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Chair

Mr. James Maloney

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● (1535)

[*English*]

The Chair (Mr. James Maloney (Etobicoke—Lakeshore, Lib.)): Good afternoon, everybody. Happy Wednesday. Thank you for joining us.

We have two witnesses for the first hour, and then in the second hour we'll be going in camera for some brief committee business.

We are joined this afternoon from S&C Electric by Benoit Marcoux, who is here in the room, and by video conference by François Vitez, chair of the federal initiatives committee of Energy Storage Canada.

Thank you both for being here. Each of you will be given up to 10 minutes to make your presentation. Following both your presentations, we will open the floor to questions from the members around the table. You're welcome and encouraged to make your comments in French or English. Translation services are available if you need them.

On that note, I will turn it over to Mr. Marcoux.

Mr. Benoit Marcoux (Executive Adviser, System Reliability and Sustainability, S & C Electric): Thank you, Mr. Chair, and good afternoon to all of you. Thank you for inviting S&C Electric to appear before this committee.

My name is Benoit Marcoux. I'm a professional engineer with over 35 years of experience in telecom and electric utilities in various executive and advisery roles. I am currently executive adviser on system reliability and sustainability at S&C Electric Canada.

S&C Electric is an employee-owned global manufacturer of electrical systems for utilities, headquartered in Chicago with a major plant in Toronto and offices throughout Canada. In 1909, over a century ago, the founders of S&C developed an extremely reliable power fuse to enable the safe operation of high-voltage transmission lines, heralding a new era in electricity. Those are the types of lines we're talking about with interties.

Ironically, over the last decade, S&C has implemented dozens of utility-scale energy storage systems throughout the world, allowing utilities to defer or even avoid investing in new transmission and distribution lines. This new reality is in stark contrast to the old utility grid. The old grid has large generation stations away from users, requiring long transmission lines to bring electricity to where it is being used. Those transmission lines often take 15 or 20 years from inception to operation, use vast areas of land, disparage landscape, and are generally opposed by local communities.

In the modern grid, electricity is being generated from renewable sources such as solar and wind, installed across the grid near the users of electricity. Energy storage systems accumulate electricity when the sun is shining or the wind is blowing, releasing it at time of use. Electric vehicles are charged during the day and can even give power back to the grid when needed. Distributed utility-scale renewable energy sources and storage make use of the existing grid assets, without the large environmental impact of transmission lines.

The reality of the new electricity grid stems from major investments and innovations made across the world in designing and implementing renewable generation and energy storage systems, including electric vehicles. As a result, the price of renewable sources and energy storage technologies is decreasing rapidly, at double-digit rates per year, and they are getting increasingly competitive as the industry scales up manufacturing and learns how to better integrate those systems.

Wind, solar, and storage are not only becoming cost-effective, but doing so at a much smaller scale than traditional generation. Renewable generation and energy storage systems are therefore being installed deep in the electrical grid, at its edge or even behind the meters. The traditional and centralized grid is being transformed into a digital grid of microgrids integrated into local energy resources. In the same way that personal computers and the Internet replaced mainframe computers, the new grid of distributed energy resources is replacing the centralized old grid.

The new distributed and digital-enabled electrical grid is also more resilient to extreme weather events because it relies on multiple and alternate energy sources and paths. This new resilience is welcomed, as residential and industrial customers are increasingly dependent on electricity to power our modern life in smart communities and with the advent of electrical transportation.

What is even more dramatic is that those innovations are shaking a pillar of the Canadian economy. The electric industry touches every home and business in Canada, and reliable power is an essential ingredient for the competitiveness of our country. Electric power generation, transmission, and distribution utilities contribute almost $30 billion to the Canadian economy, with electrical equipment manufacturers contributing another $4 billion.

● (1540)

This industry employs more than 100,000 Canadians. Canada's net exports of electricity and electrical products amount to billions of dollars every year. The importance of the electric industry scales up the potential of wealth creation if the right investment decisions are made, but it also underlines the perils that we are facing. Should the Canadian electric industry fail to renew itself for the challenges of the 21st century, the entire economy of Canada could suffer.

Canadians should be inspired by how other countries are building this new electricity grid. For example, a utility-scale storage system at a substation in Leighton Buzzard, 50 kilometres outside London in the United Kingdom, allowed the utility there to avoid building a 20-kilometre underground transmission line. With this technology and others, as well as a regulatory regime that incites the utilities to perform better, U.K. communities enjoy an electrical grid that is four times more reliable than Canada's.

In conclusion, accelerating the transformation of the Canadian electric industry is essential. In an industry traditionally defined by centralized generation and rigid geographic boundaries between utilities, new linkages need to occur—utilities and customers, vendors and entrepreneurs, cities and businesses—ensuring that all see the opportunities that didn't exist before and have the support they need to get their ideas to market quickly.

The transformation of the electric industry will ensure that Canadians benefit from the billions of dollars already invested in the electricity system. The structure of the industry will emerge transformed, with Canadian-owned service providers offering novel energy solutions across Canada, backed by a web of hardware, software, and professional service vendors. This will increase the opportunities for Canadians to export their energy, their expertise, and the fruits of their labour.

Now is a time for innovation in the electric industry, like no other since Thomas Edison. Now is the time when wealth can be created as we use our collective resources and brains to ensure a resilient and sustainable energy future for all. Let's make collective investments in an infrastructure that is built for the next century, not for the last one.

Thank you.

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

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

Mr. François Vitez (Chair, Federal Initiatives Committee, Energy Storage Canada): Thank you, Mr. Chair. Thank you for allowing me to speak from a distance. My name is François Vitez. I will be speaking today on behalf of Energy Storage Canada. I'm the chair of the federal initiatives committee at the association.

Energy Storage Canada is an association that groups 50 organizations across the country. These include technology-providing investors, operators, local electricity grid companies, and even NGOs. Our members cover all types of technologies related to energy storage, going from more of the distributed, behind-the-meter type of storage and smaller-scale battery type of equipment, to flywheels, compressed air energy storage, and pump hydro, which are at the other end of the spectrum, more on the transmission side of storage.

The focus of the organization is to advance opportunities and build the market for energy storage in Canada. Most of what I will say right now is in tune with what Mr. Marcoux just mentioned. I'm one of the members of the association so it will echo for sure. In my day job, I'm a VP of project development for hydro and power delivery within a company called SNC-Lavalin, which is not the same S&C as Mr. Marcoux's. I am based out of Vancouver and my role is to develop opportunities in the field of hydro power, transmission, and distribution, as well as renewable solar and wind.

Through that experience I get to travel and develop different projects in different jurisdictions, so that's also the perspective I'll try to bring today. One message that I and the association would like to leave you with today is that in supporting the provinces and the federal government to further reduce the carbon footprint of our energy system and build resiliency, flexibility, and control cost, Energy Storage is a key partner in that endeavour. That's the seed we want to plant within your committee.

Storage has a unique capacity to provide multi-service benefits, and they're sometimes very complex. These include flexibility, peak capacity, ancillary services, optimization of current generation assets, and it also includes driving more value out of existing zero carbon assets: nuclear, solar, wind, and hydro. A good example is that sometimes we curtail some of those wind and solar resources, as well as spilling some on the hydro side, and sometimes we give energy away to other jurisdictions. Energy Storage allows us to capitalize on that renewable, green, zero-emission energy and release it later in the form of clean and renewable energy when the demand is ready for it.

Storage also helps to defer investments in generation transmission line and distribution assets. An example of this is a storage within the distribution level. A smaller community within a microgrid, for example, would allow us to shape the demand. From the system side, a much more stable demand would be required, which is much easier to manage. Therefore, we could optimize the use of the existing transmission system.

Storage can also be very useful for remote communities. Now these communities can consider combining those zero-carbon technologies like solar, wind, and hydro with storage and remain with a very reliable service. Diesel could be kept as a backup, but it would be used very few times.

● (1545)

As our economy and the community grows to have a greater reliance on the electricity grid, the impact of extreme weather events also becomes a growing concern. We have seen a lot of events now in the States, for example with the hurricanes, but we've had our own ice storms, which were very significant in Ontario and Quebec as well.

Resilience is really going to be an important conversation as we move forward, which is an element to which storage really contributes significantly. The reliable supply of cost-effective and clean energy will be key to a thriving sustainable Canadian economy. Historically, Canadian supply of renewable energy has come from large generation facilities delivering power to the load centre through long and very robust transmission lines. As the system expands and the demand for renewable grows, it is expected that much of this growth will come from distributed generating assets, as Mr. Marcoux mentioned earlier on. We're moving towards a decentralized grid system.

Again, as Mr. Marcoux mentioned, cost is coming down both on the renewable generation side but also on the storage technologies whether they be battery storage or other forms of innovative storage technologies. The benefits to the Canadian economy of this new grid are important. Energy will be produced much closer to where it will be consumed in the future, reducing transmission and transportation losses. As each smaller region becomes more self-sufficient, the resiliency of the system will improve and reliance on a single, large, and potentially vulnerable system will be reduced.

Additionally, the already large and growing Canadian clean-tech industry will benefit from an expansion of the grid through next generation assets, including energy storage microgrids and smart energy network controls. I won't go through the figures, as Mr. Marcoux provided you with good insight on that, but they are significant.

With these perspectives, the Energy Storage Canada association would like to propose some recommendations for the federal government in general and to your committee.

First, we are fully committed and encourage non-carbon emitting sources of electricity production.

Second, we recommend enabling each province to implement electrification strategies according to the historical system evolution and availability of local resources. This is to really take a holistic approach to the future planning of policies relating to our energy system.

Third, we encourage policy tools that allow modern grid investment in concert with traditional investment where cost, reliability, and resiliency can be improved. What we're saying here is that the existing assets are key. We're not saying that we're going to completely throw them away and create a new grid, the grid 2.0. We're going to base it on the existing grid but make sure that it is optimized and all the existing assets are being used to their full potential.

Fourth, we encourage investment and deployment of energy storage assets connected at the transmission grid, embedded in the local distribution network, and behind the customer meter.

Finally, the fifth, we encourage the electrification of transportation through infrastructure to support electric vehicles and hydrogen-powered fuel cell electric vehicles. These are the five recommendations that we have as an association and I'd be more than happy to answer questions in either French or English as necessary.

Thank you.

● (1550)

The Chair: Thank you both very much. First up is Ms. Ng. The floor is yours.

Ms. Mary Ng (Markham—Thornhill, Lib.): Thank you so much, Chair.

I want to thank both witnesses for coming in and giving us your time and your expertise in your presentations today. I'm going to start with Mr. Marcoux with a couple of questions.

Given that S&C is a large equipment manufacturer or transmission manufacturer, can you give us a sense what the state of our infrastructure is in Canada, for the western provinces, the eastern provinces...? Can you give us a perspective of how we're doing?

Mr. Benoit Marcoux: This is a great question.

A modernized grid is be an essential ingredient for the future. There are major investments being made by all utilities across Canada to improve the distribution grid, and improve the transmission systems as well. Overall, we are privileged as a developed economy to have a good system, but that current system does not have all of the characteristics that are needed in the future. For example, as more and more distributed energy resources are integrated into the grid, then two-way power flows will happen. That is, if you have a large solar array on the roof of your home, power will be going out through the grid, not into your home. It's the same thing at any scale, including businesses and institutions. The grid is not built for that.

Second, it is also not reliable enough for the demand of our economy. We are more and more dependent on a reliable grid, and we'll be even more so as, for example, we get electric vehicles. Furthermore, every time there is even a short momentary outage on the grid, a few seconds, you have to reset the clock on your microwave, but more importantly in terms of generation, your solar panel on your roof will go offline for minutes. Therefore, we are in a situation where the lack of reliability is actually causing our new, distributed generation to go offline. Obviously, that's not desirable.

In summary, it's in a relatively good state across Canada, but it's not built for the future.

● (1555)

Ms. Mary Ng: Given that we are doing the study on electrical interties, can you talk to us then about where the opportunities could be to essentially improve that infrastructure to allow a greater diversity of renewables to come in, and what those strategic interties could look like in this country?

Mr. Benoit Marcoux: When you look at an electrical system, historically the generators simply followed the demand: demand increase, generation increase, and so on. The first thing that happened is that people started to build transmission lines. S&C contributed to that a century ago. The reason is that, the broader the scale of that system, the easier it is to smooth out demand and generation.

Over the last 20 to 30 years we started to control the demand. For example, in some provinces now, like New Brunswick, you can control the water heaters. They turn them off for a few minutes during peak times so that they can better balance the grid. Now after generation, after transmission, after load, there's a fourth element that is now coming into play to balance the grid, and that is storage. In fact, storage becomes an alternative to long-haul transmission lines, simply because it allows energy from local generation to be stored locally to be used later.

Another aspect as well is that, when we look at building transmission lines, we're talking 15 or 20 years and a lot of discussions at the local level. If you build a large utility-scale storage system, well frankly, it looks like a warehouse. In my exhibit I have a picture of the one in the U.K., and it's a warehouse. There are various shapes, but they have them distributed in industrial parks, and smaller ones behind the meters in houses, and anywhere in between.

Storage, which is the fourth way to balance the grid after the generation, transmission, and load demand, is probably more suitable for the future. In order to implement that, we need to improve the local distribution system so that it supports two-way power flows, and it is more reliable.

Ms. Mary Ng: Let me pick up on where you just ended and go to Mr. Vitez.

Mr. Vitez, on that point about storage, can you talk to us about what infrastructure you think needs to take place to enable greater storage capacity in our system?

Mr. François Vitez: In terms of major infrastructure—because I think it's where you're heading here—let me give you an example. In Ontario, where there is a lot of curtailment, there would be a use to having a bulk storage element, let's say a pump storage or air storage of a few hundred megawatts. You could build that infrastructure right where it's needed at one of the nodules of the system, where it could actually store whatever energy that has been produced by the intermittent renewables, the ones we already have that we're curtailing and the future ones that we want to build to fully decarbonize our electricity system. For example, a pump storage project in the greater Toronto area would allow us to make use of that energy that is otherwise lost, and it would also provide another thing that is very important, all the ancillary services.

You asked earlier the question, what is the status of our system in Canada? That refers to the physical infrastructure, but we also have a certain commercial infrastructure around energy. Unfortunately, that commercial infrastructure is very oriented toward the value of energy, the kilowatt hour. That facilitates a lot of growth in the intermittent renewables, be they solar or wind, which is great, because we see a lot of penetration of those sources, but it does not reflect the true cost of having energy systems in our society.

You need to have stability, you need to be able to flex when somebody turns on the light or turns off the light. You need to have that and these forms of generation capacity do not provide that. There is an element that is built in those—

● (1600)

The Chair: I'm going to have to stop you there. I'm sorry. We have to move on to the next set of questions, unfortunately.

Mr. Falk.

Mr. François Vitez: Okay.

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

Mr. Vitez, I'll pick up with you a little bit on your thought there. You did talk about compressed air storage. Can you give me examples of different kinds of storage that would be available?

Mr. François Vitez: In the bulk storage, the larger scale, compressed air falls in that category. Some examples are existing mines, where the cavities underground are injected with air when there is a surplus of power in the system. When there is increased demand, then that pressure is released through generators and converted into renewable energy. Similar is pump storage. Using a mine as an example of that, using an open-pit iron mine, you pump the water up to the upper reservoir when there is too much surplus, and you turbine the water back down when you're in need, so it's a closed loop system.

There is some battery storage that is really on the verge of becoming larger scale in the hundreds of megawatts, but there are very few examples of that yet. There is no doubt it's going to get to that point at some time.

There is another technology called liquid air, where it's the same principle as compressed air, but it's much more compressed, a much more industrial type of system with tanks instead of using the cavern.

I could go on. There are lots of others.

Mr. Ted Falk: Yes, along that line again, we've heard from other people who have testified and presented at committee here that the technology for storage just isn't there for a large-scale storage facility for the use of electricity in our existing grids and for commercial and residential application, to meet that demand.

Can you tell me what kind of capacity you would have the ability to store, as far as kilowatt or megawatts, and for what length of time could you store it? What is the cost, based on today's construction? What does it cost per megawatt hour to do that?

Mr. François Vitez: I would be pleased to share a lot of those details. We do have the capacity to store a very large amount of power over a long period of time. As an example, the traditional pumped storage has been here for a long time. We have some in Niagara. We have some in the United States. There's a good project under development right now in Ontario, 400 megawatts for five hours, which is significant. Depending on the site, this could increase. There's a project right now in the United States being developed. It has 16 hours of 600 megawatts. The technology is there. It's very site-specific, though, for storage.

When it comes to other forms of.... With liquid air, for example, you can add modules, and you can go to 100 megawatts. I think sometimes people don't make the distinction. When they think about energy storage, they think about batteries, which are a very important part of it, but it's not limited to batteries. Right now, the largest battery project under development is 100 megawatts. That's going to be fairly large, but it's soon going to be increased in size, for sure. That might be where some people were referencing the limits of storage.

Mr. Ted Falk: In terms of the compressed air or liquid air storage that you're referencing, is the cost to produce energy for storage equal to the return on the energy that it would produce, or is there a loss in available energy?

Mr. François Vitez: From a pure energy standpoint, there's always a certain round-trip efficiency, which varies depending on the technology. We would be running at around 80%.

To the question of whether the cost of pumping is worth the cost of generating, the answer is no, if we think only in kilowatt hours. If you're thinking, as a consumer for example, that you buy the electricity at retail and sell it to the grid when the rates are higher, there's no storage project right now that can actually make it on that arbitrage. You need to have a mechanism that values the other products that this provides, which are that flexibility, the frequency regulation, and all the ancillary services.

● (1605)

Mr. Ted Falk: Thank you very much.

Mr. Marcoux, I would also like to ask you a question. You talked about this new and modern grid, and you mentioned that part of the components of that will be energy storage. Could you comment a bit on some of the things that Mr. Vitez has said, and also summarize by saying what the need for increasing interties would be in that kind of a system, or whether the existing intertie system is sufficient?

Mr. Benoit Marcoux: There will always be a need for large transmission lines, at least over the planning horizon, and probably more in specific locations. However, the advent of storage, if you project the trends over the last few years, will mean that less of it will be required than if we had continued the same technologies that we've had over the last century.

It's quite incredible. The cost of storage and the cost of, say, solar generation has been decreasing at about 20% to 25% over the last many years. There's no reason for it not to continue. The manufacturing scale is increasing, largely driven by electric vehicles. The scale of the systems is increasing. Right now, the largest battery is about 100 megawatts. It wasn't there last year. The scale is increasing every year. Manufacturers like S&C are learning how to better integrate all of these systems together, working with our utility partners. You can foresee the same kind of trend in the future. What does 20% to 25% mean? It means that, say, in three years it's going to be half.

Right now, a large-scale utility storage system is about $400 per megawatt. In three years, it's going to $200. In 10 years it's going to be about one-tenth of that, projecting linearly. You can say that seems quite incredible. Well, perhaps, except that you may have heard about Moore's law in computing, which says that every 18 months the cost of computing drops by 50%. That law has been going on for 50 years, since 1967. What we're seeing is the same kind of thing happening in solar energy and storage. For the foreseeable future, we'll see a constant decrease in price, which will make it more and more cost-effective.

Today, solar is the most cost-effective source of energy in 60 countries. It's coming down by 20% per year, so you can expect that next year there will be more than 60 countries.

The Chair: Mr. Marcoux, my apologies, I'm going to have to stop you. We're out of time. We're going to have to move on to Mr. Cannings now.

Mr. Richard Cannings (South Okanagan—West Kootenay, NDP): I'll just perhaps let you continue. My question was going to be talking about that timeline of the shift away from the broad, long-distance power lines to these local distributed systems, and how the decreasing costs of storage is driving that. I'm still unsure what all these prices per kilowatt hour mean, but the price of storage still looks pretty high to me. When you compare four cents versus $400, there seems to be quite a difference. Maybe I'm missing something.

I'm just wondering how you see that timeline. We're talking about interties here. Should we be talking more about developing these distributed energy systems at a local level?

● (1610)

Mr. Benoit Marcoux: It's always hard to predict the future because it hasn't happened yet. Let me give you an example in a similar industry: telecom.

Twenty years ago to this day, I was operating what was at that time the largest Internet telephony network in the world out of Toronto. We were selling international telephone minutes for pennies instead of dollars per minute, as the telephone companies were doing. When I travel now at night I'll often make a FaceTime video conference with my grandchildren. The marginal cost is zero. Over the course of 20 years we went from dollars per minute to a marginal cost of practically zero. The industry structure has changed tremendously. In fact, it didn't take 20 years to get there.

When you see a sea change of technology like this, things will happen very quickly. They will not change 2% a year for the next 50 years. You get to a point where, in a given environment, the new technology is cost-effective and it flips. We are approaching that point in many ways.

What is the time frame? I can't give you an exact number, but it will happen very quickly, given the trend that we've seen in the past, given the interest that we're seeing in the industry, given the amount of investment being made by all sorts of companies to make it happen.

Mr. Richard Cannings: Perhaps I'll ask you both to comment on this.

We were talking about the electrification of our energy systems, and particularly with electric vehicles we're talking about storage. I just wonder if you could both comment on the theoretical use of a fleet of electric vehicles across the country as a form of storage, and how effective and manageable that might be.

Mr. Vitez, you can start.

Mr. François Vitez: There are some studies about that available with some empirical data gathered in the States. We could share that with you.

It is theoretically possible for those battery cars, or vehicles, to be used to store energy and then release that energy when it's needed. The question is whether it's what the customer will end up wanting. That's what the studies have been saying. When car users come in, some of them would prefer to have their cars plugged in right away and charged fully for security reasons, which in actual fact increases the demand at the wrong time. Others will say, “I can make money out of this. I'll do it.”

It really becomes more social, and it depends on how you roll out the program. Theoretically, technically, it's definitely possible—the incentives and the culture.

Mr. Richard Cannings: Right.

Mr. Benoit Marcoux: I concur with that. One thing that is quite interesting is the amount of storage in vehicles. Say we convert most vehicles in Canada to electricity. The amount of storage there is going to be very large even in comparison to what's needed in the grid itself. That may create a natural synergy. At a minimum, we'll need to control charging—that is, control that load, control that demand to charge vehicles—so that it doesn't otherwise coincide with peak demand.

There will probably be synergy. I see this more as an opportunity than a problem, especially in a situation where utilities right now see a decrease in demand for electricity, so that having electric vehicles, and that new load, will actually be positive for those utilities. It's a new market for them.

Mr. Richard Cannings: Just to finish off, Mr. Marcoux, I have a question about the storage facility in Leighton Buzzard that you have a picture of. How is that economical with these storage costs, and how would that relate to what we're facing here in Canada?

● (1615)

Mr. Benoit Marcoux: It depends on where you are. In places like the U.K, where the cost of energy is higher than it is in Canada, it is already cost-effective in some instances. In Canada, where the cost of energy is lower, it's going to take a few more years, at 20% or 25% a year, remember. In three years, if that's not enough, make it five. That's what we're talking about. We're talking about a delay before the same thing happens here, but it's very real. The utilities here, in the United States, in the U.K., and elsewhere are learning to use those systems on a smaller scale and are ready to scale up as the break-even point is reached.

Mr. Chair, if you and some of the members are interested, we can take you to see some of these existing systems. You'll see it for yourselves.

The Chair: That's time.

Mr. Richard Cannings: Thank you.

The Chair: Mr. Tan.

Mr. Geng Tan (Don Valley North, Lib.): My first question is a quick question to Mr. Marcoux.

According to your company's description, S&C has a broad product line focused on high-voltage switches and protection. I know that Hydro One in Ontario has been asking for upgrades and innovations for their system of transmission lines probably for decades.

I'm very curious. Do you ever work in co-operation with Hydro One to upgrade or replace their aged power transmission, distribution lines, old switches, or outdated transformers?

Mr. Benoit Marcoux: I must say that virtually all utilities in Canada are customers of S&C for one thing or another, including Hydro One. Hydro One is a very good customer of S&C. I know Hydro One has programs to improve the reliability of its systems. Hydro One is also one of the utilities that has the most distributed generation on its system. Although it's a rural system, it's a difficult system to have DG, digital generation, on it. They have a lot. They have maybe 20,000 rooftop solars on their system. It's a huge number. We are working with them as we are working with other utilities across Canada to help them modernize a grid.

Mr. Geng Tan: Thank you.

Now I turn my questioning to Mr. Vitez.

Energy Storage Canada is a subgroup under the smart grid forum. How might this smart grid forum work with the government? Also, how can your organization, Energy Storage Canada, contribute or support our interties? What exact role or contribution can you make to our interties?

Mr. François Vitez: Energy Storage Canada is an independent association. It was created by its members that are all part of the energy storage industry. In that sense, we are not officially linked with the smart grid cities, the Smart Cities Association, but energy storage intrinsically is definitely a very important ingredient of smart cities and smart grid.

I cannot share with you today exactly all the interfaces we have as an organization with those because I'm not aware of them myself, but I know that we have a lot. From a technical standpoint, from the solutions that we can bring, I could not imagine how we could implement the smart grid system without considering storage at different levels, be they right behind the meter, which are small-scale battery types, or at the distribution level, where we're near the switchyard. At the very minimum are these two levels.

Mr. Geng Tan: Some provinces, like B.C., Quebec, and Ontario, have an electricity surplus. With new or enhanced interties, we can expect that there might be even more energy surplus from those provinces or even from other provinces.

From what I heard from your words, the capacity of the energy storage industry in Canada is not big enough to digest all the electricity surplus, so those provinces probably still have to sell their electricity to other provinces or to the U.S.

I wonder which way...? Is it more economical to sell the electricity to other provinces or the U.S. rather than just to store the energy in your own province? Which is more economical, to store it or just to simply sell it?

● (1620)

Mr. François Vitez: I'll take that one, Mr. Marcoux.

The issue of having surplus is more of an accounting exercise at the end of the year, seeing that we had too much so we sold so much outside, but there are moments in the year when each of those jurisdictions that you mentioned are in need of power and need to build additional infrastructure.

That need for capacity is what is needed, and it's much easier to build that capacity through storage. That means taking some of that excess energy when it's not needed and releasing it when it's needed. It's much easier and much cheaper to do that today than it is to try to build additional capacity or to connect to somewhere much farther away where they might have the capacity available, and it's not to say that they will have that capacity available at the moment you need it as a jurisdiction, either.

Mr. Geng Tan: I have one minute, so this will be a quick one.

I have a simple description of your organization, Energy Storage Canada. In the first sentence, it says that your association is the only energy storage industry association in Canada, but the last sentence says that your association works closely with other energy storage alliances and associations.

I am quite curious. When you say “other”, does that mean those alliances or associations are outside of Canada, and how do you work with them? When you say you work closely, what do you mean? Do you share a study or research with other alliances or associations, or just simply purchase some products from them?

Mr. François Vitez: The association is constantly looking at what's happening in other jurisdictions to better educate and be able to look into a crystal ball with more clarity. We do have good interties with Energy Storage Association, ESA, out of the United States, and others as well, for that matter. That's what is meant mostly here.

The Chair: Thank you.

We'll go over to Mr. Schmale for five minutes.

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

To both of you, I appreciate your being here, and I want to pick up where Mr. Cannings left off. We've heard from a variety of witnesses over the past few weeks about the necessity of interties. The general consensus seems to be that they are one piece of the puzzle but not necessarily the most important, just a piece. What I'm hearing about today is the opportunity for storage, and we've heard from other witnesses over the last couple of days about localized power generation.

In your presentation today, you talked about the length of time to build transmission lines after you go through the planning and you name it. Going back to what Mr. Cannings was pursuing, should we really be focusing on the necessity of interties right now, because from what I'm hearing from you two today, maybe we're looking in the wrong direction.

Both of you can answer, please, if you would.

Mr. Benoit Marcoux: The industry is evolving very quickly, which, obviously, is an issue when you're talking about infrastructure that takes two decades to build. I think there are three things that need to change. First, we need markets so that a large number of players—consumers, businesses, utilities, independent power producers, distributed generators—can actually trade energy in those markets-to-be, and that includes energy storage obviously, time arbitrage, or offering other services to grid.

In order to have this distributed grid, digitized grid, we need to modernize it to allow for two-way power flows, to allow for protection that will work to have higher reliability so that we don't turn off our generation assets when there's a glitch. For those two things to happen, a third one needs to happen. We need to update regulations.

The regulatory environment in Canada is not designed for that modernized grid. We need to look at new ways of doing things, like incentives for a more reliable grid, incentives to reduce the cost, incentives to invest and innovate in the grid, as is happening in other jurisdictions across the world, the U.K. being one. Those things need to happen. I think that as far as urgency, that's probably far more urgent than building a lot of new transmission lines.

● (1625)

Mr. François Vitez: I would add that this is probably where most other jurisdictions are heading. It's not to discard the option of building transmission line infrastructure, but it's to look at it from a big picture perspective and to see the coming trend of decentralized generation.

Mr. Jamie Schmale: When you say incentives, you're mostly talking about government subsidies. Is that...?

Mr. Benoit Marcoux: No.

Mr. Jamie Schmale: You're also talking about private sector investment?

Mr. Benoit Marcoux: An incentive could be “if you do well, you get money; if you don't do well, money is taken away from you”. Utilities in Canada right now are all regulated on the basis of what's called the rate-base rate of return. When you put incentive into that regulatory regime, it means that if a utility, for example, is more reliable, it gets money. If it is successful in reducing its own internal cost, it can keep part of that money. That's the kind of incentive that is in place in the U.K. and in some places in the United States. You have a little bit of that in Alberta—just a little.

It's a fundamental trend in the industry. One of the reasons is that such a regulatory regime helps modernize the grid. It is also required if you want to have a healthy market for participants to exchange energy in.

Mr. Jamie Schmale: Do you want to add to that before I go on to the next question?

Mr. François Vitez: The only thing is that, when we talk about value of storage, we always talk about cost. When we talk about value, it adds value much more than just the energy. That's where oftentimes we miss out here. All these costs associated with flexibility and all the other ancillary services, we as a society end up paying for them but they are hidden in that rate base.

As Mr. Marcoux said, if we could start identifying layers of performance associated with those services, that would allow the utility to be incentivized automatically. If you want to apply that to the private sector, develop a layer of benefits associated with those services.

Mr. Jamie Schmale: Yes, so—

The Chair: Thank you.

We're over time already. I'm sorry. There's only five minutes.

Mr. Jamie Schmale: I was just getting on a roll.

I was going to quote the CBC, Marc.

Voices: Oh, oh!

The Chair: Do I hear a motion to extend the time? Okay, no.

Mr. Arseneault, I can give you about three minutes.

[*Translation*]

Mr. René Arseneault (Madawaska—Restigouche, Lib.): Thank you, Mr. Chair.

Whatever time I have left I'll be giving to my colleague Mr. Serré.

Welcome gentlemen. As neither a scientist nor an engineer, I would ask that you take pity on me when you answer. Ha, ha!

The current challenge seems to be the storage of clean energy, electricity, so that we can use it when we need it. I'm going to stray from the subject slightly for the sake of an analogy.

A while ago, I was on a plane reading an article about the technology used in electric cars. In response to environmentalists, the authors were arguing that the environmental damage caused by the battery of a single electric vehicle was equivalent to that caused by the manufacturing of three Hummers. I never forgot that figure. Perhaps I was naive, but I'm telling you what I read; I'm not being critical.

This storage solution really comes down to building a giant battery. Have you done a cost estimate or assessed the environmental impact? Of course, we want to use and store clean energy, but there are costs to building that kind of mega-battery. Have they been measured? Is it worth it? It's an innocent question.

● (1630)

Mr. Benoit Marcoux: I saw that study about two years ago, and I have to tell you that it was challenged pretty quickly. Clearly, any industrial or commercial endeavour has an environmental cost. One of the core reasons, however, that we promote the electrification of transportation and electric vehicles is the reduction in carbon emissions, which is, after all, a fundamental consideration.

That said, our motivation may have more to do with the economic benefits. Economically speaking, we are nearing a point where electric vehicles, grid-based energy storage, and renewable energies are competitively priced.

Mr. René Arseneault: My question was more about the building of that storage system. My analogy concerned electric car batteries.

Mr. Benoit Marcoux: We could find some references, but if we had to compare the system with other economic activities that would achieve the same result, I wouldn't be too worried.

Mr. René Arseneault: Very well.

Mr. François Vitez: It's important to keep in mind that energy storage systems aren't just about batteries. A lot is recycled during the production process. It's also necessary to look at the other types of technology, which have very different repercussions. Although there is always an impact, it can vary greatly.

Mr. René Arseneault: Thank you.

Mr. Marc Serré (Nickel Belt, Lib.): How much time do I have, Mr. Chair?

The Chair: You have 30 seconds.

Mr. Marc Serré: Thank you, Mr. Chair.

You said that the provinces had to think 40 to 50 years into the future. Do the investments Ontario has made over the past decade put it in a better position going forward than the rest of the provinces?

Mr. Benoit Marcoux: That would require examining each case. Overall, though, Canada's electric grid is in good shape. The issue is how well-designed is it for the future. Yes, Ontario has made significant investments, but so has Quebec. New Brunswick has done a lot as well. Everywhere has. Generally, Canada's electric utilities have kept their grids in good condition, even though those grids are hard to maintain in some cases. Saskatchewan is one such place: it has more polls than customers. That's true.

Situations like that are challenging, but the electric utilities have worked to keep their infrastructure healthy.

[*English*]

The Chair: Thank you.

That's all the time we have this afternoon, gentlemen. Thank you both very much for taking the time to be here with us and for contributing to this study.

We'll suspend now for two minutes. Then we will go into committee business briefly.

[*Proceedings continue in camera*]