HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Natural Resources

RNNR • NUMBER 064 • 1st SESSION • 42nd PARLIAMENT

EVIDENCE

Wednesday, September 27, 2017

Chair

Mr. James Maloney

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● (1540)

[*English*]

The Vice-Chair (Mrs. Shannon Stubbs (Lakeland, CPC)): I call the meeting to order. I'm Shannon Stubbs, serving as chair today. Good afternoon.

I apologize to our witnesses for the late start.

As everyone knows, we will have three witnesses today over the course of the meeting: Patrick Bateman from the Canadian Solar Industries Association; Bryson Robertson from the Institute of Integrated Energy Systems at the University of Victoria; and via video conference, Malcolm Metcalfe from Enbala Power Networks.

Each of you will have seven minutes to make opening statements, and then we'll move into questioning. Members, as we go around the table, will have a round of seven minutes for questions and then, if we get time, a second round of five minutes.

Let's begin with Patrick Bateman.

[*Translation*]

Mr. Patrick Bateman (Director of Policy and Market Development, Canadian Solar Industries Association): Madam vice-chair, ladies and gentlemen members of the committee, good afternoon.

I would first like to thank you for having invited me to testify here today, and also for giving me this opportunity to practise my French. I would also like to thank the clerk for his very good work.

My name is Patrick Bateman and I am the director of policy and market development of the Canadian Solar Industries Association, or CanSIA. I have been working in the area of renewable energy for 10 years now. I devoted a large part of my career to working with companies in the solar energy area in order to make solar energy production more common and more generalized in all of Canada's provinces and territories.

[*English*]

As stated in the policy objectives in the pan-Canadian framework on clean growth and climate change, and as demonstrated in several analyses, including Canada's mid-century long-term strategy, meeting Canada's climate action and clean growth targets and objectives is reliant on maximizing the efficiency of our energy use and minimizing the greenhouse gas emissions intensity of the energy that we use.

Non-emitting electricity generation, including that from the renewable energy sources—solar, wind, marine, and hydro—currently meets approximately 80% of Canada's annual electricity needs. Canada's abundance of existing non-emitting electricity assets and untapped renewable and solar energy potential is Canada's single largest competitive advantage in the challenge of deep decarbonization of our economy.

Canada is committed to a target of 90% of our electricity production being from non-emitting energy sources by 2030. Not only will this ambitious outcome result in material emissions reductions from the electricity sector; it will also provide an emissions-free, reliable, and affordable option for fuel switching in the transportation, buildings, and industrial sectors. This is also termed electrification.

There is no viable alternative for Canada to meet our international obligations under the Paris agreement other than to rapidly increase the proportion of non-emitting electricity in our supply mix and to pursue significant levels of end use electrification.

Solar electricity generation is a supply-mix option that can contribute to this targeted outcome. Many studies are being continually published that document the rapidly declining costs of solar electricity generation. One such study, from Lazard, shows that the cost of solar electricity has declined by 85% since 2009. Many studies show that solar energy will be the lowest-cost option for new electricity generation throughout the world by the mid-2020s. This will also be the case for Canada.

[*Translation*]

For instance, the CEO of Hydro-Québec, Éric Martel, was recently quoted in *Le Devoir* . This is what was said:

> Hydro-Québec believes that, as of 2024, the cost of locally produced solar energy will rival that of hydroelectricity distributed on its network .

[*English*]

The narrative about solar electricity has quickly been transformed from when it will be cost-competitive to how much cheap solar electricity we can reliably integrate onto our grid. Jurisdictions around the world are demonstrating that high penetrations of variable generation, such as solar, can be reliably integrated. For example, during the first half of 2017, more than 10% of the United States' electricity was met with wind and solar energy for the first time in history. During this time, several states actually met 20% to 40% of their monthly electricity demand from wind and solar. World leaders, including Germany and Italy, currently meet between 7% and 9% of their annual electricity needs from solar energy.

With respect to interties, interties that create larger areas across which to balance variable supply and demand are one tool in the tool box for the system operators in these regions to manage increasing penetrations of variable energy resources. As such, CanSIA believes that strategic investment by the federal government in transmission infrastructure that provides greater linkages between the electricity systems of two or more provinces can support our national climate action and clean growth policy objectives. CanSIA recommends that a key basis on which the decision to invest is made is that the investment will result in significant greenhouse gas emissions reductions and contribution toward our national 90% non-emitting electricity target.

In addition, we would recommend that due diligence on the cost-effectiveness of individual projects take into account current and realistic future pricing for solar electricity and also for storage technologies. There are many examples of long-term investment decisions being justified on outdated pricing for alternative options. Solar plus storage can, and will, cost-effectively fulfill some of the roles that some interties would play in future. Any investment decision should be made with a full and accurate understanding of the various available options.

Finally, it is also CanSIA's view that the electricity system of the future is one that places electricity consumers at the forefront with a wider array of new, clean, smart, and distributed technologies available to them. CanSIA believes that investment in new interties should ensure that Canadian electricity consumers are provided with more options to manage, generate, and store their own electricity as well.

This concludes my remarks.

● (1545)

[*Translation*]

Once again, I thank you for having given me this opportunity to speak before the committee.

[*English*]

I look forward to any questions you may have.

The Vice-Chair (Mrs. Shannon Stubbs) Thank you, Mr. Bateman.

We will now go to Mr. Robertson.

Professor Bryson Robertson (Adjunct Professor, Institute of Integrated Energy Systems, University of Victoria): Thank you very much for this opportunity to present, as well as to Mr. Bateman for presenting a lot of the facts that I was going to present. Mine will be a little shorter, allowing more times for questions.

As a bit of background, I'm an adjunct professor at the University of Victoria's institute for integrated energy systems. I'm here wearing two hats today: one with regard to the 2060 project, which is funded by the Pacific Institute for Climate Solutions, looking at deep decarbonization pathways for Canada's energy system, as well as on behalf of Marine Renewables Canada and the marine renewables industry.

The 2060 project looks at the intersection of technology, policy, economics, environment, and society in developing decarbonization pathways for Canada's electrical sector. At this stage, we focus primarily on British Columbia and Alberta, and I'll give some reasoning as to why that is.

I think it is important to state up front that that project is technology neutral. We don't pick winners or losers, we simply place all the technologies available to us on the table. We allow the system to optimize the least-cost, least-risk solution for Canada in meeting our greenhouse gas reduction targets.

On the marine renewables side, I also run a project looking at wave energy for British Columbia, looking at developing and understanding the opportunities, hurdles, and value proposition for developing marine renewables for British Columbia. By connection to Marine Renewables Canada, we look at tidal on the east coast.

I'm going to try to answer the questions from those two perspectives. If people get confused, I'll try to elucidate which perspective I'm talking from.

Looking at the intertie, as Mr. Bateman pointed out well, Canada's mid-century, long-term, low-greenhouse gas development strategy states that Canada needs to reduce greenhouse gas emissions by 80% by 2050. This is transformational change. This isn't something that is incremental. There is a significant change that needs to happen.

The Canadian system is well positioned to be a global leader in this space. Currently, 80% of our generation comes from non-emitting resources. Provinces like British Columbia, Manitoba, and Quebec are well positioned to be able to do this already. The other provinces are just not naturally endowed with this competitive advantage.

Times are changing, though. If we look at what is happening in Alberta and around the world, it's being driven by both policy and economic drivers. We are seeing Alberta put into account their 30% renewables by 2030 and push coal out of the system. As well, I don't think anyone would have suggested or predicted the cost changes that we're seeing in wind and solar these days.

Connectivity is key to this reliability question, being able to take complete advantage of our natural resources that we have in the country. There is a huge distribution of our rural renewable energy resources across the country. We have hydro in British Columbia, wave in British Columbia, solar and wind in Alberta, and tidal on the east coast. Interties allow us to start to connect these. It allows us to start to look at peak demand diversity and how to mitigate those and reduce costs to the general consumer.

I think it's important to note, before I get into an example on how we're showing the value of interties, that there are a lot of zero-carbon energy resources that are economical right now. It's important for us to think beyond that and look at zero-carbon flexible capacity. What is going to be there to manage the variability in the energy resources that we have? We have limited economically viable options right now in that regard.

The 2060 project will look at deep decarbonization for British Columbia and Alberta. We don't look at it from a provincial perspective, we look at it from a regional perspective. If the two provinces were able to create a market that worked for both and come to political agreement on a whole slew of different things, what would the benefit be?

Under a climate change-inclusive vision for the future, we can see that seasonally there are huge advantages. As Alberta builds out its wind resources, they're going to have overgeneration in the winter. They are going to generate too much renewable power in the winter, which they are either going to have to curtail or they're going to have to export somewhere else.

Concurrently, British Columbia's hydro resources will no longer be generating at the same level. They will be slowed up, so we will be able to absorb that. In the summertime, British Columbia is going to continue to be affected by the freshet and have low cost of power. We'll be able to export that into Alberta where their wind resources aren't working. There is huge complementarity in the seasonal and temporal aspects of these resources, and intertie unlocks that potential.

What does this do for our greenhouse gas emissions? If we stayed with the situation as normal, we suspect British Columbia would stay at about 95% renewable. Alberta will reach its 30% goal. However, if we intertie them, we probably can get to about 92% or 93% renewable. There is significant investment. The intertie needs to grow eight to 10 times its current capacity, but I think just showing that there is a value proposition there is important.

● (1550)

On the marine energy side, to provide that, one of the greatest competitive advantages of marine energy is its location. Our current electrical system is generally fairly centralized to where our resources are, and a lot of our coastal communities don't have a lot of generation. They're connected by somewhat unreliable transmission lines to the coast. No disrespect to the utility. They work hard and they do a fantastic job, but there is this complementarity among our variable renewable resources, and there's a huge advantage in our starting to unlock all of those tools, all those resources that are in our tool box as a country.

We need spatial and temporal diversity in our resources, so we're looking at wind and solar. I don't think there's much debate that wind and solar will dominate in the future, but in the long-term predictions, once we start to see incremental value to incremental gains and capacity, we start to see value build out in diversifying beyond those two.

The Vice-Chair (Mrs. Shannon Stubbs): You have one minute.

Prof. Bryson Robertson: In conclusion, including marine renewables in our generation resources will provide us with a more resilient and independent system and allow us to offset additional transmission capacity to provide generation resources on our coastlines.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you.

Now we'll move to Mr. Metcalfe, by video conference. You will have seven minutes.

Mr. Malcolm Metcalfe (Founder and Chief Technology Officer, North Vancouver, Enbala Power Networks): Thank you very much, Madam Vice-Chair and committee members.

It's a real pleasure to have been invited to speak to you today. This topic is of critical importance to us all, and I'm happy to assist in whatever way that I can.

I started a career in energy almost 60 years ago, when I worked for a utility in B.C. As a student I earned enough working in the summer months to pay my way through university. I started at the bottom, but by the time I was finished my master's degree, I'd worked as a load dispatcher and trained some operators on how to operate a power plant.

I've worked for a number of energy companies in Canada. After retiring, I started a new company called Enbala Power Networks. Initially there were three of us. Our intent was to implement cost-effective solutions to reduce emissions in hotels in Whistler. We actually were successful. We reduced the greenhouse gas footprint for the village by 10%. This earned me the honour of carrying the Olympic torch.

I have to say, I'm happy to tell you that the University of Victoria, Bryson's team in Victoria, has been a major source of employees for us. I think almost all the new engineers that we've hired have come from UVic. I'm heading into town in a few days to spend the day with one of our new people.

Canada is really very fortunate. We have about more than 80% of our electrical generation in renewables. That may change because, as we shift from fossil fuels to electrical use, for example, use of electric cars, then I expect that there's going to be a lot of pressure on that number. We're going to have to take some steps.

I'm taking a slightly different approach on this because I see Canada as being divided into three significant areas. B.C. has huge hydro storage and hydro generation, Manitoba has large hydro storage and large generation, and Quebec has large hydro storage. In between, these provinces need very badly to access the storage that's available. The idea of putting tie-lines in between the provinces that lie between B.C., Manitoba, and Quebec would be very valuable to them to allow them to improve their carbon emissions.

The problem of actually integrating solar and wind is not quite as easy as a lot of people seem to want to think it is. I'm doing a Ph.D. right now—even at my advanced age—on a novel method of integrating solar and wind into the grid. One of the things that's interesting is that we found that the grid as it exists, because generation follows the load, is only used to 50% of its capacity. If we turn the grid upside down and manage from the bottom, manage loads, manage storage locally, manage distribution, distributed generation, and distributed storage, we can actually deliver much more power through the grid.

There's been a lot of effort put into the system to minimize and optimize the uses of electricity. For example, for electric lights and electric motors, which are the two largest loads on the electric system, the efficiency has dramatically changed in recent years.

In fact, there are opportunities now, I believe, to optimize the source because in actual fact we have line losses of about 10%. But when you run generators up and down as we're currently doing to follow the load every day, the average efficiency is down well below 90% for hydro generation, and below that for some of the others. In fact, some of the fossil fuel generation runs at about 30% efficiency. There's a huge opportunity to work together to integrate the storage that some of the utilities have, specifically B.C., Manitoba, and Quebec, with Canadian provinces to gain.

Just to put this in perspective, B.C. Hydro over recent years has been selling power to California. We actually have not been selling energy. We sell power during the afternoon and buy it back at night because they're unable to shut down some of their plants. We've made as much as $3 billion on buying and selling. Yet the actual amount of energy has been negative. We've actually imported energy, yet still made $3 billion.

● (1555)

That money could actually be used in Canada by strategic interties between B.C. and Alberta, and perhaps between Manitoba, Alberta, and Ontario.

Manitoba, I know from discussions with them, has done very well by supporting wind energy in the U.S. Quebec, we all know, has done extremely well doing the same thing in New York that BC Hydro did in California.

I believe, then, that there is a real value, but there's a need for a strong plan that will look at the whole system.

To carry this a step further, we're having some degree of difficulty because the utilities are all sitting.... I would argue that they have done a very good job of supplying reliable power, but they are out to make their share of the money. They are regulated as to what they can make, and they will collect that amount of money regardless of how much energy they sell.

The Vice-Chair (Mrs. Shannon Stubbs): You have one minute.

Mr. Malcolm Metcalfe: On the other hand, we're seeing people now putting in solar systems all over the U.S., installing them to reduce their costs.

You have, then, two groups trying to optimize the same thing but coming to very different results. The net result is not a very happy one, in that the U.S. utilities appear now to be looking to charge a demand charge for electricity that will actually damage the cost-effectiveness of a lot of the solar energy.

I believe that if we were to work as a unit and have some kind of central planning or some sort of central operation that planned for both sides, we could maximize the amount of renewable energy we get on the system and run very efficiently.

It's going to take all we can get. If you look at the amount of energy that's used.... We did a lot of audits in B.C. in buildings and found that two-thirds of the energy came in through the gas pipe and one-third came in through the electricity wires. If you're going to eliminate the fossil fuel side of things and attach the transportation industry at the same time, you're going to find that the need will be very dramatically shifted towards electricity. We're going to have to work very closely together.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you, Mr. Metcalfe. We're a tiny bit over time. Hopefully, you'll be able to expand on your thoughts as we commence questioning.

Mr. Malcolm Metcalfe: That's fine; I was just going to say that I'm done.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you.

We'll start with Mr. Tan for seven minutes.

Mr. Geng Tan (Don Valley North, Lib.): Thank you, gentlemen, for being with us today.

Mr. Bateman, how could strategic electricity interconnections help the rise of solar and other renewables in Canada?

For those provinces with solar capacity already, how can the inter-regional co-operation through strategic interties help the provinces transition to cleaner energy sources?

● (1600)

Mr. Patrick Bateman: I'll start with the second question.

With respect to the jurisdictions that already have solar electricity generation, the penetration currently is still very low. At this point, in many cases the solar electricity is being consumed at a local level and isn't finding its way to the transmission system. In those instances, transmission infrastructure is quite often not needed either within the region or inter-regionally.

To build on something that Mr. Robertson said, when you begin to have higher penetrations of wind and solar and other resources—for example, in Alberta—the wind resource is very strong in the winter and at night, whereas the solar resource is excellent but is also the opposite: it's very strong during the summer and during the day. When you have very high penetrations of wind and solar, the majority of the time you have just the right amount, but when you have too much of one or the other, it helps to share with your neighbours and to balance between the two.

Mr. Geng Tan: Can you speak to the competitiveness of solar and to the way it can help with the integration of renewable energy sources? Right now, whenever people talk about solar the image in people's brains is just that from solar you get electricity. Actually, though, there are other ways of using solar power. For example, some people use solar energy to melt salt, and they use the molten salt to heat other things—water, or whatever—to provide heat sources.

Can you also comment on the potential of these kinds of technologies?

Mr. Patrick Bateman: With respect to cost, as I mentioned for utility scale solar, we've seen price declines since 2009 of about 85%. It's very hard to keep track of how quickly these costs are coming down. It's the same for laptop computers or smart phones, it's just been driven down further and further.

The advantage of solar electricity generation is that all of the capital costs are incurred up front, so the cost of electricity generation has close to a zero marginal cost and you know exactly what your cost is going to be for 20 or 30 years. In many cases, you're not subject to inflation risks. You have no exposure to what can be at times volatile energy markets. Also, since it's not emitting, you have no exposure to carbon risks either.

We're still seeing something of a delta between new solar generation and other forms today, but when you take a life cycle approach then in many cases, solar is less expensive than other forms of new generation in Canada today. In years to come, we'll see solar potentially reaching lower costs than existing assets as well. I draw attention to Mr. Martel's comment from Hydro-Québec that they expect solar to be cost-competitive with existing hydro assets by 2024. In electricity generation asset lifetimes, that's a very short period of time.

I took quite a long time with your first question, so I'll be quick with my second one. Photovoltaics have been the dominant electricity source. The application that you mentioned with molten salts uses a variety of different forms of mirrors to concentrate solar energy. Typically, to date at least, those technologies have been most suitable for jurisdictions that have a direct normal radiance of more than five kilowatt hours per metre squared per day. In Medicine Hat, there is the only example of a similar kind of technology. We're at very early stages. I think that there's probably limited applications for things like that in the immediate near term. In the future, it may be possible, but I think for the time being that photovoltaics will be the dominant technology.

Mr. Geng Tan: Let's come back to the interties. What are the projections, in terms of jobs and the economic stimulation associated with this increase to interties between the provinces?

● (1605)

Mr. Patrick Bateman: I couldn't speak directly to the interties, but what I would say is that solar electricity generation creates more jobs than any other electricity source by dollar invested or by megawatt hour generated. Specifically, with the relation to the interties, I don't have a comment at this time.

Mr. Geng Tan: Mr. Metcalfe, do you want to comment on that as well?

Mr. Malcolm Metcalfe: I would actually take a slight issue with the value because California, as an example right now, is looking at an intertie, or at a ramp rate of 30,000 megawatts over a few hours, as the solar comes on and goes off in the morning and evening. Therefore, what they're needing to do is to ramp up generation in the evening, as the solar goes down, and ramp it down in the morning, as the solar comes up. They do not have the generation capacity to do that, so they're looking to B.C. to try and offer them the ramping capability so that they can do that.

By the way, you notice that Hydro-Québec is saying that this solar will offer a large part. It can do that because their utility is capable of very fast ramping, so that between night and day, or when the wind starts to blow and stops, they can ramp their hydro up very quickly and ramp it down equally quickly. They can provide the rate of change that's needed in order to integrate the two together. That's going to be a problem.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you.

We'll move to Mr. Schmale for seven minutes of questioning.

Mr. Jamie Schmale (Haliburton—Kawartha Lakes—Brock, CPC): Thank you, Madam Chair.

It's great to be here. This is a great conversation to have, and I think something that is quite supported. The interties across provinces I think is a fantastic thing we need to be moving towards.

Mr. Bateman, thank you for joining us. Thank you, all, for joining.

My questions, and being from Ontario, you can probably see where I'm going with this.... At our last meeting, the Canadian Wind Energy Association was here. Obviously, you're very familiar with what's going on in Ontario. An article from 2015 says the Ontario Auditor General says those in Ontario paid $37 billion more over the past eight years because of hydro. I do realize there were a variety of reasons for that, so I'm not putting it all on the industry. You said something about jobs just a few minutes ago. Can you repeat that for me, just so I have it clear?

Mr. Patrick Bateman: Solar creates more jobs per dollar invested, or per megawatt hour generated, than any other electricity source.

Mr. Jamie Schmale: Where are the jobs? I don't mean that to be sarcastic, we have solar panels, we put them up, but....

Mr. Patrick Bateman: The bulk of the jobs are on the technical side of the equation, so engineering, construction, design, and installation.

Mr. Jamie Schmale: They seem to be more shorter period jobs.

Mr. Patrick Bateman: That's correct. There are jobs associated with operations and maintenance and other....

Mr. Jamie Schmale: Sure.

Mr. Patrick Bateman: But the majority are in the front end of the project.

Mr. Jamie Schmale: We had a gentleman from Bruce Power here on Monday who said with their organization they have 22,000 indirect and direct jobs associated with their nuclear facility. It was interesting to hear that.

You also said, Mr. Bateman, that the cost of solar is going down. I'm curious as to your explanation why. According to this *Globe and Mail* article from May 2015, a lot of that has to do with the fact that the solar panels are being made in China, which as we all know has weaker environmental standards, and that the chemicals being used on these panels cannot be recycled, they have to go into the landfill. Basically, it's saying it's not as clean as one would think. Could you maybe clarify that?

● (1610)

Mr. Patrick Bateman: For sure, and I'd be interested to read the article to have the full background.

The reality of the situation is that with the modules themselves more than 90% of them are recyclable by weight. The large part is aluminum framing and glass, so in reality the waste stream post-manufacturing is highly recyclable. There are some modules that contain very minute amounts of chemicals that require more careful attention. A lot of the manufacturers that have those chemicals in them have direct-to-consumer line of sight for recycling after use.

Over the past few years, due to a variety of different trade cases and other dynamics within Asia, a lot of the manufacturing, not only of solar but of other electronics whether it's TVs or smart phones, has become more diversified. We're seeing more and more solar being manufactured in southeast Asia, for example, and I think we're seeing improvements across all electronics in recycling and environmental standards through innovation and efficiencies. We're seeing fewer and fewer materials used. We would want to see continued improvements within the environmental performance and the manufacturing side. We do have manufacturing capacity in Ontario that is top of the pack for environmental standards, and also the United States as well. But the majority is in Asia, for sure.

Mr. Jamie Schmale: In my area, we have farmland being used for these solar facilities. Basically, to create these solar farms—can I call it a solar farm?

Mr. Patrick Bateman: Sure.

Mr. Jamie Schmale: Concrete needs to be poured into the ground, it needs to be sturdy, there's secured fencing around, cameras, and all that stuff. Basically, the land is useless after the contract's up with the MicroFIT program, unless there's a new program, is that safe to assume?

Mr. Patrick Bateman: Let me clarify—

Mr. Jamie Schmale: Well, you can't really use it for farming again, can you? You can't dig up all that concrete and take the soil away. Is it basically useless then, that land?

Mr. Patrick Bateman: Solar is a very benign technology environmentally. After 20 to 25 years, in many cases.... I would view the land being in stewardship for 20 or 25 years, and the quality is likely better than it was at the time of installation.

Mr. Jamie Schmale: With all that concrete?

Mr. Patrick Bateman: Yes. The amount of concrete, in terms of the footprint, is minor. It's not that the proportion of the land would be used for—

Mr. Jamie Schmale: I guess that depends on the size of the solar farm.

Mr. Patrick Bateman: There would be more concrete with a larger solar farm, but proportionately there would be a similar amount just scaled up based on the size. For remediation, we often see people saying to just leave the concrete in there rather than take it away because it will cause more environmental damage by removing it than otherwise.

I'd love to invite the members of the committee to visit a solar farm in June or July, and you would be amazed at the biodiversity that is there. I have some great examples that I'll provide via the clerk later on about a solar farm owned by Enbridge in Sarnia, and the wildlife that live there is really incredible. I think there obviously needs to be responsible operations, maintenance, and development activities but, for the most part, there is opportunity to enhance biodiversity as opposed to environmental degradation.

Mr. Jamie Schmale: Okay.

Mr. Metcalfe, I have a question for you. I'm just going to try to squeeze one more in for Mr. Bateman, and I will hopefully get to you.

Mr. Malcolm Metcalfe: Okay.

Mr. Jamie Schmale: Mr. Bateman, according to the independent electricity system operator on the state of the electricity system at 10-year review, the Province of Ontario is a net exporter of electricity. The excess electricity is sold, in many cases to competing states at pennies on the dollar, because of the Green Energy Act.

I also took the opportunity to look at a briefing you did on YouTube where you are talking to people from Alberta in 2016, and you are discussing the benefits of wind and solar. I was struck by one of your responses to a question on why rural Ontarians are paying more than urban Ontarians and—

The Vice-Chair (Mrs. Shannon Stubbs): You are over time. Maybe there will be an opportunity for a follow-up.

Mr. Weir.

● (1615)

Mr. Erin Weir (Regina—Lewvan, NDP): Well, Mr. Metcalfe keeps getting cut off or excluded, so I'm going to try to remedy that by directing my first question to him.

Mr. Metcalfe, you mentioned the potential of interties to connect the hydro storage capacity that exists in Quebec, Manitoba, and B.C. to other provinces. Coming from Saskatchewan, I'm particularly interested in the possibility for more interties with Manitoba as a way of supporting more generation of intermittent electricity in Saskatchewan. I wonder if you could comment on that.

Mr. Malcolm Metcalfe: Saskatchewan has a largely thermally based system. If you run it at a constant load, it's reasonably efficient. But if you run it up and down—which they have to do in order to match the load because the generation always has to be the same as the amount of load—it becomes much less efficient. Now if you had a heavy connection.... Saskatchewan has a very small tie with Alberta and Manitoba, but very little else. If one were to connect and do some sort of deal with Manitoba Hydro and allow them to operate their existing generation at a constant level and then take up any swings that occur as a result of adding solar or wind, then the whole system would run more efficiently. I have very strong beliefs that this would be a very good thing to do.

Mr. Erin Weir: Okay, excellent.

Now, in northern Saskatchewan there is also the potential for large-scale hydro. For example, in the 1970s the government of Allan Blakeney explored the Wintego dam project. There are obviously pros and cons to any major project, but if Saskatchewan had the choice between investing in greater interties with Manitoba versus developing more large-scale hydro in our own province, what would you recommend?

Mr. Malcolm Metcalfe: How far north is it?

Mr. Erin Weir: Well, it's quite far north, and it would require additional transmission capacity, for sure.

Mr. Malcolm Metcalfe: Well, it's interesting because, if you go beyond about 600 miles, it becomes much more expensive because it's very difficult to transmit AC current over long distances or, to put it in technical terms, more than a quarter of a wavelength. B.C. Hydro chose to add series capacitors in lines everywhere. Hydro-Québec chose to isolate themselves completely from the U.S. and connect only with DC.

My suspicion is that, if you were to look at the cost-benefit ratio, you would be better off focusing on renewables in the south and interties with Manitoba rather than a long, long transmission line to the north.

Mr. Erin Weir: I guess, given—

Mr. Malcolm Metcalfe: That's based on lack of real knowledge.

Mr. Erin Weir: —that Manitoba is already paying for the long transmission lines.... It's the Churchill River. It's the same river between the two provinces where a dam could be built.

Mr. Malcolm Metcalfe: Yes, but notice that their lines are DC lines. They run on direct current, and they're quite expensive.

Mr. Erin Weir: Thanks very much for your very good insight.

I also want to ask about solar, given that Saskatchewan is the sunniest province. I suppose, as was already mentioned by Mr. Metcalfe, Saskatchewan currently gets about one half of its electricity from coal, so the appeal of developing solar isn't simply for export to other jurisdictions. It's to actually replace thermal generation in our own province.

What would you see as the most important policy changes to enable more solar energy in Saskatchewan?

Mr. Patrick Bateman: The first thing I would mention for the members is that SaskPower is currently running a competitive procurement for a 10-megawatt solar farm. That will deliver price discovery for how much solar electricity will cost in Canada. We feel that people will be quite astounded by how low and how cost-competitive it's going to be.

Competitive procurement is an important part of utility scale. It ensures that people sharpen their pencils and deliver the best value for money.

I also expect that SaskPower is going to be producing or considering potentially developing new programs to enable households and communities to get more involved as well. Our challenges from climate change are big and real. There's a lot of investment that's going to flow from corporations, but there's also a lot of investment that can be leveraged from small businesses, from households, and from communities. Policies that enable those people to invest and to get engaged with this are very important.

● (1620)

Mr. Erin Weir: Having SaskPower as a publicly owned crown corporation is definitely a huge advantage for Saskatchewan. It's a very strong policy tool in developing renewable power without having to overpay private providers in the way that Ontario may have done through the Green Energy Act.

Could you speak to the relative appeal of the type of large-scale solar farm that you described versus small-scale distributed solar, which is essentially people putting panels up on their roofs?

Mr. Patrick Bateman: I see a lot of appeal in all scales. They fulfill different functions and different roles.

For large-scale generation, you can site it in a location. Solar is very scalable. Whereas, for instance, with a hydro dam you need a suitable river or whatever the case may be, with solar you can put it anywhere. The solar resource in Saskatchewan is really excellent throughout. The first benefit of large scale is, if you need generation somewhere and you want to minimize spending on distribution or transmission, you can choose where to site it and put it there. That kind of scalability is probably the key benefit of the large-scale stuff.

The second is that you can require a great deal of control and visibility from a system operator's perspective. Rather than having multiple datasets coming in from a thousand different systems, you have one dataset coming in. That can make it easier in some instances for it to be integrated on the system. The same thing could be turned around and it could be said that there's also a variety of benefits on the distributed side, but those are two of the key ones on the large-scale side.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you.

Mr. Serré.

Mr. Marc Serré (Nickel Belt, Lib.): Thank you to the witnesses for your presentations and the preparation for today.

I just want to, before we start, clarify some of the comments made in the last meeting regarding electricity pricing. I just want to quote from the comparison of electrical report issued by Hydro-Québec in April 2016. When we look at North American cities on residential consumer pricing, we see that Ottawa, for example, is at 16.15 cents per kilowatt hour. Toronto is at 17.8 cents per kilowatt hour, and then Boston is at 27 cents per kilowatt hour. Then we have Detroit at 20 cents per kilowatt hour, and Charlottetown at 16 cents per kilowatt hour. We also have New York at 29 cents per kilowatt hour. We have San Francisco at 31 cents per kilowatt hour. So we see here that Canadian pricing for electricity is still doing well and we have potential when we go to the exports.

I want to cite another report, from the Canadian Electricity Association, and I'd ask if you have any comments about this. It says, “Canada's access to renewable resources allows for some of the lowest residential electricity prices in the world.” Canada is at 10.5 U.S. cents per kilowatt hour, and this was done just two years ago. The U.S. is at 13 cents per kilowatt hour. The United Kingdom is at 22 cents per kilowatt hour. Japan is at 27 U.S. cents per kilowatt hour and Denmark is at 37 cents per kilowatt hour. Mexico is at less than 9 cents per kilowatt hour, but as we know there is not electricity all over in Mexico.

I just wanted to see if you have any comments relating to the Canadian electricity pricing and how that's competitive as we move to more interconnection with North America.

Mr. Patrick Bateman: I don't think I have a substantive comment, Mr. Serré. I apologize.

Prof. Bryson Robertson: A great question. I think there's a whole variety of factors that play into that. I can't talk to all the jurisdictions, but in the British Columbia perspective, our fuel costs for our generation are next to nothing. It's rain falling from the sky, whereas other jurisdictions that are fossil fuel generated still have a significant fuel cost.

In addition, British Columbia, as Mr. Metcalfe mentioned, benefits greatly from our ability to trade there. There's a significant benefit to the taxpayer and the ratepayer by allowing us to leverage California's need for power and to arbitrage that power, and that directly comes into our rate structure.

That's definitely a major player and why we have such reduced residential electricity prices. I think that shows across provinces. New York has significant ones. They just don't have the ability to get enough power in there fast enough. So that comes with a huge cost. You have a transmission cost that comes with transmitting this power. It depends on where the load is and where the resource is and then what that resource is.

● (1625)

Mr. Marc Serré: Thank you. Also, Mr. Robertson, you indicated, for example, that the east coast has an unreliable lack of infrastructure dollars spent there or...? But you also indicated how important it was for connectivity. It's key.

Again, Mr. Bateman, you indicated how important it is for better integration for renewable energy sectors.

Can you both comment on why that is important as we move forward for a more greener economy?

Prof. Bryson Robertson: Great question. Just to qualify my first statement, it was more for the small communities. In British Columbia, we have a lot of communities at the end of transmission lines along the coast with no local generations. They're reliant on the transmission grid to get them power. When you have winter storms and so on, they're often cut off and they'll spend a week or two without power. That was to qualify that. It's not on the large utility scale.

I apologize. The second part of your question was...?

Mr. Marc Serré: The interconnection was key to moving forward.

Prof. Bryson Robertson: As we move towards renewable generation, the resources are in the locations they are in. It's no longer with fossil fuels, or that we can take coal or natural gas and transport it to generate power where we need it. Wind is only available where wind is, and the sun only shines where sun is. If we look at where the regional renewable resources are, we see that in British Columbia we have rain and mountains. In Alberta, they have great sun, and Saskatchewan has great sun. Alberta has great wind resources. We need to be able to take advantage of those, and as diversity allows us, connecting these diverse resources allows us to average out that variability. That's a big part of it. Each renewable on its own is inherently variable, and by being able to aggregate that, we come up with a much smoother signal that allows us to run our fossil fuel systems more efficiently at higher capacity and less, reducing our GHG emissions.

Mr. Marc Serré: Mr. Bateman.

Mr. Patrick Bateman: I have nothing further to add to Mr. Robertson's response.

Mr. Marc Serré: Okay.

Mr. Robertson, you also talked about the expansion of tidal. Perhaps you could expand a bit on that. How important is it when you look at the marine renewable energy strategy? This is specifically with regard to tidal, to waves and so on.

Prof. Bryson Robertson: I would hope that Elisa Obermann from Marine Renewables Canada would be here to provide a better answer. I can tell you about our perspective on the west coast in the wave space, which is somewhat shared. As we get towards our deep decarbonization goals, as we want to try to meet our mid-term strategy, wind and solar will only get us so far. We're then going to rely on hydro, which requires significant interties, or we're going to start to rely on batteries. While there is a lot of great press around batteries, they are still exceptionally expensive, and they do come with an environmental footprint. If we can diversify our generation resources so that we don't have to store as much, that has huge value.

Tidal, for instance, is infinitely predictable. We can tell you exactly how much power will be generated in 2053 at two o'clock. That has value to the grid operator. When they're trying to decide what other resources to turn on so that the lights are on and everyone can run their air conditioners, being able to rely upon that tidal generation has value.

Mr. Marc Serré: Thank you.

The Vice-Chair (Mrs. Shannon Stubbs): Mr. Falk.

Mr. Ted Falk (Provencher, CPC): Mr. Robertson, I think I'll start with you. You talked a little bit about storing energy. Correct me if I'm wrong, but my understanding is that in its raw stage, you would store it on the backside of a hydro dam. Storage of produced electricity is difficult today.

You were just beginning to speak to that.

Prof. Bryson Robertson: Yes. When I look at that, I guess I should put it in the context of storing unused energy. Rather than us storing California's power, we're simply using California's power in British Columbia and not running our dams. We've managed to keep more water behind the dams, stored, as opposed to actually taking power from California, pumping water uphill or something of that sort, in the west coast perspective.

Storage is going to become incredibly valuable. I think if we look around the world at decarbonization strategies, they all are calling for increased availability of storage.

● (1630)

Mr. Ted Falk: That's the problematic thing, I guess, with wind and solar. We have to consume the energy immediately as it's produced.

Prof. Bryson Robertson: Correct. My earlier comment was that our zero-carbon energy generation sources are cost-competitive, or will very soon be cost-competitive. But the generation resources that we can call on at any instant, at any time, the flexible generation resources, other than large-scale hydro, are not economically feasible right now. If we utilize interties to reduce our requirements for storage, or the high utilization of storage requirements that we have, there's your biggest bang for your buck.

Mr. Ted Falk: Okay.

Mr. Bateman, you mentioned the cost-competitiveness of the different types of energy being produced. Solar, wind, and hydro are becoming much more competitive. What kind of amortization or life cycle are you basing that on for solar and wind?

Mr. Patrick Bateman: I can speak to solar. Typically, the amortization cycle used is about 25 years. The reason for this is that manufacturers provide a warranty for 25 years.

Mr. Ted Falk: That's a full warranty? Each panel is warranted for 25 years?

Mr. Patrick Bateman: The numbers can differ, but typically it's to 82% or 83% of performance. After 25 years it would still be producing at 83% of its rated capacity.

Mr. Ted Falk: Okay.

Are the power utilities that you represent through your association satisfied with the interties available to them when they produce solar power?

Mr. Patrick Bateman: To answer that, Mr. Falk, I think I'll build on one of your questions to Mr. Robertson. With very low levels of penetration of wind and solar, the transmission just simply isn't required. Storage isn't a problem, because the demand is there and it soaks it up. When you begin to have higher penetrations of wind and solar, that's when the interties are required.

A direct response to your question is that right now they are satisfied, but if we do build out more wind and solar, then they will need storage, be that hydro dams or batteries, curtailment, a variety of different solutions, or interties. In most modelling exercises that I've seen, strategic transmission has been one of the things that are best able to manage higher penetrations of wind and solar.

Mr. Ted Falk: Okay.

Mr. Metcalfe, I'd like to ask you a question as well. You talked a little bit about AC power and DC power. I believe you said that DC transmission lines were very expensive to construct. Can you tell me about the advantages and disadvantages to either one?

Mr. Malcolm Metcalfe: Sure. The AC lines are excellent for short distances of up to perhaps 1,000 miles. If you get anything beyond that, you have to deal with stability issues.

With DC transmission, you can go a very long way. One of the longest lines we have in North America goes from Los Angeles to Oregon, and it's a DC line. The advantage of DC is that the systems can essentially run isolated. Quebec, for example, is completely isolated from the rest of the North American grid, because they connect—through New Brunswick in some cases, through Ontario in others, and directly in others—only with DC transmission.

DC transmission lines are expensive because of the converter stations. You have to put a converter station at each end, and you also have to have an AC source available at the end to help that converter station work. They are a bit more complicated, but in fact, if you are going to start tying the Canadian provinces together, you are going to find that the U.S. is divided into two.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you, Mr. Metcalfe.

Mrs. Mendès, go ahead.

Mrs. Alexandra Mendès (Brossard—Saint-Lambert, Lib.): Thank you very much, Mr. Metcalfe. I will pursue that because I was quite interested in it. How do you balance...? Hydro-Québec has been mentioned as being completely isolated. Why is that? I come from Quebec, so that interests me. Why are they isolated, and what benefit does it bring to them, if any?

Mr. Malcolm Metcalfe: That's a great question.

Actually, at the time that happened, BC Hydro was developing northern transmission, and they made the decision to spend the money to remain connected solidly to the U.S. at all times.

Hydro-Québec looked at the same problem and decided that they would isolate themselves, because they have very long lines going up to their northern hydro plants. It was cheaper for them. They would have had to go to over one million volts. Right now, they have 765 kilovolt lines. That's three-quarters of a million volts up there now. They chose to do it that way.

The irony is.... You asked what Quebec gets from that. I'll tell you exactly. Quebec does have more outages than Ontario has—they have gone black a number of times—but when they go black, they have a hydro system that can recover in a matter of a few hours. When you have a blackout in Quebec, the lights come back on quite quickly. If you have a blackout in Ontario, you may be out for a week. The reason for that is the difference between a hydro system and a thermal system, which is the eastern interconnection.

In Canada, if we are going to use DC lines.... The U.S. is fundamentally divided into two, the eastern interconnection and the western interconnection, and they are essentially isolated. If we happen to have a small line going from Alberta, for example, through Saskatchewan to Manitoba, we would ultimately be connecting the whole eastern U.S. with the whole western U.S., and the line would break somewhere in between.

What we need to do is take care of that, and probably use DC.

● (1635)

Mrs. Alexandra Mendès: That's a little more complicated for how I understand it, but okay. Wonderful.

Going back to the interconnectedness and the interties that we need in order to make the system more accessible to all Canadians, how would you recommend that we go about this? This is not an easy solution.

Mr. Malcolm Metcalfe: No, I don't think it's that difficult. I actually think you could put a strong DC tie-line between Quebec and Ontario, a strong DC tie-line between, perhaps, Manitoba and Saskatchewan, and more AC tie-lines between Alberta and B.C., because somebody has already discussed the potential to help each other between B.C. and Alberta. Certainly, there is a lot that could be done there.

Where you are risking connection of two very big systems.... I teach electric power systems, and I compare this to two elephants running down the road, tied together by a thin piece of thread. It doesn't take much of a divergence to break it.

The advantage of DC is that it would allow you to shift power back and forth without a big problem. If you look at Europe, England is connected to Europe all with DC lines, and that's exactly why.

Mrs. Alexandra Mendès: Would you have anything to add to that, Mr. Robertson?

Prof. Bryson Robertson: I think it's on point. My only comment there would be if we look at our transmission networks across North America, we have to remember that there are huge transmission networks north and south, and there's good reason for that. We're heavily connected to our southern neighbours, so when we're looking at pan-Canadian frameworks and visions, doing it in isolation of what the Americans are doing is misguided because they dominate what happens.

Mrs. Alexandra Mendès: So nothing comes from population.

Thank you very much.

The Vice-Chair (Mrs. Shannon Stubbs): Now we'll go to Mr. Schmale, for five minutes.

Mr. Jamie Schmale: That's perfect. Thank you, Madam Chair.

I might as well finish up with Mr. Bateman, and then I'll ask my question to Mr. Metcalfe.

According to the IESO's August 2016 report on the state of the electricity system, that was the 10-year review, the Province of Ontario is a net exporter of electricity. I think we all know that. Electricity is sold in many cases at pennies on the dollar. We have businesses here paying more for hydro than they should and then subsidizing their competitors across the border.

I looked at your September 16 presentation on YouTube. You're in Alberta. Some of the interesting things you said.... I was struck by your response to a question from the audience about why rural Ontarians pay more than urban Ontarians. Your answer, if I'm quoting this correctly was related to the proximity and the cost of getting power to those rural users. And we often hear that when it comes to the price of a litre of gasoline, it costs more to get fuelled in Haliburton than it does in Scarborough.

Further in your presentation, you speak to the reliability of power and specifically that the concerns regarding the reliability of wind and solar can be mitigated by the sheer number of wind turbines and solar panels that are spread across the province of Alberta. Presumably in Ontario those panels and turbines would not obviously be spread out among Yonge Street and Bay Street, but they would be spread out in rural Ontario. So under the 2009 Green Energy Act, and as pointed out by the Auditor General, Ontario agreed to pay solar power and wind turbine operators as much as 10 times the market rate for electricity they produce under 20-year contracts. Then you spoke to the warranty issue, which I believe is one of the reasons they chose that.

If we're going to put rural Ontarians with the burden of housing acres upon acres of wind turbines and solar panels, in your opinion, wouldn't it be better for all concerned, rural Ontarians, the ratepayers, the solar industry itself, that we hold off on spending money to improve the entire system, a system to sell subsidized power at a loss and perhaps instead focus on investing that money in the technology needed to store? I believe Mr. Robinson, Mr. Metcalfe, and you did too, Mr. Bateman, pointed to capturing that electricity and allowing it to be captured.

Wouldn't that reduce the number of panels and turbines needed and reduce the need for subsidies and make a profit for Ontarians?

● (1640)

Mr. Patrick Bateman: I would respond to two central planks. The first one is innovation versus deployment. Do you support the innovation now or do you support the deployment? In my opinion, there's a role for federal and provincial governments, all levels of government, in both right now. In reality, our 30% by 2030 emissions reduction targets is approaching quickly, so the innovation is not enough to get us there. I would recommend a strategy on both fronts, the innovation and the deployment.

With respect to the burden or opportunity for rural landowners or municipalities, given that a lot of renewable energy development is currently focused in Alberta, I would point toward a lot of the rural municipalities that are competing for the investment and the opportunity to host the facilities as well. I think that goes hand-in-hand with responsible development, responsible siting, and so on. It's not always the best news story that it could be, but I think there are examples of willing hosts across Canada that do want to benefit from the property taxes and from the local jobs and so on as well.

Mr. Jamie Schmale: Wouldn't it be better, based on the fact that in solar, as we talked about, the panels have high levels of toxic chemicals used...? You did say that technology is getting better, and I accept that. A wind turbine plant in Tillsonburg, Ontario closed this past summer. It put 350 people out of work, because the subsidies were basically drying up. They didn't actually go outside Ontario for the work.

How do you see this going forward? Wouldn't it make more sense to invest in ways to generate power in areas that could be more sustainable and reliable? I do understand the comment from Mr. Robertson about the interties, and I do believe that's perfectly said.

Why would we continue to, in my opinion, over-subsidize an industry when we already have an oversupply of energy that we have access to with interties, which we can then sell and actually make money from for Ontarians?

Mr. Patrick Bateman: The comment I would make in response to that statement is that there's an enormous opportunity from clean growth, and with all governments working together, there's an opportunity to benefit from that.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you, Mr. Bateman.

Now, we'll move to Ms. Rudd for five minutes, and then afterwards, we'll go to Mr. Weir, for three minutes.

Ms. Kim Rudd (Northumberland—Peterborough South, Lib.): This is very exciting for me. It's the first time I've ever spoken at this committee, so I thank you.

I'm going to ask a question, and then maybe each of you can contribute an answer in whatever way you feel is best. I don't want to take up all the time.

To my colleague who loves to talk about Ontario—and I'm from Ontario—I really want to focus on the national.... Every province has its own uniqueness and its own reality. I look at Prince Edward Island, and see that wind is their major source of generation. The interties that are happening on the east coast of Canada, particularly, are quite unique and quite substantive.

You mentioned Canada and the U.S., and that the U.S. really does control.... Jamie mentioned the IESO. I have toured that, and for those of you in Ontario who haven't, it really is quite fascinating, because you can see in real time the energy crossing the border—north, south, east, west—and what that energy is generated from. Whether it's coming from nuclear, what their load is, whether it's wind or solar, it's quite fascinating. I encourage you to do that. It puts this in context.

I guess I would like your thoughts on the interties, from a number of perspectives. One is in terms of energy security, both interprovincially and internationally with the U.S. We have a North American energy strategy and an MOU with the U.S. and Mexico, and we're really looking at how we can strengthen that. Your point about the U.S. controlling a lot of this is very true, but we rely on each other a lot. I lived through the blackout, as many of you did, a number of years ago.

I understand your point about solar, particularly—but it would apply to wind as well—that until there's more capacity within the system, the interties don't really play in. The goal is that they will.

Could you envision what those interties could do to increase our capacity to reach our goals under the Paris agreement, and also in terms of economic development for the regions that will be impacted by that?

● (1645)

Mr. Malcolm Metcalfe: First of all, I would point out that I have toured the IESO. I have worked with them a lot. They're wonderful people, and the control centre is really worth seeing. In the Ontario situation, the tie-lines to the U.S. are used heavily. One of the reasons that the comment has been made that we're selling power at cents on the dollar is because in the U.S. wind is subsidized, and the night price of wind often drops to -$15 per megawatt hour so you're paying people to take the power. The politicians in Ontario have blocked that. That's a problem.

We would be far better off to trade with Manitoba and with Quebec than to trade with someone who has subsidies applied that are allowing them to make money at -$15. I would argue that the tie-lines are doing a wonderful job now of improving security, because while you get many fewer outages than Quebec does, or than an isolated utility would, you do suffer when something really bad happens and the whole system goes down. I would say that overall, the interties do a great job for Ontario.

Ms. Kim Rudd: Thank you.

Prof. Bryson Robertson: I can't talk too much to the Ontario perspective.

Ms. Kim Rudd: I want a national perspective.

Prof. Bryson Robertson: To come to the point, yes, renewables are heavily subsidized in the U.S., but that can create situations where you're getting cents on the dollar. It also can create situations when you have storage in which you are getting paid to store someone else's power.

In the British Columbia perspective, you have the same thing, but we are getting paid up to $500 per megawatt hour not to use power at night, so you get the benefit of being able to store that power behind a dam and you are getting paid.

It really depends. There is no silver bullet that is going to solve this problem. An intertie is not one of them, but it's a tool in your tool box, and it needs to be deployed in places where markets will help support it.

I've talked about B.C. and Alberta, but we also have to be very cognizant that the markets across the border are significantly different. You have BC Hydro, which is a vertically integrated crown utility, and you have an energy-only market. Trying to connect those two does have some sensitivities that need to be accounted for.

In terms of what it does for the resilience of our system and our interdependence from our dependency on the U.S., the point has been made that across the country we have the recurring pattern of hydro-dominated province, fossil fuel-dominated province, hydro-dominated province, fossil fuel-dominated province. If we can connect those two more closely, we will have a greater diversity of resources, we will have a greater diversity of when our load peaks out in the time of the day, and we will be able to manage it better. Then we will be somewhat less dependent on our neighbour while still being able to take advantage of that as a market.

● (1650)

The Vice-Chair (Mrs. Shannon Stubbs): Thank you.

Mr. Weir for three minutes.

Mr. Erin Weir: Thank you very much.

I did want to just pick up where we left off on distributed solar power. My sense is that, even with current technology and the current prices, it's quite lucrative for people to install solar panels on their roofs. Part of the problem, though, is it requires this huge upfront cost and then an investment return over a long period of time.

But unlike, say, buying a house, there really isn't financing available for individuals to install solar panels. I wonder, first of all, if you would share that assessment, and second, if you would see a role for the federal government in providing some type of financing to allow distributed solar?

Mr. Patrick Bateman: The current situation is that the traditional capital markets are functioning very well for larger utility-scale projects that have contracted revenue streams. Typically, they have access to a very low cost of capital and, in combination with the lower capital costs, it means that renewables are now cheaper than they ever have been before.

But that same thing cannot be said for smaller projects or projects that do not have contracted revenue streams. For instance, if somebody installs solar on their home or their business, the real value stream is displaced future electricity costs or displaced future spendings. The same thing could be said about energy efficiency. You cannot easily monetize future energy you don't use, whereas there is a whole host of different benefits from that.

So size and the revenue streams are two reasons why it is very difficult to finance these smaller kinds of projects. But there is, however, an enormous opportunity from a technical, technological, and investment perspective within these projects.

We feel the Canada infrastructure bank could play a role. We have submitted a detailed submission to Infrastructure on that, and I would be pleased to share that with the committee for your consideration.

Mr. Erin Weir: There are also these federal crown corporations in the financial sector that do different types of lending like Farm Credit Canada and the Business Development Bank of Canada. There are concerns out there about the infrastructure bank, but do you see a role for other federal entities, perhaps, to provide financing for solar?

Mr. Patrick Bateman: It's certainly an excellent suggestion and not one we have looked at in detail. Certainly, I think you have identified one of the key barriers to unlocking a lot of investment from residences, small businesses and so on.

If there were an opportunity for folks to get access to lower costs of capital, given that the projects have a different risk profile and a different value profile, like you have suggested, there are no solutions. If the federal government were to fit in this space, then, there is definitely a need and plenty of benefit to be had.

The Vice-Chair (Mrs. Shannon Stubbs): Thank you.

The meeting is scheduled to go until 5:30. Is there interest from members for further questions? If there is, I would put to the committee another equal-timed round for each party.

Ms. Kim Rudd: I don't think so. I think the witnesses have been very generous with their time.

The Vice-Chair (Mrs. Shannon Stubbs): Okay, we're good.

Thank you to the witnesses for spending your time with us this afternoon. We appreciate your expertise, your insight, and your participation with this committee.

Thank you to all of our colleagues.

I don't think there is any further business for the committee.

Thank you to the witnesses and to all of my colleagues for supporting me today as chair. I hope that, despite the fact that we have differing personal views, I was able to conduct myself objectively and impartially, just as chairs of all committees can do.

This meeting is adjourned.