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Chair

Mr. James Maloney

Standing Committee on Natural Resources

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● (1530)

[*English*]

The Chair (Mr. James Maloney (Etobicoke—Lakeshore, Lib.)): Good afternoon, everybody.

We have 10 minutes set aside for committee business at the outset. There are three things to discuss, all on a preliminary basis.

One is the PDAC conference, starting on Sunday, March 5. We've received word back that PDAC is going to put on something on the Sunday for all members of Parliament, but it's going to be focused on natural resource issues, obviously with a focus on the members of this committee. Anybody who wants to go is free to do so. After that you're on your own—from a committee perspective, anyway.

Second, we have received word back from the Liaison Committee. They have looked at our preliminary travel budget proposal and have asked us to come back to submit a detailed travel budget proposal to be reviewed at the next Liaison Committee meeting on March 9, which is Thursday of the first week we're back after break week.

You should have a two-page document before you, with some numbers put together by our analyst and clerk for the eastern and western portion of the travel proposal we discussed earlier, which went before the Liaison Committee. We had to do up the proposal we submitted on the basis of a range, which we did, of between $100,000 and $150,000. This one comes in significantly lower, for a total of about $84,000.

What I propose, rather than getting into it today, is to let people take time to look at it and make some suggestions over the course of the next week. When we come back on Tuesday March 7, we'll set aside some time for committee business that day to deal with and finalize it so we can get it to the Liaison Committee the following day, the Wednesday, so they can consider it on the Thursday.

T.J.

Mr. T.J. Harvey (Tobique—Mactaquac, Lib.): I have a quick question.

If you look at the totals in this and at the accommodations, and if take Yellowknife, Calgary, Fort McMurray, and Vancouver, this breaks it down to $200 per night, for a subtotal of $400. It doesn't multiply it by the number of people on the committee. Why is that?

The Chair: That's an excellent question. To be honest with you, I haven't looked at this myself yet.

We'll look into that and try to fine-tune it.

Is there anything else before we move on from that item?

John.

Mr. John Barlow (Foothills, CPC): I don't want to keep this going too long, but I want to point out to everyone that I don't think we're going to support the travel. We didn't travel for the oil and gas, mining, and nuclear study, and $100,000.... It's going to be higher than this—that was a good pickup by T.J.—

A voice: For both.

Mr. John Barlow:—for both, exactly.

It's going to be closer to $100,000. I don't think we need to do that for this study. I think the information we're going to get from our witnesses will be fine if we receive it here. I don't think we need to travel. You guys can take a look at it, but I don't think we'll be supporting it.

● (1535)

The Chair: Okay.

Is there anybody else?

Michael.

Mr. Michael McLeod (Northwest Territories, Lib.): Accommodations in Yellowknife...? I take it we're staying in a bed and breakfast? That's pretty low for accommodations in Yellowknife. I think you underestimate it.

The Chair: Okay.

Could anybody who identifies any other perceived errors or anything they want to add or amend or change or delete email me and our clerk as early next week as possible so that this can be revised, so that we can consider it on the Tuesday?

The last thing is, it appears that the minister is able to join us on April 6, so that date will be put into our calendars.

Unless there's any other business, I propose that we bring the witnesses in and get going.

We'll suspend for a few minutes.

● (1535)

(Pause)

● (1535)

The Chair: Good Thursday afternoon, everybody. We have three witnesses who have joined us for the first hour. I would like to thank them first of all.

First, we have Pierre Desrochers, director at the Institute for Management and Innovation, University of Toronto, Mississauga. Next, from the Consumer Policy Institute, we have Brady Yauch, executive director; and from the Smart Prosperity Institute, Michelle Brownlee, director of policy, joins us. Thank you to the three of you for joining us.

We'll give each of you up to 10 minutes to make an initial presentation and then we're going to open the floor to questions. We do run on a schedule here. The first segments for questions will start at seven minutes each and then get reduced as the hour goes on.

Without further ado, I'll open the floor and I'll leave it to the three of you to decide who would like to start us off.

Dr. Pierre Desrochers (Director, Institute for Management and Innovation, University of Toronto Mississauga, As an Individual): Okay.

Thank you for having me. As mentioned, my name is Pierre Desrochers.

I'm here to present remarks that reflect only my opinion and those of my co-author Joanna Szurmak, who is also from U of T.

I usually don't begin my talks like this, but I would like to point out that I was contacted last Thursday morning and that Joanna and I spent a few sleepless nights producing a 20-page document that we obviously didn't have time to translate. You have the executive summary of what we wrote—it has been translated—but I would be grateful if the material that we produced could be included in the documentation of this committee.

The mandate you gave us was fairly broad. I figured that as an academic the best thing I could contribute would be a few conceptual thoughts. I would like to go over my main points using the images that were sent to you. You should all have a copy.

To be honest, the paper that I've sent to you and my remarks are somewhat of a fundamental challenge to the Natural Resources Canada paper that we were sent. What I want to argue in my presentation is that a lot of the concepts that were put forward in that document can be challenged on a number of counts. Basically, what I want to argue is that they ignore the historical reality of spontaneous cleaner technology development in the market, and that much historical evidence suggests that getting the government involved in trying to promote cleaner practices among businesses is likely to backfire.

The first image that you have is of one of the first computers, the ENIAC, the Electronic Numerical Integrator and Computer. As you can see, it filled a room about the size of this one. It weighed over 30 tons and consumed a lot of electricity and had something like 18,000 vacuum tubes. All you could do with it was long division.

Needless to say, I chose that example because it's the most obvious one that shows how, in competitive markets, people produce ever more useful output using ever fewer inputs. The laptop I have next to me, which weighs almost nothing, is in computing capacity far beyond what the people who developed the ENIAC could have thought of.

The point I want to make here is that this is not something that is limited to the computing sector. Thus, the third image that you have illustrates how people in the agricultural sector, and thus natural resources, produce ever more output using ever less input over time. The image on top of the chart has some corn on it, and to the left, the tiny little thing is the original ancestor of corn, teosinte. The numbers below indicate how much more corn we produce on a piece of land today than 100 years ago. In a part of Canada such as southern Ontario, we produce something like seven times more corn and seven times more useful animal and human feed on the same piece of land than was the case a century ago. We feed many more people using much less resources.

The chart that follows indicates that this has been true throughout the agricultural sector. This shows data from the Food and Agricultural Organization of the United Nations. Today we produce roughly three times more chicken meat using the same amount of animal feed as a few decades ago and roughly three times more dairy products than was the case using the same amount of input a number of decades ago. Competitive pressure, technological change, better feed, and better animal care spontaneously results in firms becoming more eco-efficient over time.

Obviously, this occurred in a context that was strictly economic. People did not improve their environmental performance because of environmental concerns but because it made good business sense to do so. This is referred to as the materialization of our economies: doing more with less by creating a lot more value using a lot less input.

Another academic concept, at the top of the page following, is best illustrated by a smartphone. I'm glad to see a lot of grey hair today—no offence—because you need grey hair to understand how much value is created by a smartphone today and recall all the technology, all the steel, the pulp and paper, plastic, metals, and other material that would have been required a number of decades ago.

● (1540)

Again, spontaneously, just because it made good economic sense, we developed over time increasingly greener practices in order to save money.

Another example of business being spontaneously green without any government prodding is shown by the development of kerosene. It's a nice Canadian story that is not known by enough people. As you may know, in the 19th century people used to go to the Canadian Arctic and to the Antarctic and other places to hunt whales. That's because especially sperm whale oil was the best illuminant available at the time. It gave you a brighter light with less smoke and no smell, which were all problems you would get if you tried to burn pork fat or various types of vegetable oil.

Obviously, though, it's not because whales were renewable that their management was sustainable, and so over time, as the whale population decreased, the price of whale oil went up, because it was, again, the best illuminant at the time.

Then a Canadian stepped in. I don't know how many of you are familiar with Abraham Gesner. He's buried in Halifax. He was the real pioneer in the development of kerosene out of petroleum, which proved to be a valuable substitute for whale oil, and so he should be given more credit for saving the whales than Greenpeace.

The problem with kerosene is that, if you know anything about the oil industry, kerosene is more or less in the middle of the barrel. There is lighter stuff on top, which was thrown out and burned; there's heavier stuff at the bottom, which was thrown in rivers or burned, and it was causing a lot of pollution. Over time, however, valuable uses were found for these polluting waste products. In the upper fraction there was something called gasoline, with which you might be familiar, which was a waste not too long ago. Then, of course, we managed to create value out of what was a polluting waste product.

The lower fraction had things such as asphalt. Remember that when Gesner was around, roads were not paved, so again a source of pollution was spontaneously turned into a valuable product. Wealth was increased and pollution was decreased. People became wealthier, while the environment became cleaner at the same time. This pattern of developing valuable outputs out of pollution can be observed in any industry.

What you see on the slide showing “Chicago Union Stockyards 1924” is all the uses that were developed for waste products out of livestock. At one time only the meat and the leather were valuable; everything else was thrown away. When people were throwing it into rivers, significant pollution problems resulted; people got sick because of it. With the rise of the railroads, however, and the concentration of production in places such as the Chicago stockyards, everything but the squeal became a valuable byproduct.

What you have on this slide is the list of all the things that were manufactured in the early 20th century out of animal waste, which was once a source of pollution. Of course, many of these were later replaced by plastic, but still nothing is wasted today in that field.

On the next slide, to stick to the natural resource theme, we see that much more value is created out of wood today than was the case a number of decades ago. One of my colleagues likes to joke that we now live in houses made out of glue rather than out of wood, but that's again because a lot of sawdust and other types of waste that were problematic at one time were turned into valuable byproducts, again strictly for economic reasons, not to save the environment, not because of government regulation, not because of government taxes.

On the next slide, you see one of the most tangible results of all of this spontaneous innovation. You have four maps of the United States. The darker parts are the U.S. forest cover.

What you have in 1620 is what we think the forest cover looked like at the time. In 1850, in the top righthand one, you can see that people are moving along waterways and are settling in the most suitable areas. Then by the 1920s, with the railroad going everywhere, the low point of the U.S. forest cover is reached. But the forest, as you can see on the bottom right side, has rebounded tremendously since then.

I would argue that this was not because of deliberate governmental policies but because business managed to create value out of waste, and increasingly, valuable things were created from resources that came from underground rather than from the surface. Again we have good, spontaneous green results without any government prodding.

That's the first set of ideas that I wanted to throw at you.

● (1545)

The next slide refers to the precautionary principle. This underlies much of the vision that was in the Natural Resources Canada document. The precautionary principle says that we should not go ahead without absolute certainty. What my co-author and I argue in the paper is that this is not a sustainable way to look at risk in the natural resource sector.

Basically, what we argue is that a better way to look at development should be the creation of lesser problems than those that existed before. This is how we should look at all technologies that are labelled as green today. Often they create, I would argue, more problems than those that existed before. It's not because they're based on renewable energy sources that they are necessarily more sustainable.

If you look at the document that you don't have, you will see that we spent a fair amount on the precautionary principle and on explaining why we believe it is not a good guide to policy. On slide 13, another way to look at this is shown. You see Newton about to be hit by the apple.

Again, there might be problems in developing new technologies, but we argue that the historical record shows that there have been more benefits than problems. You should keep in mind that refusing to try to improve technologies will leave significant problems as significant problems, whereas technological progress has a very good record of creating lesser problems than those that existed before.

Now, the document you sent me also wants the government to do a lot of things, but what I point out is that the government is already doing a lot that is highly questionable: promoting inefficient use of resources, spending money on things that individuals would not spend their own money on, such as ethanol. We could discuss wind and solar power if you want, which, I would argue, create more problems than they solve and only exist because of government subsidies. Perhaps doing less in that context would be actually the way to go, if you want business to spontaneously behave in a more sustainable fashion.

● (1550)

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

Dr. Pierre Desrochers: Yes, I'm done in 30 seconds.

Two slides following the Newton slide, the Porter hypothesis is discussed in context. I would argue that the idea has been around for a century and a half. There is no evidence for it. Government has never been able to force business to become greener by designing good regulations.

What I would suggest instead, if you want to promote greener practices, is to eliminate market distortions. Look at the way business was spontaneously prodded to become greener in the past and so give no subsidies; hold them responsible for their actions but let them be free to innovate; and don't consider the Porter hypothesis and the precautionary principles as policy guidelines.

The Chair: Thank you.

I should have mentioned at the outset that there are headsets available. Feel free to speak in either official language; also, you will be asked questions in both.

Mr. Brady Yauch (Executive Director, Consumer Policy Institute): First I want to thank the members of this committee for the opportunity to provide my insight and thoughts on the proposed study.

We've provided a brief background of my work and that of the Consumer Policy Institute, the Toronto-based organization of which I am the executive director.

The organization's overriding mandate is to advocate for the rights of consumers, ensuring that they receive reliable services at the lowest cost, particularly within public service institutions. In recent years we have focused primarily on Ontario's energy sector, which has been transformed under increasingly active political management. I've appeared many time before Ontario's energy regulator, the Ontario Energy Board, as well as in many media outlets.

Let me be clear at the outset of this study that the term “clean energy” to me is a loaded one and assumes that technologies labelled “clean” have no environmental impact. There's ample evidence showing this to be demonstrably untrue; nonetheless, I urge this committee to look no further than Ontario for a clear presentation of the dangers of getting it wrong when it comes to clean energy policy.

Over the past decade and a half, Ontario has embarked on one of the most aggressive clean energy policies not just in Canada but anywhere in the world. As part of Ontario's clean energy push, Queen's Park undertook a number of dramatic policies, including the forced closure of the province's coal plants, subsidizing industrial wind turbines and solar panels to the tune of tens of billions of dollars, over-ruling the rights of local municipalities, and under-mining and ultimately destroying the province's electricity market by providing guaranteed rates to favoured renewable energy generators.

The result of those policies for Ontario consumers, businesses, and the province's energy sector has been a disaster. The average household ratepayer in Ontario has seen the cost of power increase in some cases as much as 155% over the past decade. That's nearly eight times the rate of inflation this province has seen. Many customers in Ontario have seen the fastest rate of hydro bill increases of any jurisdiction in North America. In just the last two years, the price of power that we pay during so-called peak hours has increased by nearly 30%, or more than 10 times the rate of inflation.

These dramatic price increases have seen hydro bills transform into one of the leading concerns among Ontario residents, leapfrogging concerns about traditional government services such as health care and education. The provincial government now finds itself facing unhappy ratepayers at every turn.

Utility bills, which were often considered a fairly boring and benign topic, are now front and centre in dinner table conversations across this province. The policies implemented in Ontario have seen many households struggle to pay their monthly bill. Across Ontario the number of homes behind on their hydro bills has increased by 20% from 2013 to 2015. The number of low-income households—those who are already struggling to get by—that are behind in their hydro bills has increased by more than 40% over that time.

Businesses both large and small have warned that these rate increases are making them uncompetitive. Just this past December, for example, an Ontario-based manufacturer with more than 200 workers cited soaring hydro rates as the main reason to expand its operations in the U.S. rather than in Ontario. There are many other similar stories.

In recent years the province has tried to ease public concern over soaring hydro bills by issuing a number of band-aid solutions, but unlike a traditional Band-Aid, which helps a wound heal, these Band-Aids provided no healing, as they often came in the form of rebates that didn't address the real reason for soaring hydro rates. At one point these rebates were simply moving more than a billion dollars annually out of general revenues to subsidize hydro rates. Taxpayers were bailing out ratepayers.

In short, Ontario's soaring electricity prices, which are a direct result of its energy policies, have imposed an unprecedented burden on households and businesses and have garnered thousands of headlines.

I hope this crisis will be top of mind for this committee when it writes its report on trying to de-risk the cost of clean energy. If de-risking means tabling generous subsidies in an effort to support the renewable energy industry, Ontario offers a precautionary tale on what not to do. Transferring risk from the companies receiving those subsidies to the consumers who ultimately have to pick up the tab is a poor policy no matter which way you look at it.

But Ontario's renewable energy experiment holds another crucial lesson, for both policy makers and the resource sector. That lesson is that the power market as a whole has been systematically destroyed in Ontario. The electricity sector has become a playground for political machinations, not the economic management of an essential service, and the reason the market was destroyed is largely that misguided energy policies were applied.

When Ontario Hydro went bankrupt in the late nineties, Ontario attempted to move itself towards a market-based system of power. That was a model that had worked successfully in jurisdictions around the world. A competitive and well-regulated market would match the supply of power to that of demand and take the politics out of the whole sector.

The market reforms introduced in the wake of the breakup of Ontario Hydro were intended to ensure that generators, industrial users, and small energy consumers would make decisions on energy production and consumption based on real market principles, signals, and environmental laws. The province would focus on regulating the energy sector, not micromanaging it.

Under this market-based system, competition and efficiency, hallmarks of well-regulated and functioning markets around the world, would be the norm. Consumers would benefit from lower prices—if possible—and the industry as a whole would remain financially viable and avoid the need for public handouts and bailouts.

● (1555)

To this day, we need look no further than Ontario's natural gas sector, which is regulated by the same regulatory body that oversees the electricity sector, to see these principles in action. Gas customers have paid reasonable prices, have received reliable gas service and, more important, have done so without any public subsidies or ratepayer subsidies.

In the electricity sector, these principles were undermined by a politically driven push for clean technologies at any cost. Federal legislators should not want to see this play out across Canada. Queen's Park ultimately took it upon itself to use the legislature to set prices. In doing so, it offered lucrative contracts to produce non-fossil-fuel energy in Ontario and downplayed the cost of these contracts to the public.

The politically determined gold rush for so-called clean energy saw market dynamics completely undermined. The supply of energy ballooned, but so too, thanks to these subsidies, did the cost of that energy. The result was a soaring of electricity rates in a time of shrinking demand: the exact opposite of what would occur in any well-functioning market.

The system has become so perverse that businesses, industries, and households across this province are now paying some of the highest electricity rates in Canada for power that is, at many hours of the day, worthless by any market criterion. The province, realizing that the sector as it's currently being managed is unsustainable, is now looking for a way out.

We hope that Ontario serves as an example to this committee of how de-risking the clean energy industry through a barrage of subsidies can have perverse side effects. The best move that federal legislators could make would be to allow the benefits of competition and markets that have served Canadians so well, in so many other areas of the economy, to be the driving force behind clean energy adoption in the resource sector. The government's best role is to regulate the market, ensuring that it's fair and enlightened, not to micromanage it.

Thank you.

The Chair: Thank you very much.

Ms. Brownlee.

Ms. Michelle Brownlee (Director, Policy, Smart Prosperity Institute): Thanks for having me here today to speak with you.

I'm going to share with you some of the the Smart Prosperity Institute's findings on clean innovation in Canada. We've spent about two and a half years looking at this issue specifically. We held a conference in Calgary with academia, business, and various stakeholders. We've done our literature survey and our grey literature survey, and a series of targeted and structured interviews with experts in this space, largely from Canada but also outside of Canada, from various parts of the “clean innovation ecosystem”, as we call it.

We will be releasing the first report that includes our findings later this spring. I'd be happy to share it with you in early April, but in the interim I'm going to give you highlights of some of the things we're finding in our work.

I should remind you that Smart Prosperity Institute, in case you're not familiar with us, is a think tank here at the University of Ottawa. We are research based and evidence based. We look to see what we can find from the evidence out there and we draw conclusions from that.

What we've found in clean innovation is this. Increasingly, the world is looking for clean innovation. There is a market demand for these things. Economic rewards will flow to those nations and firms that embrace the new thinking necessary for improving our economic strength and simultaneously protecting our environment. These clean innovation opportunities permeate the entire economy. They're not just in one sector or some sectors. They're giving rise to new industries and at the same time rewarding traditional industries, such as the natural resource sectors, for making existing products more efficiently in a lower-carbon way. Also, they're creating altogether new products from this.

The world is rapidly moving this way, so Canada can't afford to fall behind. If we do, we will lose the opportunity to have market share in export markets. This is true both in terms of meeting our national environmental objectives and the objectives we've set in international agreements and in terms of seizing this as an economic opportunity. We think you can position Canada and the “made in Canada” brand as one that really could have economic credibility and could seize some economic market share in export markets by developing our products, whether they're goods, services, or commodities, in the most resource-efficient and low-carbon way possible. They will be rewarded for that.

Generally, there is the thought that countries innovate best around what they already do well, and—

● (1600)

The Chair: May I ask you to slow down just a bit for the interpreters? They're having a bit of difficulty.

Ms. Michelle Brownlee: Yes. I'm sorry.

Generally, countries innovate best around what they already do best. That's where you tend to be your most innovative. For Canada, because we do a pretty good job in natural resources as it is, there's a huge opportunity for us to create market value and new opportunities by innovating in that space. We're not there yet, and we have to figure out why.

That's the question we've been asking over the past two and a half years: why are we not there yet? We've looked at what we call the "clean innovation ecosystem"—all the players at all the stages of tech development in clean innovation in Canada. That includes natural resources, but it includes some other sectors too. What we've found is that to improve Canada's environmental and economic performance here, it will require addressing a double market failure.

I will share a bit of economic theory here in terms of double market failure. There's a knowledge spillover that occurs whenever you're creating new ideas. If you create a new idea, the market can grab it up, but you're not able to capture all the benefit of that idea. That's true of all types of innovation. It's not unique to clean innovation at all. What's unique to clean innovation is that you're creating something that doesn't have a market value. If you're creating a commodity that has a lower environmental footprint, the market doesn't care. It cares about that commodity, not the fact that there's a version of that commodity that has a lower environmental footprint. That's an environmental externality, which we call a market failure.

This is what's unique about clean innovation. You have the regular market failure around a knowledge spillover, but you have this special and kind of unique market failure around there not being a market or around a market not recognizing the full value of the cleaner thing you're producing. That's unique. As a a result, there's a unique role for government in this space, and that is to make the market work well, not to direct the market, not to tell it what to do, and not to tell anyone what to do, but to create a field in which the market can work well on its own and private investors and private business can then work efficiently.

The problem is that these market failures translate to risk for business. This goes to your question about de-risking the sector. Perhaps the most important role for government is de-risking the policy risk. Because it's a unique situation in clean innovation, where you have a double market failure, there's a role for government to step in and help create that market demand for the cleaner technologies. It means that entrepreneurs, investors, and researchers are relying on government's actions to help create the demand for their products and services.

If there's uncertainty around a government's environmental policy agenda, including what policies it will put in place, how those policies will evolve, or how resilient they are in terms of political change, that translates into uncertainty in the market. This policy risk leads to underinvestment in clean innovation. It's a problem that only government can solve.

The key, though, is to intervene in smart ways, not to direct anything, but to create a situation where the market works well. Through our two and a half years of work, we've found that there are four areas where policy is needed.

The first has to do with creating policies that address those challenges around the creation of new ideas. That's the stuff focused on R and D, the policies that get the great ideas out of the government labs and the post-secondary institutions and harness them. There's a second set of policies that helps to create that market demand for clean innovation and cleaner commodities; pricing carbon is a great step in the right direction, but there are other things as well. There is a set of policies that we need to help grow companies to a bigger size, to help commercialize them and get them to scale so that they can compete and export. Finally, there are some kinds of crosscutting policies, if you will, that support the entire ecosystem, such as skills, data, and cluster development.

The challenge is that because the system works well only when the whole ecosystem works, you need to have some policy interventions in different places, and you really have to target them to where the market failure or the market barrier is so that you're doing it in a smart way.

I'm going to tell you a bit about some of the pull policies, because that's our area of expertise at the Smart Prosperity Institute. Pull policies are the ones that pull technologies to market. They're the ones that create the demand for those clean innovations.

Carbon pricing is one of them. By putting a price on the environmental attribute that you don't want, you create a nice reward for the products and services that don't have that negative environmental impact. It pulls those technologies and those commodities to market, but it's not the only one. As well, you can have well-designed regulations that can do that and that provide a sort of implicit price on pollution. You also can use government procurement, infrastructure spending, and those things to target this and to use the power of the government as a purchaser to create market demand for these new technologies.

Fortunately, these things have been studied at length. The OECD has done a lot of work on this. They've found that these policies do work really well. They induce innovation and achieve the market demand you want but, like any policy, they can be badly designed or well designed.

They found that for them to be well designed, there are a few criteria you want to meet. You want them to be stringent. If you create an environmental policy that doesn't do very much, it's not going to have much impact.

● (1605)

If you create a policy, it should be predictable. You want to de-risk that policy and show what's going to happen over time so that the private sector knows what's happening and will come in and will invest in that space.

Finally, you want them to be flexible. You don't want to direct anyone to what they should be doing, but you want to solve those problems in a way that allows the business community, municipalities, and governments to respond in the way that makes the most sense for them. Carbon pricing is flexible, but there are lots of other ones that are flexible as well.

I would just say that the natural resources sectors of the Canadian economy have an opportunity in this clean technology space in the next little while. It's an environmental opportunity and it's an economic opportunity, but it's not going to happen without a suite of coordinated policies. You really have to look at the entire ecosystem to see where there are issues and figure out the thing as a whole. We're going to need different policies in different places depending on whether we're targeting knowledge spillover or an environmental externality, or there's a barrier around the financial community not investing in clean tech in the natural resource sectors because they're not familiar with it, which is one of the barriers we've heard about a lot.

Different policy is needed in different places, and it gets a little complex, but the unique thing here is that there are some things that only government can do. When it comes to this vision of achieving market share and growing these companies and improving their environmental performance, these things are going to require some smart, far-sighted, and sustained government action. That's going to allow the private sector to do the work. The private sector is still the big player here. Over time, the private sector takes on more and more of this because the government has corrected the market and let it work.

Government has a natural role in setting a vision and a level of ambition that position natural resource sectors for long-term success. Governments can invest more patiently with longer horizons than the private sector can. They can approach risk differently, but most importantly, only governments can provide that policy certainty and create the market conditions that will unleash the clean innovation.

Thank you.

The Chair: Thank you very much.

Mr. Lemieux, you're up first.

[*Translation*]

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

I also want to thank the three witnesses for their excellent presentations.

While preparing for this committee meeting, I noticed that Mr. Desrochers knew a great deal about the history of hydrocarbons, which are found in the oil and gas sector and coal sector.

I'll take advantage of your presence, Mr. Desrochers, to ask for your opinion on certain matters I hold dear.

First, I recognize all the benefits provided by fossil fuels in terms of the overall quality of life of humans. However, the use of this type of energy also has adverse effects.

I also find your strong precautionary principle very good, Mr. Desrochers.

Do you think the National Energy Board, the Minister of Environment and the Minister of Natural Resources systematically use this strong precautionary principle when conducting analyses before approving pipeline projects?

● (1610)

Dr. Pierre Desrochers: I would need to consult the documents for certain projects. I think, in general, it's not as bad as the Europeans, although I feel a shift toward the European approach.

People are so afraid of the risks that they ignore the fact that stalling also creates long-term problems. These problems are much greater than any potential issues caused by technological advances.

For example, let's look at the pipeline issue. No product is perfect, but we can't ignore reality. Reality isn't optional, as I often tell my students. Once we actually have petroleum product alternatives, we won't need to fund alternatives that aren't alternatives to petroleum products.

People strongly oppose pipeline development, but they often confuse the issues. Solar energy and wind energy produce only electricity. Moreover, these two types of energy don't compete with petroleum products, which are used specifically for manufacturing clothing and computers and for transportation systems.

There are certainly problems associated with the transportation of petroleum products. However, all the benefits must be considered. I think the regulatory bodies and project opponents often don't weigh the pros and cons in a realistic and acceptable way.

Mr. Denis Lemieux: I'm a member from Quebec, so from eastern Canada. I have a question about a matter that interests me a great deal.

Can you explain why oil produced in Canada has such a bad reputation and why it's too often, in my opinion, described as dirty oil?

Dr. Pierre Desrochers: It's strange.

Often, people from California tell us how terrible we are because we develop oil sands. However, many deposits in California leave a larger carbon footprint than the oil sands. There's a notion that easily accessible oil resources exist, and that we're scraping the bottom of the barrel for oil sands. If you read the history of petroleum products, you learn that no deposits have ever been easy to reach.

When I spoke about Gesner, it was before the first oil wells were dug. The first oil wells went about 20 metres underground. Salt mining techniques were used. It was expensive, and there was a great deal of pollution. A century and a half later, we go four kilometres through the sea, two kilometres underwater or four kilometres underground, for example. The price isn't higher than the best deposits available in 1870. People forget the fact that, as a result of technological development, today we can exploit resources that are difficult to access in a way that is just as ecological as the deposits considered of good quality a generation ago.

To answer your question, I think Canadian oil's bad reputation is undeserved. In any case, the actual impact of all this is felt when we use gas in our vehicles, for example. Even though the oil sands leave a slightly higher carbon footprint than the other deposits, once we've taken into account the fact that the real carbon emissions come from using fuel in our vehicles, the difference is actually minimal. I think there are people who need to complain. I think people are unfair when it comes to Canadian deposits.

Mr. Denis Lemieux: In this case, how could the oil industry's best practices be better explained to people in the east to dispel the false reputation of dirty oil?

Dr. Pierre Desrochers: I have done my best for a number of years. Can we explain things to people who don't want to listen to us?

In this case, I think the facts speak for themselves. Canada has made significant progress. The deposits may be of lower quality and less accessible than in other economies. However, we use by-products, we capture emissions and we use natural gas much better than in many Middle Eastern countries or Nigeria. These places, in theory, have better quality deposits. We need to explain the processes, Canada's performance and the improvements over time. I trust that, at some point, we'll manage—I'll say it again—to explain things based on facts. That said, I admit that it's difficult.

Mr. Denis Lemieux: How can we explain all this in simple terms that make sense to Canadians?

Dr. Pierre Desrochers: I've written documents on this subject for the general public. Many things are available online, but how do we explain them?

I've been giving energy policy courses for a number of years. When facts are presented, reasonable people will recognize that there may have been some exaggerations. However, how we change perceptions? If I had the magic formula, I would perhaps have another career at this time.

Mr. Denis Lemieux: I was expecting answers from you today.

Dr. Pierre Desrochers: In any case—

● (1615)

Mr. Denis Lemieux: We will—

Dr. Pierre Desrochers: There is material, and I did my best. I tried to present accessible material, and the material is available for free online.

Mr. Denis Lemieux: To finish, I will address the three witnesses.

How do you think carbon pricing will affect the development and implementation of new clean technology in Canada? I want to hear from all three of you.

[*English*]

Mr. Brady Yauch: There's the idea that if you get a carbon price, it sends the risk signal to all industry, and then they can decide how best to attack it. If government comes up with an idea and they've quantified the cost of carbon to Canada and Canadian taxpayers, Canadian ratepayers, they can apply that price to industry. Then industry can go on their own and best figure out how to deal with it.

The carbon price has the luxury of being the most transparent to everyone, in that it clearly tells everyone what we think the cost of carbon is to this country, and then business can deal with it however they want.

Ms. Michelle Brownlee: As I was saying in my remarks, the carbon price tries to capture that environmental value, or put a price on the negative impact of the activity. As such, it rewards the activities that don't suffer that cost. The cleaner technologies are induced or encouraged, incentivized, to come onto market. It helps to level the playing field between the technologies that are polluting, that have an advantage currently because they're not priced, and the ones that are cleaner and are sort of disadvantaged because we're not taking account of the fact that they are cleaner.

There is a lot of evidence to show that the more flexible the regulation or the approach, like a carbon price or a well-designed regulation, they do induce innovation. We have done a meta-analysis of the Porter hypothesis, which shows that it does hold true in many circumstances. I can share that with you, if you'd like.

All the evidence we've seen, in looking through the academic research as well as the grey literature and talking to others, is that it really does induce innovation. The challenge is that the carbon price is much lower than the true social cost of carbon, so it will only induce so much. There are other market barriers and challenges that will also require some policy intervention.

The Chair: Thank you.

Mr. Strahl.

Dr. Pierre Desrochers: I need 20 seconds. Carbon taxes—

The Chair: No, no, I'm sorry, but I'm going to have to cut you off.

Mr. Strahl.

Mr. Mark Strahl (Chilliwack—Hope, CPC): Thank you.

I would argue, in response to some previous questioning, that a prolonged and very purposeful campaign against Canadian oil is a large part of why some people consider it to be dirty, when in fact we know that it's among the cleanest technology and lowest-carbon oil out there.

My question was going to be to you, Mr. Desrochers.

I recently spoke with an entrepreneur who has developed a “waste heat to energy” product. She expressed extreme frustration with government policy, which she described as the government always trying to “fund the moonshot”. It continues to go back not to proven technology, which is marketable and could be scaled up and brought to bear in real-world applications, but to, as she said, the moonshot, which it funds with billions of dollars.

If government were actually good at fostering innovation, would the billions of dollars that have been spent by successive governments not have made Canada a world leader in this? She was certainly frustrated that she was finding more ability to commercialize her product in other jurisdictions than in Canada.

Dr. Pierre Desrochers: The only problem I would have with that characterization is that governments are not subsidizing the moonshot; they're subsidizing sailboats. You have to ask yourself, why, when the wind was there all along and we had sailboats, did coal and diesel and other fuels come along and displace that energy? The world was not short of windmills in the 19th century. The Egyptians had solar energy 2,000 years ago. Carbon fuels were developed and displaced those energies because they had a number of advantages. They're reliable. You know exactly what you're going to get. You know how much you're going to get. You know when you're going to get it. Unfortunately, governments tend to associate cleaner with renewable, whereas in practice it was never the case.

I share the frustration of your entrepreneur, who would actually create real value and fewer problems than existed before. My beef would be with the notion that the government is going for the moonshot. No, they're going for the sailboat.

● (1620)

Mr. Mark Strahl: Mr. Chair, I'm going to share my time with Mr. Barlow.

Mr. John Barlow: Thank you, Mr. Strahl.

Mr. Yauch, you talked a little bit about what's going on in Ontario, and certainly I think we're going about this all wrong. I like to look at Gridwatch for Ontario, and we're seeing it in Alberta as well. We're spending billions of dollars on wind and solar, which is getting us less than 10% of our energy source. If you look at more traditional fuels—coal and natural gas—which are supplying the vast majority of energy needs, they continue to be more innovative and more technologically advanced, and they get us to where we need to go sooner.

I would just like your opinion. Are we wasting taxpayer dollars with these wind and solar projects? Would it be more beneficial to look at more traditional fuel options? If government is going to get involved, should we go more in that direction?

Mr. Brady Yauch: First, renewable energy has a role to play in every energy system. It can be there, and it can provide some sort of value. But what happened in Ontario, and what's happened in other jurisdictions around the world that have gone all in on it, is that they overemphasize the value of it and they underemphasize the value of traditional sources of generation, such as natural gas and coal. While coal and natural gas have some environmental side effects—we all know about them—they also provide power in a reliable manner that is cost-efficient.

In Ontario we decided that we're going to pick these two as the winners and put them on a pedestal. The reality is they haven't been able to stand on that pedestal for very long because they can't provide what we all want, which is clean, reliable and cost-effective power.

Mr. John Barlow: Mr. Desrochers, you had a chance to talk about it, and I want to give you the opportunity to finish your thought.

I've looked through your deck. You see the innovation that we've had around the world without a carbon tax, and I don't see that our having a carbon tax will mean that all of a sudden we would have this incredible innovation in green technology. I don't think that's been proven. Do you—

Dr. Pierre Desrochers: That's my problem, if I may say, with people who advocate carbon taxes. They operate on the premise that there was no intelligent life before 1960.

I mean, all these ideas have been around for a very long time. Why did business spontaneously behave in a green way in the past? Well, it's because when you buy raw materials and you throw them through the smokestack or throw them in the river, you're wasting money. There's always been an incentive for firms to extract the most value possible out of everything they pay for. This is why over time everything becomes more efficient. This is why pollution is spontaneously turned into valuable by-products. This is why our economy has become more self-contained. The profit motive, I would argue, provides all the incentive you need.

Of course, you need to penalize people who commit real environmental crimes, such as releasing stuff in rivers, but it's not a carbon tax you need; you need to hold firms responsible. In the past we had lawsuits. If you dumped your trash in your neighbour's backyard, he could sue you. That was an additional incentive not to do it, which I would argue worked pretty well. All this talk about green technology is completely historical. At some point, who are you going to believe, these theories that have not been proven or the images that I've given you?

Mr. John Barlow: We had the department in here the other day. I asked if they could define for me clean technology, green energy, and I was surprised when they said they didn't really have a definitive definition.

That's a problem.

Dr. Pierre Desrochers: Well, you know, we're human beings. We breathe, we exhale, we do all sorts of things. There can be no such thing as a clean technology. There can, however, be a cleaner technology. I would argue that the criteria for progress should be creating fewer problems than those that exist in the real world. You need to look at all the impacts of those technologies, their costs, and whether they're really having an impact on carbon emissions.

So there can be cleaner technologies, but you need to look at the whole picture, not just at whether they're renewable but also whether they're creating fewer problems than those that existed before.

The Chair: Thank you.

Mr. Stetski.

Mr. Wayne Stetski (Kootenay—Columbia, NDP): Thank you.

I hope to get in questions with all of you.

I'll start with you, Ms. Brownlee. Where do you think the low-hanging fruit is for the clean technology sector that the government should support and from which we can potentially see some good results? Mr. Cannings has talked to a lot of people in the tech sector, and electrification keeps coming up as perhaps one of the options that can be improved.

Ms. Michelle Brownlee: I won't point to specific technologies as the ones to invest in. I don't think that's the role of government at all. I think the role of government is to create the market conditions where those technologies will bubble up and come forward.

That said, there's a lot of evidence that when you do have some activity around a technology or a technology space, there can be a role for government to help accelerate that by creating a cluster or a hub or some kind of critical mass. The nice thing about Canada is that we have so many regional differences and strengths and weaknesses in different places of the country. I would argue that the provinces know best, and the industries and different areas know best, what the technologies might be, whether it be energy storage in Ontario or waste in Nova Scotia. It's where there is already some advantage in terms of economic opportunity and a healthy resource sector already that the innovation tends to happen.

I would argue that the government can deal with some of these market barriers and market failures and then let those technologies come forward, playing to the strengths of each of our regions.

● (1625)

Mr. Wayne Stetski: What about electrification in general?

Ms. Michelle Brownlee: I'm not an expert on electrification. I think if we are serious about climate change, we will have to use more electricity in the future, but I won't comment further than that.

Mr. Wayne Stetski: Okay. Thank you.

Mr. Desrochers, when I was the mayor of Cranbrook, I went to China—this was part of our friendly city relationship—and visited an innovation and technology centre where government subsidizes new businesses until they get their feet under them and are able to fly on their own.

I'm curious why you think it's okay for government to subsidize research and development at universities but not support research and development in the private sector through subsidies.

Dr. Pierre Desrochers: There are various sources of funding in universities. There's government funding. There's private sector funding. I could argue, although I won't be very popular with my colleagues for doing this, that perhaps the funding wouldn't need to be more targeted at universities. Perhaps more industry funding would force people to focus on real problems.

I studied the history of university funding in the United States. Before the Second World War, most of the funding came from either private foundations or industry. There was plenty of innovation going on in those days. Then the government stepped in, of course, and we hired a lot more people at universities. But I would argue that perhaps some of that funding lacks the specific focus that industry would require.

At the same time, universities are in the business of doing fundamental research. Private businesses are in the business of developing practical technologies. I believe if there were promising technologies, plenty of venture capitalists and investors would invest in those things. I don't believe government funding overall is very significant in terms of funding innovation for promising technologies. If you look at the history of the development of greener technology practices, as soon as something looks really promising, capital will flow. That won't be a problem.

Mr. Wayne Stetski: Yes, but you do have to get it to a certain point, though, before it can look attractive, I would think.

Dr. Pierre Desrochers: There I would probably disagree with you, because historically, when you look at those stories, you see that they often come from sectors that are completely different from the one in which they ended up having an impact. You never know where these new ideas will come from.

What I would argue with regard to government funding is that government is often very reluctant to take a chance on things that might be promising but that are not really.... As you know, government often tends to subsidize winners, in my experience, and to subsidize large firms rather than small start-ups. If you lower the overall tax burden, if you let people keep more of the money they've earned, I think the history of technology shows plenty of evidence of people then taking chances on things that seemed off the wall and that would never meet the kind of criteria that a government program might require. In a way, I would argue that if you look at the history, you'll see that there were plenty of people with extra money left in their pockets who were willing to take chances on things that looked promising. I don't see why things would be any different in the future.

Mr. Wayne Stetski: You don't think some of those were winners because of government subsidies helping them to get going?

Dr. Pierre Desrochers: Well, as you know, government has subsidized so many things that of course a few things will have succeeded, but I would argue that in the cases I showed you there, the funding was entirely private. Again, I have no doubt that if things really are more efficient, if new technologies look more efficient and have a reasonable promise of earning you a return on your investment, private investors will risk their own money and will fund them. I have no fear of a capital shortage in that respect.

Mr. Wayne Stetski: Mr. Yauch, I would like to go back for a minute to Ontario's Green Energy Act. When we look at what happened in Ontario, we can see that they apparently committed to some pretty high-priced buy offers, particularly around solar energy, which was priced really high in 2010. When you look at where the technology is taking us, you can see that the cost is dropping. In the last RFP the Ontario government put out, they had wind power at 6.5¢ for the first time, which is lower than what nuclear power costs and lower than what wind power cost five years ago at 13¢.

There seems to be a trend going on. As technology improves, the costs of power, for example, are going down. With that in mind, would you agree that the Ontario experience has been more a failure of policy and pricing and not a failure of the technology itself, which is getting better and cheaper all the time?

● (1630)

Mr. Brady Yauch: I'll half agree with that. I do agree that there is a failure in the way they did the policy and the pricing.

You've talked about the lower prices for wind energy and solar energy that are happening in the wider marketplace, and that's true to a certain extent. However, first, Ontario ratepayers aren't benefiting from that because we were locked into long-term contracts, so any competitive forces at lower prices haven't actually made their way through. I think that's something we should consider. Second, wind power could almost cost zero cents. In many cases it's useless, because it produces power that's totally unreliable, at times when we don't need it. Solar power has I think a brighter future in the sense that it at least provides power in a more reliable manner, but we don't need the wind power that's coming online right now, whether it's at 6¢, 5¢, 4¢ or 3¢. It doesn't really matter; it's useless at this point.

The Chair: Unfortunately, we are out of time.

Thanks to the three of you for joining us this afternoon. We appreciate your making the effort to be here today and thank you for providing valuable information.

We'll suspend for two minutes and then carry on with the next segment.

● (1630)

(Pause)

● (1635)

The Chair: We're going to get started with the second hour, or a little bit less than an hour, so I'm going to dispense with too many formal introductions.

We have three witnesses for this segment, one in person, Mr. Gilmour from the Quality Urban Energy Systems of Tomorrow; and two by video conference, David Popp, a professor from Syracuse University, who is also from the C.D. Howe Institute, and Bryan Watson, the managing director of CleanTech North.

Gentlemen, each of you will have up to 10 minutes to do an initial presentation, and then we will open the floor to questions. We're running with some pretty strict timelines for presentations and questions, so I may have to interrupt you from time to time to keep things moving.

Mr. Gilmour, I understand, was kind enough to provide us with a deck, but it's in English only. It was a last-minute delivery so I'll need approval from around the table to distribute it.

Some hon. members: Agreed.

The Chair: We're all in favour of that, so that's fine.

Mr. Gilmour, you're here, so why don't you start us off?

Mr. Brent Gilmour (Executive Director, Quality Urban Energy Systems of Tomorrow): Good afternoon, everyone. I appreciate the opportunity to address the standing committee. My name is Brent Gilmour. I'm the executive director of QUEST, Quality Urban Energy Systems of Tomorrow.

Across Canada, communities account for 60% of our energy use and over half of our greenhouse gas emissions. At QUEST, we're focused on supporting all levels of government to achieve their greenhouse gas and energy objectives through the development of smart-energy communities. Smart-energy communities put in place the conditions that reduce greenhouse gas emissions, lower energy use, drive the adoption of clean technologies, and foster local economic development and job creation in Canada.

Established in 2007, we have a national grassroots network involving thousands of organizations across Canada, including local, provincial and territorial governments, utilities, energy service providers, building owners, landowners and operators, and clean technology companies working at the community level to develop smart-energy communities.

There is no shortage of capital to invest in clean energy technologies, and there are no shortages of community-energy-scale projects

We've documented that there are over 250 community energy plans covering more than 50% of the population, which have identified the need to deploy mature clean technologies for energy efficiency, renewable energy, the efficient use of conventional energy sources including natural gas, and transportation. These plans are developed by local governments, utilities, industries, and businesses, and they represent local clean technology investment road maps for investors in projects related to energy efficiency, storage, harnessing local renewable energy, and the efficient use of conventional energy systems.

The challenge is that most of the community-scale projects are best positioned to support small and medium-sized enterprises.

However, this sector often lacks the capacity and funds to procure the kinds of professional advisory services that larger companies will typically underwrite, such as engineering studies, debt financing, equity capital raising, power purchase agreements, and associated legal services for a clean-tech project.

As a result, many of the community projects identified in the 250 community energy projects and plans are at risk of not going ahead even when the underlying economics may be sound and it is in the community's best long-term interest to see them proceed.

A well-known barrier that often stands in the way of the adoption of clean-tech projects is the ability to assess the technical and financial capacity required for the project development stage, and not the actual financing of the project. Just to be clear about that, we're talking about the preconstruction stage and not the actual financing of the project when it's ready to go. That's what attracts the big capital, which I will go through on these diagrams for you.

Most proponents find it extremely difficult to attract financing from investors either because they are too small to warrant the cost of due diligence by the investor or because their project does not meet the risk profile required by investors, meaning the project has just gone out of the preconstruction stage, which can include prefeasibility, environmental permitting, engineering design, and so forth.

Possibly the most significant hurdle is scale. The average transaction cost for an investment of scale last year was $440 million by institutional investors. That would be what we often refer to as pension funds, shown as the larger oval in that diagram, which says institutional capital.

Further down the investor scale, clean-tech investors, or what we call commercial investors, are often looking for projects of greater than $50 million. For most community-scale projects, those in your ridings, such as small-scale district energy or micro cogeneration, which you hear talked about a lot, the scale of investment is much less—from hundreds of thousands to $25 million.

There is an immediate opportunity to de-risk clean-tech projects and attract investment for community-scale energy projects like renewable and natural gas, as well as for district energy systems, combined heat and power, smart grids, energy efficiency retrofits, and the construction of new net zero-emission buildings.

● (1640)

Many existing projects that have been identified or proposed by communities, including indigenous communities, need support at the project development stage. We have three key considerations for the committee with regard to de-risking clean technology projects at the project development stage.

First, promote the development of purpose-built lending products to foster small and medium-sized enterprise adoption of clean technologies. When we think about small and medium-sized enterprises, for those who are familiar, about 86% of the 1.7 million private sector employers, who make up most of the workforce in Canada, are under 20 people. That's the group we're talking about, the ones who may not be able to attract larger-scale investors and understand how to aggregate.

The opportunity here is the adoption of clean technologies, including energy efficiency, district energy, combined heat and power, micro-cogeneration, and renewable energy installations. Examples of these smaller programs include the Global Green Growth Institute, which is working with governments to establish financing projects that will unlock debt capital. For instance, in India they put forward a $30-million U.S. fund that has successfully attracted $430 million in off-grid energy projects. The focus, though, wasn't on financing the project. It focused strictly, at that beginning pre-construction phase, on allowing those projects that could make the financial test and hurdle more attractive to investors by de-risking it.

Second, facilitate stronger networks through a greater focus on clean technologies in broader initiatives that support centres of excellence, communities of interest, and partnerships among researchers, entrepreneurs, and industry with the goals of advancing and demonstrating emerging technologies and supporting commercialization in key opportunity areas. A really good example that's happening now is the “low carbon partnership”, a collaborative of four organizations—including QUEST, Quality Urban Energy Systems of Tomorrow—that is proposing to work with thousands of SMEs and is well positioned to support the Government of Canada's climate change objectives by undertaking to scale up proven tools and programs. What we're looking to do is engage 4,000 businesses in over 300 communities from now to 2025, delivering about $150 million in cost savings to SMEs across Canada, and aiming to reduce greenhouse gas emissions from half a tonne to one to two tonnes by 2025.

Third, pilot the establishment of a project development advisory program with the purpose of supporting community-scale projects through the development process and connecting them with investors. A good example of this is called “Climate Investor One”, which is being seen globally, right around the world. They have established investment funds to finance renewable energy projects—quite honestly, they're looking at all kinds of projects—at specific stages of the project life cycle. Their primary focus, though, is early project stage development, recognizing that this is where you get the biggest bang or return for your buck.

Other variations can include “batch-mentoring”—a term you might not have heard—a series of project proposals at the regional level through the project development cycle. That's a nice way of saying that it's providing services and support through an expert advisory committee, which can provide either in-kind or subsidized services for the pre-construction phase of a project. That is, how do you help someone figure out the engineering studies they need to do, which is complicated unless you hire an engineering firm, and who do you hire? What's debt financing, who do you go to, and what does that look like? What about the equity capital raising, power purchase agreements, and associated legal services for a project? The batch-mentoring process is intended to get projects to the bankable stage and attract private sector investment. It is not intended to finance them.

Those are our three key considerations for the committee that I wanted to share with you today.

I really thank you for the opportunity to join you.

● (1645)

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

Mr. Popp, maybe you can pick up from there.

Dr. David Popp (Professor, Syracuse University, As an Individual): Thank you, Chair.

Thank you for the opportunity to speak to you today. I'm a professor of public administration and international affairs at the Maxwell School of Syracuse University. I'm an environmental economist who has studied the interactions between policy and clean technology development for the past 20 years.

Over the last summer, I wrote a report for the C.D. Howe Institute on the development of low-emissions technology in Canada. As part of that work, over the last 18 months I've had the opportunity to give presentations in Toronto and Ottawa and to speak with government officials in Ontario and Alberta. While I wouldn't consider myself an expert specifically on Canadian energy policy, I have had the opportunity to learn a lot about it over the past two years.

Given the questions that were sent out before the meeting today, I will focus my comments on the adoption of clean technology. The most important thing to keep in mind here is that policy is the main driver of clean technology adoption. Many if not all the benefits of clean technology go to the general public, in the form of a cleaner environment, rather than the user of the technology. This translates into what economists call a "market failure", in this case an externality. Without clear policy signals, investors have little reason to adopt clean technology.

This is important, because this also adds risks to the process, particularly for capital investment. Within the natural resources sector, we're often looking at equipment that may be used for 20 or 30 years. This means that investors want to know not just what will be in place today but what policies will remain in place for the future. It's important to think about what signals the government can provide that the policy in place today will exist through the lifetime of the investment. As a simple example that we all may be familiar with, even when gasoline prices increase, consumers may be reluctant to switch to more fuel-efficient vehicles if they expect that prices will fall again in the near future, as they so often have.

Given this, what should these policy signals be? That depends on what the policy goals are. I want to lay out a couple of different options. The simplest thing to use is a broad-based, technology-neutral policy that simply addresses the environmental externality. Examples could be large-scale policies such as the carbon tax in place in British Columbia, or the cap and trade that has been used in Ontario. It could also include sector-specific policies that do not explicitly favour one technology over another, such as a renewable portfolio standard.

In cases such as this, firms will comply with these policies by choosing the most cost-effective technologies available to them. This means that technology-neutral policies favour the technologies that are closest to being market-ready. Essentially, it narrows the gap between the cost of fossil fuels and the cheapest available renewable energy source. Such a policy has been efficient in that it keeps the compliance cost as low as possible. If that's the policy goal, then a broad-based policy is best, and we need to only ask what other market failures might exist to discourage the adoption of otherwise clean technologies. I'll return to that point later.

I would argue, however, that clean technology policy should focus not only on adoption but also on innovation. Since technology-neutral policies favour the clean technologies that are closest to market, they're not enough to support the development of technologies that are not yet market-ready and are considered important to meet future environmental needs. Thus, if the goal is also to encourage the development and the deployment of new breakthrough clean energy technologies, you'll want to complement these broad-based policies with additional policies targeting those technologies that are not yet market-ready. As an example of this, as I mentioned before, renewable portfolio standards encourage the development and diffusion of wind energy. Countries, states, and provinces that have used that policy have seen the development of wind and not as much the development of solar energy.

The development of solar has occurred in countries with more targeted policies. Germany, for example, uses feed-in tariffs, which were set initially seven times higher for solar energy than for onshore wind. As a result, it's led to a big expansion of solar energy in Germany, and Germany has become one of the leaders in solar energy usage. It's important to keep in mind, though, that there's a trade-off here. Such a policy comes at a cost, as these higher feed-in tariffs are passed on to the consumer in terms of higher electricity prices. Really, there are two competing needs to balance off here—the goal of keeping current costs as low as possible versus the goal of trying to encourage continuing improvement with a technology.

Once the environmental externality has been addressed, we can then consider what other barriers remain. Within the natural resources sector, a couple that are particularly important include the high cost of capital. Because the natural resource sector is capital-intensive, clean technology requires large up-front investments, which leads to a couple of issues. One issue is that it raises the cost of switching to a new technology. There's the concern that policies may lead to the lock-in of currently affordable technologies that make it difficult for a new technology to come online. When we think about the challenges that electric vehicles have, not having charging infrastructure online I think would be an example of that.

● (1650)

Financing is also a challenge, particularly for small firms. The United States has used a couple of policies that have helped to address some of these financing barriers. I'll talk about a couple of them and how they've been successful.

One is the small business innovation research grant program. This is not specific to energy. It's required of 11 different U.S. government agencies to set aside a little less than 3% of their extramural R and D budget to give out to small firms.

A recent study of the Department of Energy's small business innovation research program by Sabrina Howell, an economist at New York University, shows that the recipients of these grants, compared to applicants who applied but did not receive the grants, were much more successful. They received more subsequent patents, they were more likely to receive future venture capital, and they were twice as likely to earn positive revenue. When they did earn positive revenue, they made more money than the non-recipients of the grants did. Her research went on to show that the reason for this success was that these funds were important for developing demonstration and proof of concept. It's very challenging for these smaller firms to come up with the initial financing to get their products under way.

Another program that has been successful is the Department of Energy's loan guarantee program. This has received negative press because of the funding that was given to Solyndra, which eventually failed; but overall, it's important to note that the program received more back in interest payments than it lost on failed loans.

A key point here is that targeted funds that can help commercialization can be useful, but should focus on things that the market won't do on its own. This could include breakthrough technologies further from the market; complementary technologies such as improvements to the transmission grid, which are important for the development of renewable energy; and, focusing on smaller firms that may have more difficulty raising capital in the financial markets.

I'll conclude with some recommendations.

Any policy effort should start with broad-based policies. Here, it's important as well to provide long-term signals. For example, using the revenues from a carbon tax to lower other taxes signals a long-term commitment, right? If the revenues are used to lower the taxes, the government is less likely to take away the carbon tax because doing so would necessitate raising other taxes to replace that revenue.

Any targeted policies that are used should focus on breakthrough technologies that are further from the market. It should encourage some adoption of these, enough to encourage further development of the technologies, but they shouldn't be so large or widespread as to make the use of expensive technologies over cheaper substitutes the dominant technology in the market. The goal isn't, for example, to have solar energy overtake wind, but to encourage enough investment in these costlier technologies so that further learning and technology development can continue.

Finally, I would note that higher energy prices are not a substitute for environmental policy. It's important to distinguish between prices that increase due to energy market forces and price increases that result from policy.

A clear example of this comes from the oil market. Oil prices reached record highs during the early 21st century. Because of Canada's rich natural resources, these high energy prices spurred innovation within Canada, both on low-emission technologies such as wind and solar, but also on methods designed to increase the extraction of fossil fuels, such as the expanded efforts in the oil sands of Alberta.

Thus, simply relying on uniformly higher energy prices provides incentives for the development of both renewable energy and enhanced energy extraction.

In contrast, by reducing the price gap between low-emission energy sources and fossil fuels, policies such as a carbon tax encourage additional development and adoption of low-emission energy technologies, but do not promote additional investments in new oil recovery technology.

Thank you for your time.

● (1655)

The Chair: Thank you very much.

Mr. Watson, we'll go over to you.

Mr. Bryan Watson (Managing Director, CleanTech North): Thank you very much. There were some speaking notes provided, but that was fairly late in the game, so I don't know if those came across. If not, that's fine.

Thank you very much to the committee for letting me provide my testimony. My name is Bryan Watson. I am the managing director of CleanTech North. It's perhaps also relevant to this discussion that I was a partner at Flow Ventures, and previously the executive director of the National Angel Capital Organization, focusing on early stage capital.

Specifically on CleanTech North, we are a consortia of clean technology companies from across Canada. Our mission is to help clean technology companies commercialize their innovations and grow internationally. We take a consortia-based approach and focus specifically on the technology companies, not necessarily on the projects where they are being implemented. For example, we would be working with companies that have a new wind turbine, but not necessarily working with companies that are providing the wind farm and that project rollout. That's the context that I'll be approaching things from.

I believe we are the only organization that focuses on a broad base of clean technologies and not strictly on water, oil, or soil remediation. We look at all technologies. We find that provides a good cross-sector perspective.

The questions that were posed to this committee and to witnesses like me fed quite nicely into a survey and round table discussion that we hosted about a year ago, so I'm going to address those in terms of the recommendations and findings we had from that survey and round table session.

The specific topic of that survey and session was what the challenges are both for selling to and for adopting clean technologies. The participants in that were all our members. They included companies that were selling clean technologies into industry—early-stage SMEs, venture backed and angel backed; end users, such as utilities and others of that ilk; and, of course, angel investors and venture capital funds.

There were four main categories of recommendations and risks that were identified. I'll go through those sequentially: financial de-risking, including access to capital; industry receptor capacity development; technological de-risking; and, ecosystem navigation and support.

With respect to financial de-risking strategies, there were a couple of recommendations. For the preferred recommendation and preferred mechanism for helping de-risk early-stage technology and growth companies from a financial perspective, two were highlighted.

The first was using the SR and ED tax credit instrument as a vector for helping induce more investment into early-stage clean technology companies. In Ontario, for example, that input tax credit was reduced in 2016. That certainly had a negative impact on the amount of money our companies were able to spend on the R and D side of things. The recommendation from our group was that there be a focus on clean technology and upping that at the federal level.

The other side, which speaks more to the access-to-capital side of the equation, is an investment tax credit. Similar models have been in place in B.C., Manitoba, and many states in the U.S. In B.C., this is specifically a venture capital and angel tax credit, which provides for an incentive to pull money into early-stage technology companies. I can speak more on that later, if requested.

The third recommendation was to augment capital. In Ontario—and in another couple of other provinces, I know—a number of programs are set up specifically to act as co-investment funds to leverage the investment that private investors are putting into companies. Specifically, there is the investing in business innovation program of the Federal Economic Development Agency for Southern Ontario, which invests usually via a debt mechanism of one third to two-thirds. That means industry and angel venture capital investing two-thirds, with FedDev doing their own due diligence but often following on as a co-investment fund for that extra third of the capital needed, up to $1 million.

● (1700)

The full recommendations were to introduce a 3% to 5% clean technology R and D tax credit; to support an investment tax credit based on the B.C. model; and to continue to fund such programs as the FedDev IBI program, similar to those in other provinces, and to ensure that those programs do not run out of funding within a five-year window, which has happened numerous times in the lifespan of FedDev internally in Ontario.

On the industry receptor capacity development side of things, the recommendations were to support industry receptor capacity-building on both the private and public sector sides. There is a lack of confidence in new technologies and ways to bridge that gap such that new technologies can be trusted to be implemented. There are many ways to do that. One that was recommended, and I think referenced earlier, was the U.S. Department of Energy's small business vouchers pilot program. We could implement a similar program here with a clean technology voucher program to support the engineering, legal, financial, and other services that are necessary to give end-users the confidence they need to implement clean technologies.

The other recommendation from our members was to support a clean technology version of the NRC IRAP program, the digital technology adoption pilot program. This was focused specifically on digital technologies for the web-cloud infrastructure, but the recommendation was to repurpose a program such as that to focus on clean technology adoption.

The third recommendation was for technological delisting. There are many programs out. There are more acronyms of programs than I could possibly list that support and provide grants and other supports to early-stage clean technology programs. They're generally effective, but they often don't match the pace of business. They often have a year-long application cycle and by that point a lot of the projects people hoped to undertake have had to begin regardless of the grants. The recommendation is to support those programs to take the technology readiness level from a six-to-seven range to an eight-to-nine range but to focus specifically on those granting agencies that can provide that in a timely manner and ideally, through a local entity that can help form consortia of end-users as well as funders with that early-stage company.

Finally, we recommend ecosystem navigation support. The clean technology innovation ecosystem is a confusing and many-faceted one. There are many different partners that a clean technology company needs to employ from end-users to investors to various different government programs, to R and D partners, to universities and colleges. It is a confusing ecosystem to say the least, so the two recommendations that our members brought forth were to set up a strong cross-sector community of interest to support the technology companies in the navigation of that process and to set up a concierge service to help navigate that process so that those companies can actually both find end-users and navigate the process through the various different grants and other services needed.

I have a quick comment on what's working and what's not working, and we can certainly be open to more of these as requested. Things that our members highlighted that were working well were the SR&ED tax credits program and the programs hosted by Sustainable Development Technology Canada and all of the partner programs with organizations such as the Ontario Centres of Excellence, Alberta Innovates, etc.

There are also the network centres of excellence programs, particularly the business-led network centres of excellence, which require business-led consortia to be put together to pull technologies into use by those consortia. Specific examples include the Green-Centre Canada and LOOKNorth out of Newfoundland and Labrador.

There are also government procurement programs. The Build in Canada innovation program was well received by our members, who found it to be a good process to help companies get the government to be their first consumer, thereby helping support access to capital as well.

● (1705)

With that, I will turn it over to the committee again.

The Chair: Thank you very much.

Mr. Serré.

Mr. Marc Serré (Nickel Belt, Lib.): Thank you, Mr. Chair.

To our three witnesses, thank you for your presentations and for your preparation for today.

[*Translation*]

I want each witness to spend 30 seconds defining the term “renewable energy”. Earlier, two of them had difficulty defining it.

Let's start with you, Mr. Gilmour. I want to know how you define renewable energy.

[*English*]

Mr. Brent Gilmour: When I look at the definition of renewable energy, it would, in context, be all sources that would actually contribute to the goal you're trying to achieve. I wouldn't start putting barriers or constraints on what's in or what's out. I think it's about what you're trying to achieve: the performance outcome.

[*Translation*]

Mr. Marc Serré: Mr. Watson, you have the floor.

[*English*]

Mr. Bryan Watson: Certainly, and I've actually been in rooms debating the definition of clean technology ad nauseam, for days on end, so I appreciate the depth of the question. In terms of renewable energy, I believe the best definition would be one that focuses on the fact that the inputs are, by definition, renewable. These are inputs that can be used, captured, and converted to energy, whether it be wind—which, ideally, has good storage capacities and we have clean technology companies that can store that sort of energy.... This sort of energy is provided by a source input that does self-renew, as opposed to one that by its very nature has a limit.

[*Translation*]

Mr. Marc Serré: Mr. Popp, what do you have to say?

[*English*]

Dr. David Popp: I think that's the right way to look at it. Renewables are things that are created from sources or inputs that are not finite. It could be wind and solar, but it also could be biomass. It could be the generation of electricity from municipal solid waste, which means that renewables and clean technology are not necessarily the same thing.

[*Translation*]

Mr. Marc Serré: Thank you.

My second question concerns Canadian and American renewable energy markets. As we know, China has invested a great deal in this area and is currently developing a number of forms of renewable energy.

Have you developed relations with the United States that would enable us to compete with China in the renewable energy field, in terms of the number of jobs, investments or the market of the future?

If you don't have experience in this area, you can pass.

[*English*]

Mr. Brent Gilmour: I'll offer this perspective. We are looking to engage with our counterpart in the U.S., with our equivalent, the ACEEE, the American Council for an Energy Efficient Economy. What we appreciate about ACEEE is that they have done their scoring—and this is something that we could consider about U.S.-Canada relations—and have developed a great policy assessment state-wise on how policies are working, whether that's around renewable energy, combined heat and power district energy, or energy efficiency.

What has that done? It's created an interesting process from a federal and a state perspective. States are actually competing to see who is driving effectively a policy that makes sense, relative to the demands of trying to put this forward. They've moved that down to a community level as well. At the municipal level, too, they're trying to see what kinds of policies are being put in place to really drive this.

Why I see that as being something that Canada can do is that I think it would also have the same effect, whereby we could start to compare how policies are having the intended outcome. We had earlier discussions, I think, with some of the other members, about whether policies actually are achieving what you want them to do. We haven't done a lot of that assessment. I think this is where we could head in terms of a direction that would help, whether it's on clean tech or right through. That's what ACEEE achieved. They didn't focus on clean tech; they just looked at energy as a whole and asked, “What are we doing well and what are we not doing well?”

We haven't done that. I think that's something we could do effectively across Canada.

● (1710)

[*Translation*]

Mr. Marc Serré: Mr. Popp and Mr. Watson, do you have any comments?

[*English*]

Dr. David Popp: I'd like to make a couple of points with regard to that question. I think there is obviously now less collaboration between the U.S. and Canada on environmental policy than there would have been before the election in November. As far as the Canadian perspective goes, I think the important thing to keep in mind is that most environmental policy, particularly that related to climate change, which is where a lot of clean technologies focus now, is happening at the state level rather than at the national government level. To the extent that you want to establish good relationships, I think it would be through working with states such as California, or in the northeast, where these policies are in place.

I do want to make another comment, though, because in that question you also made a specific comparison with China and asked about jobs. I think it's important to keep in mind that when we think about environmental policy, jobs are certainly relevant, but environmental policy isn't going to be the main thing that drives us. The reason that China has been so successful with solar panels, for example, is low labour costs. It's not that they're promoting solar energy in China.

To give you an example from my own work, in a lot of my work I look at patent data. In looking at patents related to wind energy in the United States, I saw that one of the states that has the most patents is South Carolina. It was a surprise when I found this out, so I started digging into the data. The reason for this is that most of these patents are assigned to General Electric. General Electric has a turbine-manufacturing facility in South Carolina. South Carolina has done very little to actually promote renewable energy. The reason the facility is there is that South Carolina has lower taxes and lower labour costs.

To attract jobs, the things that matter for other sectors are the same things that matter for the clean technology sector. Environmental policy isn't going to be enough to motivate that.

The Chair: You have 30 seconds, Mr. Watson.

Mr. Bryan Watson: I'll try to take 15.

From our experience, most of the collaboration ends up being our technology companies selling into the U.S. and exporting technologies into larger products and projects with those companies. We really get to focus on the export side of our technologies. A good example would be Hydrostor, which stores wind energy for use in non-peak times or when there is not sufficient wind.

The Chair: Thank you.

Mr. Strahl.

Mr. Mark Strahl: Thank you, Mr. Chair.

I'll be sharing my time with Mr. Barlow.

Professor Popp, I've listened to your testimony, and I also have an article here from an August *Globe and Mail*, wherein you indicate among other things that "[s]ubsidizing consumers who adopt new tech is not the solution". I take it that you would not be a fan of giving people who can afford a Tesla a government-funded $10,000 rebate.

Dr. David Popp: Your characterization is exactly right. I would not be in favour of giving money to people who can afford a Tesla to help support that purchase.

Mr. Mark Strahl: My other question is about what you mentioned a few times: "breakthrough technologies further from the market". In this article, you talked about perhaps the same thing: "emerging tech not yet cost-competitive".

When a technology is far from the market, who determines when it is a breakthrough technology if it's not the market itself? Does that then fall to government bureaucrats? Government is not typically nimble. I think we heard previously about how sometimes it takes a year to get a project application through for these things. Government is not known to be nimble in responding to market needs. If the market hasn't already done it, how would this turn into anything but a bureaucratic nightmare if the government is the one trying to make the determination on what technology should be funded or what technologies are about to break through?

Dr. David Popp: I think the important thing there is that breakthrough is really a question of timing. It's about technologies that are five or 10 years away from the market, so the market isn't going to finance the development. The most important thing is to think about the government's role to be able to support a diverse portfolio.

I think you're exactly right. You don't want the government in the position of micromanaging and picking whether technology A or technology B is going to be the winner.

The reason it's hard for these things that are further from the market to be able to finance themselves in the private sector is that in a single investment each firm is all in, right? If the investment fails, the company goes under. The government has the advantage of being able to support several technologies and to see which ones work—essentially, to let a thousand flowers bloom.

There was a nice study done by the National Academy of Sciences that looked at the research supported by the U.S. Department of Energy in the 1970s and 1980s. The great majority—I think probably over two-thirds—of the projects were unsuccessful, but if you look at the cost-benefit ratio for the program as a whole, it was a resounding success, because the few products that were successful were really big hits. That's really the idea: to be able to diversify to support a larger portfolio of projects than any one company could do on its own.

● (1715)

The Chair: Thank you.

Mr. Barlow.

Mr. John Barlow: Thank you, Mr. Chair.

Professor Popp, my riding is in southern Alberta. I was reading a memo that you put out regarding your meetings with Ontario and Alberta, and I noticed that several of the five recommendations you put forward to those provincial governments included a carbon price. Our concern, with the United States now backing away from following through with a carbon tax, is how does Canada remain competitive? Do you see the United States, for example, falling behind in innovation and technological advancements when it comes to clean tech? They are not going to have a carbon tax. Does this show that the United States will be falling further behind?

Dr. David Popp: You've asked an interesting question. I think the key thing is that there are a lot of policies still going on at the state level. The largest markets in the U.S.—California, the northeast, New York, Massachusetts—are still making efforts towards a climate policy, so I don't think it's as simple as saying there is nothing happening in the U.S. It does raise the question about whether the bar will be as high, because the policies that the states are putting in place certainly are not as stringent as what would have been put in place, for example, if Obama's clean power plan had stayed in place. I think it's something for the governments to be cautious about, or certainly to be aware of.

One of the things I remember talking about in the policy brief for C.D. Howe was that it may mean that Canadian firms with a focus on clean technology will turn their attention to, or focus more on, the European market rather than the U.S. market. I think you're absolutely right that there is a danger of the U.S. falling behind in clean technology.

Mr. John Barlow: Further, in one of your recommendations you talked about the possibility—I don't know if “risk” is the right word—that government funding for research and development could displace private sector funding for that. For me personally, that's something I would discourage. I want us to find ways to encourage private sector investment in research and development.

Can you expand on that a little bit, and on what your concerns were there? I think it's something we have to very cognizant of. Government, as my colleague said, doesn't always make the best decisions and certainly doesn't move quickly, whereas I think the private sector, carbon tax or not, has done some incredible work. We want to make sure that we incentivize them or encourage them to continue that work and that investment.

Dr. David Popp: Yes. I think there are two things there. One, as I heard in the previous session, involves making a distinction between more basic research, or the more fundamental science and the engineering behind these technologies, versus the applied research, or trying to commercialize these technologies. The government can play a role in that more basic research.

The other place where government can play a role is in thinking about things that are complementary to these technologies. We've seen the private sector do a lot of work in wind energy. There's less private sector research focusing on the transmission grid, on the smart grid, because that's an innovation that has huge public benefits with any breakthrough; that benefits all the companies who invest in renewables; and that will be hard for any one company to reap the rewards of. So investing in some of those complementary technologies is important.

It's really a question about technology choice, about trying to avoid doing the things that the market is already good at. I think that's one thing that's fairly straightforward for governments to observe, because it's easy to see what things the private sector is doing and is doing well.

The Chair: Thank you, Mr. Popp.

Mr. Cannings.

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

Thank you to all of you for being here today.

Mr. Gilmour, you stated that communities account for 60% of energy use and over half of all greenhouse gas emissions in Canada. Could you comment on any government programs that might help communities reduce that energy use through clean tech or whatever? This is a study about clean tech and natural resources, and this is the natural resources committee. How would helping communities reduce energy costs and energy use affect natural resource companies, particularly energy companies?

● (1720)

Mr. Brent Gilmour: I think when we talk about communities, we often get into a couple of different areas that would affect any firm, natural resource companies or not. By this, I mean transportation and buildings. When we talk about where we use our energy, from the end-use perspective, 25% of our energy use is in buildings. On a community scale, you're looking at another significant portion for transportation.

You're looking for efficiencies. You're looking for natural resources in terms of what companies can be doing with them, such as in extraction areas, with communities, because it's a shared opportunity. Thinking about the north, you have communities with high-priced energy who are looking for great ways to work with their industry counterparts who are there, which might reduce their energy costs.

I think when we start looking at programming, as we've heard from some of the other panellists here, we look at twinning, at what you are able to do to help a community and the local industry there—not one or the other, but both. Everyone wins. When we pick one, that's when things go awry, and that's where you start offsetting.

I think this is why we're trying to encourage that. You'll probably hear it from some of the other witnesses here today. When we think of forestry or mining, their number one cost in mining, for instance, is energy for production. If you're going to help them, it's also a fact that the community likely has high costs for heating. It's not just for electricity production.

The other big part that I would encourage, when we're thinking of programming development, is with the types of investment areas. We've talked a lot about electricity, yet we only use about 30% of electricity totally, whether it's in terms of buildings or transportation. The rest of it is mainly for heating, in industrial processing or buildings. That's where I would be talking of thermal energy, when you are thinking of programming. Anything that can be done with clean technology opportunities to advance thermal opportunities will have a significant benefit for industry and businesses, whether it be in terms operating their buildings, their transportation, or their industrial processes.

I'll just leave it there. With regard to thinking about a principle of approach, we tend not to talk at all, for any reason, about thermal, yet that's our biggest challenge.

Mr. Richard Cannings: Okay. Thank you.

Mr. Popp, you mentioned briefly carbon pricing and externalities. I wonder if you could just quickly talk about externalities and why it's important to put a price on them in this situation.

Dr. David Popp: Sure. The idea here is simply that much of the benefit of using these clean technologies doesn't go to the person who invests in the technology. An externality is when one person's action affects somebody else. A smoker's second-hand smoke affects the person next to them. A firm's pollution affects the people next to them.

The idea of a carbon tax is to do what we call “internalizing the externality”. Market prices don't take into account the harm done by the pollution. If the tax is set a price that's comparable to the harm caused by the pollution, that now becomes part of the decision-making process of the firm. That cost is internalized, and it now becomes part of their decision-making process—the goal of the carbon tax.

Mr. Richard Cannings: You mentioned that you aren't a fan of subsidies, for instance to incentivize people to buy electric cars. I'm wondering if you could comment on perhaps governments getting involved in infrastructure. A lot of the reason that people aren't moving as fast as they perhaps might to electric cars is that the infrastructure isn't there for refuelling.

Is that something that governments should get involved with? That's something I hear from my mayors. They want to see electric refuelling stations across my riding.

Dr. David Popp: If you're thinking about where to get the most bang for your buck, that would be much more effective than providing a subsidy. The idea behind it is that with the infrastructure, you're enabling people to do something they can't do right now. If you don't have charging stations, people will not purchase electric vehicles.

The challenge with a subsidy is that you can't differentiate with a subsidy. Are you giving the money to people who wouldn't have purchased the product without the subsidy, or would they have purchased it anyway? A lot of the money will go to things that would have happened anyway, so I think the infrastructure investment will be much more effective.

● (1725)

Mr. Richard Cannings: Okay.

Mr. Watson, you threw out a lot of acronyms and program names. I wonder if you could talk about where government could have the biggest impact, whether with an existing program or by expanding it, or developing a new program. Just pick one and....

Mr. Bryan Watson: Certainly. I'd say there are a couple.

One program is on the access to capital side. I do believe that the SR and ED tax credit program, which provides an innovation tax credit specifically geared towards commercialization and adoption—and obviously the R and D side of that commercialization and adoption—will have a great effect on the adoption of those clean technologies. The first pilots of those technologies, the infield testing and calibration to market, is where that innovation tax credit does come into play.

The second is again on the access to capital side. The program that I've seen have the greatest effect, being from Ontario, is FedDev's investing in business innovation program, which I've been involved in for quite a while. It leverages two-thirds to one third, up to $3 million, in investments in early-stage clean technology companies. It really helps to bridge that valley of death that a lot of companies face in getting to market. With a venture capital ecosystem that has had some interesting policy in it over the years, which has been slightly detrimental to that ecosystem, that sort of program really is necessary to get those companies over that valley of death.

The Chair: Thank you very much.

Mr. Harvey, you have a minute or two.

Mr. T.J. Harvey: I won't be very long. I'll give you each an opportunity to comment really quickly at the end.

I want to quickly touch on this. We talk about clean technology, the option of clean technology, and the renewal of clean technology in some sectors across the country, and a lot of times clean technology is associated with renewables. I think it's important that we recognize not only the ongoing development of clean technology in traditional sectors, but also the past development of clean technology that has been adopted in the oil and gas, mining, forestry, and agriculture sectors. We need to make sure that we take that into consideration from a policy perspective.

A lot of the traditional industries have made great strides over the last 25 or 30 years, especially in the last 10 years, in forging ahead with the adoption of cleaner technologies. A lot of times, I find, such progress gets disassociated from those traditional industries, and the focus tends to be on renewables. I wanted to make sure that I got that comment in there. I'll open it up for all three of you to give a last take on that. That's my opinion.

The Chair: You have about 20 seconds each, if you're all going to take a turn.

Mr. Brent Gilmour: I'll be very quick. I would stress one thing: don't invest just in the tech. We keep talking about technology. I want to stress from my perspective that it's about being careful, but also about investing in the project development stage. This is the infrastructure argument too. This is where you're going to get the biggest return, regardless of where.

Mr. T.J. Harvey: Yes—

Mr. Brent Gilmour: Whether it's upstream or downstream, this is what we're talking about. That's what I would encourage, regardless of where we're going. Invest not just in the tech. Give consideration to the project development stage.

Dr. David Popp: I think that's an excellent point you make. It's one area where there's a distinction between what firms will do as a reaction to the markets is important.... I say this because in setting the policy, whether it's a carbon tax or environmental policy generally, it's important to set the clear goals and encourage a lot of innovation.

Mr. Bryan Watson: From my perspective, you're spot on. A lot of our technology companies focus on mining tailings or the industrial Internet of things to monitor pipelines for safety. There is a very wide group of technologies that plays into the clean technology sector and that may apply to all sectors: hydro, water, and gas. Energy generation is just one. There are many other sectors where clean technology plays a role, such as what green chemistry does in intermediating chemicals that are quite harmful. All of those have to be considered and supported.

My final point would be to have a clean-tech voucher program bridging the gap between that technology and the project where it's implemented—with that technology, that industrial Internet of things for pipeline management systems and monitoring systems, being implemented for a pilot trial on an actual pipeline. In those sorts of projects, that's where a clean-tech voucher program to help bridge that gap is very important—and not just in energy generation.

Also, I agree with you on making sure that it is not just the energy generation and renewables sector that is the focus.

● (1730)

The Chair: Thank you very much, gentlemen, for taking the time to join us today. Unfortunately, we're out of time. We're going to have to stop here.

As for the rest of you, we'll see you in 10 days.

The meeting is adjourned.