are we saying you have to go through this when we should straight-line it? We would be two years ahead of schedule.

Mr. Jamie Schmale: How many years; two years behind this fighting government?

Mr. David Mackett: It took us two years to do the REA.

Mr. Jamie Schmale: That's two more years you've been using the digital field, two more years your people have been dropping out of high school, have been living in poverty, with despair. That's two more years to fight government; you could have been ahead of the game.

Mr. David Mackett: It's very difficult, but I think I see that change now. I really do. I see a change in all parties. Both governments recognize we need to do things differently. We need to combine, we need to stop the silos, environment funding from the low-carbon economy comes from the Ministry of the Environment, yet it's a forestry project. It all comes together now. We've had to live on fiscal to fiscal, and I think one thing where the government...we developed a funding round table. We invited everybody to the table, federal and provincial, every program, even if they didn't have funding.

We almost challenged them and said this is what we were trying to do; could they help us? I think what you can do as a government... Ontario is doing more of it. Come together and look at each other's funding programs and how they can help. Some of our funders couldn't fund one particular thing in a project. They couldn't fund project management, yet project management is such a key thing in a project like this, but the other funders said no, that was one of their cost categories. We left it up to Canada and Ontario on most occasions to figure out the right mix in helping us move forward. The fiscal to fiscal is very hard when you've got a project to develop like this. As I say, if we had been a bigger company, or had the investors to come in and do it, we would probably have been done in three years' time, not the time it's taken us since 2009.

● (0930)

Mr. Jamie Schmale: I agree with you, and again this isn't Liberal versus Conservative because this has been happening for years. We're just discussing issues that might improve the system.

I have a question for both of you. I only have a minute left so let's see if I can fit this in.

David, you mentioned your project in Quebec and Mr. Marshall brought that up as well. In this project between the Canadian and Quebec governments, is a $76.5-million investment, if I read your news release correctly, about $27.4 million in private sector...? That's about 26% of private sector dollars in this project, and the rest is government dollars. We recognize government has a role—and I have 15 seconds—and we also want to reduce the risk to taxpayers. Is there a formula that might work better? Obviously government money works well, but is there a better way?

Mr. David Boulard: Is there a better way? I think there are two aspects. When you're looking at a project you're always faced with capital, and you can't go to a bank for innovative products. You can try. I'm thrilled to see BDC and EDC funding that will free up capital for organizations like us, and we're in discussion with them, but the reality is there is a funding gap. Our project is to confirm that it works. The ability for the government to step in where there aren't other sources of funding—

Mr. Jamie Schmale: But to that level?

Mr. David Boulard: I think so. I think the reality is there's a gap. I can't define the gap.

Mr. Jamie Schmale: What about what Mr. Marshall said about a tax cut?

The Chair: I'm going to have to stop you there. I was trying to let him answer.

Mr. Jamie Schmale: I did have questions. We can talk after.

The Chair: Mr. Cannings, over to you.

Mr. Richard Cannings: Thank you, all, for being here this morning. I'm going to start with Mr. Mackett and Mr. Toset.

It's just a wonderful story that you've told here, very inspiring. I've been hearing from other first nations. I'm from British Columbia, and I was just at a meeting in Prince George where the Fort Ware First Nation talked about their new electrical generation plant using wood to get them off diesel.

You say you're the first of your kind in Canada; I'm not sure what parameters you put around that. Is there any dialogue among first nations across Canada on this? Are you going out and telling everybody that story? This is something we hear all the time, about getting first nations and other remote communities off diesel, what they could do. Also the story of getting that wood from the big companies is another story I hear.

You seem to have come in at a lucky time, but I'm just wondering if there's a role that the federal government could play in talking to the provinces, because that allocation is a provincial thing, getting allocations for communities for this purpose.

Mr. David Mackett: A couple of things. It's the first of its kind in the fact that we're doing the wood pellet plan as an economic development piece. Other communities have replaced their electricity, but nothing on this magnitude. We have been all over Canada, from Whitehorse to Vancouver. We did a first nations environmental conference a couple of weeks ago, and the response from the other first nations was incredible. What we're trying to develop is a “first nation to first nation” business relationship, where we can help those communities get off diesel through the use of our pellets.

It's a very unique concept. They're supporting our business; we're supporting them. On the access to fibre, I don't know about the other jurisdictions, but we had to go through the competitive wood supply. When the industry collapsed in 2008-09, there was an abundance of wood.

We didn't wait around. We put a team together and we put in a business plan and said that this was what we wanted to do with the wood. People defend their wood, even when they're in bankruptcy. They say, “That's our wood.” We've seen that a lot. “No, you can't take my wood.” Well, they're in bankruptcy.

What we've done, I think, is just fit a non-traditional forestry project in a traditional forestry area, which is now going to benefit traditional forestry. We're doing those things they normally can't do. To access fibre in the other provinces...I don't know how they do it in each province.

In Ontario, you apply for the wood. If there's available wood, you give them the business plan and a facility licence application, and if they accept that, you have the wood.

● (0935)

Mr. Richard Cannings: Thanks for that.

To follow up, it is inspiring. We always hear of these remote first nations that have huge unemployment, huge social problems because of that poverty. To hear this story where you're headed in the right direction is really remarkable and inspiring.

Mr. David Mackett: Thank you.

Mr. Richard Cannings: All you need is access to that resource. In this case it's forestry. It might be other resources elsewhere, because all these remote first nations have resources all around. That's one point.

On the other thing you've talked about was getting access to investment capital. You needed that government capital as a lever to get there. I'm just wondering if you could comment on the difficulty that first nations experience getting access to capital that private companies would not—

Mr. David Mackett: How many banks did we walk into at the beginning, and we were basically told, “Nah, it's a forestry project. It's a first nations project. What are you going to put up?” Great. We would say that we had a power purchase agreement, and their eyes would open.

On that power purchase agreement, part of the negotiation is that it must remain in Whitesand First Nation. Nobody can come in and just take over the power purchase agreement. It's an extremely attractive revenue stream.

Even with that, we weren't openly welcome. On that gap acuity, the type we're talking about, let's make it a $75-million project. We can finance $25 million of that, and we're looking at those two capital funding programs. That's why they were designed for projects like ours.

The greenhouse gas reduction account is from carbon credit sales in Ontario, and it's specifically designed for projects such as ours that are going to build the low-carbon economy, the bioeconomy. Those are avenues, I think, any type of project can go into for it.

It would be very difficult without those programs for us to go to build. I don't know how we could do it.

Mr. Craig Toset: We couldn't.

Mr. Richard Cannings: Mr. Boulard, could you elaborate on this problem with U.S. competition, how that works?

Mr. David Boulard: Just quickly, policy is a global issue. When we develop Canadian renewable energy policy and carbon reduction credit systems, we like to think it's a “made in Canada” solution. Renewable energy and carbon reduction are becoming a global competition, so policies have to be competitive. All we're talking about right now is the U.S. policy being more competitive, by which renewable fuels are accessible into a marketplace for a higher economic value than Canadian policy.

To say it again, the credit development that exists in the United States allows us to price our customer so that a customer in the U.S. can pay more for carbon reduction than a customer in Canada. Until our policies become competitive, that may always be the case. When we look at policy, whether it be environmental policy, credit policy, or renewable fuel standards and carbon reduction credits, we have to look at them in a global context as well as a domestic context.

Our type of fuel is just like crude, petroleum crude; you put it in a tanker and you ship it all over the world. The vision for liquid wood is similar. We already have 40 railcars. We ship it by railcar. We ship it by tanker truck. When our facility comes online in Q2 in Quebec, we're dealing with CN Railway to get that throughout the United States marketplace via railcar.

We're looking at these products as competitive. When I call myself an engineer of wood products, that's what we are. We line up with the trains that send two-by-fours down to Georgia and Florida... oriented strand board fibre and MDF fibre, we're the same thing, but on the energy side, when we look at our desire to reduce carbon, we have to also appreciate there's a competitive influence there.

The Chair: Thanks, Mr. Cannings.

Mr. Serré.

Mr. Marc Serré (Nickel Belt, Lib.): Thank you to the witnesses.

I have so many questions and only seven minutes. Those were great presentations.

I want to start off with Mr. Marshall.

You talked about the first petrochemical cluster in Sarnia and building that cluster, how important that is for the value chain and jobs when you look at the R and D, right to the commercialization, with the value of that, and some of the challenges with that. I want to talk a bit about the innovation centres and the clusters, but, first, you indicated in your presentation that there were six policies that you would recommend to the federal government with the standards, the regulations, and you indicated R and D.

● (0940)

Mr. Alexander Marshall: They're in the forestry bioeconomy framework, so they're not actually ours. I was just referring to them because they came out of the forestry framework. They would be better asked to the guys in the NRCan forestry service.

Mr. Marc Serré: Perfect. Because those are good recommendations, I also want to make sure we get more in-depth recommendations as part of those six policies.

We've talked a bit about the issue of government support, R and D, and commercialization. I want to get your sense of what those government investments linked to the private sector have done to foster innovation, to foster growth, and to support job creation in this industry and how important it is to the industry to move forward and really look at this billion-dollar market in Asia, Europe, and the U.S. in the future, because we're kind of falling behind, and we need to step up. I just want to get your sense of that.

Mr. Alexander Marshall: I'll talk mostly about the experience we have at Bioindustrial Innovation Canada, because we're working within the cluster structure. Our focus is commercialization, so we basically work directly with early-stage companies to try to move them through the valley of death to successful commercialization. I think that segment of working with those early-stage companies and helping them to succeed in Canada is really very important.

I came out of the traditional petrochemical industry. I worked for Polysar, Bayer, and Lanxess over my career. What I learned from my career working for a multinational that was not Canadian-based is that multinationals that aren't Canadian-based don't really have a long-term vision about Canada. We're basically a business entity for them.

If we're really going to be successful in creating businesses in Canada, we need to build and strengthen our own Canadian-based companies. We have a few large Canadian multinationals, but we don't have enough. Developing and supporting innovation in early-stage companies that have developed their technologies through Canadian universities, or wherever it came from, through all these awards from NSERC and the various innovation and support structures we have in Canada, is really very important. The challenge we have, though, is a lot of those technologies get developed, and then, ultimately, funding comes from somewhere in the United States, and then they get pulled away and commercialized elsewhere.

It's really very important that we put a big focus on commercializing technologies in Canada and having the mechanisms in place to support the commercialization. I focus that differently from innovation, because we are really good at innovation. In commercializing, there are so many aspects to it that can cause you to fail. Finding ways to deal with those pieces of commercialization that these companies have to overcome is very, very important.

Mr. Marc Serré: Regarding commercialization, we've heard this from many industries. We need to really work on that aspect.

Mr. Boulard, is that an area that you want to expand on, for Canadian companies to compete against the U.S. companies? What are they doing differently from us?

Mr. David Boulard: From the Canadian standpoint, I think what we do really well is capital. I think we do gap capital really well.

Where the U.S. does really well is market access and openness. I think that's what we're experiencing. We're able to build facilities in Canada, at least the first major commercial ones, and therefore, spin off to others. We don't have a Canadian market. We have to go to the U.S. for market and market access.

I think those are some areas that we could improve.

Mr. Marc Serré: Thank you so much.

Now, in two minutes or less, I want to focus on Mr. Mackett.

It's fantastic what you're doing. I commend you on the work and the persistence. When you're the leading edge and on new ground, as a pioneer, obviously there are going to be some challenges.

Can you make sure the clerk gets the presentation? I want to follow up on that.

How can we support? We've heard so many times from a first nations' perspective, across Inuit territories, through northwestern and northern Ontario and B.C., to get off diesel fuel...even mining companies to develop more resources.

How can we utilize your experience since 2009, to promote, expand, and build upon what you're doing across the country in other first nations communities?

Also, when we look at the 60 jobs, I'm pretty sure there are going to be a lot more indirect jobs that will come after that....

● (0945)

Mr. David Mackett: Exactly.

Mr. Marc Serré: ...economic impact.

Mr. David Mackett: You guys and your time limits.

Canada is doing the pan-Canadian framework on reducing diesel. You have some new programs coming out that will help communities do retrofits or fuel replacements. Ontario's doing the same. Ontario's actually moving to another treasury board to convert our homes now from diesel furnaces.

How do you support it across the whole country? What happens a lot is that these funding programs are competitive. Some first nations.... I'll have to say that we're one of them. Craig and I know how to write funding proposals; we've been very good at it. It turns into a competition and somebody is turned down. At times, I think we need to prioritize. Do we look at the largest or the most needy? It's very difficult to cross the whole landscape.

I met a girl from Austria. What they did, to get off diesel, and what it did to their gross domestic product.... Now, they are world leaders in pellet stoves and boilers and district heating systems, which are manufactured there, that now come to Canada. We're looking at a few. It's the same in Finland. By building this economy here.... We just got another offer. All of our pellets are going to Europe, right now. Why? We were just contacted by Canadian Tire, which would be great for us. We need to build that domestic market, so that people....

The price of diesel and propane in northern Ontario is crazy. Many people have traditional fireplaces, with wood, those things. That's even getting harder. I'm 61 now, so it's hard for me to do my firewood every year. I'm going to convert to pellets.

I think Ontario has a new program coming where you can do retrofits.

First nations are so innate.... If you put in one small heating system, electrical system, or district heating system in a first nation, you're creating one, two, three, four, or five jobs. That may not sound like a lot, but in a lot of these communities, that's the spinoff. The spinoff is that you're building the economy, capacity, and employment opportunities.

It's very hard to answer your questions very quickly.

The Chair: You did a good job and we're grateful for that.

Gentlemen, thanks to all of you for coming out this morning, to give your very interesting presentations. Your evidence will be a great help to this study.

Unfortunately, we do have time constraints. We could spend a lot more time discussing this with you, but we just can't, which is unfortunate.

Again, we're grateful. We will suspend for two minutes, sharp.

● (Pause)

● (0955)

The Chair: We're going to get under way here. We have one presentation in this hour and then we're going to stop at about 20 to, because we have a few minutes of committee business to deal with at the end.

We have, from the National Research Council of Canada, Éric Baril and Nathalie Legros.

Thank you both for joining us today.

Mr. Baril, the floor is yours for 10 minutes.

Mr. Éric Baril (Acting Director General, Automotive and Surface Transportation, National Research Council of Canada): Thank you, Mr. Chair. *Bonjour.*

My name is Éric Baril. I'm the Acting Director General of the Automotive and Surface Transportation Research Centre of the National Research Council. I'm joined today by Nathalie Legros, the technology leader for polymer and composite products manufacturing in the NRC advanced manufacturing program.

[*Translation*]

We are pleased to have been invited to speak with you today.

Before taking your questions, we would like to take this opportunity to briefly discuss with you where the NRC has been, what we are doing today in support of Government of Canada priorities and the Canadian economy, and, based on current trends, where we see the future of biomass research in Canada.

So to start, I want to share with you an idea of the scale and scope of the NRC.

The National Research Council Canada is a national organization with some 3,700 scientists, engineers, technicians, and other specialists, including 255 business and technology advisors through NRC's industrial research assistance program, located across the country.

[*English*]

Our 14 research centres operate out of 22 locations, spanning Canada's geography. You will find the NRC's ocean, coastal, and river engineering research facilities in St. John's, and our astronomy and astrophysics centre in British Columbia.

My own research centre, automotive and surface transportation, for example, operates research facilities here in Ottawa as well as four other facilities in Ontario and Quebec. Our work covers a broad range of research disciplines, the outcomes of which have changed the lives of Canadians and people around the globe. The 14 research centres are mobilized to deliver on 37 targeted R and D programs.

● (1000)

[*Translation*]

The NRC has been the Government of Canada's premier federal research and development organization over the past century. We have acquired a reputation for excellence, with breakthrough inventions such as radar, the pacemaker, the black box, canola, the Canadarm, a vaccine against meningitis, 100-year cement used for critical infrastructure, and the first bio-fueled jet flight in the world. Moreover, we are proud to claim the late Dr. Gerhard Herzberg, who won a Nobel Prize for his work in molecular spectroscopy, as one of our researchers.

Each year, our organization works closely with industry, conducting research and development work with over 1,000 businesses. We provide technical advice to some 11,000 SMEs, and we collaborate with close to 152 research hospitals, 72 universities and colleges, 34 federal departments, and 35 international partners.

[*English*]

The NRC is an organization that emphasizes collaboration and the convening of technologies. We are aligned with federal priorities, and today we focus on three core areas: delivery of business innovation, support for federal mandates, and advancing science and innovation through exploratory research.

The research conducted at NRC in support of the bioeconomy is highly interdisciplinary and multi-sectoral. That being the case, we conduct initiatives in bioenergy, bio-based specialty chemicals, and industrial biomaterials.

Today we will concentrate on industrial biomaterials.

[*Translation*]

Working directly with clients, we provide technical services, technology development support, and credible scientific advice to assist technology-based Canadian companies transform our country's renewable resources into sustainable, high-value products.

[*English*]

Over the past 20 years, the NRC bioproducts programs have contributed to accelerating the innovation process by ensuring that Canadian companies have access to the best and most cost-effective research and technology support available, to support the need to develop new processes and products, and to bring them to market as quickly as possible.

[*Translation*]

The NRC is active in the research and development of industrial biomaterials, defined as products made, entirely or partially, from renewable resources, to be used by many different industries. We focus on using the byproducts and residues of the agriculture and forestry industries to produce cost-effective, lightweight, and eco-responsible products that effectively reduce our dependence on non-renewable fossil fuels. This focus results in the enhancement of Canada's manufacturing companies and their competitiveness in the global market.

[*English*]

Our research transforms non-food-grade and renewable resources widely available in Canada, such as forest biomasses like lignin and wood-derived fibres, and agricultural fibres for development of value-added products.

We also work with renewable chemicals and bio-based materials, including cellulosic fibres, bio-resins, and bio-additives. These materials are used in the development of specific products, ultimately providing renewable alternatives to identical fossil fuel derived products.

[*Translation*]

The results of these products and processes are environmental benefits, stability, low-cost, and unique properties that benefit and differentiate Canadian industry in general and manufacturing in particular.

As the demand for energy and plastics continues to grow, the pressure to identify renewable resources for the production of such materials is increasing. Globally, economies seem to be shifting towards bio-based solutions. Driving this migration is an increased desire to be environmentally friendly and questions on the future accessibility and/or depletion of petroleum.

[*English*]

This shift presents opportunities in areas where Canada has clear advantages from its abundance of agricultural and forestry assets. With greater frequency, manufacturers are using Canadian biomass products that do not compete with the food chain to replace petroleum-sourced plastic and fibres. This can be seen in the transportation, packaging, and even construction industries.

The biomaterials sector is of strategic importance to the growth of Canada's bioeconomy, improved environmental sustainability, and job creation.

[*Translation*]

Bio-products can effectively contribute to the development of sustainable materials for manufacturing industries. A number of these bio-products have already been implemented in automotive and construction today. Currently, most vehicle interiors incorporate bio-composites made with cellulosic fibres that can come from hemp, flax, wood or cotton. Another well-known example is the wood fibre composite boards that have been used in housing in North America for over a century.

[*English*]

One illustration of the potential for bioproducts is the collaboration between NRC and Domtar. We have worked together on the transformation of lignin powder into a product in a pellet form. This form can be handled and used by the manufacturing industry for the production of plastic parts without going through the costly step of melt compounding. This collaboration has led to a commercial-scale demonstration at Domtar's Canadian-based operations, and application developments with funding support from Natural Resources Canada.

[*Translation*]

Technologies that like these that we are developing open new higher value markets for forest biomass products and enhances competitiveness. Canadian manufacturers able to produce greener plastic products will create new economic and employment opportunities.

Earlier, I mentioned lignin and I would like to come back to this innovative product. Lignin is the second most abundant renewable carbon source and also a byproduct of chemical pulp mills. Previously, as lignin was considered a byproduct, it was primarily used as a low-grade fuel. However, lignin now is used to replace conventional petroleum-based polymers.

● (1005)

[*English*]

The lignin-based polymer products are not only cost-competitive and cost-effective, but are also more environmentally friendly as compared to petroleum-based counterparts. Proofs of concept with plastics containing lignin were conducted for insulation foams, automotive seating, various moulded parts, construction panels, and plastic films. They can be formulated and processed in conventional equipment.

In addition to lignin, we are also concentrating our research efforts on the utilization of Canadian wood and agricultural fibres for the production of biocomposites. The NRC has worked together with the automotive supply chain to develop cost-effective, light biocomposites for automotive interiors. The project outcomes provide effective solutions in converting Canadian cellulosic fibres into eco-responsible interior products. This ultimately contributes to the Canadian economy by generating wealth and creating jobs, while reducing pollution from vehicle production and in-service maintenance.

[*Translation*]

Overall, the NRC strengthens Canada's role as a leader in the development of sustainable bio-sourced materials and technologies.

[*English*]

Through collaboration and partnerships, like the examples offered, we are capable of integrating our technical expertise with the entrepreneurial spirit and business know-how of Canadian industry leaders. Together with industry, we are creating solutions for the manufacturing of new, lightweight, cost-effective material.

This technology will be used in future vehicles and homes.

[*Translation*]

In the course of achieving these impacts, NRC will lead the way in collaborative research and development with other science-based departments.

We will be validating hypotheses and claims, developing new knowledge, asking new questions, providing validated answers and solutions, and ultimately filling current knowledge gaps.

These research and development activities will be invaluable for industry when responding to new business opportunities created by the rapidly emerging bio-economy. Further, our research and development activities will be relevant for industry by ensuring that solutions are cost-effective and available where and when needed.

[*English*]

Going forward, we are equally well positioned to convene the right stakeholders to work collectively to play a major and distinct role in achieving Canadian goals for a vibrant bioeconomy. We accomplish this by supporting Canadian manufacturers and their supply chains, strengthening their research and technology development, product innovation, and manufacturing process capabilities. This, in turn, results in the successful development of commercially viable bioproducts and systems. This will make a difference to Canadians now and in decades to come.

[*Translation*]

To close, it is the NRC's breadth of experience, our unique scientific infrastructure, and our national scope, all combined, that enable us to bring players together from across Canada and abroad.

[*English*]

Thank you for your interest in the NRC. My colleague Nathalie and I will be pleased to answer any of your questions.

The Chair: Mr. Baril, thank you very much.

Mr. Serré, you're going to start us off.

[*Translation*]

Mr. Marc Serré: Thank you, Mr. Chair.

Mr. Baril, thank you for the research work you are doing across Canada for the benefit of all our industries.

You kind of answered the first question I had for you in your presentation when you spoke about the importance of government investment in the private sector. You mentioned things like pacemakers, vaccines, and the Canadarm. A number of examples show us that, without government investment, those innovations would not have seen the light of day.

As I understand it, it will be possible to strengthen Canada's position as a leader in the development of bio-materials, if the government invests in the private sector. Are you in agreement with that?

Mr. Éric Baril: Yes, I am.

Mr. Marc Serré: Thank you very much. So let us continue down that road.

We hear a lot of talk about industrial clusters in all sectors and about the importance that your research and development provides. We also hear a lot of talk about commercialization and some associated problems. The United States and some other countries have moved ahead of us in this area.

What support do you provide to industry in terms of bringing their products to market? What more could the government do?

● (1010)

Mr. Éric Baril: That is an excellent question.

In recent years the NRC has established industrial research groups. We do not limit ourselves to Canadian partners, which allows us to go beyond our borders and encourage Canadian, American and international players to come together to work on issues in research and development. Ms. Legros will be able to give you a number of examples later.

The industrial research groups allow us to establish contacts between the players in industry, to determine precise issues, to tackle those issues and find solutions together. That also allows us to create partnerships that will bring products to market. Commercialization is not done in isolation, but through partnerships.

Ms. Nathalie Legros (Research Council Officer, Automotive and Surface Transportation, National Research Council of Canada): If I may, I will add to Mr. Baril's answer.

Forest biomass is an important factor in our work. We are trying to incorporate it into biomaterials to be used in construction and in automotives. We are trying to establish projects that bring different partners together. For example, we arrange for manufacturers of biomass products such as lignin and cellulosic fibre to work together with automobile manufacturers to develop biomaterials that will be used in the next generation of vehicles.

Mr. Marc Serré: That is excellent.

We have heard a lot of testimony about the labour shortage in the industry. The private sector is looking for people.

What recommendations could we make to government to encourage women to join that workforce and to participate in the economy of the forestry and natural resources industries? What role is the National Research Council Canada currently playing to encourage women's participation? I am a member of the Standing Committee on the Status of Women, where we are talking about quotas, but that is always a controversial subject. In terms of funding, do you encourage the hiring of women in science, technology and engineering? What additional role could the NRC and the government play in order to increase the participation of women in those fields?

Mr. Éric Baril: That is an excellent question.

I can attest our organization's stance in that regard. In our research centre in Boucherville, the biomaterials group is led by a woman. That group is also managed by Ms. Legros, who is here today. So we have a lot of women and I think that they are living proof that women can progress in this career,

Mr. Marc Serré: Does the funding you provide come with any requirements? Should there be any?

Mr. Éric Baril: I am not personally involved in the funding side.

In hiring, we give priority of access to women. The research centre's advisory committee is made up of men and women equally. We encourage the presence of women in all NRC's decision-making processes and in its structure.

Mr. Marc Serré: Ms. Legros, do you want to add anything?

Ms. Nathalie Legros: I think I am a good example.

Mr. Marc Serré: Indeed.

● (1015)

Ms. Nathalie Legros: That is all the more true given that I work in the automobile and surface transportation sector, where there a lot of men. The fact that I am a woman working in a slightly more male environment sets an example and greatly encourages other women to become involved in sectors of the industry like automotives or construction.

In my opinion, the NRC is doing as much as it can to provide access for highly qualified women.

Mr. Marc Serré: Thank you.

In terms of possible international markets, do you have any specific recommendations? We have heard witnesses say that Asia, Europe and even the United States are further ahead than we are in the field of biomaterials and they are better at seizing the opportunities presented to them. Can you give us two or three examples of specific areas in which the federal government could work with the private sector in order to increase exports of our products to the world? This is a several-billion dollar market to which we presently have no access.

Mr. Éric Baril: It's a good question.

Ms. Nathalie Legros: I will answer your question with an example on lignin.

Lignin can be precipitated from black liquor, a by-product of the pulp and paper industry. We can do many things with lignin, particularly polyurethane foam, which is used in building insulation and car seats, as this foam material also provides comfortable seating. The NRC has developed innovative technology that allows lignin to be used in the chemical composition of polyurethane.

Allow me to draw a parallel with Ford Motor Company, one of the world's leading car manufacturers. Ford currently uses soybean oil in almost all of the car seats it manufactures.

If Canada can convince one or several car manufacturers or car seat manufacturers to use small amounts of lignin in the polyurethane foam that goes into these seats, I think that it would have a positive impact on the environment, as well as on Canada's economy and bio-economy.

Though Ford only currently uses small amounts of soybean oil, it does manufacture a considerable number of car seats.

In Canada, we now have this very interesting technology that allows us to integrate lignin into polyurethane foam, so we should find a way to take advantage of it.

[*English*]

The Chair: Thanks very much.

Go ahead, Mr. Schmale.

Mr. Jamie Schmale: Thank you very much, you two, for joining us here today, and thank you for your contributions to research in your fields, which is very impressive.

I wonder if I can start with your point number 17. I just want to clarify, and it doesn't really matter who answers.

In the sentence, “Driving this migration is an increased desire to be environmentally-friendly and questions on the future accessibility and/or depletion of petroleum”, could you just clarify what you mean by that last little bit there, the “depletion of petroleum”?

Mr. Éric Baril: The sentence means the depletion of access to petroleum. Petroleum is becoming more expensive because of difficulty of access, so that's one dependency we can see for these products, that the costs will become higher because of the depletion of easily accessible sources of petroleum.

Mr. Jamie Schmale: Are you seeing that more of access, or would you say...? It's hard for you to say this, but I'm trying to phrase this in a way that.... The stats I'm looking at don't indicate access. The stats I'm seeing are indicating that within the next 50 years demand for petroleum-based products is going to increase. We know that in the oil sands they're looking at 50 to 100 years of known reserves, and they're just starting to find new sources in Alberta and Saskatchewan.

Is it more the fact that more and more taxes are being put on these products, because what we're saying is that it's not basically access, and prices are fairly low?

Mr. Éric Baril: Yes, you're right. I cannot say more about that.

Actually, in here what we meant is certainly that there is a competition between products from a renewable source and petroleum products. The switch point between the two will be price-wise, when the petroleum price will be in competition or at a competitive price with the biosource products. I think that switch point will happen because of either accessibility, high demand of petroleum products for.... Petroleum products will remain for driving the transportation economy, for sure, and therefore, having plastics and other products sourced from other sources will leave petroleum for other applications and maybe pointed application for the petroleum use. I think that's the only thing I can say about it.

● (1020)

Mr. Jamie Schmale: In the study we've done, we've had various witnesses testify about where government plays a role, and we all do agree that government does play a role. But what we're noticing is that the level of government subsidies in some of these industries is almost putting in a very uneven playing field. According to the stats from my friend, in 2016–17, oil received only 6% of all government subsidies, and most of that was in the range of a tax credit through their exploration tax credit.

Is that what it's called?

Mrs. Shannon Stubbs (Lakeland, CPC): Yes, subsidies to energy.

Mr. Jamie Schmale: Yes, or subsidies to energy, where 75% of those subsidies went to wind power, and we know how that worked out for Ontario so far.

Marc, that was for you.

Rather than pitting sector versus sector—and I know it's hard for both of you to answer this question—we want all of them to thrive. When you're dealing with these new projects like lignin—and I don't know if you two know this—what level of subsidy is the government providing to develop that product?

[*Translation*]

Ms. Nathalie Legros: It's very hard for me to answer this question.

We develop technologies that allow us to replace certain polymeric products with lignin. These days, enormous amounts of plastics are produced. To replace a small portion of these plastics with lignin, which is seen as a bio-plastic, would already be interesting. Given that plastics are derived from petroleum, they are subject to the same price fluctuations. If plastics manufacturers can integrate small amounts of bio-sourced materials, they will be able to better control the price of the plastics they manufacture.

I'm not sure that I answered your question well.

[*English*]

Mr. Jamie Schmale: For the most part, yes. I guess what I'm trying to get at, and what we saw with the witnesses, is the fact that the industry is heavily subsidized and this is, again, as I pointed out, not Liberal versus Conservative or what have you, because a lot of the subsidies were in the previous Parliament too. What we're looking at are better ways, but also in this, in my opinion, the government should be enhancing our freedoms, not controlling our behaviour through the tax code or distributing wealth in a way that puts one sector at a severe disadvantage. We are noticing that with these products if there is a market for them, the market will pay for them. However, we don't want the oil and gas industry to be negatively affected as a result of some of these decisions because there are thousands upon thousands of jobs that depend on this.

However, if the market does move in a direction to replace some of these products, as you pointed out, that would be fine. I'm more curious about how much the government subsidized it because with this type of thing, of course, companies are going to be very happy with this. If a company can say, the government will help me in my research, that's a cost I do not have to incur, and that is a cost I do not have to roll into the price of my product on the other side of things, and which affects the price.

Is there anything else you want to add? That's what I was getting at.

Mr. Éric Baril: One of the challenges of this industry is there was a lot of investment in the upstream part of the industry, the genesis of the raw material, but very few investments into the downstream part, the application. Right now what we see is there's an interest in the downstream. Ford is an example. There are a couple of users that see the integration of the biomass products into their product as something good for their client. There's a demand for that, more and more. I think they're looking at answers for that. That will drive the product from upstream to downstream and create the value chain that you need to create to have a sustainable economy for these types of products. This is where we're playing right now. We're playing on the downstream part, defining products that will work for the business and for the industry that are cost-effective. We are not investing money in this, we're doing the research. We're the tier one of the research; we're the arm of the research and we're answering the demand and trying to get the best product on the market.

● (1025)

Mr. Jamie Schmale: Most of what I was saying was a rant, too.

Ms. Nathalie Legros: We don't think the bioproduct should replace—

The Chair: I am going to have to stop you there, sorry, Ms. Legros.

Ms. Nathalie Legros: —bitumen-based products, and really it's going to be an addition to a solution that can be used.

Mr. Jamie Schmale: Are we done? We'll take it off Marc's time.

The Chair: We're overdone.

Mr. Cannings.

Mr. Richard Cannings: Thank you, both, for being here today and I want to thank you, Mr. Baril, for mentioning the astrophysical observatory in my hometown in British Columbia. I don't know how relevant its research is to this study, but galaxies far, far away, who knows. Thank you mentioning that.

I just wanted to start off saying that I think Canadians have a lot of appetite for new products that will take waste streams, whether it's wood or agricultural waste streams, and turn them into valuable products that might reduce our greenhouse gas emissions, reduce what we have to put into landfills, or simply burn. I keep hearing a deep concern about especially agricultural products that might compete.... You said products that do not compete with the food chain, but even just by planting a crop, you're competing with the food chain in that sense.

I'm not happy to hear that Ford is using soy to make me more comfortable in my car, but the fact that we could, perhaps, use waste product from the pulp and paper industry to replace that is I think good news. On the other hand, I know you're in surface transportation, but you did mention the biofuel that was developed in Canada and used in some new jet fuel. Qantas just had their flight across the Pacific fuelled by *brassica carinata* oil that was developed here in Canada. One article that I read on that said that one flight—and the fuel was just an additive, a 10% additive—used 150 acres of plants. I think there would be some pause there if Canadians thought, boy, we're using 150 acres for every flight, is that a good use of our land, or the land anywhere on this planet, to grow food? I just wondered if you could comment on that issue, because it's a huge issue for many Canadians.

[*Translation*]

Ms. Nathalie Legros: Let's take the example of agricultural fibres. We're trying to use flax hay to produce flax fibres. In Canada, flax is harvested for its seeds. We use flax seed in different industries, and even in food. When we extract the seeds, we are left with bales of flax hay, which can be re-used to extract fibres. These fibres could be compared with wood fibres, which are used in different materials such as bio-composites. In Canada, we don't only grow flax for its seeds, but we could go further and extract its cellulosic fibres. It's the same thing for hemp and wood fibre. There is currently a huge supply of wood fibre, because it is a by-product of the paper and pulp industry.

Mr. Éric Baril: Another sector in which the NRC is active is the production of biofuels that aren't produced from agricultural sources, but from waste bio-digestion. Household waste and municipal wastewater are of little value, but they actually form biomasses that can be converted into biofuels. In fact, there are many other sources of biofuels.

The fact that biofuels are now being used to power airplanes demonstrates their potential. The source of the biofuels becomes important. It is quite appropriate and important to choose a source that has no impact on the food chain.

● (1030)

[*English*]

Mr. Richard Cannings: That was my point. I'm hoping that when we make decisions in the future, and now, we don't push ahead with products that are going to limit our ability to produce food. In a few years we'll have nine billion people on the planet, and we'll need every square metre we can find.

I wanted to get back to lignin, which seems like a very good-news story in Canada. There are pulp mills all across the country. Some of them are in various states of difficulty because of reduced demand for paper and pulp. I've asked this of other witnesses, but what's the volume of lignin that you can foresee being used in these industries versus the volume of lignin that is produced? I assume we have an overabundant source, and this will be just a small part of that. Can you comment on how this might boost the pulp and paper industry?

[*Translation*]

Ms. Nathalie Legros: First of all, lignin is extracted or precipitated from black liquor. To understand how much lignin can be obtained, one only has to look at the corresponding volume of black liquor. I don't think that all pulp and paper companies will be converting their black liquor into lignin, because they use the former for other things nowadays, but the volume of the latter can be very significant. Many companies such as Domtar and West Fraser already have semi-commercial lignin demonstration and production plants.

I can't tell you how much lignin is currently produced, but I can share statistics on the volumes of plastics. In 2013, 233 million tonnes of plastics were produced; in 2020, it is projected to reach 330 million tonnes.

We could consider the possibility of replacing a small portion of these plastics with lignin in very specific applications when possible. Either way, I think that there will never be enough lignin for it to be used in a wide variety of applications, at least not in the years to come. This is the way we should approach this. We have to work on the right products with the right applications. We have to identify where it is possible to replace some of these plastics with lignin. I specifically mentioned polyurethane foam, but lignin can also in part replace PVC. PVC is one of the most commonly used plastic polymers for construction, but it is not very environmentally friendly. We have achieved lots of progress with techniques to inject lignin into PVC while maintaining the performance of PVC products.

[*English*]

The Chair: Thank you.

Mr. Whalen.

[*Translation*]

Mr. Nick Whalen (St. John's East, Lib.): Thank you very much, Mr. Chair.

I would like to talk about the same subject as Mr. Cannings.

Could we establish standards for lignin use in plastics, kind of like the witnesses who spoke right before you mentioned needing standards to sell liquid wood as a biofuel?

Ms. Nathalie Legros: I don't know if standards are the most important thing right now. Lignin is produced in powder form, which is not always very consistent. What we really need to do is develop technologies that make this lignin powder usable by the plastics industry.

A good example of this is what we're doing with Domtar. The company's lignin powder is transformed into small granules that look like the plastic granules used in the plastics industry to produce moulded or extruded objects.

I don't really see the need to establish standards. It's more a question of developing solutions that allow existing industries to use these new bio-materials.

● (1035)

Mr. Nick Whalen: Is it easier for lignin to decompose? Does it stay in the environment for less time? Can you explain?

Ms. Nathalie Legros: Yes.

Lignin is a material that is just as compostable as cellulose in certain conditions. It can also be used to create compostable products. For the moment, we're trying to use lignin to partially replace plastics that aren't necessarily compostable as of now.

To answer your question, I would say that it is a compostable and biodegradable material.

[*English*]

Mr. Nick Whalen: In terms of other roles that government might play, in addition to setting standards or helping to develop the technology for the use of biofuels, is there another recommendation you might have—in addition to the recommendations we heard earlier—about how government can help the adoption of these biomaterials by industry?

Ms. Nathalie Legros: We put a lot of effort into the development of bioproducts, but more upstream, like the development of lignin, cellulosic materials, and so on. What is needed now is to bridge the gap with the end-user, so to help with communication and discussion between the biomass developer or transformer and the end-user like the automaker, the company that produces materials for construction, or the company that produces packaging. We're really trying to develop technology that bridges this gap and also put in place multi-party projects in which we can have all this—

Mr. Nick Whalen: Well, that sounds interesting. Maybe if I can do the comparison between the soy-based bioplastics that Ford is using and the lignin-based bioplastics that they hope they will use, who funded the research for the soy-based bioplastics, and how did that come about? Was it Ford itself?

Ms. Nathalie Legros: I don't have exact answer, but I'm pretty sure it's a combination of Ford and the U.S. government, because the soybean is quite important in the U.S.

Mr. Nick Whalen: Okay, so that seems like something that would be valuable.

On the foams you're talking about, that are made with lignin, would there be any concern about the decomposition of those foams if they were used in cars?

Ms. Nathalie Legros: There are some performance aspects that have to be evaluated, but we have good results so far. For sure, we also have to evaluate the long-term performance. We haven't done everything in terms of research, but definitely we obtained very good success with lignin in polyurethane foam.

It's not only the NRC that is working on that: a lot of universities are also developing polyurethane foam for insulation. What we do at NRC these days is really to develop polyurethane foam for the cushioning materials that they use in car seats, furniture, and so on. The volume is huge. It's very important. Again, it's a question of finding a way to use a little lignin in a lot of volume.

Mr. Nick Whalen: I'm not sure if you're able to answer the question on the economics, but if we had a barrel of lignin versus a barrel of oil, are we looking at selling a barrel of lignin for $60 a barrel to a petrochemical company to make plastic, and do you get more or less plastic out of the lignin? What are the economics of it?

Ms. Nathalie Legros: That's an excellent question.

When we work with the end-user, cost is the main issue. When we develop new products, we have to maintain the cost and increase the performance, or reduce the cost and maintain the performance. It's always like that. One advantage we see with lignin, for example, in polyurethane is that we try to replace a chemical component that is more expensive than lignin. That's really the way we can convince the end-user to adopt such technology.

Mr. Nick Whalen: Do you have some numbers you can share with the committee on the values?

Ms. Nathalie Legros: I don't have the number in my mind, but it's something that we can provide to you for sure.

Mr. Nick Whalen: As well, the sheet that you quoted from earlier would be helpful.

● (1040)

The Chair: You have one minute.

Mr. Nick Whalen: I have a final question, then, and it can be to either of you. If we make 233 tonnes of plastic this year—I think that's the number that you quoted in the previous answer—if we were to use all the lignin supply in Canada to replace plastic, how much would we get? If we used all of it, do we get 10 megatonnes? Do we get one megatonne? Do we get 100 megatonnes? I don't have a sense in my mind about what the replacement would be compared to oil and whether this is a significant or insignificant amount.

[*Translation*]

Ms. Nathalie Legros: That is a very hard question to answer.

Once again, we can't replace all plastic products with lignin. Lignin has its benefits, but also its drawbacks. We have to go step by step. For example, we could calculate the result of replacing 10% of polyurethane volumes with lignin.

Mr. Nick Whalen: Can you calculate that and send it to us?

Ms. Nathalie Legros: Certainly.

Mr. Nick Whalen: It would help us very much to get an idea of the scale of these issues.

Ms. Nathalie Legros: Yes.

Mr. Nick Whalen: Thank you.

[*English*]

The Chair: Thank you.

Thank you, Mr. Baril and Ms. Legros. I appreciate your coming and taking the time to join us today. Unfortunately, we're out of time, so we're going to have to let you go on your way.

We're going to go quickly into committee business for a couple of minutes.

[*Proceedings continue in camera*]