HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

# Standing Committee on Natural Resources

RNNR • NUMBER 063 • 1st SESSION • 42nd PARLIAMENT

**EVIDENCE**

## Monday, September 25, 2017

## Chair

**Mr. James Maloney**

# Standing Committee on Natural Resources

**Monday, September 25, 2017**

● (1535)

[*English*]

**The Chair (Mr. James Maloney (Etobicoke—Lakeshore, Lib.)):** Good afternoon, everybody. We're going to get under way. Thanks to all of you for joining us today.

Mr. Schmale, thank you for joining us today. We're glad to have you as part of the team. Until today, you were just a rumour. We're glad this is real. Welcome.

We have three witnesses in the first hour and two in the second.

In person for the first hour, we have Steve Coupland from Bruce Power. By video conference from PowerHub, we have Etienne Lecompte, and from the Alberta Electric System Operator, we have Jerry Mossing.

Thank you for being here, gentlemen. We'll give each of you up to 10 minutes for a presentation, which we encourage you to do in either official language. There are earpieces available for all of you, because you will be asked questions in both official languages.

Mr. Coupland, why don't we start with you?

**Mr. Steve Coupland (Senior Advisor, Regulatory Affairs, Bruce Power):** Thank you very much.

First let me thank the committee for the invitation to appear today. This is an important study. Interties are a very important component to the electricity system and I'm glad to see the committee studying it. I do want to stress that while it's an important key, I sometimes think people see transmission and interties as a bit of a silver bullet. They're not, and I'll elaborate on that a little more as we go along. However, that's not to dismiss them. They're a very important part.

I'll begin with a quick overview. Bruce Power runs the world's largest nuclear operating site. We supply 6,400 megawatts of power, 30% of Ontario's electricity, and we do that at 30% less than the average cost to generate residential power. We are Canada's only private sector nuclear generator and we're a Canadian-owned partnership. Our principal owners are TransCanada Corporation and OMERS Infrastructure. We have two other important owners. We are 90% unionized, and our two unions, the Power Workers' Union and the Society of Energy Professionals, are both owners of the company. Both have small pieces.

Operations at the Bruce Power facility have a significant economic impact. We're one of the drivers in our region of the province. We support 22,000 direct and indirect jobs annually and provide about $4 billion in annual economic benefit through direct and indirect spending on operational equipment, supplies, material, and labour income.

Over the past 16 years, Bruce Power has been one of the largest investors in Ontario's electricity infrastructure. We've invested billions of private dollars into the Bruce site, which remains a site owned by the Ontario government. Bruce Power runs it through a long-term lease.

We're also one of the few nuclear facilities globally that has the ability to produce cobalt-60, which is a valuable resource in treating cancer and other diseases, both domestically and across the world.

I want to just touch on something we call “major component replacement”. In December 2015, Bruce Power signed a long-term agreement with the independent electricity system operator in Ontario to extend the life of the Bruce facility out to 2064. This is a $13-billion private sector investment and will enable us to continue providing low-cost, emission-free power for decades to come. The agreement has two parts. It allows us to immediately invest in life-extension activities, which are currently on time and on budget. Our major component replacement program begins in 2020 and will see $8 billion invested in our units over the 15 years, ending in about 2035. It will create or support 5,000 direct and indirect jobs annually and provide $1.2 billion in labour income.

Before I get to interties, I'm going to touch quickly on isotopes. As I mentioned, Bruce Power is one of the largest cobalt-60 suppliers in the world. Cobalt-60 is a mainstay of the global health system. It's used as a radiation source to sterilize medical devices and supplies such as gloves, syringes, and other medical equipment, and in the decontamination of spices and consumer goods, as well as a phytosanitary measure for the reduction of pests on produce, which is a growing and important asset. We have a partnership with Kanata-based Nordion, which is a leading provider of gamma technologies and medical isotopes, and we're able to supply them with a stable supply of cobalt-60 for the next three or four decades. We also have an agreement with Nordion to supply something called high specific activity cobalt-60. It's produced in only very few reactors globally and is used in innovative radiation-based treatments of cancer, such as something called the Gamma Knife.

In regard to interties, I'll start with the battle against climate change. As I think most of the committee members are aware, Ontario's decision to shutter its coal-fired generation is probably the single largest step that Canada has taken towards fighting climate change. It wouldn't have been achievable without nuclear power.

● (1540)

When Bruce Power took over the Bruce site in 2001, the four Bruce A units were not operational. We invested money to bring them back, and as a result we were able to restart all four units, which provided about 70% of the baseload electricity needed to shut down coal-fired generation. It has not only dramatically reduced our greenhouse gas emissions, but it's also had a profound impact on air quality. In Ontario in 2005 there were 53 smog days. There haven't been any since 2014.

As I said, I want to talk about greenhouse gases. One of the keys to meeting Canada's greenhouse gas targets is to reduce emissions. We do that through greater electrification, but of course this will only work if the electricity we use is non-emitting generation. Canada is blessed to have vast hydroelectric resources, as well as a strong, vibrant nuclear industry. These two sources are able to provide us with vast amounts of baseload generation, which is what we will need if we are to achieve our climate change targets.

With respect to interties, interties are an important tool for balancing the peaks and valleys in daily and seasonal demand, as well as ensuring grid stability and reliability. Provinces are in need of power or sometimes have excess power over a certain time period, and they can benefit from these interjurisdictional electricity trades to ensure that the power is available to consumers at the best rate possible.

Of course there are differences in our provinces in seasonal demand, as well as different characteristics in the nature of generation. This provides opportunities for reciprocal benefits between neighbouring electricity systems through open, competitive electricity trade. I want to give an example, one I'm most familiar with, which is Ontario and Quebec. It's a good case to look at.

Ontario is able to supply Quebec with electricity in the winter, because there is baseboard electric heat in most homes. That is when the peak is, and in a cold winter it is often tight and often needs additional supply. Ontario is able to supply it through our four different interconnections. Because we have a surplus, we'll also supply some power to Quebec in the summer, which allows them to back up their hydro dams and store water there, which allows them to generate more electricity during the day when the peak is a little higher.

In contrast, as I said, because Quebec is able to store that power, they are able to supply additional power to Ontario, particularly in these hot summer months. I didn't look at the grid before I came, but I suspect the trade is pretty good between the two provinces today, although it's the same weather in both provinces so both provinces will be using a lot of their own supply.

As the committee knows, electricity is a provincial responsibility. Canada's been blessed with vast and varied sources of electricity generation. One of the results of this is that we've developed an independent provincial electricity system with a large focus on local generation. As mentioned previously, interties have largely been seen as supplemental to domestic generation.

I want to go back to what I said at the beginning. It's important to bear in mind that interties are a major asset and continue to do more, but they're not a silver bullet. Large-scale transmission, in my view, is not much easier to site than pipelines. It has a long time frame and is expensive. Canada should pursue it, but only where practical and cost-effective.

Going forward, a Canadian energy strategy should focus on energy solutions that drive innovation, support local economies, and provide affordable power to people who rely on it every moment of every day. Ensuring a diverse, affordable emissions-free supply mix to maintain the reliability of the grid should be a permanent consideration. Affordable emissions-free electricity is an extremely valuable commodity on all sides of the border in the fight to battle climate change.

In our view, investments in these resources, along with the socio-economic benefits to local economies, will create a benefit for all Canadians over the long term.

Thank you for your time. I look forward to your questions.

● (1545)

**The Chair:** Thank you, Mr. Coupland.

Mr. Mossing, we'll move on to you.

**Mr. Jerry Mossing (Vice-President, Transmission, Alberta Electric System Operator):** Thank you, honourable members of the committee. I appreciate the opportunity to appear before you to discuss Alberta's electricity interconnections or interties, as I will refer to them, and to provide context from an Alberta Electric System Operator point of view. I'll provide an overview of the Alberta Electric System Operator, and I'll discuss Alberta's interties, their role, and the value they provide to Alberta's electricity system. I'll also provide a view of the value of interties in the future.

The Alberta Electric System Operator, or AESO, is a non-profit, independent, statutory corporation charged with providing the safe, reliable, and economic operation of Alberta's interconnected electric system. We also facilitate the fair, efficient, and openly competitive market for electricity.

Alberta is one of the least-interconnected system operators in North America, with the third-largest peak demand for electricity among all provinces at around 11,500 megawatts. Our intertie capability is less than 15% of our peak demand. Our intertie with B. C. has approximately 1,000 megawatts of transfer capability and connects the Alberta grid with the B.C. Hydro grid. Our Saskatchewan intertie connects us to the SaskPower grid and is capable of transferring 150 megawatts, and the Montana intertie is capable of transferring about 300 megawatts.

Our neighbouring provinces each have crown corporations in charge of their power grids. B.C. Hydro and SaskPower are able to offer supply and withdraw electricity from Alberta's market through their respective interties. Both B.C. Hydro and SaskPower have implemented open-access tariffs designed to enable commercial entities to access their transmission systems, including their interties.

Interties can flow power in both directions. Over the past several years, exports from Alberta averaged about 1% of the power produced in Alberta, and imports averaged between 2% and 5%. While these percentages are low, the times when the flows occur are often important to reliability and to market operations. Interties can provide both reliability and market operational benefits. It's also important to note that the benefit of interties is mutual. Grid stability, emergency assistance, and added competition extends to parties on both sides of the intertie. From a reliability perspective, interties play a valuable role in emergency situations. They can assist with stabilizing frequency by allowing grid operators to access supply during emergencies and supply shortfalls.

During emergencies, Alberta, B.C., Saskatchewan, and Montana are able to receive or extend power to assist each other in providing the high level of reliability that consumers have come to expect. From a market operation perspective, interties also play a key role, and Alberta's interties provide market participants with the ability to access the Pacific northwest and Midwestern U.S. electricity markets. Similarly, B.C. Hydro and SaskPower can also provide electricity in and out of the Alberta market.

Looking forward to the future, Alberta's electricity landscape is evolving. As Alberta moves to phase out coal generation and meet the target of providing 30% of electricity from renewables by 2030, a fundamental change to grid operations, planning, and the market will occur. Interties can play a role in this transition.

First, renewable resources in Alberta are expected to be largely from wind and solar generation. By nature, both wind and solar generation are variable, non-dispatchable resources. As electricity supply and demand must be kept within very close boundaries, dispatchable resources must be available to balance the variability of wind and solar. Interties can provide this dispatch capability in large blocks in both directions, up or down, quickly and reliably. They can do this because they harness the dispatchability of the generators on the other side of the intertie. This does require close coordination between grid operators.

Second, renewable electricity portfolios have increased in many other jurisdictions. As predicted, the diversity of renewable resources over wide geographic areas can help balance out the overall changes in supply levels. For example, when wind is increasing in Alberta, it may be decreasing somewhere else. Interties can be used to help balance the overall variability. In fact, some jurisdictions are implementing programs to capture this diversity over wide areas.

● (1550)

Energy storage can help to manage the variability of wind and solar generation. One of the many storage solutions includes large hydro reservoirs. These have been used historically to balance variability and can be used in the future.

Fossil fuels—primarily natural gas—will provide the majority of the supply-and-demand balancing of renewables and baseload electricity in Alberta for years to come, but by using the diversity of variable renewable resources over a wide geography, and by accessing other renewable resources such as hydroelectricity and reservoirs, interties can facilitate overall lower greenhouse gas emissions. While interties are a vital component to a functioning grid, a careful balance must be struck to maintain reliability and facilitate a competitive market.

In conclusion, Alberta's interties will continue to play a key role in Alberta's electricity grid and its evolution. Careful planning and analysis must be undertaken to establish a plan that considers all aspects when determining if, when, and where new interties should move forward.

This concludes my opening statement. Thank you, honourable members of the committee, for your time.

**The Chair:** Thank you, Mr. Mossing.

Mr. Lecompte.

**Mr. Etienne Lecompte (President, PowerHub):** First and foremost, thank you for the opportunity to speak on this topic about strategic interties. Before I start, this is a little about myself and our company, PowerHub.

I am a co-founder and entrepreneur in both clean tech and software, so I bring a different perspective to the table. We're a homegrown Canadian company. We were born and bred in the Ontario feed-in tariff program, starting in 2011. We're a small company that's been growing successfully. Our head count grew by about 60% this year. We work globally, in North America, Latin America, Europe, Asia, and so on.

We have a varied perspective on renewable energy because we're dedicated to the renewable energy sector as a software company. We work with global and local portfolios of renewable energy assets to help them run more effective and efficient operations to ultimately lower their costs of operation. We've seen a lot of renewables entering the grid in a variety of ways, and those are the things I would like to bring forward today.

When I received the invitation to join this committee, I wondered why strategic electricity interties. I think there are very important questions regarding options here. Regarding the reasons to look at interties, be it the import-export of power, its grid stability, better trade between jurisdictions, reduced dependence on fossil fuels in certain instances, you can also consider grid expansion to under-served areas.

If I look at grid interties overall, I think the important question to bring forward today is whether the investment in interties has a greater social benefit than the costs from these investments. I think it's very important to look at this opportunity to invest in interties, invest in interconnections, from a ratepayer point of view, where there are basically ratepayer-funded improvements. Even if this is a provincial jurisdiction, I think greater ratepayers in all of Canada need to consider it. We can look at the social benefits of good interties and good grids. Reducing the costs of energy to ratepayers brings great positives to system balancing, impacts on jobs, or even other social benefits.

I think we have a great opportunity to look at this across Canada and a more cohesive juncture than simple market by market, which we see all across the globe. I think now is a great time to be asking these questions.

If we look at what our clients are saying about interconnection, interties, they're looking for a grid that has more capacity, certainty, reliability, modernity, and transparency. The transparency aspect is very important, as grid operations can be fairly opaque to a lot of people, even people in the industry. We have clients, for example, who are currently stalling in a few projects that have been built. They are awaiting commissioning for their specific interconnect reason, so they're looking for more transparency there. Ultimately this leads to an opportunity to look at this in a really smart way, and see how we can manage not only interties, interconnections, but all of the grid in a smarter fashion.

I'll preface this by saying that PowerHub is not a company operating in a smart-grid format, first and foremost. We're simply a software provider for renewable energy providers. Depending on the goals that we have for interties, the key thing to consider, in my opinion, is to invest in tomorrow, looking at this as grid modernization and intertie modernization rather than simple expansion, and smarter ways to do that. It's looking at building a better integrated grid instead of simply a bigger grid.

This is supported by baseline trends that we see everywhere, not only in North America but worldwide, for increased investment in energy efficiency, which can have an impact on demand-side management. On the flip side of that, the growth of distributed energy resources, the infamous DERs of the grid, where customers are becoming a generator as well, so enhanced customer participation.... You lay on top of that the rise of EVs, and the electricity mix and functions are changing drastically.

We have an opportunity to look at how we can build a state-of-the-art electricity system where benefits really outweigh the costs for the ratepayer. In my humble opinion, we should look at smart grids as a method above and beyond simple interties. We should look at how we can automate, monitor, and control the grid in a dynamic way, to basically better integrate renewables on one hand, improve reliability on another, drive operational efficiencies, plan the grid, enable EVs, and ultimately bring in some storage, which will deal with some of the dispatchability issues that are inherent to renewables.

● (1555)

If I look at the Canadian energy strategy, focusing on smart grids can also have areas of focus on the energy efficiency side, on the transition to a lower-carbon economy, on anticipating the rush of renewables, and on developing a modern and reliable transmission system. I think there are some great opportunities here for us to look at this as a federal point of view.

As I mentioned, I think electricity is a provincial purview, but if we look at this as Canadians, the real question for me is whether we can create the right climate for innovation and development around those problems, around those opportunities regarding the grid, interties, and so on, because I think the time is right. Looking at this from an entrepreneur's standpoint where we've developed capabilities that we're now exporting worldwide, I ask how we can do the same in the grid. When I say “we”, I don't mean it personally, but I'm looking at the whole Canadian community. How can we cultivate this innovation to ultimately drive long-term wealth creation and exportable knowledge, IP, which is going to create resilient jobs, create growth and create knowledge?

Ultimately, in my opinion, that is going to create returns for the ratepayers and create the possibility to really set ourselves up for success in the long term.

Thank you very much and I look forward to your questions.

**The Chair:** Thank you very much, all three of you, for your presentations. I will open the floor for questions.

We're going to start with Ms. Jones from Labrador.

**Ms. Yvonne Jones (Labrador, Lib.):** Thank you very much, Mr. Chair.

I'd like to thank all three presenters for your presentations today and for the information that you've been able to provide to the committee in terms of what's happening around energy development in Canada.

I will tell you a little about me. I'm from the subarctic region of Canada, from Labrador. Of course, we're home to some of the largest hydro development projects in the world today. Ironically, we're also home to some of the most dependent communities on diesel-generated power, including industry using diesel-generated power. I have a vested interest in many ways in terms of how we move forward with power grids in Canada that are going to help us reach out to the industry, communities, and individuals who need them.

I'm going to start my questioning today with Mr. Coupland, if you don't mind. First, I want to say to you that I am a supporter of uranium mining. I voted to support uranium mining in Labrador in the provincial legislature and so did the indigenous people whom I represent. In addition to that, I'm a big supporter of nuclear generation of power and especially of the work that you guys have done around medical isotopes and the work around cobalt-60, which I believe is helping change not just the Canadian economy and how we do and deal with medical services but the whole world is watching us right now and learning from the examples that we've set. I'm a cancer survivor, so I'm very prone to what's happening in this side of the business. I wanted to preface my comments with that.

As a government we have worked very hard to try to set the right framework for energy expansion, development, intergrid operations, and energy corridors in Canada. As a person who's in the business, is involved with building new grids, providing supply in Canada, how do we as a government that's very much committed to this process help make sure that we can strengthen the process as it goes along but also to ensure that there is reliable and stable generation of power for people across the country?

● (1600)

**Mr. Steve Coupland:** I think the starting point is to look at the way our system has grown up. We have the provincial jurisdictions with the electricity, but we have local grids and there is local generation. There's been a lot of investment over the years in that and that has to be where we start from. We can't start in some different direction. I think using that is the base and then looking about at what fits and what works.

One of our challenges is geography. It is an extraordinarily difficult thing to try to take, for example, a large amount of clean, non-emitting hydroelectricity from Labrador and get it into Ontario, for example. You are well aware of the interprovincial challenges, the other jurisdictions you have to go across. I think we have to look at it in realistic bites and try to see where we can make small steps first, where we can make the grids connect, and where we can make the most of our assets.

I think one of the federal government's biggest roles is to try to encourage that and try to support some of it through some of the innovation funds and those sorts of things in terms of development. That's where the federal government can best contribute, but it is about trying to get the provinces to work together. That's one of the key steps.

**Ms. Yvonne Jones:** Thank you. I appreciate your comments, because you're telling me that we're on the right road in terms of where we need to be going as a government.

The concern for me arises when you have provinces that can develop large quantities of power, yet don't have an interconnected grid or a transmission mechanism to get power to markets that need it in Canada. I know this is mainly a provincial jurisdiction, but I always look for a better solution to bring it together.

Maybe that will allow me to ask Mr. Mossing a question here.

You talked about the success that you've had with inter-regional groups and the interperforming grids that you guys have been involved in. As the federal government, how do we allow for the reliability and stability that comes with such interconnection for other Canadians? How do we build the bridge to make it stronger, from where we have power available through generation and ensure that it gets to Canadians who need it?

**Mr. Jerry Mossing:** Again, in the context of provincial jurisdiction, I think the federal government can play a role in encouraging provinces to establish goals and objectives that are common, and in addition, as is being considered, establish through federal funding new or enhanced capacity that would allow transactions to occur.

Coordination between provinces will be required to make sure that the transactions occur and that benefits are shared across all provinces, but east-west among the four western provinces, as opposed to or in addition to the north-south transactions that occur primarily between B.C. and the U.S., as well as between Manitoba and the U.S.

**The Chair:** You have about 20 seconds left.

**Ms. Yvonne Jones:** I'll pass to the next questioner.

Thank you very much for your answers.

**The Chair:** Mr. Schmale.

**Mr. Jamie Schmale (Haliburton—Kawartha Lakes—Brock, CPC):** It's great to be here with my new committee colleagues. I look forward to working with all members on all sides, their staff, and the staff at the committee. Thank you to Shannon and Ted for letting me come in and join each and every one of you.

It looks like quite an interesting topic, especially when we hear about nuclear power. In the riding I represent, parliamentary secretary Kim Rudd and I share a border, mine to the south and hers to the southwest, and we have—at least I have and I think you have, Kim—many people who commute into Darlington or Pickering, where there are nuclear facilities in Ontario. For us, it's quite a significant part of the local economy because of the jobs.

I think, Steve, you touched on that. I believe you said there were 22,000 direct and indirect jobs tied to nuclear in your area.

● (1605)

**Mr. Steve Coupland:** That's just from Bruce.

**Mr. Jamie Schmale:** That's what I meant, but it shows the significant impact of what nuclear does.

As I think we've all said, energy is a provincial issue, and for the most part—not all but for the most part—each province has been fairly concerned about providing energy for their own population. We're trying to work around that.

Going into the future and looking ahead—and I think some of the questions just before us touched on this—what other, cost-effective solutions are we looking at for the generation of energy? Here in Ontario we have had the Green Energy Act, and I think it was touched on also, which has caused us to have some of the highest energy prices in North America.

It has driven out manufacturing. It has pitted community against community. In my area we've had wind turbines that community members have fought against tooth and nail because local consultation was basically torn right out of the Green Energy Act when it was written. It went over the Oak Ridges Moraine, which was an environmentally sensitive area. and just basically steamrolled all local consultations.

Now we have solar panels going up that are heavily subsidized like the wind turbines, and they are being placed, in some cases, on good farmland, and we're seeing family farms, because of the benefits of the subsidies.... Now, at some point, and I think we are breaching that point, the subsidies are being toned down, because the province just can't afford them and neither can the population.

I was in Massachusetts over the summer, and they're having the same problem. The issue with their subsidies and their solar and wind turbines is that their grant program was put on hold and then reduced, just like Ontario's, because their population couldn't afford it and their government couldn't afford it.

How do we move forward? What are the most cost-effective ways of moving forward by which we can work on these interties without crippling the public and the provincial purse?

I open the floor to anyone who wants to answer.

**Mr. Steve Coupland:** Let me take a crack at that to start.

When you're talking about forms of generation, we need to bear in mind that all forms of electricity generation have different characteristics. They have different strengths and weaknesses. One of the strengths of our country is that we have all of them. When we're building a grid, we need to balance that out.

Obviously, if you look at B.C. or Manitoba, they've developed hydro, because they have a lot of it. Ontario used most of its hydro, accessible hydro, and went to nuclear. You use the kinds of assets you have.

Going forward, and let me just kind of talk about my own industry for a minute, I would say two things. In the province of Ontario, we've undertaken a massive refurbishment project. We're refurbishing the Darlington and Bruce units. They will continue to supply somewhere in the vicinity of 60% of Ontario's electricity to 2060. That's largely because there is no form of new generation that is cheaper than refurbishing existing generation. That's the approach we've taken there.

There are a couple of things that my industry is working on that we're hoping will have some impacts. One is in the context of something we call small modular reactors. Small modular reactors can break down into two different sizes or reactors. There are reactors that are anywhere from 50 megawatts to 200 megawatts, which are actually designed to be connected to the grid, and largely looking at replacing fossil fuel generation. But there's another category that we're working on called the very small modular reactors.

These are things that are in the 5 to10 megawatt range. I should have actually mentioned this to the member from Labrador last time. The hope behind them is that they're specifically designed to go into small off-grid communities, and be able to supply steady power there and replace diesel. That's a targeted goal.

I wouldn't want to tell you we're going to get there overnight. One of the things about the nuclear industry is that we don't do anything real quick. Our national lab at Chalk River has just launched a program to research some of those with a view to building a prototype. We're hoping that sometime in the next decade we might be able to move something like that forward. I know that's not a good answer to the people who are relying on diesel right now, but that's one of the things that we're doing.

Again, I would just talk about the need to use interties for what they can give us in terms of stability and in terms of providing support and reliability. I'm not convinced that transporting thousands of megawatts of electricity across long distances is economically viable at this point, which is not to say it won't be somewhere down the road, but we should understand that interties are an important asset. They're important to stability and reliability, and need to be connected in multiple locations in multiple jurisdictions.

● (1610)

**The Chair:** Mr. Cannings.

**Mr. Richard Cannings (South Okanagan—West Kootenay, NDP):** Thank you, and thank you all for being here. It's been very interesting.

I'm going to start with Mr. Lecompte from PowerHub.

You talked about grid modernization, and how it would be good to work to a better grid, not perhaps a bigger grid. You talked about distributed energy resources, the challenge, and opportunity there. You also mentioned that you work globally.

Do you have any good examples from outside Canada of where countries have got it right, where they've been able to make these advances, and how we could perhaps use those lessons, if you will, in Canada?

**Mr. Etienne Lecompte:** Thank you very much for the question.

There's no one recipe that works everywhere unfortunately. The electricity mix and local conditions make for different recipes adapted to different realities, but there are some examples that do stand out. It really depends on what kind of support we're looking at to roll this out. I think the Canadian government supporting innovation is a great one, but creating local conditions to encourage investment in certain fields also goes well.

We'll use the U.S. as an example. You have renewable portfolio standards as more of a state-sized kind of policy, but you still have the income tax credits for renewables that are set up federally. That spurs on investment there.

One of the key examples regarding grid modernization and grid investment that we've seen is pretty much more in Germany, where we have local communities that have invested and are trying a very diverse energy mix to integrate a grid, and that's seen great resources. Now the next move for them is to scale that out and see how that works on a greater regional or even country-wide basis. We see there's a lot of investment going out in these types of projects for remote communities. As an example, that would be a great place for us to start here in Canada, to trial out some of these microgrids of sorts, where we can combine multiple generation sources together.

Then it's about adapting to local realities. In Chile, as an example, interconnection issues and intertie issues have led the government to move away from larger-scale plants, both in renewables and the traditional sense, and to look to what they refer to as PMGDs, which are a smaller-sized generation facilities that interconnect on the node side to bring them closer to consumption centres and then have an impact. They're looking at opportunities to better balance the grid by bringing generation closer to the point of consumption, and that's always something that can be learned from and considered.

● (1615)

**Mr. Richard Cannings:** Okay, thank you.

You also briefly mentioned the future of storage in terms of dealing with some of the renewable energy challenges. Can you expand briefly on where you think that storage issue is right now?

**Mr. Etienne Lecompte:** Storage is just learning to walk, if we use the development cycle for humans. It's going to start running pretty soon. We have views that in the next 10 or 15 years storage is going to be prevalent everywhere and completely reshape the grid as we know it. In my humble opinion, we need to consider where things are going. We can take a longer outlook. That's really what we need today, because storage is going to be prevalent, cheap, efficient, and create multiple value-added services to the grid very soon.

**Mr. Richard Cannings:** Thank you.

I'd like to move to Mr. Mossing in Alberta.

We've heard that Alberta, of course, is phasing out coal, moving to renewables and other sources, and we've heard of some of the challenges that Ontario has had there. I just wonder if you could comment on how perhaps Alberta might be doing things differently from Ontario.

**Mr. Jerry Mossing:** The challenge of phasing out coal in Alberta is, I think, a little bit harder than Ontario's challenge. Ontario had more coal capacity to phase out, but it was a smaller percentage of their overall generation portfolio. In Alberta we are dealing with three private companies that own coal generation as well, where in Ontario they were provincially owned.

In terms of phasing out coal and implementing more renewables, we've had to make adjustments to our market. We are adding a capacity market to go along with our energy and ancillary services markets, and we value the competition that comes with the market framework to drive the lowest cost, whether it's the cost of renewables, which are reducing over time and will become economic.... If storage is added to that mix, it helps balance the variability and it becomes economic. We would see a natural evolution to those technologies. In terms of the coal phase-out, as the provincial government has chosen to implement a tax to encourage the reduction in greenhouse gas emissions, we see that as an economic signal as well.

For sure, Alberta is blessed—along with B.C., northeast B.C. in particular—with a lot of natural gas resources. It is a fossil fuel, but at 50% fewer emissions as compared to coal. We see that natural gas generation will provide the baseload energy and some of the ramping to go along with the renewable energy that we get.

As I said in my opening statement, accessing renewable in the form of hydroelectricity from the west, B.C., and on into the Pacific northwest, and/or use of the hydro reservoirs as storage, can go along with the provincial programs to lower greenhouse gases over time, but our preference is to see that happen in an economic fashion to help keep the cost to ratepayers as low as possible.

**Mr. Richard Cannings:** Thank you.

**The Chair:** Mr. Serré.

[*Translation*]

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

Once again, my thanks to the three witnesses for their presentations and for the research they have done in preparation for their testimony today.

The work that you are doing in your field is greatly appreciated.

Mr. Coupland, in your presentation—and thank you for it—you emphasized the fact that nuclear generation contributes to the reliability of the electricity grid in Ontario. You mentioned the problems that we no longer face and you gave as examples the 53 smog days that we no longer have, the German temporary workers, and total power outages. I appreciate the way in which you expressed it.

I am going to ask my first question in English.

● (1620)

[*English*]

Can you explain the difference between intermittent and reliable energy sources, and why it is important to diversify the grid along those lines?

**Mr. Steve Coupland:** Sure. Electricity right now is a product that we use on demand. One of the other folks has talked about storage, and we will get there, but we don't have a lot of storage right now so demand electricity essentially gets used when it's created. We don't have enough storage. The result is that you need to balance the demand and the supply. One of the challenges with some of the renewables, in particular wind and solar, is that the wind doesn't always blow and the sun doesn't always shine. Even when the wind does blow, it gusts, so you have different levels of supply. You need another source, usually some sort of baseload, to balance it out and create that steady draw so there is always a steady supply.

The gentleman in Alberta can probably tell you a bit about that as well because that will be one of the challenges as they move to a high level of renewables. That will be one of the things they'll need to balance out.

Just to that point, as we get more and more electrification of industry and other things, our transit, you can't have it be inconsistent. I hope that answers your question.

**Mr. Marc Serré:** Mr. Mossing, how can the federal government play a role to try to balance that load, balance the intermittent, and promote a bit more interconnectivity with the electrical system?

**Mr. Jerry Mossing:** For a minute I'll build on something Mr. Coupland said. When you have your renewable resources, as we do in Alberta, as most economically coming from wind and solar, and you have to deal with the variability but you want more energy from renewable electricity, the low-capacity factor—30% or 35% in the case of wind and up to 20% in the case of solar—means you are going to have to over-install capacity. When that over-installed capacity is producing, you are likely to have surplus.

There are really three possible ways to deal with the surplus. First is to curtail it, second is to store it, and third is to send it over to your neighbours. Again, that can be a mutual benefit over a wide geographic area. The two components where I think the federal government can help are in investing in infrastructure to make it happen and encouraging the co-operation between entities to make sure the transactions can occur and be expected to occur in an economic manner.

**Mr. Marc Serré:** Mr. Mossing, you indicated earlier that Alberta is one of the less interconnected jurisdictions in North America. Do you believe there's enough R and D dollars and interest in the province to get people to invest in the electricity grid? Is the R and D currently in the electricity transmission of high enough potential in the province to build that? Also, what can the federal government do to help stimulate that investment in R and D?

**Mr. Jerry Mossing:** The R and D question, I think, is interesting in the sense that there is a lot of R and D in smart grid and new technologies and investing in more efficient forms of generation from renewables across the world. Certainly Canada could have a role to play in that space.

However, in terms of general interest in Alberta, right now we are in the process of our first renewable electricity auction for 400 megawatts of capacity to be closed at the end of this year. We have 29 participants and 4,000 megawatts' worth of projects participating. This is private investment coming in. The interest is there and looks to be there in the long term.

In Alberta we have transmission capability to move the electricity from both wind and solar from the renewable resource-rich areas in the southern and eastern areas of the province to the load centres in Calgary, Edmonton, and some of the industrial areas. However, we don't have enough electrical transmission to make that happen to the full extent, that 30% target. Regulatory processes will help that along inside the province, funded by Alberta ratepayers. The structure is there.

Back to the R and D question, whether Canada can contribute a lot to it or not, I'm not as knowledgeable in those areas. Certainly there is a lot going on around the world, and that technology is all transferable to Canada.

● (1625)

**The Chair:** Thank you.

Mr. Falk, it's over to you. I can give you about two minutes.

**Mr. Ted Falk (Provencher, CPC):** Thank you, Mr. Chairman.

Thank you to all our witnesses for your presentations here this afternoon.

Mr. Coupland, you made a comment that it wasn't economically feasible to transport electricity over any long distances. Can you tell me what distance makes it feasible?

**Mr. Steve Coupland:** I can't give you the magic number that it's feasible over. It depends upon the distance, the amount of electricity, what the geography is, how many different jurisdictions you have to go through, how many regions, and how many first nations or indigenous claims you have to go through. That all weighs into it. Obviously, it's easier to build something across a relatively flat prairie, let's say, than it is going across the shield or the mountains. Those are some of the challenges.

I don't really have a magic number. You also have to balance out what the other generation sources are that you'd be replacing.

**Mr. Ted Falk:** Right. So the cost primarily is driven by the cost of the transmission lines themselves, of erecting those lines.

**Mr. Steve Coupland:** That would be a big part of it. The other part, of course, is that you have to be able to get the electricity from a particular jurisdiction. Is that jurisdiction able to provide the electricity at a price and volume that beats what the buying jurisdiction could produce it for?

**Mr. Ted Falk:** There are a lot of variables.

**Mr. Steve Coupland:** Right. I mean, I'm not saying it doesn't make sense to do it in some cases. I'm just saying it's not a magic bullet. You have to look at all the different variables.

**The Chair:** I have to stop you there, unfortunately.

Gentlemen, thank you very much for joining us today. We appreciate your contribution to our study.

We'll suspend for a few minutes and then start with our next set of witnesses.

Thank you.

● (1625)

(Pause)

● (1630)

**The Chair:** Let's resume.

We have two witnesses in the second hour—Robert Hornung from the Canadian Wind Energy Association, and Keith Cronkhite from New Brunswick Power Corporation.

Gentlemen, thank you for joining us today. I think you were here earlier, so you heard the instructions. We'll give each of you up to 10 minutes. You have earpieces and microphones, and you can speak in either official language. You will be asked questions in both, I can assure you, so take advantage of it if you need to.

I was just told that you're supposed to go first, Mr. Hornung, so we'll open the floor to you.

● (1635)

**Mr. Robert Hornung (President, Canadian Wind Energy Association):** Thank you very much, Mr. Chair, and members. It's a pleasure to be here, and I appreciate the opportunity to speak to you on this issue of strategic electricity interties.

I'll take one second to tell you a bit about our organization, the Canadian Wind Energy Association. We are the national association for the wind energy industry in Canada. We represent a little over 200 companies who are involved in the industry: turbine manufacturers, component suppliers, wind energy project developers, owners, and operators, as well as a range of service providers to the industry.

Just to put wind in context these days in Canada, there's been more wind generation built in Canada in the last decade than any other form of electricity generation. Canada is now the eighth-largest producer of wind energy in the world, and we produce enough electricity from wind to meet about 6% of Canada's electricity demand today.

We think this issue is very important because of the commitments Canada has made with respect to climate change. Under the Paris accord, when we're looking to limit the increase in temperatures going forward, our long-term commitment really will require Canada to reduce greenhouse gas emissions by about 80% from current levels.

You will not find an analysis anywhere that says you'll be able to do that without a significant increase in the production and use of non-emitting and renewable electricity. In fact, Canada starts from a very positive position, because 79% of our electricity today is non-emitting. That puts us well ahead of most countries. The federal government has established a target of seeing that go up to 90% by 2030. We think that's a sensible target, and ultimately, by 2050, we will have to have a grid that's 100% non-emitting if we're hopeful about meeting our climate change objectives.

Not only will we have to have a non-emitting grid, but we'll have to be using that electricity in a number of other sectors, to substitute for fossil fuels in transportation, industry, and buildings. That will require increased electricity production going forward.

Meeting an objective of that scale is going to require increased collaboration and co-operation across jurisdictions, and indeed increased interconnection across jurisdictions, which is why this discussion is so important. Historically, and indeed constitutionally, electricity is largely an area of provincial responsibility. In Canada that has actually led to challenges, I would argue, in terms of interjurisdictional co-operation.

We do a very good job within the country of optimizing our electricity systems at a provincial level, but the one thing we know is that if we optimize 10 separate electricity systems at the provincial level, the one thing we can be sure of is that nationally and federally we have a suboptimal system, because we haven't explored the opportunities for co-operation, collaboration, and interconnection going forward.

That's changing now. Climate change considerations have led to an increased discussion and examination of opportunities to work together across the country with respect to electricity planning, electricity markets, and electricity infrastructure. This is going to be absolutely critical if we're going to respond successfully to climate change.

We're a strong supporter of electricity interties, both between Canadian provinces and between Canada and the United States, because we believe that well-designed interties can do a number of things that will help us to meet these climate change commitments. It can help us to enable the development of renewable energy resources in resource-rich areas by providing more transmission capacity that allows us to access and move that energy across the country.

It can improve the efficiency of renewable energy use in areas where we currently have transmission constraints and you're forced to curtail or cut back on renewable energy production.

Importantly, it can facilitate the integration of variable renewable energy, like wind and solar energy, because it provides you with an opportunity—if wind or solar energy production is going up or down—to have a broader range of options you can access to balance that. If you have greater interconnection, you have access to more generation, and you can do more to balance and manage that variability.

Interties can also provide increased access to non-greenhouse gas emitting options for jurisdictions where those are not as common, and I'm sure you will have heard—and will continue to hear throughout your hearings—talk about B.C. hydro going to Alberta, or Manitoba hydro going to Saskatchewan, or Quebec hydro going to Ontario. We have a tremendous diversity of renewable energy resources in Canada, but they're not distributed equally in geographical terms. Therefore, there's an opportunity through interties to use those resources more efficiently.

● (1640)

Finally, interties can help us open up new markets for the export of electricity, not only between jurisdictions in Canada but also between the United States and Canada.

Canada has the opportunity to really be the clean energy battery for North America in terms of helping the United States to address its carbon challenge within the electricity sector, a challenge that is much more significant than ours because the U.S. has much more coal and gas to start with than we do.

The pan-Canadian wind integration study was a study released last year and funded by NRCan. It looked at the possibility of moving to a situation where 35% of the electricity in Canada came from wind. That study was undertaken with a steering committee that involved system operators from across the country. It concluded, in the end, that there are no operational barriers to having 35% of our electricity from wind. It does require some strategic investment in interties.

What it found was that, from a system basis, the investment in those interties, their cost, was more than offset by the savings from no longer paying fuel costs for fossil fuels. Essentially, those reduced fuel costs more than offset the cost of building the intertie when it was done strategically in jurisdictions targeted at reducing greenhouse gas emissions.

Having said that, interties are expensive, they're long term, and we need to be thoughtful about how we'll proceed. There are a few considerations that we think need to be looked at when we're looking at intertie investment.

It's absolutely clear that the key objectives of an intertie must be clearly defined and well understood, and, we would argue, they have to be consistent with Canada's climate change commitments.

We think transmission interties have to demonstrate that they're actually a cost-effective means of achieving those objectives. It may be possible to reduce greenhouse gas emissions not through an intertie but by taking action within a jurisdiction. It may be possible to balance variable renewable energy not through an intertie but through building storage. In fact, there are exercises under way in both western and eastern Canada right now through the RECSI initiative to look at those different options to see which are most cost-effective.

It also makes sense to look at how we can use our existing transmission system more effectively. In the United States, we see a growing movement towards something called energy imbalance markets, which allow greater trading of electricity across interties on a more flexible basis, not through long-term contracts but in a way that is much more responsive to situations that allow them to reduce emissions.

Having said that, the scale of the challenge we're talking about and the emission reductions we're looking at mean that interties are going to be a key part of the agenda going forward. Interties have to, obviously, enhance the reliability and the resiliency of the grid. We wouldn't do it otherwise.

I would argue three last things. I think we want to make sure that new transmission interties actually facilitate opportunities for renewable energy development on both sides of the intertie. I mentioned that Canada is resource rich. We have ample solar and wind energy resources, for example, in every province of the country. We want to try to unlock the full potential, but more importantly, we want to ensure that interties provide an opportunity for economic development in both of the jurisdictions connected by the intertie to enable them to build out their capacities.

We want to ensure that there's open access to new transmission interties, that's there's a transparent, fair, and competitive process to gain access to those interties. We want to ensure that people are competing and actually using the most cost-effective power in that regard. We also want to ensure that we have a level playing field for people using interties. There are some challenges in Canada. We have different types of electricity markets, different types of structures, different types of players. Sometimes when crown corporations are competing with independent power producers, it's hard to make it a level playing field. Crown corporations can, for example, take some costs and transfer those onto the rate base. An independent power producer might not be able to do that. It's not an obstacle but it's a challenge, and it's something to be thoughtful about.

Finally, we can also build new transmission through a number of different players. Crown utilities and private sector actors can also build transmission. I think we need to be open to a range of different approaches, but we do need interties.

I would argue that if we're going to make the investment in interties, we want to make sure that we're building them the right size, that we're not building them just to deal with an immediate issue, that we're not looking only five or 10 years ahead. We have to recognize the long lifespan of these structures and the long-term challenge of the climate change issue that we're dealing with. We have to build these interties with a view to being able to expand our usage of them over time. We have to build for the future, as opposed to just building for the current situation.

● (1645)

Thank you. Those are my introductory remarks. I'll be happy to answer any questions.

**The Chair:** Thank you very much.

Mr. Cronkhite, we'll now switch over to you.

**Mr. Keith Cronkhite (Senior Vice-President, Business Development and Strategic Planning, New Brunswick Power Corporation):** Thank you, Mr. Chair and committee members, for the opportunity to present before you today on an important subject.

Perhaps I'll start by giving you a little background on New Brunswick Power. We're a government-owned public utility. Our vision is to provide sustainable electricity for future generations with a mission to become our customers' partner of choice for energy solutions.

We have a very diverse generation mix. We range from hydro, biomass, and wind, to coal, oil, and nuclear. We pretty much have all the bases covered. That generation mix has served us very well over the last 100 years of our existence. Today, we're proud to say that, with that generation mix and with our interconnections, we are over 70% non-emitting. We have a target of 75% non-emitting by 2020 and we're confident we will achieve that.

New Brunswick Power is probably one of the most interconnected utilities in North America and I'll outline our interconnections for you. For New Brunswick to Quebec, we have 1,000 megawatts. For New Brunswick to New England and northern Maine, we have approximately 1,100 megawatts. For New Brunswick to Nova Scotia, we have 300 megawatts and for New Brunswick to Prince Edward Island, we have 300 megawatts. As you can see, our geography and geographical location has benefited us well over the last 50 years.

When we talk about regional electricity independence, we recognize that Canada is a very diverse country and with that diversity, our electricity production has similar characteristics. Some regions benefit from vast hydro resources, while others require more diverse supplies, such as ourselves with small hydro, wind, and imported hydrocarbons, as well as electricity imports.

Electricity is necessary to sustain an acceptable quality of life and it is critical for economic prosperity. We view electricity as a staple. You have to have it to exist. It needs to be reliable and economically priced.

Historically, electricity needs have been met by each province individually. They look after their needs first and foremost. Within the Maritimes and Atlantic Canada, Quebec and New England have had a long history of interties with 50 years of collaboration for the purchase and sale of electricity and capacity in the operation of the power system. This has benefited customers within New Brunswick, our surrounding neighbours, as well as those within New England.

When we look forward, with new developments such as Muskrat Falls, hydro development within Quebec, and the potential for a second nuclear reactor within New Brunswick, the regional collaboration envisions the participation of the four Atlantic provinces along with Quebec. As in the past, transmission interconnections are the key enabler to allow regional collaboration.

When we look forward to a low-carbon electricity distribution, recent experience has shown us that by adopting intermittent renewables, we're reaching our point of saturation certainly within the provinces and the balancing region of northern Maine and Prince Edward Island, so we need to look at new solutions for how we can integrate more renewables. This is why New Brunswick has embarked on an energy smart or, in other terms, a smart-grid initiative within the province to allow a more dynamic flow of electricity and allow greater integration of renewables.

As I mentioned before, each province has its own challenges with respect to their carbon footprints. To enable regions to reduce their carbon footprints strategic interties are necessary to facilitate the movement of renewable as well as non-emitting electricity across the broader region. When we look at Canada as a whole, we have strong interties typically north to south with our U.S. partners. On the east-west conversation, we are limited in other parts of Canada. Many regions are not able to have capacity exchange for electricity with their neighbours or to develop their interties as they should perhaps.

Over the last 50 years, as I mentioned, New Brunswick has benefited from strong interties with our neighbours. Last year, we had the opportunity to present in front of the Senate Standing Committee on Energy, the Environment and Natural Resources regarding the transition to a low-carbon economy. We recognized and stated during that opportunity that this is only made possible through the development and expansion of strong interties.

● (1650)

Optimizing the abundance of hydro, expanding renewable generation, and embracing new nuclear development allows for each region in Canada to meet its future electricity requirements in a safe, sustainable, and environmentally sustainable way.

As I mentioned before, when we look to the U.S. and our relationships with our partners in the U.S., Atlantic Canada has been a leader, along with Quebec, in developing these interties over the last 50 years. It has allowed both of us to benefit from lower and stable rates while maintaining reliability. Looking forward, Canada is well-positioned to benefit from these strong interconnections and new strategic interties with the U.S. The recent Massachusetts request for proposals that closed in July, requesting large quantities of renewable electricity, is a good example of these opportunities.

When we look at the North American free trade discussions that are ongoing currently, it's important we preserve electricity and ensure that it is not subject to any new duties or penalties that could jeopardize this commerce from occurring. When we look at employment and economic impacts, a cornerstone of New Brunswick Power's ability to provide reliable and competitively priced electricity is related to two things: our diverse generation mix and our strong interconnections.

New Brunswick is unique, and as I indicated earlier, there are many jurisdictions within the country that are unique. We have a very strong dependence on electricity. Our economy is very electric-intensive as a result of pulp and paper, mining, and petroleum refining. New Brunswick is one of the most electric-intensive economies in the world. Certainly, within Canada, it is second to Quebec, and within the broader spectrum, it is in the top five in the world as far as being one of the most electric-intensive economies. As such, we are acutely aware of the need for competitive, stable rates in order to sustain our economic growth. We're also very export dependent. As I mentioned earlier, with our pulp and paper, mining, and petroleum, our exports are very critical on a go-forward basis to make sure electricity is competitive.

Given New Brunswick's electric-intensive and competitive electricity rates, strong interconnections are critical on a go-forward basis, and that we maintain them and strategically expand them.

In conclusion, the utilities within the Maritimes, Quebec, and New England have a long history. As I mentioned, we've had 50 years of collaboration. This has been enabled through strategic interties. Canada's energy strategy and transition to a low-carbon economy is very dependent on strategic interties not only east to west but north to south.

As I indicated, our economy is very electric-intensive and export dependent. Competitive electricity rates to sustain our economy are essential. Finally, given our independence and uniqueness in each province, it will be important for the federal government to support and promote the development of strategic interties across provincial boundaries.

Thank you, and I welcome your questions.

**The Chair:** Thank you very much.

Mr. Lemieux.

[*Translation*]

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

My thanks to our witnesses too.

As you know, I have worked on the construction of a number of hydroelectric power stations during my career as a mechanical engineer, mostly in northern Quebec, in James Bay, and in my beautiful Saguenay–Lac-Saint-Jean region. As a result, the subject we are discussing today interests me a great deal. It's funny: in my region, we have just finished building the biggest wind farm in Canada. So my questions mainly go to the Canadian Wind Energy Association.

Mr. Hornung, as we can see from your Association's website, Canada has the cleanest system of electricity generation among the G-7 countries. More than 75% of our electricity generation comes from renewable energy.

What concrete steps can the federal government take to increase that percentage, in terms of contributions to developing and implementing research in the field of wind energy?

● (1655)

[*English*]

**Mr. Robert Hornung:** Thank you very much for the question.

As I noted in the presentation, Canada has been a leader in building out wind, but we have tremendous untapped resources. We are really only scratching the surface of what is possible. In terms of what the federal government can do—and I'm speaking from an association perspective here—we feel that the federal government has laid in place some very important foundation measures. For example, the implementation of carbon pricing is something we think will continue to drive investment and innovation, particularly if carbon pricing continues to increase after 2022.

We've seen aggressive action, for example, on coal. The federal government is also considering putting in place standards for electricity emissions from natural gas and electricity generation. It will also be important to use those standards to send a signal that natural gas generation must continually improve performance going forward, from a greenhouse gas emissions perspective, to ensure it's consistent with Canada's long-term obligations. We are keen to see a standard that is essentially best in class today and continually pushing for improvement going forward.

Investments and interties, like the ones we're talking about today, are obviously very important in terms of providing that framework and structure, and the federal government has played a very important role. It has some limitations in what it can do, because electricity is a provincial jurisdiction, but I think it has moved very smartly in this area, for example, by serving a convenor function, to bring jurisdictions together to explore the options and to look at how we can move forward to reduce emissions.

There are a number of initiatives the federal government has taken, which it can build upon going forward, to ensure that renewable energy continues to grow in this country. For example, we have measures related to depreciation, accelerated capital cost allowance, that are in place, available in the renewable energy sector, and will be expiring in 2020. Given the commitment of the government to continue to reduce greenhouse gas emissions going forward, we think that's something that could be extended.

Fundamentally, Canada is in a strong position. If there is any country in the world that can move to a 100% non-emitting electricity system, it should be Canada. I think Canada has the opportunity to be a leader in this regard, and within the North American context as well. The federal government can play a good enabling and facilitating role in helping lead, and provincial governments will have an important role to play as well.

[*Translation*]

**Mr. Denis Lemieux:** Thank you.

Despite the increase in electricity exports to the United States, we have seen prices on the American market drop in the last eight years.

Do you think that those price reductions will have an impact on the development of wind energy in Canada?

[*English*]

**Mr. Robert Hornung:** Prices are coming down here as well. Alberta and Saskatchewan both have very aggressive targets in place for new wind energy development. They both currently have competitive tenders under way to procure new wind energy. I am extremely confident that we will see the lowest prices we've ever seen for wind energy in Canada coming out of those procurement processes, which will be announced in December in Alberta, and in the spring in Saskatchewan.

Wind in the United States has had a historical advantage relative to wind in Canada, because there is a production tax credit in the United States, which supports wind energy development. We do not have a similar initiative in Canada at this time, but that will be expiring in 2020, and once it has expired and we have a fully level playing field, we are confident that Canada will be able to compete. Our wind resource is generally better than in many parts of the U.S. and generally, in a number of jurisdictions, we have had fewer challenges in terms of moving forward and permitting wind energy projects than we see in many American jurisdictions.

I am very confident that wind will be able to compete. My colleague, Keith, mentioned the Massachusetts RFP, which just recently occurred. On a megawatt basis, most of the proposals that came in to support Massachusetts actually came from Canada. There was a blended hydro and wind energy mix from Emera, which drew on resources in the Atlantic provinces. Hydro-Québec put in a proposal with a hydro-wind energy mix, and they also put in an independent hydro proposal. There were wind energy producers that put in just a wind energy proposal. We are confident that, if those proposals are successful, that will open up significant new opportunities for Canada.

New York has a commitment to move to 50% renewable electricity by 2030. Under any analysis that I have seen, it has no capacity of being able to do that simply within New York state. It is going to have to look for electricity to come from outside New York's borders, and Canada is very well positioned to provide that.

● (1700)

**The Chair:** Mr. Schmale.

**Mr. Jamie Schmale:** Thank you, Chair.

Thank you both for coming.

I would like to reiterate both of your comments and my support for Canada moving to sources of non-emitting energy. I think that's a positive step. I am quite pleased that we are looking to phase out coal, and in Ontario, we have done so. That's a huge step. I'm very supportive of that.

Mr. Hornung, I don't know if you were here for the last part of the committee meeting when we talked about sources of energy, such as wind turbines. I mentioned that wind turbines have started to spring up in my area. It's pitted neighbour against neighbour, mostly blamed on the Green Energy Act here in Ontario.

One question that's come up repeatedly was mostly asked on the provincial level and through my provincial counterpart, but since I have you here, I'm going to quickly ask this question regarding wind turbines and birds. According to your website, in 2014, we had about 5,500 wind turbines in Canada. It says here, according to Environment Canada, that lands at approximately 45,000 bird deaths a year.

This was an issue that people in my community brought up as they were fighting the wind turbines coming into their community. They were basically steamrolled, but that's no fault of yours. That's an issue I have with the provincial government. Other industries are taking measures to help the health of wildlife. As of yet, I have seen nothing in our area. Could you update us on what your industry is doing, please?

**Mr. Robert Hornung:** I have a couple of comments.

First, in terms of numbers, I think it's always important to put these numbers in context. You will also find that Environment Canada has data that's very clear in stating that the contribution of wind turbines to bird fatalities in Canada is minimal, relative to all sorts of other sources of fatality including transmission lines, cellphone towers, buildings, automobiles, house cats, etc. That's not a reason not to take action.

**Mr. Jamie Schmale:** I was going to say that. Thank you for getting there.

**Mr. Robert Hornung:** First, I think provincial regulators have very strict provisions in place in requirements for both monitoring interactions with birds and then taking action if any significant impacts are noted.

The industry itself, I think, has been quite proactive in working with various sectors in doing that. We have worked with university researchers. You'll find that a lot of the research that is drawn on to assess bird migration patterns, etc., is coming from the industry. They're required to do this as part of their environmental approval process.

This is also true of bats, where wind energy has worked with NGOs through the Bats and Wind Energy Cooperative to fund and support a research program looking at mitigation measures to help reduce impacts on bats. We have partnerships between organizations like TransAlta and the University of Calgary that are doing research on bat mitigation.

We've tried to be proactive. Fundamentally, it's in everyone's interest that we seek to minimize any impact. We strive to do that.

● (1705)

**Mr. Jamie Schmale:** Sure.

One thing I want to touch on again is that a lot of the issues I have aren't with you and your organization, so I want to start with that. The problem I have is with the provincial government. Although you did say that you support putting a price on carbon.

**Mr. Robert Hornung:** Yes.

**Mr. Jamie Schmale:** Putting a price on carbon basically means increasing the price of almost everything. The fact that your industry is heavily subsidized, which is taking more money out of the pockets of people and business, pushing out manufacturing, how do you stand on that position when your hand's out on the other side?

**Mr. Robert Hornung:** First, I would argue that wind energy in Canada is not subsidized, in the sense that I think is most commonly understood.

**Mr. Jamie Schmale:** How much is it? Do you know per kilowatt hour?

**Mr. Robert Hornung:** Right now, we're seeing that Ontario has moved to a competitive tendering process.

**Mr. Jamie Schmale:** Well, we trust the Ontario government.

On average, what do you think it is per kilowatt hour?

**Mr. Robert Hornung:** The most recent procurement in Ontario was in the range of 8¢ a kilowatt hour, in Quebec it was 6.3¢ a kilowatt hour, and we're confident the procurements you're going to see in Alberta and Saskatchewan are going to be significantly below that. We've seen the cost of wind energy decline by 66% in the last seven years in the United States. Those costs are going to be reflected in new projects coming forward in Alberta and Saskatchewan. I would argue and feel quite confident in saying that if you want to build new non-emitting generation in Canada today, you would be hard pressed to do anything cheaper than wind.

**Mr. Jamie Schmale:** Here I have nuclear at 5.6¢, solar at 50¢, and wind at 13.5¢. I do agree technology is a way to increase competitiveness. My issue again is with the provincial government. When the government gets involved at this level, you are stifling investment and crippling the market. You're not letting the free market take place, and that's what a lot of my issue is with.

Where do you see the future going? Do you see more public-private partnerships? Where do you see your industry going?

I do have a couple of questions for Mr. Cronkhite, too.

**Mr. Robert Hornung:** I'll be brief.

In Canada today every jurisdiction has moved to a competitive tendering process, which requires intense competition. Alberta is looking to procure 400 megawatts of wind and has 29 companies bidding projects into that. You can be very sure you're going to get very competitive prices coming out of that. The 13.5¢ you talk about is the old feed-in tariff in Ontario, which was put in place several years ago. As I said, the most recent wind in Ontario was procured for 8¢.

I think you will find that wind energy is extremely cost-competitive today versus any new generation. The nuclear generation you spoke to is existing generation, not new generation. I guarantee you new wind is cheaper than new nuclear.

**The Chair:** Thank you.

Mr. Cannings, we'll move over to you.

**Mr. Richard Cannings:** Thank you, and thank you both again for being here.

Thank you, Mr. Schmale, for bringing up birds. I'm a bird biologist, so I was interested in hearing your answer on that. I have a lot of colleagues, including my son, who have worked on wind projects, and I'm confident that your industry will bring those numbers down. As you say, they're small in relation to other issues.

I just wanted to start by talking about these interties. You were mentioning, Mr. Hornung, that they're important for allowing renewables to gain access to other markets to help. You mentioned the Massachusetts situation. I used to live on the island of Newfoundland, and it struck me that there's a huge wind resource there. Of course, Newfoundland and Labrador get most of their electricity from hydro in Labrador, but we heard last week about the new interties between the island of Newfoundland and Labrador and Nova Scotia.

Can you comment on how that might perhaps open up a market for wind on the island of Newfoundland so that they could then sell that into other jurisdictions?

**Mr. Robert Hornung:** The more isolated a grid is, the more challenging it is to integrate variable renewables, and Newfoundland has truly historically been an isolated grid. With the new developments that are under way, certainly Nalcor, for example, has spoken about the possibility of accompanying its hydro development in Labrador with new wind development as well, and to have that, again, look like a blended product in that regard.

At the end of the day, the more flexibility you have within the system, the greater opportunity you have to integrate and bring in variable generation. It's not just a story about wind, it's all sorts of different generation that is coming forward. We see the electricity system diversifying almost daily at this point, and flexibility is going to be a very important characteristic for it going forward.

● (1710)

**Mr. Richard Cannings:** You also mentioned you were asking for a level playing field and open access to these interties. I'm just wondering if you could expand on that and explain exactly what you mean. Where hasn't the playing field been balanced or been level? We talk about big utilities. I don't know, maybe I'm wrong, but it strikes me that it's those big utilities that are making the investments in these interties. Perhaps that's not the case. How would you like that playing field balanced?

**Mr. Robert Hornung:** I think if you look at a situation, for example, where there's a lot of reflection on the possibility of building an intertie between British Columbia and Alberta, you see that we have two very different systems. You have a British Columbia system, which is a crown utility. In Alberta, you have essentially a fully competitive market. At the end of the day, if you're looking at having B.C. Hydro, for example, compete for access to that intertie against TransAlta, or a small renewable company in Alberta, you see they work under very different financial models and have very different business structures, which makes it challenging for them to compete on a level playing field in that regard.

That's what we're asking people to be sensitive to and to be thinking about, because as I said, interties can provide opportunities on both sides of the line for development, and we think that's something we should be striving to do.

**Mr. Richard Cannings:** Mr. Cronkhite, New Brunswick is very famous for tides. I wondered how this whole conversation might be tied in with the future of renewables in New Brunswick in tidal energy, and in particular how new interties, a better grid, would help that along. What's the timeline we're looking at there?

**Mr. Keith Cronkhite:** I'll say certainly within Atlantic Canada, particularly New Brunswick and Nova Scotia, there are considerable efforts relative to tidal energy and exploring different options.

What I can tell you is that with 28-foot tides you have a pretty harsh environment and very different conditions that exist. We've worked with some different companies. We're also monitoring the activities that are going on in Nova Scotia. It's really still on the cutting edge as it relates to the Bay of Fundy and the environment that exists there to have turbines that can withstand the environment that currently exists.

With respect to tidal or wind development, interties within our jurisdiction are absolutely critical to allow that flexibility because, as we know with these types of resources, they are intermittent so there does need to be sufficient availability on the transmission interties to allow that energy to move more freely.

It's also necessary to look at the other resources that exist within a region and to look at how you can match up those intermittent resources with other sources of energy. Hydro, as you mentioned earlier, particularly in Newfoundland and Quebec, is a great battery to complement wind and other intermittent renewables.

With the interties between those regions that have those resources available, ultimately by working together, you can get more intermittent renewables or more renewables into the system. It's absolutely critical; independently, not so much.

**Mr. Richard Cannings:** We heard from a previous witness today about the problem with distance and interties, if you want to move electricity to New York or Massachusetts or between provinces. What's that conversation like? What are the things in play there when we talk about how far we can afford to build out?

Perhaps you could both comment.

**Mr. Keith Cronkhite:** Certainly with transmission interties there are AC connections and then there are HVDC or direct current connections. Long distances are more conducive to an HVDC or direct current. Your line losses are something you have to factor in on a go-forward basis because essentially that's a cost or a toll on the line from an energy perspective that is consumed in delivering the electricity to the end recipient.

It's important that if you can get your generation closer to load, obviously it's better, no surprise there, but advancements in those technologies are occurring as well, so we're seeing more efficient operation of those facilities.

We do recognize certainly in eastern Canada that new hydro resources, for example, are further away from the load than we might have had previously, so advances and working with neighbouring jurisdictions is critical in order to facilitate that movement of electricity.

● (1715)

**The Chair:** Thank you.

I'm going to have to interrupt you and stop you there.

Mr. Amos, it's over to you.

**Mr. William Amos (Pontiac, Lib.):** Thank you to both of our witnesses. This has been a really interesting discussion. I've learned a lot today so far.

My first question goes to Mr. Hornung. You spoke about the importance of looking 10 to 15 years into the horizon around the development of interties. I'd like it if you could explain a little further what some of those future developments are and what some of the future shifts in the overall electricity market dictate or necessitate that kind of forward-looking.

I wonder if you could comment also on the advent of storage. We had a previous witness who came in and said that, in that kind of time frame, we're going to be looking at transformational changes in storage. How does that impact the recommendations that your organization would have around the investments into interties? What interties might be most strategic?

**Mr. Robert Hornung:** I think, obviously, if we consider decarbonization a key rationale and driver, most of our carbon emissions in the electricity sector today can be found in Alberta, Saskatchewan, New Brunswick, Nova Scotia, and Ontario. Interties that help to reduce those carbon emissions are going to be strategically important going forward. You're absolutely right that there is a range of pathways that we'll have to follow in terms of decarbonization.

When I'm talking about looking longer term, I'm thinking of it more in terms of specifically what the demand for electricity is going to be longer term. There have been decarbonization analyses done for the United Nations looking at Canada that said that electricity has to move from less than a quarter of our total energy, like oil and everything else today, to close to 50% by the time we get to 2050, a doubling. That's a lot of new electricity coming online.

We need to consider what resource availability is in different jurisdictions. There are some jurisdictions that have the potential to develop more than others. We need to think about that in determining where it strategically makes sense to go forward. We also have to look at costs, obviously, as well.

There is going to be a mix. Interties are not the sole solution by any stretch of the imagination. It's going to be a diverse strategy that will be required to be followed and go forward. I can't offer you an answer today that says it's going to be precisely these two interties and it's going to have to be this size.

I'm suggesting that we do need to be very thoughtful about it in that regard. The only thing I would say, I guess, is that any projection of renewable energy development that has occurred over the last 20 years has undershot significantly. Renewables have been developing much, much faster. When we're looking forward and going ahead, we just need to keep that in mind, that the trends that we're seeing both technologically and economically that are driving renewables forward are likely to accelerate the introduction of these technologies into the grid. We want to make sure that, when we're making infrastructure investments, we're sensitive to that.

**Mr. William Amos:** Looking more specifically at storage, though, how does that affect the conversation around interties?

**Mr. Robert Hornung:** I think it can affect it in the sense that storage provides another opportunity for managing variability. You can look to manage variability in wind through the use of batteries, through importing electricity from elsewhere, or through the charging of electric vehicles at nighttime. There's a whole range of different strategies to go forward.

We do need to be sensitive to what we see in terms of trends in storage. I guess the one comment I would make about the technologies and the technological improvements that we're seeing is that the technology is moving forward gangbusters. I think the bigger challenge we're going to face is infrastructure to support that technology, which is not just interties. It's building distributed generation or distribution systems to deal with all the people who are going to be putting solar panels on their roofs as well, storage at the home level, and things like that.

We also have to be sensitive to the fact that electricity markets have to evolve. The electricity systems we've designed and the rules that govern them were essentially created to deal with the electricity system we had 10 years ago. We have to start thinking about what the electricity system is going to look like 20 years from now and how the market needs to evolve to change that. Infrastructure is part of that. Market is part of that, but it's going to be more diverse and more decentralized, and we have to put in place an infrastructure that allows us to support that.

● (1720)

**Mr. William Amos:** I think it's well known that there has been significant community-level and quite partisan opposition to wind energy developments in Ontario.

I wonder if you could comment on some of the misinformation that has been perpetrated. I won't indicate by whom. I think there are many actors involved, but there has been significant misinformation, particularly about the impacts that this sector could have on job creation and the cost of electricity in the province of Ontario. Could you comment on that, please?

**Mr. Robert Hornung:** I'll start by saying, community opposition is actually a characteristic of virtually any development these days. It's not a wind-specific issue. Nonetheless, it's certainly true that there has been community opposition to wind energy development. Some of the issues that have come forward about which I would argue people have been misinformed are issues related to health and property values, where we think we stand behind very good science on that regard to demonstrate that wind energy is not having the impacts that are being talked about.

On the economic side, we see wind energy has become the scapegoat for rising electricity rates in Ontario. There are certainly a number of factors that have contributed to increased electricity rates, including new investment in infrastructure and new investment in all sorts of generation, including natural gas, which is significantly growing in Ontario going forward. Has wind contributed? Yes. Has wind been the major factor? No.

Wind is actually bringing significant economic development into communities going forward. It's not just through the investment that's coming in, but through job creation in the shorter term around construction and the longer term around operations, in terms of land lease payments for landowners, in terms of property taxes as a new property tax base for municipalities going forward. We've actually seen wind energy in many communities, not all, as being strongly supported. You have communities that are actually trying to secure new wind energy projects going forward.

**The Chair:** Thank you. I'm going to have to stop you there, unfortunately.

Ms. Stubbs, over to you for five minutes, including questions and answers.

**Mrs. Shannon Stubbs (Lakeland, CPC):** Thank you, Chair. I appreciate that. That's kind of an inside joke. Sometimes I get hot under the collar when I'm told I'm running out of time.

I'd like to thank the witnesses for being here and spending their time with us today.

Mr. Cronkhite, I'll direct many of my questions to you today.

As a first-generation Albertan with family in Nova Scotia, Newfoundland, and New Brunswick, it's always nice to have familiar people here at the table. You mentioned in your presentation the Canadian energy strategy. As you know, we're undertaking this study under that umbrella. One of the 10 focus areas of the Canadian energy strategy is a recommendation about improving the timeliness and certainty of regulatory approval decision-making processes while maintaining rigorous protection of the environment and the public interest, which I think are two priorities that we all share regardless of the province or region we're from or the political party we might represent.

I have a general question for you on that front in terms of interprovincial transportation and transmission of energy, regulatory approval, and then more specifically, after, towards regional collaboration. As you might know, the federal government has undertaken four major regulatory reviews. There is a critical infrastructure project that's important to my province, and it's important to yours. We've seen recently what happens when there's a lack of clarity and certainty around regulatory requirements, and the rules get changed at the last minute. That can mean billions of dollars of investments and thousands of jobs being put at risk.

Has New Brunswick Power to your knowledge, or anybody in the province, been consulted during the course of the consultations on the four major regulatory reviews by the federal government that have been happening for the past two years—I understand they hope to be legislating on them in the next year—and if there are any specific ambitions, concerns, hopes, gaps, or opportunities that you wanted to address on that front?

● (1725)

**Mr. Keith Cronkhite:** Certainly, on the regulatory side and regulatory approvals, they are key to any project. Knowing the landscape under which you'd operate in order to achieve those approvals is essential from a timeliness point of view, but also from an investment point of view.

With respect to a number of the discussions, and certainly at the federal level, we have been consulted. We've had the opportunity to provide input. As the utility, we are very conscious of the environment. We're very conscious about our customers, and we're very conscious about the footprint we have within our province, that being foremost in the conversations with our customers.

Certainly, on the regulatory side, and changes to whether it be National Energy Board processes or environmental impact assessment processes, we recognize that better consultation, better conversations, better engagement, early engagement, these are absolutely fundamental to any project.

Getting the right facts out there and having the opportunity to do so is critical to the successful execution of moving projects forward in a meaningful way, but also from an investment point of view, to having a degree of certainty that the objective under which we move forward or try to achieve is achievable.

Today, there are many conversations occurring at different levels that provide a degree of uncertainty. It's important, on a go-forward basis, that we figure this out sooner rather than later, so that these strategic investments can occur.

As I mentioned in my discussion earlier, there are provincial interests that occur with respect to various projects, not only electricity projects. It's important that we recognize we're all Canadians and that we need to optimize our resources to the best of our abilities. Doing so through collaboration at various levels and ensuring that the process is understood is critical for our ability.

These infrastructure projects are significant and require significant investments from our customers, so we need to do that prudently.

**Mrs. Shannon Stubbs:** I agree with you.

No matter what resources we're talking about, as you pointed out in your presentation, the diverse energy mix that Canada has is a strength. All of us recognize the prosperity and benefit to these investments, which may seem to have disproportionate impacts sometimes in one province or region, but in fact, are good for all of Canada. That goes for a variety of energy development and also for this subject today.

Are there any specific gaps, challenges, or adjustments you'd like to—

**The Chair:** It pains me to do this, but you're at five minutes.

However, we do have about one minute left for that corner over there.

**Ms. Yvonne Jones:** Because there is one minute left, it's obviously not much time to ask questions, but I appreciate your comments, and there are lots of questions I could ask.

My colleague Mr. Schmale brought up the rates of generation, and you made reference to them. Those rates might be more pertinent to Ontario, and I'm not sure if they're still adequately dated.

I would ask you to provide the clerk the rates of generation for each province across Canada. I think the information is important. If we're going to have it, we should have accurate information.

**The Chair:** That takes us to the end of the meeting.

Gentlemen, thank you both very much. I echo Mr. Amos's comments. That was a very informative session.

The meeting is adjourned.