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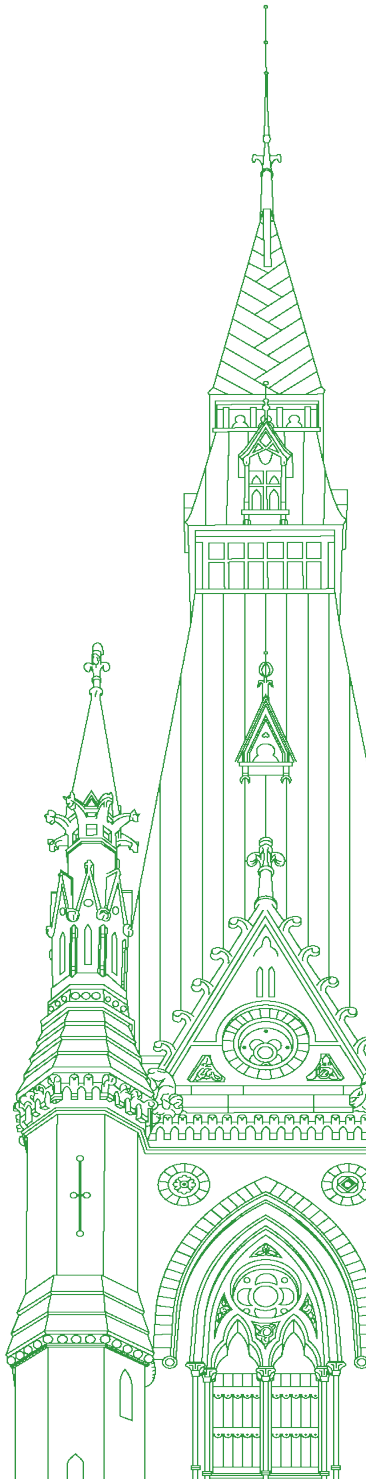

Chair: Terry Duguid

Standing Committee on Natural Resources

Thursday, April 30, 2026

● (1530)

[*English*]

The Chair (Hon. Terry Duguid (Winnipeg South, Lib.)): Colleagues, I call this meeting to order.

Let me start by welcoming some new members of the committee, Mr. Gurbux Saini from Fleetwood—Port Kells and Jennifer McKelvie from Ajax.

It's always good to see you, Mr. Rowe.

Mr. Ruff, it's great to see you at this committee.

I believe we have Sima Acan on the screen. Welcome, Sima.

Let me acknowledge, as we always do, that we are meeting on the unceded territory of the Algonquin Anishinabe nation.

Welcome to meeting number 35 of the House of Commons Standing Committee on Natural Resources. Today's meeting is taking place in a hybrid format.

I would remind participants, particularly our online folks today, to please wait until I recognize you before speaking. For those participating by video conference, click on the microphone icon to activate your mic. Please mute yourself when you are not speaking. For those on Zoom, at the bottom of your screen, you can select the appropriate channel for interpretation: floor, English or French. For those in the room, you can use the earpiece and select the desired channel. All comments, as you know, should be addressed through the chair.

Pursuant to Standing Order 108(2) and the motion adopted on Thursday, September 18, 2025, the committee shall resume its study of Canadian energy exports.

I would like to welcome our witnesses. From Clean Energy Canada, we have Evan Pivnick, associate director of public affairs; and from Nergica, Frédéric Côté, general manager.

All virtual witnesses have conducted a mandatory witness onboarding test.

You each have five minutes for your opening remarks, after which we will open the floor for comments and questions.

Mr. Pivnick, we'll start with you. You have the floor for five minutes.

Evan Pivnick (Associate Director of Public Affairs, Clean Energy Canada): Thank you so much.

Good afternoon, Mr. Chair and members of the committee.

Clean Energy Canada is a national think tank at Simon Fraser University focused on advancing and seizing opportunities for Canada in the global energy transition. This committee's study comes at a vital moment. Canada is reorienting its economy and approach to global trade for a world where the U.S. is no longer a reliable trading partner and the rules-based system Canada has relied on is under threat. At the same time, escalating global conflicts are accelerating an equally fundamental shift—the electrification of the global economy.

Clean technologies are already dominating global investment. In 2025, of the $3.3 trillion of global capital spent on energy, $2.2 trillion went to clean energy technologies and electricity infrastructure. The electricity sector is now the largest energy employer globally. EVs are poised to make up 30% of new car sales worldwide this year. Last year, renewables overtook coal power as the largest source of electricity generation globally.

In the face of increasingly volatile fossil fuel prices, insecure supply chains and falling prices for clean energy technologies, all the countries Canada has sought to strengthen our trading partnerships with have doubled down on electrification as the safer long-term bet. The Korean government has framed the Iran war as a “significant turning point” and has advanced new commitments to nearly triple the share of renewable energy capacity on its grid by 2030. China's latest five-year plan aims to reach peak carbon emissions by 2030 and further secure its dominance in clean energy and technology supply chains. Just last week, the EU released a new strategy that expands efforts to reduce reliance on fossil fuel imports, doubles down on homegrown clean energy, accelerates electrification and invests in clean technology industries.

As Canada works to double non-U.S. exports and attract $1 trillion of new investment, these are the global energy and investment trends we must factor in. This starts with expanding how we think about energy exports. Whereas oil and gas are the hallmarks of the conventional energy system, electrons, clean technologies and critical minerals underpin an electrified one. Canada has all the ingredients to compete globally and position itself as a clean energy superpower, including a stable investment environment, affordable clean power, abundant natural resources, innovation and one of the most skilled workforces in the world.

To succeed, Canada must focus on two priorities. First, we must rapidly grow and modernize our own clean electricity system. Second, we must prioritize and invest in the economic sectors and supply chains that underpin global electrification. As the spring economic update made clear, “Clean, affordable, and dependable electricity is central to Canada’s long-term economic strength.” Securing this advantage will require Canada’s forthcoming clean electricity strategy to coordinate our energy trade and economic policies, increase investment into local grids and smart technologies, and provide a pathway to building new interties.

● (1535)

[*Translation*]

Mario Simard (Jonquière, BQ): Excuse me, Mr. Chair.

I hate to interrupt the witness, but for the well-being of my friend the interpreter, can we slow down a bit so she can breathe? I'd like her to make it to the end of the meeting.

[*English*]

The Chair: Thank you, Monsieur Simard.

Mr. Pivnick, for the sake of our interpreters, could you slow down a bit?

You still have two minutes and 19 seconds.

Evan Pivnick: Thank you.

Next, supporting clean economic sectors and supply chains is inherently a diversification strategy. Analysis shows that our existing clean energy exports are already growing faster with the rest of the world than with the United States. These sectors range from critical minerals and EV manufacturing to grid technologies. Global demand for key critical minerals, such as lithium, graphite, nickel and cobalt, is poised to grow two to six times by 2040, overwhelmingly driven by clean energy technologies. Canada ranks among the top 10 for total global reserves of each and should position itself as a preferred supplier to key allies.

Combining Canada’s clean grid with high-quality iron ore reserves could expand green steel production to align with the EU’s carbon border adjustment mechanism and grow capacity for in-demand specialized products like electrical steel. Canada’s clean electricity supply chain—from clean generation and grid technology manufacturing to the innovation and management services that integrate them—is another opportunity we need to scale. To achieve this, Canada needs to map and then leverage our competitive advantages in these supply chains.

While the pace of electrification may vary country to country, the overall direction of travel is the same. Growing our clean energy exports is the key to long-term economic competitiveness, positioning Canada as the type of energy superpower that will last.

Thank you, and I look forward to your questions.

The Chair: Thank you, Mr. Pivnick.

We're going to move on to Mr. Côté.

You have the floor for five minutes.

[*Translation*]

Frédéric Côté (General Manager, Nergica): Mr. Chair, honourable members of the committee, thank you for inviting me to speak today as part of your study on Canadian energy exports.

My name is Frédéric Côté, and I am the general manager of Nergica, a college centre for technology transfer based in Gaspé, Quebec. We focus on applied research in the field of renewable energy, mainly wind and solar energy, and their integration into electricity grids. We're also working on storage and hydrogen.

We work with equipment manufacturers, independent electricity producers, utilities, indigenous and non-indigenous communities, as well as innovators in Quebec and in Canada. We work closely with Natural Resources Canada on research that strengthens grid reliability and accelerates the deployment of clean technologies. We also represent Canada on research groups at the International Energy Agency, including on distributed energy production and cold climate energy production.

I'm also the co-founder of the Northeast Grid Planning Forum, a civil society initiative to promote better inter-regional planning of electricity grids in eastern Canada and the northeastern United States.

In order to meet demand, Canadian electricity generation will need to roughly double by 2050. The bulk of this new generation will be predominantly wind, as well as nuclear, hydro and solar. This represents a huge growth opportunity for our businesses and communities. It is therefore essential that we have a real industrial electrification policy to guide and increase our capacity to develop, deploy and export know-how and technologies in electricity generation, as well as in the storage, transportation and operation and maintenance of these infrastructures.

Canada has world-class energy resources, but our ability to move electricity across interprovincial and international borders is limited by fragmented planning and insufficient transmission capacity. Too often, provinces have planned in silos, focusing on one-off export opportunities rather than common solutions that reduce system costs and improve reliability. Electricity needs to be balanced in real time. As wind and solar grow, larger and more interconnected grids can mitigate regional variability, integrate manageable resources and make sharing more reliable, including during extreme weather events.

In short, inter-regional transportation is not just an electricity issue. It's also a lever for Canadian clean electricity exports and industrial competitiveness.

● (1540)

[*English*]

A clear point of consensus among Canadian grid stakeholders is the need for inter-regional transmission planning. The Canada electricity advisory council, in its "Powering Canada" report, recommended that the federal government and provinces jointly establish a policy framework to identify and support inter-regional transmission projects, including governance, cost allocation and funding.

From our work in eastern Canada and the northeastern U.S., three practical steps would materially improve Canada's ability to expand clean electricity trade and support broader energy exports.

First, establish a transparent, inter-regional planning process that meaningfully includes provinces, first nations, utilities, industry and the public.

Second, create federal-provincial tools to advance priority projects, especially clear rules on cost allocation and access to financing for projects of national interest.

Third, invest in shared, open modelling and data so provinces can evaluate trade-offs consistently and negotiate from a common evidence base.

In closing, Canada's ability to generate and export clean electricity and associated technologies and to strengthen energy security at home will depend on a clear industrial policy and building the right transmission backbone, guided by transparent inter-regional planning.

[*Translation*]

Nergica and its partners are ready to support the federal and provincial governments thanks to applied research and practical tools.

Thank you. I look forward to your questions.

[*English*]

The Chair: Thank you, Mr. Côté.

Thanks to both of you.

We're going to our first round of questions. We'll start with Monsieur Martel for six minutes.

[*Translation*]

Richard Martel (Chicoutimi—Le Fjord, CPC): Thank you, Mr. Chair.

Thank you to the witnesses for joining us.

Mr. Pivnick, you've said before that approval processes are too long and costly.

Wouldn't prioritizing certain projects based on their contribution to what you call clean growth risk adding an additional layer of subjectivity and regulatory complexity?

[*English*]

Evan Pivnick: Thank you for the question.

I think that right now, with the government's "projects of national interest" approach, we see the choosing of projects that offer opportunities to position Canada for a variety of different reasons. One—and there's the criteria that I've applied there—is looking at climate competitiveness. Given a world that is electrifying, that is an essential piece, when we're looking at finite resources, people's finite time and finite dollars, to make sure those projects are building opportunities for where the global economy is going and where exports are going.

I think there's the opportunity to learn lessons from this, where we've selected a smaller number but that can then be applied to a wider suite. It doesn't have to be either-or. We can choose priorities and then take the lessons learned as we move projects through those processes and apply those lessons more generally.

[*Translation*]

Richard Martel: Mr. Pivnick, in concrete terms, who decides what constitutes a priority clean growth project? What are the measurable criteria being used?

[*English*]

Evan Pivnick: Thanks for the question.

At this point, we have a government process that is selecting projects. They are engaging with provinces to bring them forward, so there's a collaborative effort there. Given that we're talking about government investment on both sides and finite resources in governments at both the provincial and national levels, that is the process we've set out to date.

In terms of the criteria we're looking at, the ability to supply exports, create jobs and add value in local communities, all of that is going to be absolutely essential alongside clean. We need to think about the ability to access demand where the countries we're looking to trade with are going. That's where the electrification trends playing out in the rest of the world have a critical role to play when we're thinking of this from an export perspective, so that we're not simply building projects that focus on the short-term opportunities but on where countries are aiming to be themselves in the next five and 10 years.

● (1545)

[*Translation*]

Richard Martel: Once again, your work shows that China controls a dominant share of the refining of several critical minerals.

Given this dependence, is accelerating the energy transition realistic?

[*English*]

Evan Pivnick: Absolutely. When it comes to China's role, they have been very clear. They are looking to be and are truly the only global energy superpower at this moment. They control 90% of many of the key supply chains, from critical minerals to clean technologies. There's a reason why Canada is being looked at to be a potential provider for exactly those same things—critical minerals and clean technologies—for other allies. We're seeing right now that dependence on one supply chain can offer quite a significant security risk for countries right around the world.

Canada has all of the different elements. As I said in my opening remarks, we have top 10 reserves in some of the key critical minerals. We have expertise across the clean technology landscape in industries such as steel and automotive and those can be leveraged. When we're thinking about our investments, we need to be thinking about how we position for those demands as well, not just the ones that exist today.

[*Translation*]

Richard Martel: In practical terms, does replacing our use of Canadian oil with a dependence on critical minerals controlled and processed by a foreign state actually improve our energy security?

[*English*]

Evan Pivnick: Right now, Canada is in discussions with countries right around the world. When we look at the EU and at trading partners, we're integrated into the economy right now. That exposure to different countries and the ability for.... Especially in a system where the rules-based order is breaking down, that risk exists today. That is a challenge we already saw. In putting tariffs in place, countertariffs also get put in place.

When we're talking about our energy system, we absolutely need to prioritize domestic electricity security. The build-out of our domestic electricity system is paramount. It's why, when we think about being a clean energy superpower, it's not just what we can export to the world. It's what we can build here, and it's making sure that from a domestic perspective, our electricity system has secure supply chains for its own build-out, which, as Frédéric Côté spoke to, is needing to double over the next 25 years.

[*Translation*]

Richard Martel: I didn't check my time, Mr. Chair. How much time do I have left, approximately?

The Chair: You have 40 seconds.

Richard Martel: Okay.

I have one more question for you, Mr. Pivnick. At what point do you think we'll be able to produce 100% Canadian batteries on an industrial scale?

[*English*]

Evan Pivnick: I couldn't speak to the specific fully integrated supply chain. That's going to come down to the investments that companies and governments make.

We already have expertise and roles to play. In terms of analysis, it has shown, from a battery supply chain perspective, all the way from the critical minerals to the materials that go into batteries to the processing and manufacturing of them, that there are opportunities for it. We should expect to remain in an integrated global supply chain. We need to think about partnerships with other countries. Whether we're talking about the current energy system and our current energy exports or one that's looking at an electrified world, we're going to be reliant.

The Chair: Thank you both.

Mr. Guay, you have six minutes.

Claude Guay (LaSalle—Émard—Verdun, Lib.): Thank you, Mr. Chair.

I give a big thank you to the witnesses for participating today. I'm happy to talk to them.

Mr. Pivnick, I will direct my first question to you.

In budget 2025, we talk about the clean electricity investment tax credit. We extended the tax credit to government-owned entities and indigenous organizations.

Do you see the implementation of the clean electricity investment tax credit as essential to building clean energy projects here in the country?

Evan Pivnick: Absolutely. The clean electricity ITC is a vital part of it. I think the latest addition of the potential content requirements being consulted on right now is an example of where in the electricity strategy we need to ensure that our trade, economic and electricity policies are coordinated.

If we're putting requirements for Canadian-made parts that aren't manufactured, we do risk adding costs and timelines to clean electricity projects. While the clean electricity ITC is a vital part of lowering costs and lowering electricity bills for Canadians, we do need to be very deliberate about how we apply those content requirements. Using them instead as a bonus process, where the ability to supply Canadian supply chains adds to the bid and has additional benefits as opposed to a strict restriction, will ensure the best of both worlds.

● (1550)

Claude Guay: Mr. Pivnick, you've obviously heard about a national electricity strategy that is up and coming. The Prime Minister has mentioned it.

Are you encouraged that the government is moving forward with that? Could you elaborate on what you would expect to see in there?

Evan Pivnick: Absolutely. I think a national electricity strategy is vital. When we're thinking about energy exports, as I've mentioned, the domestic electricity system is absolutely vital from a competitiveness perspective. I think there are three specific pieces that an electricity strategy really needs to speak to.

One is around interties. Canada needs to clarify the federal process around the ability to fund, the ability to help share benefits and the ability to support inter-regional planning. That's going to be a vital piece of it.

The second is being able to make investments to support local grids—smart technologies and distributed energy resources, and their integration into grids. We need to modernize even as we build new generation.

The third piece, as I mentioned, is providing some coordination between our trade, energy and economic policies. The ability to provide a clear signal is going to enable greater investment into the electricity sector in Canada.

Claude Guay: Thank you very much.

[*Translation*]

Mr. Côté, let's continue on this subject.

We just talked about network interconnection, which is important if we want to increase exports. A lot of electricity is exported to the U.S. You participate in the Northeast Network Planning Forum, so you know that.

Tell us about renewable energy and the role it can play, particularly in the northeast. I'm thinking of projects like Wind West, in Nova Scotia, Boralex and, now, Hydro-Québec, in Quebec. Tell us about the projects you find encouraging or that you'd like to see happen so we can export more and meet the demand related to the development of Canadian production.

Frédéric Côté: Thank you very much for your question.

Basically, when we talk about the new capacities that will be added over the next few years, I'd say over the next 20 years, the new electricity generation capacities will essentially be wind and solar generation. We're fortunate in eastern Canada to have a very high-quality wind resource, which really sets us apart in North America. Looking at things a little more closely, you see that this high-quality wind resource is correlated with demand. For example, in Quebec, electricity is used a lot for heating, and the wind resource is stronger in the winter. This means there's a good correlation between demand and production.

We see a golden opportunity to position Canada and eastern Canada in the wind energy field. There's also an opportunity to continue strengthening Canada's know-how and its capacity to produce components for Canadian projects, but also for exports, since we've seen in recent years Canada's capacity to export not only electronics, but also Canadian know-how and technology.

Claude Guay: Mr. Côté, I have one more thing to ask you. I'd like to hear your vision on interconnections, particularly in the east, and how important they are to Canada's exports.

Frédéric Côté: There's some paradigm-shifting work to be done. Historically, development in Canada and the provinces has followed a north to south logic to promote exports to our American neighbours.

However, there's really a need to strengthen east to west interconnection between Canadian provinces. This would also make it possible to increase the resilience of Canada's networks. Geographically, we see, for example, that in Nova Scotia, there's a very high-quality offshore wind resource; in Quebec, there are hydroelectric reservoirs that can be used as storage batteries; and in Ontario, there's a nuclear vision, so they're developing a significant nuclear capacity.

I think by promoting better integration among the provinces, we'll be able to better coordinate these different profile resources.

[*English*]

The Chair: Thank you.

[*Translation*]

Mr. Simard, you have the floor for six minutes.

● (1555)

Mario Simard: Thank you very much, Mr. Chair.

I am not a witness, but I want to take a moment to answer my friend, Mr. Martel, who asked earlier if it was possible to make batteries in North America, particularly in Canada. He should remember that First Phosphate produced a lithium, iron and phosphate battery made entirely in Canada. We have all the minerals, we're not dependent on the Chinese, and we can make batteries. We have to develop the sector.

Mr. Côté, I'm glad you're here. I've visited your facilities. I've often repeated what you told me, like a parrot. It allowed me to sound smart a couple of times.

I still want to come back to a fairly important point you made in your opening remarks.

We need an industrial electrification policy. Earlier, my friend, Mr. Guay, asked you about the federal tax credit. However, in my discussions with certain stakeholders—namely you and Normand Mousseau of the Institut de l'énergie Trottier—I got the impression this industrial electrification policy doesn't exist.

Can you tell us what first steps could the federal government take or how it could intervene to facilitate the implementation of this type of industrial policy?

Frédéric Côté: Thank you.

Obviously, we know regarding industrial policy and electricity that the main responsibility lies with the provinces. There's always a balancing act between federal intervention and the respect of provincial jurisdictions.

Mario Simard: It's always surprising for someone from the Bloc Québécois to receive a lesson on this. Thank you.

Frédéric Côté: Of course, I'm not telling you anything new, but I'd say there's an important role to play, because there are three things to remember when it comes to electrification.

First, the driver for electrification had changed in recent years and is no longer just energy transition; it's also data centres, artificial intelligence and digital sovereignty. Electrification is therefore an important strategic element when it comes to industry and safety.

Second, we need the capacity to export our green and inexpensive electricity, but we also need to rethink trade to ensure it's multidirectional, meaning it takes place both between homes and public infrastructure, and between the north and our neighbours to the south. We need to push electricity south, but we also need to welcome electricity from the south for storage, something similar to what the witness from Hydro-Québec explained told you.

Third, we have to think about developing Canadian expertise, know-how and technology. I think that's a very important element because, although exporting electricity is strategic, we have to develop a complete value chain and rely on Canadian technologies and manufacturers to meet the needs. We know we can double the size of our electricity grid over the next few years, but we can also export this know-how and these technologies outside Canada.

Mario Simard: I'll continue with you, Mr. Côté, but I'll also direct this to you, Mr. Pivnick, if you can answer the question I'm about to ask.

There's clearly a link to be made between electrification and critical minerals. I think those two sectors require two federal government strategies that will go hand in hand. Both of those strategies involve the development of storage systems.

I see more and more initiatives. I'm thinking of people I visited recently who are offering storage solutions. I see these initiatives developing, but I don't know how, at the public level, we can support people who have storage projects. Earlier, you talked about wind and solar energy, which do indeed require storage strategies. However, I don't know how the government can support these people to make it easier to implement these storage strategies.

To reconcile with my friend Mr. Martel, I would say that, indeed, most of the batteries currently used by people involved in storage come from China. That means a production line will have to be developed in Canada.

If you have any advice on that, I think it would help the government.

● (1600)

Frédéric Côté: In terms of storage, I think one of the first elements is the view on the added value of storage. Recent battery strategies, including the ones we saw in Quebec, were essentially strategies that enabled or targeted the integration of the automotive value chain. That means those strategies had more to do with the automotive sector than the electricity grid itself.

I think the first step would be to recognize the value of storage in the electricity grid, that is, stationary applications, to facilitate the integration of renewable energy in areas that can't have large reservoirs, as in Quebec. There's still a need to work on that.

From there, I think there are two aspects.

First, it's necessary to support innovation and companies' capacity to innovate and develop batteries and products tailored to Canadian needs and the reality of operating in Canada, whether that's the cold climate or the presence of critical minerals on Canadian soil. It's also necessary to be able to develop those minerals.

Second, we're talking about an integrated strategy, from mining to recycling. I think it would be really important to maintain the full life cycle and ensure that there's a coherent vision, which not only helps guide investments, but also provides a narrative that will facilitate the social acceptability of projects. We know that these are all projects that have to be deployed in communities, and that a clear vision and an overall picture will promote communication with the communities.

The Chair: Thank you.

Mario Simard: Mr. Pivnick, I'll give you a few moments in my next turn.

[*English*]

The Chair: We can come back to him.

Mr. Rowe, we're going to start the second round with you for five minutes.

Jonathan Rowe (Terra Nova—The Peninsulas, CPC): Thank you, Mr. Chair.

I want to talk, today, about clean energy.

I was at an energy conference a few years ago, where a very wise CEO came out and said, “We cannot miss out on having a better tomorrow because we're fantasizing about having a perfect tomorrow.” That stuck with me. A lot of times, we Canadians sit around boardroom tables and talk about cutting down the forest and having solar panels. We almost have a dream of running the world off smiles and fairy dust. Until we figure out the technologies they use in the *Monsters, Inc.* movie, we're going to be a long way from that.

What we need to do is take a very common-sense approach. If we want to get serious about transitioning globally, we have to sit down and address what the low-hanging fruits are for that transition. That's a common-sense approach. We eat the elephant one bite at a time, and we pick the low-hanging fruit.

The world's demand for coal is still increasing, as far as I know. The answer, every year, to “what year has the most amount of coal?” seems to always be “last year”. In Canada, we're doing a very good job. Alberta has phased out most of their coal, if not all of their coal. I believe most of it is gone now. Although coal has a very important role in steel manufacturing, it is not the cleanest form of energy. What we're seeing globally is the use of coal still increasing. We have two issues happening. We have the third world coming online and getting electrified. We also have an energy race that needs energy to power AI. We are kind of entering a cold war AI race. It's among the geopolitical superpowers of the world. We come here every week and talk about how energy demands are growing and growing. We need to focus on the small steps we can do.

I would like to know if Mr. Pivnick could elaborate on how much better our oil and natural gas are here in Canada versus the oil and natural gas in other parts of the world.

How can we use that natural gas to mitigate the coal requirements of the global economy?

Evan Pivnick: I'm not an expert on comparing oil and gas environmental footprints. I was not, in my remarks, trying to make a zero-sum argument that we need to choose one or the other, here in this moment.

The global trends are clear, as I mentioned. For every dollar the world spent this past year on energy, two dollars were spent on clean energy. The investments are happening globally. If we think about the energy export markets that Canadian companies and workers can try to feed into, that's the trend line. This is true across our allies. That's not to say that oil and gas will disappear tomorrow. Certainly, when it comes to coal, it's not to say that China isn't, overwhelmingly, the largest user.

All that said, if we're trying to have a conversation about where Canada can make investments to position itself for the long run, electrification is coming. The exact speed of it is something we should continue to debate, but the trend line is constantly in one direction. We need to make sure Canada and Canadian exporters are positioned to play into those markets if we want to have competitive industries and be able to continue to export in a world that is rapidly accelerating into an electrified energy system.

● (1605)

Jonathan Rowe: Absolutely.

Part of that is about going in and electrifying Canada. You said, “electrification is coming”. That is one of our low-hanging fruits. We want to have green energy. We want to have energy across Canada, but how do we do that without interties? It's been recommended in this committee, in the past, to have interties. We had a Liberal government in the past that was very adamant about increasing green energy, yet nothing was done.

Is it because of Bill C-69 and the other requirements there for getting these transmission lines from coast to coast? I would like to know what the hindrance is regarding interties, why this wasn't done already and why we're still talking about it.

The Chair: You just have 30 seconds to respond.

Evan Pivnick: Quickly, the intertie question comes down to a Canadian grid that is truly 10 separate grids. That's not even counting the territories.

We need to have both a provincial and a federal conversation when we're looking at interties. Having inter-regional planning and clarity around a federal government role to help balance benefits among jurisdictions with fundamentally different energy systems will be a really big key. We seem to have more momentum in this moment than we've ever had in terms of an intertie conversation. I think it would be a shame if we missed the opportunity in the next few years to move this tangibly forward, because, as you say, it unlocks a huge amount of opportunity for Canada.

The Chair: Thank you, both of you.

Mr. Danko, you have five minutes.

John-Paul Danko (Hamilton West—Ancaster—Dundas, Lib.): Thank you, Mr. Chair.

Mr. Côté, I'm going to start with you. I apologize that my questions are going to be in English. I'm not going to torture you, or the poor interpreters, with my French.

I see in your background there that you have what I think is a heat pump, so you're using a high-efficiency heating and cooling unit. It's electric. We've heard quite a bit about how the entire world is going to electrification. We've heard that quite a bit from other witnesses. We've heard that it's not an ideological choice; it's simply because the technology is better, cheaper and cleaner. It is increasingly becoming the consumer's choice.

You talked about exporting energy and technology. My question is this: When we're talking about the technology side, how important is it for Canada to embrace this electrical transition and to divest from fossil fuels so that we can stay at the cutting-edge of technology and so that the products we're making here, our manufacturing sectors and other high-technology, advanced manufacturing are cutting-edge and are able to stay up to date with the modern trends?

Frédéric Côté: Basically, we see that there's a real opportunity to leverage current industries, for example, the automotive industry. We have steel, and we have aluminum. We also have a good electricity industry in Canada. We can build on these to make sure that we adopt the technologies of the future, that we have in Canada the capacity to transform and manufacture the technologies that will be required to have success in terms of energy transition, and that we are able to meet the electricity demands of the coming 20 years.

What we see is that we need, somehow, a shift, because it's really not a competition against any particular conventional form of energy. It's really about efficiency. The more you can use electricity, the more efficient you will be, so you have less heat losses and whatnot.

Basically, we really need to electrify as much as possible. We need to make sure that the technologies used to do so are as Canadian as possible and that we leverage our minerals and the natural resources that we have in Canada in terms of moving forward.

John-Paul Danko: Thank you.

Mr. Pivnick, I'm going to extend that question to you, and I'm going to use a couple of Hamilton-specific examples because you mentioned green steel. ArcelorMittal Dofasco is transitioning to electric arc furnace steel production. We have cutting-edge research and development here developing electric motors that don't use any rare earth materials—that is in production right now; it's a real thing—as well as developing high-efficiency batteries, high-capacity batteries, that don't use critical minerals. We have cutting-edge technology and global leadership.

It's the same question: How important is it for Canada to be on that technological cutting-edge so that we have these products available for export and so that we have the IP for these products that we can then export around the world? How do we make sure that we have access to global markets in terms of federal legislation—things like the industrial carbon price?

● (1610)

Evan Pivnick: I think there's a really tight connection between the deployment and adoption of technologies domestically and our ability to excel in them and export them. I should say that, in Canada, we often get caught talking about goods. However, especially in the electricity sector, in the energy space, the services, the ability to actually package, the management of the integration, the software behind it.... This is a very vital, very real and very large part of the economic opportunity for Canada across the energy space.

There are a variety of different pieces that we could be doing. For a lot of households, the barriers are upfront costs. If we can get over the upfront costs, they are able to experience cost savings in the operation of these technologies. We're able to build experience in how to manufacture, how to employ and how to use. This is where we're going to be able to create new companies domestically.

When we look internationally, we do see, across all of the trading partners we're looking to diversify trade with, that most of them either have carbon pricing in place or are putting in place carbon border adjustments, which are essentially a clean tariff. If your goods are not clean or are not manufactured using clean, they're going to ask you to pay a higher price.

That's the world we're moving into, so when we think about how we manufacture and leverage a clean electricity system that is incredibly low carbon intensity to manufacture, we're opening the door to being able to export it. If we're building that on top of domestic deployment of these technologies and building up the know-how, that's really where we're going to be able to bring these two together.

The Chair: Thank you to you both.

Mario, you have two and a half minutes.

[*Translation*]

Mario Simard: Thank you very much, Mr. Chair.

Mr. Pivnick, I'm going to come back to you to give you the opportunity to participate in the discussion we were having earlier.

I was talking to Mr. Côté about the possibility of implementing an industrial policy on electrification. I'd like to tie this back to your opening remarks, in which you talked about the volatility of fossil fuel prices. I keep seeing articles showing how China—not out of interest in climate change, but probably because they're concerned about their energy security—is making big strides in electrification, and how it's likely putting in place a highly developed industrial policy on electrification on a number of fronts.

If we were to take that route, what would the best short-term solution look like? What government actions could be taken?

[*English*]

Evan Pivnick: Absolutely. Thank you for the question.

I think it's worth pointing out that when it comes to the volatile prices, North America can feel like a bit of an island because, when you look around the rest of the world, they are responding to this as a transformational moment. With the price shocks and the costs to consumers on electricity bills, this is a moment when they are rapidly looking to make massive changes, and I just wanted to highlight that for a moment.

When it comes to industrial policy, we're already seeing right across the board demand for electricity from industries. Let's just take critical minerals. If you talk to the mining sector, they say, “Give us access to renewables. Give us access to low-cost, clean electricity to power our mine sites.” It means that they don't have to import fuel. It means that they can be connected to a reliable electricity grid to power operations and, increasingly, that runs the gamut of the full operations. That's another space where we see economic opportunities for applying electrified technologies.

I'd say the priority for an industrial electrification strategy is moving to abundance. We have had a bit of a scarcity mindset when it comes to the electricity system. We build when demand comes. Right now, we're in this contest of how much demand there is and building precisely for the moment and not building ahead. That's not what other countries are doing when it comes to securing investments. They're building ahead knowing that demand is on its way and that key to attracting investment is to be able to offer that in advance to secure those investments. That's not an easy gamut. Certainly, utilities are going to have to navigate some challenging uncertainty with that, but that's a key piece of being able to unlock a true industrial electrification strategy.

● (1615)

The Chair: Thank you to you both.

[*Translation*]

Mr. Martel, you have the floor for five minutes.

Mario Simard: Mr. Chair, I would like the witness to submit his answer in writing.

Mr. Pivnick, if you have any information to send me in writing, I'd be happy to receive it.

[*English*]

The Chair: That's right, and all of our witnesses are welcome to submit additional material. We welcome briefs. Thank you so much.

[*Translation*]

Mr. Martel, you have the floor for five minutes.

Richard Martel: Thank you, Mr. Chair.

Mr. Pivnick, in 2026, Germany continues to massively subsidize its electricity industry because of the high costs of its energy transition policy. Doesn't that demonstrate the structural limitations of a model that's highly dependent on intermittent renewables, as well as the limitations associated with energy availability far from major centres?

[*English*]

Evan Pivnick: When we look at the EU, they are among the countries, the regions, the trading blocs, that are most rapidly trying to embrace electrification, and they're doing so quickly in response to not one but two global conflicts that have fundamentally changed what they think they can rely on when it comes to their energy supply chains.

That rapid shift has all sorts of short-term impacts. They're out looking to meet short-term needs across a wide variety of energy resources, but long term, these conflicts are one of the drivers in the EU pushing for increasing the ambition to develop homegrown energy resources. That's based in renewables. That's looking at battery storage, which, to the previous discussion, Canada's falling behind on because it's seeing widespread deployment globally that unlocks renewables to an even further degree.

I can't speak to the specific subsidization in Germany's electricity sector, but certainly the focus on electrification and removing their exposure to volatile fossil fuel prices is a priority.

[*Translation*]

Richard Martel: In a scenario of sharply rising energy demand in Canada, how can we think about excluding oil and natural gas from the energy portfolio over the next 40 years?

[*English*]

Evan Pivnick: The way I would put it is that Canada should be doing everything it can to maximize the share of new energy demand that it uses renewables, battery storage and other clean sources to meet. That will allow us to be more secure when it comes to building a wind turbine, when it comes to solar power and when it comes to hydro. Those are resources that are accessible here. Those aren't reliant on any global supply chain for the actual power generation aspect. This is a key difference between the clean and conventional supply chains. For conventional, you need the constant import of fuel. When it comes to clean, once the technology is there, it stands for 20 years.

It's not a question of outright removal of every last bit. Natural gas will remain a player in our electricity system, especially in different regions, increasingly in a backup role, but we really want to take advantage of low-cost clean options that can lower electricity bills for Canadians as much as possible.

[*Translation*]

Richard Martel: Thank you.

Mr. Côté, in the microgrids that combine diesel, wind power, solar power and storage, what sources actually provide continuity of service during adverse weather conditions?

Frédéric Côté: Because the microgrids you're referring to are stand-alone power systems, they aren't connected to the national grid. Right now, stand-alone power systems in Canada rely mainly on diesel-generated electricity. The idea is to reduce the carbon footprint as much as possible, which means reducing the use of the diesel generator as much as possible, by making the most of available wind and sun, and by storing electricity when there's a surplus of power.

What the research shows us is that we can significantly reduce the use of diesel. Obviously, in the specific context of a stand-alone power system, you can't take advantage of interties with neighbours and the benefits of a larger geographical area.

That means diesel is still required to ensure stability and security, but the idea is to reduce the reliance on fossil fuels as much as possible and benefit from local energy sources, whether the wind or the sun.

Richard Martel: Considering the weather reality in Quebec, which regularly leads to periods of intense energy demand, is it realistic to have a grid based mainly on renewable energy?

● (1620)

Frédéric Côté: Currently, when you look at the situation in Quebec, you see that 97% of electricity generation comes from renewable sources, that is, a mix of wind, solar and so on.

When you look at the overall energy picture in Quebec, you see that fossil fuel energy still accounts for 55% of the total consumption, which is mainly due to transportation. From that perspective, I would say that there's an opportunity to reduce greenhouse gas emissions and the use of oil imports. It's interesting because when you look at the trade balance, imports of petroleum products are still a negative factor in the trade balance.

That means electrification is a way to reduce the use of fossil fuels and increase the use of renewable energy.

[*English*]

The Chair: Thank you, both.

Mr. Saini, welcome to the committee. You have five minutes.

Gurbux Saini (Fleetwood—Port Kells, Lib.): Thank you, Mr. Chair.

Thank you to the witnesses.

Being a British Columbian MP, I want to ask Mr. Pivnick a question about the northwest transmission line, which has been proposed as one of the major projects. It will be going to the area where we have a lot of critical minerals.

Could I hear your viewpoint on how, besides creating a lot of jobs, it will help what we're trying to accomplish in this process?

Evan Pivnick: I think we talked a lot previously about the interties between provinces, but “intra”, inside an individual province's transmission infrastructure, is just as vital. That transmission line unlocks an incredible opportunity in what's called the “golden triangle”, for those not from or living in northwest B.C. It holds significant opportunity to provide critical minerals and opens up new mines that have been on hold and looking for electricity for a long time.

As we talked about with the industrial electricity strategy, the ability to provide mines with electricity is one of the precursors to unlocking the investment in those mines. I've actually seen them standing up and being able to provide it. Transmission infrastructure is absolutely vital to seeing those investments move forward in B.C.

Gurbux Saini: The Government of Canada has announced one office, the Major Projects Office, to take care of the major infrastructure projects. Do you see that as a major step rather than having the provincial governments and several different groups trying to approve those projects?

Evan Pivnick: Thanks for the question.

I think it represents an opportunity to prioritize with finite resources and decisively move forward key projects. I think we would be highlighting the need for those projects to represent clean growth sectors for the economy, as we've mentioned.

From an energy exports perspective, it's the ability to make sure that what Canadians are increasingly able to bring to market is what our trading partners are looking for, especially as we seek to diversify trade beyond the United States. That's where electrification is really taking off.

Gurbux Saini: In a recent trip to India, we made some decisions on nuclear energy technology to be sold to India. Do you think that will help the world clean up the coal that has been talked about as one of the difficulties we are facing?

Evan Pivnick: Nuclear energy certainly represents one of the key areas where Canada has competitive advantages. We have expertise and can be exporting not just goods, but services and the ability to stand up, manage and operate these facilities. I think that's going to end up being one of the key opportunities here. As with any of the clean options, it's no silver bullet. It alone will not answer the need.

When it comes to low cost, we really should...domestically but also when we look at what the rest of the world is deploying, like renewables or battery storage. This is where countries are going to be looking to maximize because of the speed at which they can be stood up and the cost at which they can generate electricity. Looking at how we can play into those supply chains should also be a priority.

Certainly, nuclear has a role to play, especially from an energy exports perspective.

Gurbux Saini: I think that the Canada greener homes affordability program is being implemented by some provinces, but it's not something that is available across Canada. How can the federal government help so that this is made available throughout Canada and so that every province is able to take part in it?

Either one of you can answer.

● (1625)

Evan Pivnick: This goes back to the ability to ensure that Canadian households can take advantage of the cost savings from clean energy technologies. This will help drive manufacturing. This will help drive jobs in installation. This will build Canadian know-how and experience in this. This will also be a resource that can be increasingly leveraged by utilities to reduce costs elsewhere in the system.

From the federal government's perspective, it's about making sure that it is supporting electrified technologies. We should be looking at electric heat pumps as much as possible or, at a minimum, hybrid. That's going to be absolutely essential for many regions. That's going to be an opportunity.

The ability for the federal government to help ensure households can get over the upfront costs of the technologies involved so that they can take advantage of the cost savings of operating these systems is going to be absolutely vital.

The Chair: Thank you, Mr. Saini.

Thank you to our witnesses. That was a lively exchange between members of Parliament. We appreciate your being with us.

As Mr. Simard mentioned, we welcome briefs. We welcome additional information, if you'd like to submit it to the clerk.

With that, colleagues, we are going to break while we prepare for our next panel.

We'll suspend for five minutes.

● (1625)

_____(Pause)_____

● (1635)

The Chair: Colleagues, please take your seats. I've allowed a little more time for bonding because we have new members.

It's good to be back. We'll resume the meeting, as we have new witnesses. I'll welcome them on your behalf, colleagues.

From the Atlantic Hydrogen Alliance, we have Derek Estabrook, executive director, by video conference. From the Edmonton Region Hydrogen Hub, we have Brent Lakeman, executive director, also by video conference.

All witnesses, as I've said before, have conducted a mandatory witness onboarding test.

Let me make a few comments for the benefit of the new witnesses.

Please wait until I recognize you by name before speaking. I remind you that all comments should be addressed through the chair. You will each have five minutes for your opening remarks, after which we will open the floor to questions.

Mr. Estabrook, we're going to start with you. You have the floor for five minutes.

Derek Estabrook (Executive Director, Atlantic Hydrogen Alliance): Mr. Chair and members of the committee, I am Derek Estabrook, executive director of the Atlantic Hydrogen Alliance.

Thank you for the opportunity to offer my remarks about the role that low-carbon hydrogen exports from Atlantic Canada can play in Canada's energy export strategy.

Canada is fortunate to have an abundance of what much of the world needs, which is a diverse mix of clean and conventional energy resources. In the wake of recent energy shocks, including Russia's continued aggression in Ukraine and hostilities in Iran, energy security and supply resilience have become defining priorities for our European allies. They're looking for stable, reliable and long-term energy partners, like Canada.

This is our hydrogen moment. The global energy transition is accelerating, and our allies in western Europe are building the infrastructure to support growing hydrogen demand, such as ports, ammonia crackers, hydrogen pipelines and hydrogen fuelling stations. Atlantic Canada is well positioned to meet that demand. Our ice-free deepwater ports offer direct access to European markets. Our region is geographically closer to Hamburg, Germany, than to Calgary. Atlantic Canada has abundant onshore and offshore wind resources, and while we can't ship wind across the Atlantic, we can convert it into green hydrogen and its derivatives, such as ammonia, methanol and sustainable aviation fuel, which can be shipped. Decades of experience in offshore energy, hydro power and refining has built expertise and an industrial foundation that translate directly to the emerging hydrogen sector.

The policy environment in Europe is also beginning to align. Earlier this year, the European Commission approved a double auction mechanism, administered through H2Global, to support the production and export of renewable hydrogen, including hydrogen derivatives, from Canada to Germany. This approval unlocks matching support from the Government of Canada, bringing combined funding to over $600 million. The H2Global mechanism is designed to bridge the price gap between what Canadian producers need to make their projects financially viable and what European buyers are currently prepared to pay. The program is expected to kick-start our green hydrogen export sector and support up to 300 megawatts of hydrogen electrolysis capacity in Canada.

Also, Germany's parliament recently amended its GHG reduction legislation to set binding quotas for renewable fuels, including hydrogen and its derivatives, in the transportation sector. This creates real, durable demand, and Canadian hydrogen exporters are really well placed to help close the gap between that demand and Germany's own domestic production capacity.

I also want to address what some may see as slowing momentum in the hydrogen sector. While the pace of hydrogen development has moderated recently, the direction hasn't changed. The International Energy Agency's 2025 “Global Hydrogen Review” confirms that the number of projects reaching a final investment decision grew by nearly 20% last year, installed electrolyzer capacity has increased ninefold since 2021 and global hydrogen investment has grown from under $500 million in 2021 to nearly $8 billion in 2025 and is projected to grow fivefold by 2030. This trajectory mirrors the early scaling curves of solar, wind and lithium-ion batteries, technologies that also required sustained government support before achieving commercial viability.

I think we have to remember that lesson. Green hydrogen is an immature but strategically important sector that requires targeted, sustained policy support during the critical early development years. There are several large-scale green hydrogen projects here in Atlantic Canada that are focused on exporting hydrogen and derivatives to western Europe, and they're at various stages of development across our region. The funding from the upcoming Canada-Germany hydrogen auction is an important start, but to move shovel-ready projects to final investment decision, sustained support programs are necessary.

● (1640)

In conclusion, the hydrogen export opportunity is real, and the conditions for success are well aligned. We have favourable geography, abundant resources and willing producers and offtakers on both sides of the Atlantic. Now we need the policy and funding support to bring them together.

Thank you.

The Chair: Thank you, Mr. Estabrook.

Mr. Lakeman, you're now up for five minutes.

Brent Lakeman (Executive Director, Edmonton Region Hydrogen Hub): Good afternoon, and hello.

My name is Brent Lakeman. I'm the executive director of the Edmonton Region Hydrogen Hub, and I would like to thank the standing committee for this opportunity to contribute to your deliberations on the topic of energy exports.

While I recognize the scope of the committee is significantly broader than just the exports of clean fuels like hydrogen, it is important for the committee to have an appreciation of the challenges and opportunities related to the export of hydrogen to global markets, which were identified in the Canadian hydrogen strategy.

The Edmonton region of Canada plays a very strategic role in Canada's hydrogen economy. Our region has been producing hydrogen for heavy industry applications, like oil refining and upgrading, chemicals production and fertilizer production, for over 30 years. The Edmonton region is home to world-leading, low-carbon hydrogen production projects, starting with the Quest project, which was supported by federal and provincial governments more than 10 years ago.

Through projects like this, our region's leaders identified the opportunity we have to play a major role in the future hydrogen economy. Their vision positioned our region as home to Canada's first hydrogen hub over five years ago. Since then, the region has seen final investment decisions being made on some of the largest low-carbon hydrogen production projects in the world. These projects are enabled by Canada's low-cost natural gas; our carbon capture, utilization and storage infrastructure; and our experienced and innovative workforce.

The Edmonton Region Hydrogen Hub looks to build on this track record by creating the conditions to accelerate the use of hydrogen across a diverse range of sectors, including commercial and municipal fleets, heat and power opportunities and emerging industries. The hub serves as an ecosystem convenor, a systems integrator and a policy advocate.

Our partners are the economic development agencies from the region, Alberta's Industrial Heartland Association and Edmonton Global, but also the Edmonton International Airport, which is advancing hydrogen use across the airport ecosystem, and Alberta Innovates.

Our mandate is to build enabling conditions for increased hydrogen use within the Edmonton region across a range of sectors, and we also work closely with our partners to connect domestic producers to export markets. The hub realizes that to de-risk future investments in hydrogen supply and demand, exports need to be part of the equation, just as domestic use of hydrogen is critical for de-risking international export projects.

Several hydrogen companies have also explored the production of hydrogen for export markets. Over the past seven to eight years, the focus has been on the conversion of hydrogen into low-carbon ammonia, or blue ammonia, to serve the Japanese and South Korean markets. These projects were being explored with key players from these markets, such as Japanese trading houses, as well as power production companies looking to blend ammonia into their generation facilities in Asia.

These ammonia export projects, however, have not proceeded due to the complexities and costs associated with transporting ammonia safely out of our region by rail to the port of Prince Rupert. Ammonia, however, is just one pathway for export of our region's clean fuels. Leading global companies, like Kawasaki Heavy Industries, believe liquid hydrogen has several advantages over other clean fuels like ammonia, and it's developing the technologies needed to ship liquid hydrogen across the Pacific Ocean. It's also developing the technologies needed to move liquid hydrogen from the point of production, like the Edmonton region, to the Pacific coast ports.

In fact, just last week at the Canadian Hydrogen Convention in Edmonton, Kawasaki entered into a memorandum of understanding with the Edmonton Region Hydrogen Hub, Alberta's Industrial Heartland Association and Edmonton Global to explore how we can put in place the critical infrastructure to get some of the world's lowest-cost low-carbon hydrogen to the markets that need it the most. Realizing this opportunity, which is intended to serve the post-2035 Japanese market, requires that we start preparing today.

Today, we're realizing the benefits of the LNG investments that started in the 1980s to build the specialized ships and port infrastructure needed to move this product. Establishing the necessary hydrogen supply chain infrastructure from point of production to our export terminals will also take time and require strong and coordinated support from government and industry.

Before concluding, I would like to highlight other ways that hydrogen hubs can support the export of cleaner fuels to global markets.

While we need to get our products to export terminals on the west coast, the east coast and, eventually, even to northern ports like Churchill, we also need to ensure our shipping of products to these ports by trucks and by trains is undertaken in a low-carbon manner. The Edmonton Region Hydrogen Hub is working with other hubs to make these connections to ensure our transportation corridors can utilize hydrogen and other clean fuels. We've launched a western Canada hydrogen corridors initiative to do just that. The hub is working with global leaders like Hyundai Motor Company to bring its fuel-cell truck technologies to our major transportation corridors.

We're working with Canada's CPKC to show that Canada's Ballard fuel cells can be used to decarbonize freight rail, and we're bringing hydrogen-diesel dual-fuel technologies developed by Edmonton-based Diesel Tech Industries onto Canadian highways, offering an innovative and low-cost alternative for getting hydrogen used by our transportation fleets.

● (1645)

In closing, Canada is being identified by leading hydrogen-consuming nations, like Japan and Korea, to be a supplier for their energy needs. Today and in the future, hydrogen will play a key role in global market segments like transportation and heavy industry. It will also play a role in how we get our products across Canada so that they can be sent to export markets with a low-carbon intensity footprint.

Hydrogen hubs play a key role in helping to de-risk hydrogen projects, identify future demand and ensure that Canada is working to advance critical enabling infrastructure.

I appreciate having the opportunity to speak to the standing committee and would be happy to answer your questions.

The Chair: Thank you, Mr. Lakeman.

Now, we will begin our round of questions for the second panel.

Mr. Rowe, we're going to start with you for six minutes.

Jonathan Rowe: I'll start my first question close to home with Mr. Estabrook.

German officials came to Newfoundland a few years ago, and Canada and Germany jointly pledged $600 million to a wind turbine and hydrogen project. Lately, I've seen some CBC articles that say they're waiting on more federal funding decisions for exporting hydrogen.

Do we need federal funding decisions from this government, or is Germany also going to be pitching in? Should the Canadian government be subsidizing energy for other nations? It seems a bit backwards to me.

● (1650)

Derek Estabrook: Thank you for the question.

First, I'll clarify something. I believe the $600 million you're referencing is the money that Germany and Canada committed to the H2Global auction. This is a two-sided auction process. Back in 2024, the German government and the Canadian government each committed approximately $300 million in funding to essentially be a contract for difference.

Project developers for green hydrogen export in Canada will be able to bid in, and the suppliers that bid the lowest price will be successful in that auction. Then, a second auction will happen in Germany for customers for that green hydrogen or its derivatives, and the customers who bid the highest amount will be successful. The money in the $600-million pot will be used to bridge that gap between the lowest supply price and the highest demand price. That is the way the auction is intended to work.

There was a second part to your question. Should Canada be subsidizing energy that's going to Germany? That's an important question. I would frame this by saying that this money will kick-start the green hydrogen export sector in Canada. It's an important investment to get the early market developed. Once the market gets going, the goal is for it to become self-sustaining. Like the wind, solar and battery industries, it's hard to get these markets going quickly enough and scaling up rapidly enough to become self-sustaining without that initial support.

Jonathan Rowe: We see that in other industries like mining and oil and gas. Where I see the difference is that—I'm hoping someone's going to prove me wrong—I don't think we're getting any royalties from the hydrogen that's produced from wind turbines or solar farms. We're not getting any royalties from that, as a federal government, to pay or bid down those initial incentives. I don't understand how the Canadian taxpayer is going to gain anything by subsidizing an industry that's providing energy to foreign nations. I'll leave that there.

I have a question a bit farther away from Mr. Lakeman's region. I went to the energy expo in Edmonton, and there was a lot of excitement. Big things are happening with hydrogen in Alberta. I saw diesel trucks that had diesel engines converted to use hydrogen. There was a lot of other stuff there for that. It was amazing.

I'm always surprised that the province with the most oil and gas, and the most natural gas, has used its resources to be the leader in hydrogen, and other provinces in Canada, which often scream the loudest about the environment or scream the loudest against oil and gas, against the oil sands, have not done what you have done in Alberta to lead in that way. To me, that's a bit hypocritical. I think it's amazing that you have done that.

I'd like you to expand on where you see yourself in the next few years.

Brent Lakeman: We're in a very fortunate position in our part of Alberta, particularly the Edmonton region. We provide the vast majority of Alberta's hydrogen that's being produced. Alberta is by far the largest producer in Canada when you look at the industries that it supports.

Our advantage is that we have a large industrial offtake right there. That's the starting point. These are industries that need hydrogen for their processing and now, increasingly, low-carbon hydrogen coupled with carbon capture and storage opportunities. We have experience now. We've been doing it for 10 years at a commercial scale, and not many parts of the world can say that. We're very proud of that, and we're continuing to improve.

The other part of it is that technologies that were put in place 10 years ago are wonderful, but they're improving. We're doing better and better. Now it's about unlocking new markets for the hydrogen. That's where we are. There are some challenges, of course, in how we unlock those markets and new sectors such as heavy-duty transportation. What is the driver for it? We're spending a lot of time looking at that and at what the role of government is as we advance hydrogen use applications.

The point is to advance this industry. Canada has a huge opportunity, certainly my part of Canada does. What's that coordinated process? We have federal and provincial incentives that are very strong in Alberta, but we also need certainty. What does that carbon market look like as you advance hydrogen use in new sectors? It is somewhat dependent on carbon policies and things like the Canada-Alberta MOU. That plays a critical role in moving things forward so that we have the certainty and we understand the value of carbon credits as we move forward.

We see huge opportunity for Canada and huge opportunity for Edmonton, not just in heavy-industry applications but as we look at new applications and new areas like data centres and defence.

● (1655)

The Chair: Thank you, Mr. Rowe.

Thank you, Mr. Lakeman.

Mr. Hogan, you have six minutes.

Corey Hogan (Calgary Confederation, Lib.): Thank you, Chair.

Mr. Estabrook, I know you said that your region is closer to Hamburg than Calgary geographically, but on behalf of Calgarians, let me just say that we hold you close and we feel grateful to share so many bonds with your region. Of course, one of those bonds is that both of our regions have immense opportunity for hydrogen.

Canadians have an abundance of energy options. There's not going to be one winner in the energy conversation. I think that is something we hear time and time again at this committee and is something I certainly agree with. There will be different solutions for different use cases.

Mr. Lakeman began to go down this road. I'd like to ask you both this question, and maybe we'll start with you, Mr. Estabrook. For our report, I wonder if you can expand on some of the use cases hydrogen is best situated for.

Derek Estabrook: Thank you, Mr. Chair.

I assume that you're asking about use cases both in Canada and in export markets.

Corey Hogan: Absolutely. Because this is an export study, I might even be export-focused for the purposes of this conversation.

● (1700)

Derek Estabrook: The good news is that I think the best applications in other parts of the world are the same applications as in Canada. I think any jurisdiction, globally, that has ambitious emission reduction goals is going to need other sources of clean energy besides electricity.

One of the sectors that is a best use case for low-carbon hydrogen and its derivatives is heavy transportation, as Mr. Lakeman mentioned. Hydrogen fuel cells provide long-haul trucks with the amount of torque, the range and the short refuelling times that are required for those long distances, as well as other types of heavy long-haul transportation. You'll think of trains and marine vessels—especially large ones. Once you get beyond the range of what you can realistically achieve with a lithium-ion battery, hydrogen fuel cells become very important. That's one sector.

A little bit further down the road is the aviation sector. While it may be possible to decarbonize some small, short-haul flights with battery electric technologies, for long-haul flights—think across the ocean—we're likely going to need some combination of sustainable aviation fuel that is made from hydrogen and/or fuel cells. There's actually an organization in Canada called H2CanFly that has support from several large players in the aviation sector. It's doing work in that area right now to figure out how to decarbonize aviation.

Another important sector is industrial applications, especially heavy industry that needs high temperatures. Whenever you need combustion to make things like steel, bricks or aluminum, it's very difficult to do it with electricity. You really need to combust something. That's why natural gas or even coal is important in that sector. In the long term, you can burn green hydrogen or blue hydrogen for those types of industrial facilities.

Corey Hogan: I want to give Mr. Lakeman a chance to get in.

Also, I'll congratulate you, Mr. Lakeman, while I have the mic, on the MOU with Kawasaki. I think it's another example of how it's an exciting time to be in energy in Canada right now.

I'm wondering if you can answer that question, and maybe also throw in your view.... You talked a bit about markets and how we can serve markets. What are those markets looking for? Are we competing on price? Are we competing on carbon? How do you see that evolving in the future?

Brent Lakeman: Sure, I'm happy to.

Mr. Estabrook gave a great overview of the key end-use sectors for hydrogen. I can't add a lot. We certainly have been starting with heavy industry—again, refining chemical production, where it's already been used for decades. Then we'd look at new sectors and industrial sectors as well. You mentioned sustainable aviation fuels. Glass and cement are a couple of other ones. We don't necessarily have.... We have a cement plant that's decarbonizing, but not through hydrogen. It's through carbon capture and storage. In other jurisdictions, that may be the case, like with glass manufacturing as well.

A couple that didn't get mentioned.... You may have mentioned rail. Certainly rail has been a big success story here with the CPKC locomotive program. It started in Edmonton and Calgary, expanded across British Columbia and I think it's now expanding into the United States. That's an ideal heavy-duty transportation application for hydrogen that we can build off of for sure.

There were a couple that weren't mentioned. We know that the defence sector is looking at its own energy requirements, and it thinks hydrogen can play a very significant role. There are some unique applications around drone technologies and other military applications. I think some of the Canadian hydrogen expertise could well be applied in defence. Data centres still seem to be a little on the expensive side for using hydrogen, but I think there may be some niche applications for hydrogen with data centres, particularly for the backup power requirements that a data centre may have. I think those are some additional ones to round it out.

Your question was on the markets internationally. We're certainly focused mainly on the Asian markets—really, Japan and South Korea. They certainly want a secure, stable provider. The main comment I would make is security of supply.

The Chair: Thanks so much.

[*Translation*]

Mr. Simard, you have the floor for six minutes.

Mario Simard: Thank you very much, Mr. Chair.

Mr. Estabrook, I'm going to start with a small friendly correction. In your answer earlier, you said that industrial sectors need hydrogen in their processes. You highlighted the aluminum sector by saying that electricity doesn't make it possible to produce heat. Where I'm from, in Saguenay—Lac-Saint-Jean, we have been making aluminum with hydroelectricity for more than 100 years. The electrolysis process happens mainly with aluminum. I'm noting that in a completely friendly way.

I would like to tell you that I'm open to the use of hydrogen. I had many discussions about this with the former minister of energy and natural resources, Mr. Wilkinson. I remember very well that we even had a meeting with the people from Siemens, who told us that the governments might be ready to accept a higher production cost by providing subsidies to pay for it. That may be a good deal. You explained your auction method. The market has to be developed properly, so I completely understand that.

However, the people from Siemens said that the governments would never want to take on one thing, which was the technological cost. The people from Siemens told us this because they didn't believe in the possibility of making hydrogen with carbon capture and storage strategies. You will understand what I mean. The idea would be to produce hydrogen from gas, and there would be a carbon capture and storage strategy alongside it. They told us that if the production cost and the technological cost were combined, the total cost would be too high for it to become a worthwhile energy molecule.

I'd like to hear your comments on that specifically

[*English*]

Derek Estabrook: Thank you for the question.

I don't want to put Mr. Lakeman on the spot.

Your question was specifically about carbon capture and storage associated with blue hydrogen production. That's not an area where Atlantic Canada has had much focus. Our focus has been almost exclusively on the production of green hydrogen through electrolysis.

● (1705)

[*Translation*]

Mario Simard: I'm sorry, I'm off my game.

Mr. Lakeman, I'd like to let you answer that question. Forgive me, I have a cold, and I'm not all there.

[*English*]

Brent Lakeman: I'd be happy to try.

Carbon capture and storage or blue hydrogen is how we're seeing not all of the hydrogen produced in our region but the significant majority of it. That would probably be considered the most low-cost way to get to a low-carbon hydrogen outcome.

We're very fortunate to have world-class geology in the western Canada sedimentary basin. I have been involved in studies that have looked at other parts of Canada and storage potential, which does exist. It exists in Ontario and parts of Quebec—that's my understanding—as well as Atlantic Canada, but it doesn't necessarily have the maturity and all the characterization that has been done. That's really important as we move towards these projects. It's about having a deep understanding of the geology. You're going down two kilometres and having it actively characterized. That's the starting point.

We're seeing some technology innovation, as I mentioned. We're able to understand the geology and how carbon capture can work using AI technologies, for example, to continue to drive down the cost.

I think this was mentioned earlier: What the market is looking for is low-cost hydrogen. They're somewhat agnostic on whether it comes in blue, green or any other colour of the rainbow. They are looking for carbon reductions.

[*Translation*]

Mario Simard: Thank you very much.

Mr. Estabrook, I'd like to go back to the previous discussion you had.

I see two main challenges: infrastructure and exports.

The people I talked to about hydrogen said that, first of all, the best solution was to think about it in terms of short loops. It would be used in a network very close to where it would be produced.

Before we think about exporting, shouldn't we think about developing infrastructure to use hydrogen in short loops?

[*English*]

Derek Estabrook: Thank you, Mr. Chair.

You are correct on the cost. To transport hydrogen is quite expensive and using it as close as possible to the source of production is optimal. I would also say, though, that exporting hydrogen and using it domestically are not mutually exclusive. I think there are opportunities to do both successfully.

I will reference the Strait of Canso area in Nova Scotia, which is very close to the proposed location for the EverWind fuels green ammonia export project, as well as the sustainable aviation fuel project of Nova Sustainable Fuels. While these projects are focused on producing hydrogen derivatives for export, once they are in production there are local industries that can also use those sources of hydrogen.

Specifically, the Strait of Canso region has just completed a feasibility study to determine how hydrogen and its derivatives can be used in that local area. In the Strait of Canso, there's a coal-fired power generating station. There's a wallboard plant. Port Hawkesbury Paper has a large pulp and paper facility there. They are all very large energy users that could really benefit from that hydrogen. Frankly, they would benefit from a lower cost to use that hydrogen than that same hydrogen that's converted to ammonia and then exported.

The Chair: Thanks to both of you.

[*Translation*]

Mr. Martel, you have the floor for five minutes.

Richard Martel: Thank you, Mr. Chair.

Mr. Estabrook, under the current economic conditions, would hydrogen really become competitive without massive financial support from taxpayers?

[*English*]

Derek Estabrook: Thank you for the question.

It depends on what you mean by “compete”. If you're asking if it can compete with legacy fossil fuels, either oil or natural gas, I think the answer to that question in the short term is no. However, for jurisdictions that are focused on rapid decarbonization, we can only get so far with electricity directly. If we want to decarbonize sectors that are difficult to decarbonize with electricity, we're going to have to look at other options, and hydrogen and its derivatives become the best option for some of these other sectors.

Secondly, I would say that in many parts of the world, the 80% of countries in the world that are dependent on imported fossil fuels, energy security and resiliency are almost more important than decarbonization for them right now. They are really aggressively looking at how they can either diversify away from imported fossil fuels or, over the longer term, transition away from them.

Similarly, they're not so much looking at what the cost is of a barrel of oil or a gigajoule of natural gas. They're saying that if those aren't viable options, either for energy security reasons or for emission reduction reasons, they're really only looking at what is the best low-carbon option. In many sectors, hydrogen and its derivatives are their best option.

● (1710)

[*Translation*]

Richard Martel: Canada has signed hydrogen export agreements with Germany that have fairly close deadlines, but no significant volume of hydrogen has been delivered.

What are the main obstacles that explain this discrepancy between the announcements and the reality?

[*English*]

Derek Estabrook: Thank you for the question.

Broadly speaking, the biggest obstacle is that the key markets for green hydrogen exports from Atlantic Canada are in western Europe. Countries such as Germany, the Netherlands and Belgium want green hydrogen, but not at any price.

Price has become a key barrier, at least in the short term, and that's specifically what the Canada-Germany hydrogen auction is intended to address by enabling large offtakers in Germany to purchase hydrogen derivatives at a cost they can justify. The Canada-Germany hydrogen auction through H2Global is really a critical policy mechanism to kick-start the sector and get it going.

[*Translation*]

Richard Martel: Does that call into question the viability of export chains in the short term?

[*English*]

Derek Estabrook: Thank you for the question.

Like most emerging energy sectors, it requires support to get off the ground because the economics are challenging until you achieve economies of scale and the technology gets better. That is where we are with the hydrogen sector today. It's where the wind and solar industries were 15 or 20 years ago. I don't see this sector being any different. In order to get costs down, we have to be prepared to start relatively small and provide the support required to make projects economical. As we start to scale, the costs will come down.

Also, it's important to remember that, for green hydrogen production, about two-thirds of the cost is the cost of renewable electricity. As the cost of onshore wind, solar and other types of renewable energy comes down, the feedstock that goes into hydrogen production also comes down, which automatically makes the cost of green hydrogen production significantly lower.

The Chair: Thank you, Mr. Estabrook.

Ms. McKelvie, welcome to the committee. You're up for five minutes.

Jennifer McKelvie (Ajax, Lib.): Thank you, Mr. Chair.

When I was put on the natural resources committee, my first thought was that I hoped we talked about hydrogen. Lo and behold, on day one, we're talking about hydrogen. I am very excited about the possibilities around that, and about having witnesses here from the east coast specializing in green hydrogen and from western Canada specializing in blue hydrogen.

I will note that I think it's unfortunate that we don't have anybody from the critical minerals industry in Ontario or the nuclear industry who can speak to that white-type of hydrogen produced by radiolysis, which we have both in the reactors and deep inside the earth. Hopefully, we can get some submissions written in that regard.

With that, Mr. Estabrook, you did a great job summarizing some of the potential uses of hydrogen in industry. In terms of the pathways to net zero, we know heavy-duty vehicles and airplanes are going to be some of the hardest to decarbonize and move forward on, so there is a lot of opportunity there.

I am really hoping you can speak, big picture, to the opportunities we have for green hydrogen in Nova Scotia and throughout the Atlantic region in particular alongside the wind west project.

● (1715)

Derek Estabrook: Thank you for the question.

Are you asking about Nova Scotia specifically, not other regions of Atlantic Canada?

The Chair: Mr. Estabrook, we're going to pause you for a second there. We're having a little audio problem.

Can you unplug and plug in your mic?

Thank you, colleagues, for your patience.

Go ahead. We stopped the clock.

Derek Estabrook: The Province of Nova Scotia, like the federal government, has a target to achieve net-zero emissions by 2050. In order to achieve that target, we will have to decarbonize almost every energy use sector, including the ones we've talked about. We also have heavy transportation. We have trains. We have a significant marine sector in Nova Scotia, especially in the fishing and seafood sectors. Many of those larger commercial fishing vessels will be very difficult to decarbonize with batteries alone for a whole bunch of reasons that I won't get into right now. It's safe to say that we will need other forms of low-carbon energy. It could be hydrogen fuel cells. It could also be low-carbon liquid fuels that are derived from hydrogen, such as green methanol, which would be a very good option in a container ship or ferry. Those sectors will be important.

While we don't have a significant industrial base in Nova Scotia compared with some other parts of Canada, we do have some heavy industries here. They will also need to decarbonize. The energy applications that need to be decarbonized in Nova Scotia, the rest of Canada and globally are generally the same. The only difference is that Nova Scotia is a smaller province, so the magnitude is a little bit lower. In some ways, that makes Nova Scotia an attractive place to start. For example, we can develop a relatively small heavy-trucking hydrogen corridor and it doesn't have to cost a lot of money.

I want to come back to a point that Mr. Lakeman made about the defence sector. The defence sector is very important in Nova Scotia. It's home to the east coast navy. It will be home to the new Canada patrol submarines. Those submarines, when they're operating underwater in stealth mode, will operate on hydrogen fuel cells. Nova Scotia will have to start developing the hydrogen supply chain that will be required in the defence sector. That as well is an important opportunity here.

Jennifer McKelvie: Could you speak to the production of hydrogen and the opportunities that are available through Nova Scotia, both domestic as well as export, in particular with new projects like wind west and other sources of electricity you have coming online that can help you ramp up this production?

● (1720)

Derek Estabrook: In the short term, I'd say over the next 10 years or so, I think almost all the renewable electricity used in the production of green hydrogen for domestic use and export will come from onshore wind, not offshore wind. That's purely economic. You can produce onshore wind for $60 or $70 per megawatt hour. The cost of offshore wind will likely be two or three times that cost. Given that renewable electricity is the number one input cost in green hydrogen production, I think it will be 10 or 20 years or more before it's economical to produce green hydrogen here with offshore wind.

The Chair: Thank you, both.

[*Translation*]

Mr. Simard, you have the floor for two and a half minutes.

Mario Simard: Thank you very much.

I want to go back to the conversation we were having earlier.

Mr. Estabrook, you just said that we need to think about these energy technologies over the long term. Yes, that's the case. I completely understand that.

When hydrogen is made, there's still a loss of energy. That means a lot of time will go by before it's possible to deploy enough wind turbines to produce electricity to make green hydrogen.

Based on the discussions I have had with other people, I believe that, in the meantime, the key is to develop the market. If we want to develop the market in the short term, we have to have some form of infrastructure, even if we're talking about short loops.

If the government were to prioritize something, what type of infrastructure should be developed as quickly as possible to facilitate the deployment of hydrogen?

My question is for both of you, Mr. Estabrook and Mr. Lakeman.

[*English*]

Derek Estabrook: You're raising a really important challenge in that, unlike electricity where the value chain has existed for 100 years or more, in the hydrogen sector, generally speaking, at least in Atlantic Canada, the hydrogen supply chain does not exist yet. In order to develop a project, at minimum you need hydrogen production. Then you need a way to transport the hydrogen from the point of production to the point of end use. We've already talked about the importance of trying to make that distance as short as possible. If it's going into the transportation sector, then you need refuelling stations to put the hydrogen into the vehicles, and then you may also need hydrogen storage.

It's complex and expensive, and you have to build every link of that value chain simultaneously. You can't put a truck on the road using hydrogen either in a dual-fuel vehicle or in a fuel cell until you build that entire value chain. It is one of the biggest challenges the sector faces, globally and here.

The Chair: Thank you.

Mr. Ruff, welcome to the committee. You have five minutes.

Alex Ruff (Bruce—Grey—Owen Sound, CPC): Thank you, Chair.

I have a question for both of you.

A couple of years ago, I was meeting with the Canadian Hydrogen Association. I'm assuming you're both members. One of the main asks in 2024 was for an update on the national hydrogen strategy. When I look online, the last thing I can find is from two years ago, the progress report.

Considering the rapid changes and evolution in your sector, are you still seeking any clarity from the Government of Canada or any updates on the national hydrogen strategy?

The Chair: You can both answer.

Brent Lakeman: I would be happy to start.

It's very important that we have supportive federal programs. We certainly work closely with the Canadian Hydrogen Association on their submissions. One of the points that I think we've made in the past has been that we focus a lot on some of the production incentives, which are certainly important, but it's still the early days. We're working to develop markets, including being ready for the export markets, but making sure we have demand-based incentives as well for these earlier projects. In some cases, that might be much less costly to government, because it is very much the early days, but we do still need some support, whether it's the trucking corridors to use the hydrogen fuel cell or dual-cell vehicles, or other end-users.

I think that's going to be one of the messages. We have great incentives today, but sometimes they're a little more focused on the production side. We also need to focus on the end-use side, because the benefits of production don't always get passed through to the end-user, as we've seen in the transportation sector.

● (1725)

Derek Estabrook: I would add that the strategy should more explicitly reference the export opportunity and clarify that. We talk a lot about hydrogen, but from an export standpoint, it's really a feedstock that gets converted into ammonia, methanol or sustainable aviation fuel. The strategy should clearly outline the role of those fuels.

I don't believe that the hydrogen strategy referenced the defence sector or the important role that hydrogen can play in energy security at all when it was developed. Those important opportunities have evolved significantly over the last couple of years.

Alex Ruff: Thank you.

I'll turn to you now, Mr. Estabrook, specifically, on green hydrogen. I have Hydrogen Optimized in my riding. I'm assuming you're aware of who they are. There's huge potential for that organization to be a world leader with their RuggedCell water electrolysis system, up to the gigawatts scale. One of the challenges obviously with green hydrogen is the electrolysis process and the amount of energy you need to produce green hydrogen.

You talked about wind. The last time I talked to that company, they were talking of potential partnering opportunities down on the east coast, because you can turn that into ammonia and transport it, and that basically stores it.

Can you speak a little bit more about the energy requirements from not only wind but nuclear as well? In my neck of the woods, we have the Bruce Power nuclear facility. The problem with nuclear energy is that they're producing it all, but again, how do you store it? I think converting it is an option. Where are we sitting on this?

Derek Estabrook: From an energy standpoint, you need 50 to 60 kilowatt hours of electricity to produce one kilogram of hydrogen through electrolysis. Where those kilowatt hours of electricity come from doesn't matter. An electron is an electron. Whether that electron is produced from coal, nuclear, wind, solar or hydro, it all works the same in the electrolyzer.

The challenge is that if you want the hydrogen to be clean, the electricity has to be clean. It can be wind. It can be solar. It can be hydro. Nuclear is also another interesting option because it is baseload power. Using any surplus nuclear power production capacity, especially late at night, could be a very attractive option in the provinces that have that available as baseload power.

The Chair: Thank you.

Mr. Guay, you're going to wrap us up with five minutes.

Claude Guay: Mr. Lakeman, the spring economic update proposed making enhanced oil recovery an eligible use under the carbon capture, utilization and storage ITC. Recognizing that, in clean hydrogen carbon intensity calculations, how does this change your hub's project mix or economics if you're taking that into consideration? Can it make your activities even more financeable or viable? Can it help Canada overall in being more competitive?

Brent Lakeman: I think the changes to allow for enhanced oil recovery will be a positive net impact on the sector as it moves forward, certainly for the CCUS sector. The "U" is the utilization. Having a revenue stream really will support these projects, because one of the challenges that we've seen has been that you need that carbon credit value to be up to that significant level, probably over $100 or over $130. If you can achieve some additional revenue stream from the utilization and if that could be put towards the overall project economics, that's a good thing.

The hydrogen projects that are under construction currently in our region are using CO2 hubs. Those are not EOR hubs. Those are for straight CO2 storage, so I can't comment on whether any of these recent developments will change the strategies of those hydrogen companies to work with those hubs for the long-term storage. Again, I think with EOR demonstrating that CO2.... Some of it does get recycled, but ultimately, if we can store that in that geological formation during and after the EOR project, then it will have a very positive outcome.

● (1730)

Claude Guay: We can end with a question for both of you. Part of our automotive strategy included $1.5 billion for the charging and hydrogen refuelling infrastructure initiative, and that includes the building of additional hydrogen charging stations. Do you feel that this sends a signal that the Canadian government is serious about hydrogen and the increasing demand for it and will help us become a serious hydrogen producer?

Mr. Estabrook, do you want to start?

Derek Estabrook: Yes. In order to deploy trucks or other commercial vehicles like buses with either hydrogen fuel cells or dual fuel engines, you need the refuelling infrastructure. You need those stations.

What's interesting about hydrogen is that the best applications are in heavy transportation, not in passenger vehicles or light-duty vehicles. The easiest way to start is with heavy trucks and buses that return to base at night. You think of a transit bus. It's operating on an urban route. They fuel up in the morning. They're out on the route all day. They come back at night to the same place. You only need one fuelling station for that. It's the same as heavy trucks that have a route and then come back to a depot at night.

Refuelling those types of heavy transportation vehicles is a lot more feasible than trying to build a network of fuelling stations from coast to coast, as we're experiencing with battery electric vehicles as well. It's not hard to do, but it's really complicated.

The Chair: Let's go to Mr. Lakeman. He has less than a minute to respond.

Brent Lakeman: Complicated was the key word there. I think there's a little more complexity sometimes with hydrogen, because it is not as established as the electrification system. When you think about what needs to be put in place for refuelling infrastructure, it may just be the station, but it may also be that the hydrogen is produced on site or that it may need to be moved a distance. There are some additional costs there. There's more complexity with more organizations and more companies that have to be pulled together. I think we need to recognize that in the early days, supports need to be.... Maybe it's somewhat different. I think it's important that it's included, but we also need to understand that it may take a little more work to get there.

The Chair: Thank you, colleagues.

A big thank you goes to our witnesses. It was an excellent panel; I think everyone will agree. It's everything you wanted to know about hydrogen: blue, green and white. There is pink and grey, I understand.

Colleagues, I want to give the analysts a shout-out. You may have noticed that we've started to group witnesses and group topics, so we get the benefit of witnesses like we had today. Frankly, I think the whole was more than the sum of the parts.

We thank you. Again, we welcome briefs or any other information that you want to pass on to the committee. Thank you on behalf of the committee.

That concludes the panel, colleagues, but we have one more item that we have to approve. It's $17,100 for the current study. I understand it's because we've been eating a lot.

A voice: It's also sending headsets and inviting witnesses.

The Chair: These are just costs we've incurred because we've had a couple of meetings. Do I have your concurrence, colleagues?

Some hon. members: Agreed.

The Chair: Thank you.

With that, I will adjourn the meeting.