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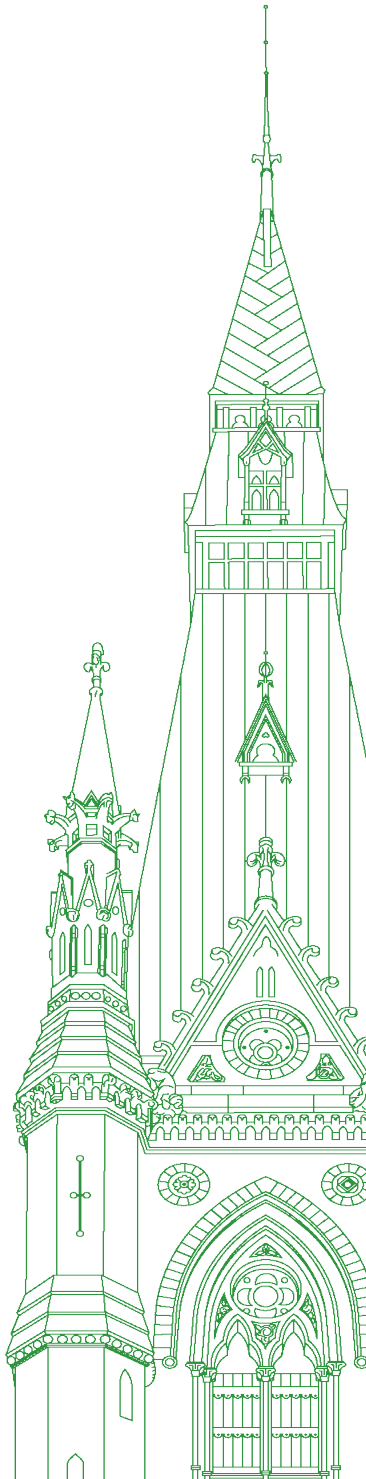

Chair: Mr. John Aldag

Standing Committee on Natural Resources

Monday, April 25, 2022

● (1530)

[*English*]

The Chair (Mr. John Aldag (Cloverdale—Langley City, Lib.)): Good afternoon, everyone.

I'd like to call this meeting to order.

Welcome to meeting number 17 of the House of Commons Standing Committee on Natural Resources.

Pursuant to Standing Order 108(2), the committee is continuing its study of creating a fair and equitable Canadian energy transformation.

Today is our second meeting with witnesses on this study. Note that until to 4:30 today we'll be meeting in public to hear our witnesses.

The meeting is taking place in a hybrid format pursuant to the House order of November 25, 2021. Members are attending in person in the room and also remotely using the Zoom application.

I'd like to take this opportunity to remind all participants that now that we're in session, taking screenshots or photos of your screen is not permitted. Today's proceedings will be televised and made available via the House of Commons website.

For those attending in person, we encourage everyone to wear a mask when they are away from the table, and we encourage anyone joining us on the periphery to also wear a mask.

As we get under way today, I'd like to ask that you wait to speak until I recognize you by name. For those participating by video conference, you need to click on the microphone icon to activate your mike, and please mute yourself when you are not speaking.

Interpretation is available for those on Zoom. You have the choice, at the bottom of your screen, of floor, English or French. For those in the room, you can use the earpiece that's provided to get the desired channel.

I remind everyone that all comments should be addressed through the chair.

For anybody who is new at committee, we ask that you talk at a normal pace so that our interpreters can keep up with the conversation.

If anyone in the room wishes to speak, please raise your hand. For anybody on Zoom, please use the "raise hand" function.

The clerk and I will do our best to manage the speaking order and we ask for your patience as we sort through this hybrid format that we've been operating in.

In accordance with our routine motions, I'm informing the committee that all witnesses have completed the required connection tests in advance of the meeting.

With that, we are going to get into some opening statements.

I would like to welcome Mr. Morrice here. Mr. Shipley, I believe, is either online or will be joining us. Otherwise, we have our regular members here.

On the study of creating a fair and equitable Canadian energy transformation, we have our witnesses, and it's a very exciting day. We actually have witnesses here in person. I think this is a first for this Parliament.

We have, from Canadians for Nuclear Energy, Christopher Keefer, president.

From the Nuclear Innovation Institute, we have Chad Richards, director, new nuclear and net zero partnerships.

Online, we have, from the Canadian Hydrogen and Fuel Cell Association, Mark Kirby, president and CEO.

Also online, from Electric Mobility Canada, we have Daniel Breton, president and CEO.

Maybe we'll go to our online guests first for their opening five-minute statements, and then we'll go to our guests in person. We used to like to do that in case there were issues with the technology. We have that better figured out in this Parliament, but it's still always good just to make sure our online guests get in there.

Mr. Breton, would you like to start?

Just so everybody knows, I use a card system. When I give you the yellow card, there is 30 seconds left. The red card means time is up. Don't stop mid-sentence, but wind up your thought and then we'll move on to the next person. That applies when we're doing the questions-and-answers round as well.

Mr. Breton, it's over to you. I'll give you five minutes.

Mr. Daniel Breton (President and Chief Executive Officer, Electric Mobility Canada): Thanks, Mr. Chair.

[*Translation*]

Good afternoon, we would like to thank the members of the Standing Committee on Natural Resources for taking the time to consider our thoughts regarding a fair and equitable Canadian energy transformation.

My name is Daniel Breton, and I am president and CEO of Electric Mobility Canada.

Founded in 2006, Electric Mobility Canada is one of the world's leading organizations in transportation electrification. Our members include manufacturers of light-, medium- and heavy-duty as well as off-road vehicles, electricity and charging infrastructure providers, mining companies, technology companies, research centres, cities, universities, fleet managers, unions and environmental NGOs. In short, Electric Mobility Canada is the national voice for the electrification of transportation.

● (1535)

[*English*]

A few weeks ago, the International Monetary Fund published a report on the green economic transformation needed to achieve net-zero emissions, including a chapter on labour market implications. The analysis demonstrates that more stringent environmental policies are associated with greener and less pollution-intensive employment. It's not only good for employees' job security; it's also better for their health.

Green infrastructure push and phase-in carbon taxes should be backed by training programs targeted to lower-skilled workers and by an earned income tax credit to support incentivized labour supply. Areas that rely more heavily on higher emissions-intensive production will have a larger reallocation need and a tougher transition. These policies would buffer the unequal impact of the transition on low-skilled workers and reduce income inequality.

Last year, our organization launched its 2030 EV action plan. That included six pillars for a successful transition towards an electric mobility ecosystem that would not only fight climate change and air pollution but also create high-quality sustainable jobs across the country. That's why we recommend supporting the clean job transition with ambitious training and retraining programs so workers will be able to find good-paying and more stable jobs in electric mobility. In the electric mobility sector, job growth is exponential, and the demand will continue growing for years.

As is written in our “2030 EV Action Plan”:

> A Canadian EV Economic Development and Investment Attraction Strategy, focused R&D efforts, and action to protect Canadian industry and workers from foreign buy-domestic rules will help ensure a prosperous transition to an electric mobility economy in Canada.

We recommend that the federal government focus its efforts on, number one, attracting more investment to accelerate EV manufacturing and related industry in Canada, including assembly, parts, machinery, charging equipment and battery materials extraction and processing with a Canadian EV economic development and investment attraction strategy. Building these industries will create good, sustainable jobs and raise the profile of EVs to further support their adoption in Canada.

Number two is accelerating technologies, research, development and manufacturing associated with reducing the cost of vehicle batteries, and thus vehicle costs per unit of charge. Achieving economies of scale in vehicle, batteries and charging infrastructure production will also help to reduce costs for consumers and fleets.

Number three is working with provinces to revamp the vehicle mechanic curriculum to prioritize EVs by fast-tracking training for EV mechanics and provide them with more apprenticeship opportunities.

Number four is building a labour force with the right skills, from engineering and research to electrical and mechanical, charging infrastructure installation and maintenance and fleet management, which will be critical to the success of Canada's transition to a zero-carbon economy, and also exploring opportunities for the government to support employers—whether traditional industry or all-EV—to train new employees who have not previously worked in the EV industry. Also, maintaining existing funding commitments for training and retraining will be vital.

[*Translation*]

We need to spur the development of our own zero-emission vehicle supply chain, from mining to mobility, to ensure that Canada is not left behind in the electric vehicle revolution that's currently under way. For environmental reasons, but also for the future of Canadian workers, we must make the most of this once-in-a-generation opportunity.

Thank you.

[*English*]

The Chair: Thank you so much for those opening comments.

Now we'll jump to Mr. Kirby.

If you would like to take your five minutes, you can start right now.

Mr. Mark Kirby (President and Chief Executive Officer, Canadian Hydrogen and Fuel Cell Association): Thank you.

Good afternoon, honourable members, ladies and gentlemen.

I'm Mark Kirby, president and CEO of the Canadian Hydrogen and Fuel Cell Association. We're based in Vancouver, the traditional and unceded territory of the Coast Salish people, but I'm joining you today from Halifax, located in Mi'kma'ki, the ancestral and traditional lands of the Mi'kmaq people.

For over 30 years, CHFCA has been the voice of Canada's world-leading hydrogen and fuel cell sector, committed to helping Canada achieve its net-zero ambitions and to growing our sector. Over the past three years, we've enjoyed unprecedented interest and growth, with good reason. I welcome the opportunity to speak with you about hydrogen. I'm sure this committee understands the critical need to achieve our net-zero 2050 goals and that clean tech is the greatest wealth creation opportunity of the 21st century.

You've heard by now that hydrogen is hot. I hope you will have had the opportunity to read NRCan's "Hydrogen Strategy for Canada". It's an excellent document. It outlines how hydrogen, by 2050, will be a $50-billion per year industry for Canada, with investment and economic opportunities, creating 350,000 jobs and with a reduction of 190 million tonnes of CO2 equivalent. Those are big benefits, and they're also absolutely critical if we're to have a hope of achieving our net-zero 2050 goals.

We're going to need many more clean power projects, biofuel projects, carbon capture and sequestration projects. Canada must also invest in hydrogen production, distribution, fuelling stations and applications.

Today I'd like to emphasize three key points. We recommend that Canada implement the recommendations of the hydrogen strategy and identify, at a minimum, $800 million for hydrogen in our clean energy programs, grants and contributions. At least $100 million of that should be directed towards supporting the development of hydrogen hubs.

Getting more specific, let's talk truck drivers. The pandemic has shown how critical they are. It's a vital and growing sector, but unfortunately, its greenhouse gas emissions are significant and growing. It must decarbonize and soon.

Truck electrification can only be done through a combination of battery electric vehicles and hydrogen fuel cell electric vehicles. Together they can lower costs for truck drivers, offering lower vehicle cost, improved performance and reliability, better fleet, driver and payload efficiencies, economically sustainable infrastructure and lower fuel costs versus diesel. This is only if the appropriate supports are there, including a clean fuel standard that provides meaningful credits for both hydrogen and electricity purchases. Done right, it can actually be a business opportunity for truckers to electrify through hydrogen and, by the way, also achieve net zero. Just 10,000 trucks out of the 200,000 trucks on the roads of Ontario alone would need $2 billion per year of hydrogen, while saving those truckers money.

Similar economics apply for light-duty fleets, off-road, mining, rail, marine, aviation, as well as industrial processes like steel and chemical production, and building and industrial heating. All will decarbonize more quickly, more economically and more efficiently if they have the hydrogen choice available.

That's why there is so much interest in hydrogen and investors are keen to build hydrogen plants, pipelines and fuelling stations. If they don't, Canada will be disadvantaged against our foreign competitors. Canada has leadership in hydrogen technologies, but we could miss out on the economic opportunity of the industry as well as miss our commitments to net zero.

Are we doing enough? We do have key policies in place, and the recent budget had significant dollars devoted to clean fuels, but there are two critical areas where Canada needs to do more.

First, clear allocations for hydrogen are needed. Unlike our international peers, the federal government is still not sending a clear message to Canadians and internationally that we are firmly in the hydrogen game. We need carve-outs for hydrogen to send a clear and unambiguous message to international investors that Canada is their choice for the world's lowest-cost and cleanest hydrogen and that Canada is the place to deploy hydrogen vehicles, processes and applications. Hydrogen allocations totalling $800 million would put us on par with the U.S.A. and at the lower end per capita versus our European and Asian peers.

Second, and it's related, is hydrogen hubs. There is a dizzying array of funding sources that could be applied to hydrogen. They each cover one narrow aspect and are not organized and aligned. This makes it very difficult and risky for hydrogen project developers to take on projects. It also opens the risk of investment in disconnected projects that do not have sound financial underpinnings. To address this, we need specific support of at least $100 million allocated specifically for the development of hydrogen hubs. Provinces are ahead on this with Alberta, B.C., Ontario and Quebec all allocating support to hubs.

The hubs cluster multiple applications around a single, common and low-cost supply of clean hydrogen. They generate jobs and investment, provide the scale that's needed and lead to new technologies, skills training and all those things we want to see happen. By the way, they're a key part of the hydrogen strategy for Canada.

● (1540)

Those are the three key points: implement the recommendations of the “Hydrogen Strategy for Canada”, allocate an $800-million carve-out for hydrogen and support the development of hydrogen hubs.

Thank you very much.

The Chair: Excellent. That was right in there on the five minutes, so thank you.

Dr. Keefer, we'll go over to you.

Dr. Christopher Keefer (President, Canadians for Nuclear Energy): Hello everybody. It's wonderful to be here in person with you.

My name is Chris Keefer. I'm an ER physician and also the president of Canadians for Nuclear Energy. We are a non-profit made up of scientists, doctors, engineers, environmentalists and tradespeople, who believe that nuclear energy is the keystone technology of our climate response and the gold standard template for a just transition.

Nuclear is an evidence-based path that we have walked before when we used nuclear energy right here in this province to provide 90% of the power generation needed to permanently close Ontario's massive coal fleet. Fossil fuel workers transitioned from high-paying, skilled trades jobs in coal to even better jobs in nuclear.

We know that to get to net zero, we need to replace fossil fuel power generation with zero-carbon power, at least one to one. It's a simple concept with staggering implications.

We currently use fossil fuels for 74% of our energy needs, and we need to build the equivalent of 113 Site C dams or 96 large CANDU reactors to double our grid in order to electrify everything.

Battery electric vehicles and hydrogen are a vital part of this solution, but electric vehicles don't charge themselves and hydrogen doesn't fall like manna from the heavens. We need reliable energy to generate that. This will be an expenditure of hundreds of billions of dollars, and given the tight timelines and limited resources, we can't afford to get this wrong.

What are our options for that low-carbon power generation? Nationally, hydroelectricity has been the backbone of our low-carbon grid, but it's largely tapped out and vulnerable to the impacts of climate change. Geothermal is geographically limited. We're left with potential scalable options of wind, solar and nuclear. It is my contention that the just transition is technologically specific, and that despite excellent PR and branding, wind and solar, unfortunately, do not offer a just transition for Canadian workers.

I'm going to explain myself by examining the respective supply chains, job types and negotiating positions of workers in these respective sectors. The nuclear supply chain is 96% made in Canada. That includes the mines, fuel fabrication, heavy industry, construction, operation, maintenance and spent fuel handling. Nuclear energy consists of cheap uranium plus high-skilled mostly union labour. It experiences an economic multiplier effect unparalleled by any other energy source. Every dollar invested in nuclear in Canada generates $1.30 return in GDP. We capture the value of that entire investment—and again, we're talking about hundreds of billions of dollars—within the Canadian economy, and mostly within the pockets of working Canadians.

Wind and solar unfortunately don't share this.... The supply chain is almost exclusively overseas. Forty per cent of the world's polysilicon is made in China's Xinjiang province, where there are credible allegations of forced Uighur labour, and where the Canadian Parliament voted last year, 266 to zero, that a genocide of the Uighur people is taking place. Seven of the 10 largest wind turbine manufacturers are Chinese companies, and European wind developers are quickly moving their manufacturing to China for cheaper raw materials and labour.

What are the just transition implications of spending hundreds of billions of dollars here at home in Canada on nuclear, the ultimate economic multiplier, versus generating an epic trade deficit by sending that money to a foreign supply chain in an authoritarian country and becoming a nation of low-skilled, foreign-made solar panel and wind turbine installers?

Let's talk about jobs now.

I want you to imagine yourself in the parking lot at a nuclear plant. It's a big parking lot with probably 2,000 spots. Who's getting out of their cars? They are nuclear plant workers, skilled tradespeople, boilermakers, pipefitters, electricians, welders, STEM professionals and Ph.D.s. These workers have permanent, secure, intergenerational employment anchored in their community, and almost all of them are union members. They earn six-figure salaries mostly, and spend their wages within their thriving local communities, stimulating their local economies.

Wind and solar, on the other hand, do not offer these same kinds of jobs. The majority of them are in installation and construction. Jim Harrison, the director of renewable energy for the Utility Workers Union of America said, “It’s a lot of transient work, work that is marginal, precarious, and very difficult to...organize.” Two-thirds of jobs are low skilled, and most are non-union. Once constructed, these facilities are virtually workerless.

I want to close by talking a little bit about labour history and how workers have got themselves just working conditions to this date. As Frederick Douglass famously said, “Power concedes nothing without a demand.” Workers were not historically gifted high wages and safe working conditions; they fought for them. It is high-skilled workers, who are hard to replace with scab labour, who have the right to strike who win concessions. Nuclear offers precisely this mix. An overseas supply chain, workerless wind and solar facilities, and temporary low-skilled jobs do not offer this possibility.

● (1545)

Ultimately, Canadian workers will be the heroes of their own just transition, but only if policy-makers make the right technological choices and set the right industrial policy, one centred on Canadian nuclear energy.

My organization would like to see nuclear included in the green bond. Bonds built this country's infrastructure off of which we're currently freeloading. You've heard about the sheer volume of the number of power plants that we're going to need to build. I'd also like to suggest that we develop a federal vehicle that can help facilitate investment in this structure, streamlined licensing, etc.

Lastly, there is a critical need for education in the STEM areas and skilled trades to staff the positions of this nuclear renaissance, which we truly believe is coming to Canada.

Thank you very much.

● (1550)

The Chair: Thank you.

We'll now go to Mr. Richards.

You have five minutes for your opening.

[*Translation*]

Mr. Chad Richards (Director, New Nuclear and Net Zero Partnerships, Nuclear Innovation Institute): Thank you, Mr. Chair. I'm very pleased to be with you this afternoon.

[*English*]

At the Nuclear Innovation Institute, we provide a platform for accelerating the pace of innovation within the nuclear sector, while also serving as a connector and convenor of ideas and people to tackle the challenges we face today. Those challenges are many and they are significant.

Twenty-seven years, 250 days, that's how long we have until January 1, 2050. We're all aware of the pledges and promises made to get to net zero by 2050, but what is the scope of that challenge? Numerous reports have forecasted that Canada will need to triple its level of electrical power production from 500 terawatt hours to 1,500 terawatt hours.

What does adding this new generation look like in real terms? It's the equivalent of adding 115 new large hydroelectric reservoirs like Site C in British Columbia, or more than 19 new nuclear sites, as Chris mentioned. Using solely small modular reactors, SMRS, means adding 380 SMRs to our grid. For wind, it means adding tens of thousands of new turbines. Relying solely on solar would require solar panels to be installed on a geographic space roughly 2.5 times the size of Prince Edward Island.

All of this means that we need to use every low-carbon and decarbonization tool in the tool box, and we need to start now. Quite simply, the net-zero equation will never balance unless nuclear is a fixed variable. When it comes to creating a fair and equitable energy transformation as part of these efforts, Canada's nuclear sector has many clear benefits.

Canada's nuclear assets are already creating the kinds of economic opportunities that must be commonplace in a net-zero future. The phase-out of coal in Ontario, by using nuclear, is a prime example of a just transition in action, and it's working. One need look no further than the Clean Energy Frontier region of the Bruce, Grey and Huron counties in Ontario—a rural economy that has been given a monumental economic boost from the presence of the Bruce Power nuclear generating station. The major component replacement project at Bruce Power, which will extend the life of this clean electricity powerhouse until the year 2064, is injecting immense levels of investment and opportunity into the region through new businesses and literally thousands of jobs and new opportunities.

These opportunities have supported our indigenous communities, in terms of both employment and new ventures. Indigenous-owned businesses like Makwa-Tron and Makwa-Cahill have been created because of the MCR investment, and a partnership between the Saugeen Ojibway Nation and Bruce Power has been signed jointly to market medical isotopes. These are the kinds of opportunities we all think of when we envision a fair and equitable energy transformation in Canada.

As work is under way to replace major components at Bruce Power, we are also finding new opportunities to increase the site's contribution to fighting climate change. Project 2030 at Bruce Power will see the site initially increase power output so this clean energy asset can provide clean power to another quarter of a million homes. By 2030, it looks to increase that output up to 7,000 megawatts. Maintaining and maximizing our clean energy assets will be critical in the goal of reaching net zero by 2050.

These opportunities are supporting Ontario-based and Canadian-based supply chains. More than 90% of Bruce Power's total spending occurs within Ontario and 98% of that stays in Canada. This spending supports Canadian jobs at Canadian-based businesses. From uranium extraction in Saskatchewan to plant operations in Ontario and New Brunswick, nuclear is a true Canadian success story. Recent global events, from the pandemic to the war in Ukraine, have shown us the true value of homegrown supply chains.

Finally, when it comes to creating a hydrogen economy, nuclear will play a central role. Using targets in the “Hydrogen Strategy for Canada”, NII did the math on what it will take to meet those targets in terms of electricity production. It should be no surprise that we will need an incredible amount of new electricity generation—the equivalent of nine new nuclear sites, 196 SMRs, or 5,500 utility-scale solar farms. Nuclear must be a key contributor to creating this economy, and nuclear operators like Bruce Power are doing their part. Feasibility work announced as part of the Ontario government's hydrogen strategy is already under way to explore hydrogen production and end uses.

Governments can do more when it comes to workforce planning for a hydrogen economy. We will need a host of new skills and certifications across the country to enable our workers to work in a hydrogen economy. Positions like fuel cell retrofit installers and fuelling station managers need to be explored now. Pipeline construction workers and system safety inspectors will need new certifications and skills to work in a safe and effective hydrogen economy.

This is all highlighted in a 2021 report from the NII, which I will be happy to submit to the clerk for the committee's review as part of this study.

With that, I would like to thank the committee for the invitation to appear today, and I'll be happy to take any questions.

● (1555)

The Chair: Excellent. Thank you.

We're going to get right into our rounds of questions. The first round is six minutes each.

The floor is yours, Mr. Maguire.

Mr. Larry Maguire (Brandon—Souris, CPC): Thank you, Mr. Chair, and thank you to all the witnesses for their presentations today.

I would like to get into the nuclear side of this a little bit more.

Canada is a leader in nuclear research and technology, exporting a lot of the CANDU reactor systems and most of our uranium products. What should the government do to expand the industry here in Canada and use it to make as many jobs as we can potentially?

That's for either Chris or Chad.

Mr. Chad Richards: I can start.

Through you, Mr. Chair, Dr. Keefer mentioned the green bond framework inclusion. Ensuring there's a level playing field for all of our clean energy assets is critical. We can't just pick and choose the technologies that are going to succeed. I think we need a level playing field for all those technologies.

The major component replacement project that I mentioned taking place at Bruce Power is a key example of support that we have right now for the nuclear industry in maintaining support for these assets. Ensuring that we continue to build out those supply chains that are supporting the build-out of major components at those sites is critical and it's critical to keeping our supply chain onshore right now. There is quite literally no better time to be building more nuclear with the supply chain that's humming right now producing major components for refurbishments at Darlington and Bruce. I think now is the right time to be looking further to what more we can build.

Dr. Christopher Keefer: Just to follow on that, we have the SMR Action Plan in place, which is excellent. I think the scale of what's required, the staggering scale truly of the number of power plants we need to build, really means that we cannot abandon our CANDU technology, which, in the words of Seamus O'Regan, is a “gold standard” reactor around the world.

First off, we're into refurbishments, which is excellent. It positions Canada very well. Many other western countries have had troubles with new build in the last 20 years, and it's because they had an atrophied workforce and they were experimenting with new designs. We have a design that we're intimately familiar with, thanks to the refurbishment and an excellent tuned-up workforce ready to go.

In terms of federally how we can support the provinces—building power generation is a provincial jurisdiction—I really think this needs to be a subject of some form of parliamentary inquiry, because this is a staggering challenge.

In World War II I think we started 17 Crown corporations and we built more armoured vehicles than the Axis allies combined. We talk about the need for World War II level mobilizations. Federal governments have been involved in energy before. We have, unfortunately, bailed out things like hydro dams. The federal government bought the TMX pipeline. We have a percentage of the Hibernia oil fields. It's time to make those kinds of investments in nuclear, which is really what can deliver both effective deep decarbonization, as we proved here in Ontario, and a just transition, as I hope that we have demonstrated.

Mr. Larry Maguire: Should the committee ask the government to send a signal that nuclear energy must expand to meet future energy needs as part of this transition? You have answered that, I think, but—

Dr. Christopher Keefer: In one word, yes.

Mr. Larry Maguire: I will get back to you on that as well, but on the wind and solar technologies, you indicated in your opening remarks they are not as reliable and they are foreign made. We have a nuclear system here that I think you just described as top-notch in the world and creates valuable well-paying jobs, unionized jobs in most cases as well.

Is there anything you want to expand on that?

Dr. Christopher Keefer: Yes. There's a big taboo to talk in negative terms about wind and solar technology. This is not punching down. Of global electricity spending, it's about $800 billion. Wind and solar are using about $300 billion of that investment. This is a critical issue.

I'm not paid by the industry. I'm a physician giving up shifts so I can come to Ottawa and give this testimony. I do this out of a sense of civic duty. I'm the father of a three-and-a-half-year-old. I think we have a really divergent path forward in terms of what this country is going to look like. We desperately need to reshore industry and to do that, we need reliable energy to drive that.

If you look at what's going on with the Russian aggression in Ukraine right now, the EU is completely handicapped in terms of stopping this. They are funding that aggression to the tune of $700 million euros every single day, because they created a wind and solar dominant energy transition backed by natural gas. That's the problem as you were saying of this unreliability and intermittency. There are lots of fairy tales about grid scale batteries and other solutions, but the richest industrialized country in Europe who have embarked the most on this and spent $550 billion on this process relied on coal for the dominant source of electricity in 2021 and Russian gas now.

Canada could find itself in the same situation with the supply chains I was talking about. What happens if China takes Taiwan? How do we respond effectively to that? We cannot set ourselves up in that way for reasons again of effective deep decarbonization, of a just recovery, and a just transition, and matters of vital national security and energy security. Nuclear absolutely needs to be centred by this government.

● (1600)

Mr. Larry Maguire: Dr. Keefer indicated they were going to have double or triple the amount of electrical grid that we have in order to accommodate net zero by 2050.

Mr. Richards, specifically what policy changes should the federal government make to get more nuclear energy generation to support this net-zero future? I mean, the green bonds are one thing, but are there others?

Mr. Chad Richards: Through you, I would direct the honourable member to a recent paper that was released by the International Monetary Fund, which showed that investment in nuclear power produces the biggest multiplier effect of any clean source of electricity generation; nuclear creates 25% more employment per unit of electricity than wind; and workers in those industries earn about 30% more.

To your question about what the government can do, absolutely: On the recommendations in Dr. Keefer's address, really supporting the CNSC in moving regulatory approvals through as quickly as possible is something we can do.

The Chair: We're unfortunately out of time on that one.

We're going to go now to Ms. Jones for her six minutes.

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

Thank you for your presentations today and to our guests online.

It's very interesting. I'm going to start my questions on the uranium side, on the nuclear side. I say “uranium” because my riding is in Labrador and we have a lot of uranium. I'm happy to see that it is a critical mineral in Canada and the opportunity to really see that develop.

In addition to that, I come from one of the areas in Canada that probably has the best geological compound for repository waste storage of nuclear as well. It's something that has always been highlighted and brought forward. Obviously, it's one of the areas that has always been a concern whenever we talk about nuclear and whenever we talk about uranium and advancing that industry. I think it is a concern for Canadians. One of my questions is, then, on how we address that.

My second question is with regard to production. We see what's happening with nuclear production in Canada today. How much production do we need to get to? What does that increase look like? What's our transmission ability to bring that to provinces and territories around the country?

I'll stop there and listen to your responses.

Dr. Christopher Keefer: I'm learning the etiquette here. Through the chair, you're right, uranium is a critical mineral.

I did some back-of-the-envelope calculations on this. Uranium actually offsets one-third of Canada's national annual emissions. We put out 730 megatonnes. The uranium that we contribute domestically and internationally to the global reactor fleet, which creates the.... This is definitive now. In terms of the life-cycle analysis of CO2 emissions, nuclear is rock bottom: five grams of CO2 per kilowatt hour. That uranium displaces one twenty-fifth of all of humanity's global emissions, and again, one-third of Canada's national emissions.

Uranium is something we should be very proud of. Uranium mining has come a long way. It is one of the most heavily regulated industries in the world, and we're doing a very good job of that now.

In regard to the waste, I think this is a really important question, and I'm glad that it came up. You mentioned having really good geology for a potential repository. What really put me at ease was talking with a number of geologists. The thing is that you're saying the rock is so good, right? The rock is the barrier. The mechanism for waste to get out of a repository and accumulate in a dose that could be harmful to anybody is that water needs to get through all of these engineered barriers, it needs to dissolve a ceramic, which doesn't happen very easily, and then it has to carry those radioisotopes in solution through the rock.

For the rocks we're looking at in South Bruce, it takes a million years for water to move one metre. After about a thousand years, the only way for nuclear waste to harm you is if you eat it—pulverize it and eat it. I'm saying this as a physician who has looked into this in some detail. I'm not trying to brush off concerns here, but we have made such a mountain out of a molehill with the waste. All of the waste that Canada has produced in 70 years would fit in one hockey rink, piled one telephone pole high; just to give you a sense of that volume, it's this room, maybe, with a ceiling twice as high.

Uranium is so incredibly energy dense. That's the secret to why it is such an environmentally friendly form of energy generation. You do the least mining. You need the fewest materials. A nuclear power plant might look big and ominous, but the Pickering Nuclear power plant, on a footprint the size of Costco, provides all of the baseload needs for the GTA. It's staggering.

That's why I have come to be passionate about it. I have no ties to this industry. Having looked at the evidence and how serious climate change is and in starting to evaluate what the potential solutions are, this is where I have been steered towards.

I'm sorry if I'm taking up too much time—cut the mike.

● (1605)

Ms. Yvonne Jones: Is there enough time to address my second question, which is transmission capacity for nuclear energy? What does that look like, getting it to the provinces and territories?

Mr. Chad Richards: Transmission is absolutely an incredible challenge, given the different jurisdictional nature of building out that infrastructure. The federal government has shown some leadership in developing new transmission infrastructure, but it can go further.

There are really big conversations that need to take place with provinces about federal-provincial interties and interties between other jurisdictions. That needs to happen, and working with all of the system operators around the country needs to start ASAP.

Ms. Yvonne Jones: I'm not an expert in this. When you look at the current transmission of oil-generated power, is it the same kind of transmission capacity or is it done differently? Are there different ways that you can get it, or is it transmitted in the same medium?

Mr. Chad Richards: You need that high-grade electricity transmission to go to run from operating sites. I can't speak to what it looks like, compared to other sources, but I think that investments in transmission infrastructure are going to be absolutely critical. We need to move that now.

Dr. Christopher Keefer: What I could quickly add is that we have a number of sites, particularly old, retired coal plants like Nanticoke here in Ontario, that are sitting there with a transmission capacity ready to go. Building nuclear on retired coal sites is a great way to justly transition those workers over.

Ms. Yvonne Jones: Thank you.

The Chair: We're going to go now to Mr. Simard.

[*Translation*]

Mr. Simard, you have six minutes.

Mr. Mario Simard (Jonquière, BQ): Thank you, Mr. Chair.

My question is for Mr. Breton.

Mr. Breton, in your presentation, you talked about the federal government initiatives that could be reviewed to foster the electrification of transportation.

I will refer to a study by Oil Change International. This study clearly shows that the federal government champions investment in the oil and gas sector, but has a terrible record when it comes to investing in the renewable energy sector.

I can easily see all the support programs available to the oil and gas industry. One only has to look at the latest budget, which earmarks $2.5 billion to develop carbon capture strategies. However, with the exception of the electric vehicle tax credit, I very rarely see federal initiatives to support the electrification of transportation.

Mr. Breton, I'd like to know if you're aware of any federal programs that support transportation electrification, other than the tax credit we're all familiar with.

Mr. Daniel Breton: Thank you for this excellent question.

I have to say that I'm surprised we're talking so much about producing more energy, whether renewable or nuclear, but so little about energy efficiency and conservation, which we should be talking about more.

Canada ranks first among G20 countries for per capita energy consumption, per capita greenhouse gas emissions, and greenhouse gas emissions from our light-duty vehicles. That means we waste a lot of energy. Before we start producing any new energy, we should focus on wasting less energy and using it more efficiently. That's not to say that we don't need new sources of clean energy, but one thing is clear: We need to stop thinking that we have to keep on producing more. First and foremost, I think we need to waste less.

To answer your question more specifically, I feel it's extremely important to remember that the government has committed to ending fossil fuel subsidies. We hope that happens soon, because we've been hearing about it for many years.

With respect to transportation electrification programs, in addition to the electric vehicle rebate, the government has announced that it will implement net-zero greenhouse gas emissions legislation to persuade people to buy light-, medium- and heavy-duty electric vehicles. These vehicles include battery- and hydrogen-powered vehicles.

I started talking to the federal government about transportation electrification in 2006. However, initiatives in this area seem to have been in the works for only two years. In the last two years and past few months in particular, the federal government has announced a number of initiatives for electric vehicle manufacturing as well as battery, cathode and anode plants. So there is still a lot of work to be done.

If we want a just transition, the problem will not be so much creating a transportation electrification industry, because one already exists. In fact, it's even growing exponentially. The problem will be finding workers.

In our view, the problem is we have to ensure we can help current workers and those who are currently studying in high schools, CEGEPs, colleges and universities across Canada to find well-paying jobs. Right now, we're seeing a disconnect of sorts. Workers are losing their jobs in some sectors and can't make the transition to other sectors.

We're discussing the coaching that needs to be done with workers with people from the Unifor union, which is at Electric Mobility Canada.

As we've pointed out, if we want the electric mobility sector to still exist in Canada 10, 15 or 20 years from now, we need to announce that new jobs are being created, but we also need to train workers.

In the announcement in Bécancour just a few weeks ago, they said they need skilled workers. However, you can't just snap your fingers and get trained workers. It has to be planned out with universities, CEGEPs, colleges and high schools.

The federal government's plan to reduce greenhouse gas emissions doesn't take the worker training component into account. It's an extremely important aspect that really needs to be emphasized or it will be hard to fill jobs with current workers.

● (1610)

Mr. Mario Simard: Thank you.

I have a question for Mr. Keefer and Mr. Richards.

Mr. Keefer, I saw earlier that you have a passion for nuclear power when you talked about it. I'm a newbie in this area, but what scares me is the waste management. I'm sure you know that nuclear waste is being kept close to a major water source in Chalk River. If something unfortunate were to happen, Montreal Island could be left with no drinking water. I'm not very familiar with waste management, but many people are very concerned about it. How can waste be managed in an acceptable, low-risk manner?

In my opinion, a just transition is about supporting workers in the energy transition, but also not burdening future generations. However, I feel that they will be the ones who pay the price for waste management.

[*English*]

The Chair: We're at the end of the six minutes, but I'll give you time for a quick response to that, and then we'll move to Mr. Angus, for his six minutes.

Dr. Christopher Keefer: Like I said, this is an issue that does definitely merit a response.

We've been storing spent civilian nuclear waste for 70 years now. In the world's history of storing spent civilian nuclear waste there's not been a single death associated with that. We know how to shield radiation very, very well.

We need a permanent solution. Finland is building a deep geological repository right now. It will be open shortly. As I was mentioning before, the geology is what contains it. We talk about burdening things. We think about civilizational life skills. It's reasonable to say, “Oh my God, 10,000 years. There hasn't been a civilization that's lasted 10,000 years.” We're talking about rock that's hundreds of millions of years old and completely stable, and we understand the characteristics of that rock.

If it takes water a million years to move a metre through that rock, carrying anything that could potentially come out from all of those engineered barriers, it's no longer harmless at that point. We need to be worried about the forever waste out there, the heavy metals, and particularly, the fossil fuels that are continually spilling into our atmosphere and driving climate change.

I know we don't have much time. I'm happy to address this further, but I do think this issue has really been blown out of proportion by anti-nuclear environmentalists who use it as a means to prevent what I think is our most effective climate solution.

● (1615)

The Chair: Mr. Angus, you have six minutes.

Mr. Charlie Angus (Timmins—James Bay, NDP): Thank you very much.

I was reading the IPCC reports on nuclear. They're not quite as gung-ho as you are, Mr. Keefer. They raise the serious questions about the risk of proliferation, negative environmental impacts and mixed effects on human health. They talk about the long timeline it takes to actually get one of them up and running. They talk about the risk of accidents and radioactive waste management. Those are the IPCC reports.

I'd like to focus on the issue of proliferation. These small modular reactors are different from CANDU. Mr. Keefer, we're going to be pitching this technology to the global south, where it's possible to extract plutonium.

How are you going to address that issue with regard to the threat of nuclear proliferation?

Dr. Christopher Keefer: I'm going to pass the question.

Mr. Charlie Angus: I'm asking you.

Dr. Christopher Keefer: No, no, I'm happy to answer part of that, but I'm not a nuclear engineer.

Regarding this issue of nuclear energy leading to nuclear weapons, we have some interesting examples. Look at South Korea and North Korea. North Korea, a country with no civilian nuclear program, has nuclear weapons. South Korea, a country that is about 40% powered by nuclear energy—

Mr. Charlie Angus: I'm asking about our technology, and small modular reactors from which you can get plutonium. They're not CANDU reactors.

Why are we selling them if you can get plutonium from them?

Dr. Christopher Keefer: Plutonium is created as part of neutrons bombarding uranium-238 inside of reactors around the world. It is incredibly difficult to extract plutonium from spent nuclear fuel.

I'm going to leave that to my—

Mr. Charlie Angus: I have to go on. I only have six minutes.

I'm just Charlie from northern Ontario, but I'm reading the IPCC reports. They have flagged this as a serious concern.

I want to go to the Toronto Star of April 2 and David Olive. I'm sure you read his article about small modular reactors. He says that with over 20 years still in development, and still in the concept stage, current SMR designs won't achieve widespread deployment until the mid-2030s.

He writes:

> By then, they would have been overtaken by improvements in existing clean-energy sources and future advances in biomass, hydrogen and methane-emission reduction.

He says:

> SMRs, by contrast, are a boutique technology. Given the urgency of climate crisis, even a modest distraction by SMRs might be an extravagance we can't afford.

He refers to it as a boutique boondoggle.

Given the fact that we know these other technologies are up and ready to go, why go down this road?

Dr. Christopher Keefer: You mentioned biomass. Biomass is a terrible source of energy. We're taking land that could be used to grow food, and turning it into fuel. We're turning woodchips into power.

Mr. Charlie Angus: This is from Mr. Olive.

Dr. Christopher Keefer: Currently, the largest plant in the U.K. burns four gigawatts of woodchips from South Carolina. To say that biomass is a solution...The SMR we're pursuing here is based on existing technology. It's just a scaled-down version of a larger power plant. This isn't a bogeyman.

We've been operating—

Mr. Charlie Angus: I did not say it's a bogeyman. I'm saying it's—

Dr. Christopher Keefer: —boiling water reactors around the world since the 1960s.

Mr. Charlie Angus: We get told that we're afraid of this. In fact, you told us I could go home and tell my people they could eat uranium. God help us. People in northern Ontario—

Dr. Christopher Keefer: You're misquoting me, Charlie. I did not say that.

Mr. Charlie Angus: No, you said that we made a mountain out of a molehill over nuclear waste.

Mr. Charlie Angus: Questions are being raised about the small modular reactors and enriched uranium. This isn't CANDU waste. This is a different kind of waste.

I come from northern Ontario. We live with rock. Rock moves. Water moves. I don't know, maybe Yvonne Jones wants it....

You send your people to our area all the time, looking for a place to dump it, because it's a serious issue. The CANDU reactors have a technology, but this is different. You haven't addressed the fact that we're talking about enriched uranium, and there are serious questions about it.

Am I supposed to go home and tell people in northern Ontario, "Hey, you know? It's all been overblown. You can fit it into a hockey arena. You can eat it"? That's not a plan.

Dr. Christopher Keefer: That is true.

Dr. Christopher Keefer: Charlie, you're right that Canada has homegrown nuclear technology. We use non-enriched uranium. The rest of the world uses slightly enriched uranium in their reactor fleets and are managing their waste. The Onkalo site, the Finnish site for their DGR, is going to be holding waste from those kinds of reactors. Canada is unique in using non-enriched uranium. This is not a major issue, and again, waste is being managed worldwide.

● (1620)

Mr. Charlie Angus: Yes, but the modular reactors are different from CANDU and the explanation Mr. Ramana, the physicist, gave at the environment committee was that because it's enriched uranium it's a different waste and it's a more problematic waste. We're still trying to figure out where to put the CANDU—

Dr. Christopher Keefer: It's the waste that's produced in reactors basically everywhere in the world outside Canada, and it's what's going to be put into the Finnish repository.

I think you really need to consult with some more physicists and nuclear engineers on this to understand this issue in more depth.

Mr. Charlie Angus: I know, I'm just Charlie from northern Ontario.

Dr. Christopher Keefer: In regards to the IPCC—

Mr. Charlie Angus: Mr. Ramana is a physicist and he raised this.

The idea that, boy oh boy, you can eat the uranium once it's—

Dr. Christopher Keefer: I never said that, Charlie.

Mr. Charlie Angus: You did. You said if it sits long enough, after a thousand years—

Dr. Christopher Keefer: I said after a thousand years the only way it could hurt you is if you pulverized it and ate it. I'm not suggesting anyone eat nuclear waste, Charlie.

Mr. Charlie Angus: Well, I've been in northern Ontario and we've dealt with nuclear issues time and time again. If you're 7,000 feet underground, water moves.

Dr. Christopher Keefer: Charlie, honestly, speak to some of the geologists.

Mr. Charlie Angus: I've been there. I've seen it.

I've never met a geologist who said that we should store this in northern Ontario, especially the SMRs. You're giving us a great spin, but there are serious issues here.

The Chair: Mr. Angus, Mr. Richards was, if you're interested, trying to get into the conversation as well. I don't know if you saw that.

Mr. Chad Richards: Thank you, Mr. Chair.

Through you, to the honourable member, with respect to the question about SMR technology, the fact that it's a new technology doesn't mean that it's not going through the CNSC, our world-class regulator, to look at safety aspects. I trust the great folks at the CNSC who for years have been regulating an industry that has been operating safely and effectively. I would trust them again with this process as well, as they evaluate the utility of this technology and the safety systems around it.

Mr. Charlie Angus: So, it hasn't been approved yet; it's being tested.

Mr. Chad Richards: It's moving through the CNSC process.

Mr. Charlie Angus: Thank you.

The Chair: That's the end of that six-minute round.

We're now going to go to a slightly shorter one—a couple of five minutes and then a couple of two and a half minutes and that's going to be the end of the time we have.

Mr. McLean, you have the first five minutes.

Mr. Greg McLean (Calgary Centre, CPC): Thank you, Mr. Chair.

Welcome and thank you to the nuclear representatives here for presenting viable technology that isn't just technology. It exists today; it's not fairytale stuff. It is an energy system, not just something where you add on to somebody else's energy system and pretend it works part time.

I really appreciate your comments on wind and solar. I'd like you to expand a bit on the actual capacity of wind and solar versus the energy delivery of wind and solar. Specifically, on a cold day in Alberta, how much power is produced by alternative energy—wind and solar—versus their capacity? Any clue of the numbers?

Dr. Christopher Keefer: It sounds like you've looked at them recently.

Mr. Greg McLean: I have. I know these numbers.

Dr. Christopher Keefer: Across Canada solar averages around 15% capacity factor, meaning it produces 15% of the installed amount that you've made. Wind is usually around 30% to 35%. CANDUs are running over 90%.

Mr. Greg McLean: I think that's capacity numbers. On a cold day in Canada wind and solar combine to make less than 1% of our electricity production.

Let's accept that if wind and solar are our only options here, then Canadians will freeze in the dark. We need an energy solution like nuclear that actually does provide some baseload power, not just some intermittency.

Are you familiar with the cost of tying intermittent power into a sustainable power grid itself?

Dr. Christopher Keefer: One can look at the example of Germany, which has the most expensive electricity in the EU, and California as well. While building a solar farm is cheap, the cost of the electricity produced.... When you flick the switch, you're not just getting solar energy. When the sun goes down you're usually getting natural gas-fired energy. Those plants are not being run as efficiently because it's like stop-and-go traffic instead of highway driving for the power plants backing things up.

Mr. Greg McLean: You essentially need a lot of inverters, a lot of build-out of the power, all of which are paid for by ratepayers, which in Canada are taxpayers at the same time. Especially in Ontario and Quebec, many of the electricity customers business-wise are subsidized.

What are the dollars per kilowatt hour of production of power by nuclear? Life cycle, capital cost, everything....

Mr. Chad Richards: I can't speak to the life cycle, but I have in front of me numbers from the 2021 Ontario Energy Board total unit supply cost, and it's in cents per kilowatt hour. The average residential price for power was 13.5 cents per kilowatt hour. When we look at combined nuclear in Ontario, it was 8.9 cents per kilowatt hour that the grid was paying for that power. When we look at solar, it was 49.7 cents per kilowatt hour. For wind, it was 14.8 cents per kilowatt hour.

Nuclear, despite some of the rhetoric out there, is actually one of the cheaper forms when it comes to ratepayer benefit.

● (1625)

Mr. Greg McLean: Thank you for that.

This is versus Muskrat Falls—and I have some colleagues here from Newfoundland—which is at 26.5 cents per kilowatt hour for the electricity being provided by the newest hydro option in Canada. I appreciate the numbers.

I'm going to move to my old favourite, Mr. Breton. Mr. Breton, thank you for coming again. You've appeared before me in committee a couple of times already, and you keep promising me you're going to give me better data when the meeting is over. This is a committee of Parliament, and I have yet to see you provide me with the data that I'm missing, which you seem to be more seized with than I am. My numbers and your numbers differ substantially.

I have the transcripts of the last two times you've appeared before me in these committees. Let me go through some of those, where you talked about wind and solar being the options to move to a grid here that is sustainable and does away with hydrocarbons, as far as our internal combustion engine fleet is concerned.

Would you like me to refer to our meeting at the natural resources committee in the last Parliament?

Mr. Daniel Breton: Are you asking me?

Mr. Greg McLean: Yes, I am.

Mr. Daniel Breton: Yes, sure, but I'm not here to talk about wind and solar; I'm here to talk about Electric Mobility.

Mr. Greg McLean: That's right. You talked about $200 billion being funded by the federal government in order to move towards a zero-emission vehicle fleet. Now, you're funded by the zero-emission vehicle industry to some degree. Is that correct?

Mr. Daniel Breton: Well, yes. Like—

Mr. Greg McLean: Yet, the last time I had you in front of the finance committee, you were asking for $2 million to subsidize your office and your appearances here before Parliament in committees. Is that correct?

Mr. Daniel Breton: Yes.

Mr. Greg McLean: Okay. You asked for $2 million. I asked at the last natural resources committee you appeared at what your budget was, and you said $2 million. This is a hash. You want the federal government—

Mr. Daniel Breton: [*Inaudible—Editor*]

Mr. Greg McLean: —to give you $2 million so you can fund yourself to appear before committees. Is this not what the government calls a circular economy?

Mr. Daniel Breton: No, because we didn't get a penny. I guess we're self-funded.

Mr. Greg McLean: Would you say you're self-funded by Crown corporations?

Mr. Daniel Breton: No, because the vast majority of our members are private companies. If you—

Mr. Greg McLean: Like Hydro-Québec and Ontario hydro, these are—

The Chair: I'm going to jump in here. We're unfortunately out of time. This goes quickly.

We have limited time to finish off, so I'm now going to go to Ms. Lapointe and reset the clock.

You have five minutes.

[*Translation*]

Ms. Viviane Lapointe (Sudbury, Lib.): Thank you, Mr. Chair.

Mr. Breton, I have a question for you about Canada's transition to electric vehicles.

In your testimony last spring before the Standing Committee on International Trade, you stated that Canada's human and natural resources put us in an ideal position to become a world leader in electric mobility.

From a global perspective, can we be self-sufficient and meet all the transportation supply chain's needs with electric vehicles?

Would it make sense to focus on expertise in only certain areas of the supply chain?

Can one country do it all?

Mr. Daniel Breton: No country can be completely self-sufficient in manufacturing electric vehicles. Therefore, countries need to work together, and that's currently happening with the United States, Europe and other countries working to build a supply chain for electric vehicles. No, no country can really do it all, and Canada isn't a desert island cut off from the rest of the world.

That said, opportunities are emerging, and we saw it recently when the federal government made announcements about light- and heavy-duty vehicles. We're talking about buses, trucks, cars and light trucks. We're also talking about charging infrastructure, batteries and anode and cathode plants.

A number of very exciting announcements have been made. In my opinion, Canada was at risk of becoming a small player in the automotive sector. However, after the recent announcements, we can see that the current Canadian government has the political will to make Canada a major player. I'd like to commend Minister Champagne's initiative in this regard. He's worked very hard to attract international players to Canada, Quebec and Ontario.

Last week at the Montreal Electric Vehicle Show, I spoke with Minister Champagne, who told me that further announcements were in the works. Believe it or not, when I was young I worked at a refinery in Montreal East. At the time, there were eight refineries in Montreal East, and today only one remains.

We're witnessing an energy transition that didn't start two or three years ago, but long before that. If we want it to be a just transition, we need to make sure we can train people. Right now, one challenge we face is that we need to train people well so that they can get these high-quality jobs, whether it's in the mining sector, the research sector, the assembly sector or the sales, marketing, maintenance or mechanical sectors.

All of these sectors represent jobs, not just in Quebec or Ontario, but across the country.

● (1630)

Ms. Viviane Lapointe: In the mining and critical minerals sector, we're finding that more workers are needed in many areas along the supply chain.

In your opinion, where does Canada currently stand in terms of skilled workers in the natural resources areas needed to build electric transportation systems, but also in terms of the expertise or intellectual capital needed?

Mr. Daniel Breton: At this point, we still have a lot of work to do because we're playing catch-up. Some countries, like China, started developing this sector two decades ago.

The United States, Canada and even Europe have sort of taken it for granted. Even though I've been talking about the electrification of transportation for about 20 years, it's only been a few years since Western governments woke up and saw how important the transition to battery- and hydrogen-powered electric vehicles is. All of a sudden, many manufacturers are saying that the transition is coming and their backs are kind of up against the wall.

Last weekend, I was at the Montreal Electric Vehicle Show, and people came out in record numbers because they want electric vehicles. However, it was hard to find qualified workers who could properly inform consumers wanting to buy electric vehicles, and I'm just talking about the sales aspect. The whole value chain and training chain need to be put in place. Some of the responsibility lies with manufacturers, but the government can play a role.

I'm currently in discussions about this with Natural Resources Canada to develop training programs. It's extremely urgent.

Ms. Viviane Lapointe: You said the government had reduced the necessary risks.

Do you have any other advice for the government?

Mr. Daniel Breton: When putting forward a plan to reduce greenhouse gas emissions like the one announced a few weeks ago, they have to make sure that the money is going to be invested in the right place. The government announced a $900 million investment, of which $400 million will go to Natural Resources Canada and $500 million will go to the Canada Infrastructure Bank to install charging or supply infrastructure for battery- or hydrogen-powered electric vehicles. They need to ensure that the funds are invested in the right place, in the right environments.

At the moment, we face challenges with respect to charging and refuelling in downtown areas. We're finding that the highway systems are being well supplied, better and better supplied. Of course, some regions, like British Columbia and Quebec, are ahead of other provinces. That's why we talk regularly with elected officials and federal public servants to make sure the funds are going to be invested in the right place and in the most efficient way. We don't want to waste money.

However, I want to go back to what I said earlier. One thing is for sure: if we want to reduce our greenhouse gas emissions, our air pollution, and find a way to make a just energy transition, we have to do it efficiently. Thinking that we can always produce more energy and make bigger vehicles is a bit counterintuitive to the need for efficiency.

That's something I really want to see emphasized.

[*English*]

The Chair: I'm sorry, Mr. Breton; I'll just ask you to wrap it up. We're over time here.

Mr. Daniel Breton: Okay. I'm sorry.

The Chair: Thank you very much.

We'll now go to Mr. Simard for two and a half minutes.

[*Translation*]

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

I noticed the beautiful love affair between my colleague Mr. McLean and Mr. Breton. I just want to point out that if Mr. McLean wishes to talk about public funds being squandered unnecessarily, he should look to the oil and gas sector. He would find more valid points there.

I have a question for Mr. Keefer. As we know, the Point Lepreau overhaul has gone about $3 billion over budget.

Do you know how much one kilowatt hour generated by hydroelectricity costs compared to one kilowatt hour generated by nuclear power? Do you have any numbers on that?

● (1635)

[*English*]

Dr. Christopher Keefer: Thank you for the question, Mario.

I don't have data precisely on New Brunswick. I think it's important to remember that nuclear plants were built instead of coal and gas plants. Our Pickering nuclear station was built instead of a four-gigawatt coal plant. I'm not sure what would have been built instead of Point Lepreau. We should look at that. I'll bet you that it was coal.

You heard my colleague; he gave you the numbers for here in Ontario. Nuclear is the second-cheapest source of electricity after hydro, so I think it's a very good investment for New Brunswick to make. Point Lepreau had a refurbishment. That plant is going to be operating into the 2040s, 2050s, providing air pollution-free, carbon-free energy for the people of New Brunswick that is reliable.

I can get back to you on the numbers on it. I am not an expert on New Brunswick nuclear. But thank you for the question.

[*Translation*]

Mr. Mario Simard: I wonder if Mr. Richards has any figures that would help us compare the cost of hydroelectricity to that of nuclear power in Quebec.

[*English*]

Mr. Chad Richards: Through you, Mr. Chair, to the honourable member, I don't have numbers specific to Quebec or New Brunswick.

In Ontario, using data from the 2021 Ontario Energy Board total unit supply costs, hydroelectric power in Ontario was about six cents per kilowatt hour. Combined to nuclear, it was 8.9¢ per kilowatt hour.

[*Translation*]

Mr. Mario Simard: I will let Mr. Morrice ask the final question.

[*English*]

The Chair: It will have to be very briefly.

Mr. Mike Morrice (Kitchener Centre, GP): We have the numbers already. The forecast from the small modular reactor road map steering committee is that the first SMR won't go online until 2030, and at 16.3¢ per kilowatt hour. Quebec is currently selling to New York at 5¢ per kilowatt hour.

If we're going to take urgent action on climate change in the most cost-effective way, what is your response to these kinds of figures?

Dr. Christopher Keefer: Quebec, as we heard from our friend involved in the electric vehicle fleet, is going to need to use a lot more of its own electricity. We would be shameless, I think, to freeload off that generation that they've built in Quebec. We each need to take responsibility for our own climate solutions.

Mr. Mike Morrice: If I can just—

Dr. Christopher Keefer: No, no. I—

Mr. Mike Morrice: Sorry, this is my time.

Quebec is selling their—

The Chair: Actually, we're out of time, if we're going to play that.

Now I'm going to go to Mr. Angus, and he'll get his last two and a half minutes.

Mr. Charlie Angus: Mr. Kirby, I want to turn to you.

If this was 2006, this would be a great conversation. We could plan and we would have lots of time ahead of us. But I'm looking at the IPCC that says that in five years we have to have a serious plan.

We need stuff that we can pretty much take off the shelf and get up and running. It's why I question small modular reactors. None of them have been approved yet, and we're hearing 2030 maybe at the earliest.

For hydrogen, what's it going to take to get this technology? Is this another pie in the sky thing that we're going to have to spend billions on and try out a whole bunch of ideas, or can we get hydrogen up and running in the next few years? What would it take?

Mr. Mark Kirby: Hydrogen is certainly not pie in the sky. It's already a very major industry.

I understand that there is a debate on what source of power we get it from. However, hydrogen complements them all. If you're making nuclear, you can try to produce power, heat and hydrogen. If you're talking renewables and wind and solar, you can use the hydrogen to help smooth the band and provide additional value to them. If you're talking fossil fuels and a just transition for the fossil fuel sector, you can produce hydrogen and sequester or manage the carbon and allow that industry to continue thriving.

My personal view is that we're going to need all of these solutions. As you mentioned, we have a very short period of time—

Mr. Charlie Angus: I get that, but are you able to do it now?

Mr. Mark Kirby: We can start making hydrogen now. We are making hydrogen. We're one of the largest clean hydrogen producers in the world.

It is not as far advanced as battery technology; there's no question about that. We need to be smart about how we deploy that and start putting this into the hubs I mentioned. You concentrate and get the good economics in place and you can start deploying buses today. We can already start deploying light-duty vehicles. We can start deploying trucks that are going to be coming in the near future. When you talk to the major truck producers, they know they have to decarbonize trucking and they know that's going to have to be done with hydrogen.

We need to get ready. That can be done cost effectively.

● (1640)

Mr. Charlie Angus: I have a quick question, Mr. Breton, because my time is running out.

In terms of training, I've been meeting with steelworkers, the IBEW and Unifor, and they're all getting set. They don't see this as going to be a low-paying job, a grunt future. They see a good future.

On the issue of training of mechanics for electric vehicles underground in the mines, mine mechanics are one of the main sources. Do we have to have a whole transition in training, or are their skills transferable? What do we need to do to get their skills ready for electric vehicles?

Mr. Daniel Breton: Actually, we do need to support mechanics and workers who are working right now on internal combustion engine vehicles, because there is a huge lack, I can tell you that. I work on a regular basis with dealers, with people.... I worked at the GM assembly plant in Sainte-Thérèse back in the day, and I can tell you that right now there's a huge gap. But there's good news, because I'm talking to people in the private sector right now who are working on putting together a training program. I'm talking to NRCan as well. So things are happening. More and more colleges and universities are getting on board with this. It's happening now. It didn't happen two years ago or five years ago. It's happening right now, so we really need to accelerate the deployment of training programs.

The Chair: Excellent.

That, unfortunately, is the end of our time today.

I would like to thank each of our witnesses. We're back fresh and have had some good exchanges here today. I appreciate all of the witnesses joining us.

If there's anything from the conversation that has come up that you would like to provide additional information on, we invite you to submit written briefs of up to 10 pages. You can send those in through our clerk. I'll leave that with you, if you want to provide any additional information.

Before we go into our closed session to continue our review of the report, we do need to adopt a revision to our budget for the study, now that we can actually have people come here in person. There was a revision that was circulated to the committee. We had originally budgeted $11,925. We're requesting an extra $8,750 to be able to bring in some witnesses in person for the study. If everyone is in agreement, could we get a motion for that?

Mr. Bragdon? Okay. We need a seconder. Okay, Ms. Jones.

Is there any discussion?

(Motion agreed to)

The Chair: Thank you.

With that, we're going to suspend.

We'll let our witnesses go. I think that our analysts need to come back in, as well as Mr. Chahal.

We'll get you to switch into the closed session. We'll be picking up the emissions reduction fund report in just a couple of minutes.

Thank you.

[*Proceedings continue in camera*]