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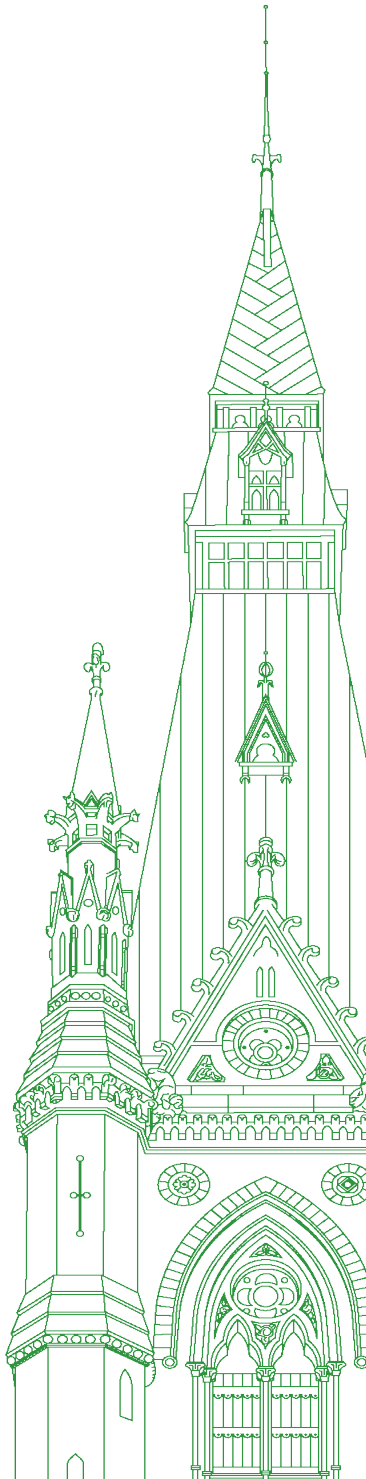

Chair: Mr. Francis Scarpaleggia

Standing Committee on Environment and Sustainable Development

Tuesday, June 7, 2022

● (1105)

[*Translation*]

The Chair (Mr. Francis Scarpaleggia (Lac-Saint-Louis, Lib.)): I call the meeting to order.

I want to welcome back Ms. Pauzé, who is back from her trip. Mr. Simard did an excellent job of covering for you while you were gone.

I would also like to welcome Mr. Redekopp, who was on the committee in the 43rd Parliament. He'll be with us for an hour, this morning, filling in for Mr. Seeback.

Before we get started, I'd like to provide an update on the committee's nuclear waste governance report. We reviewed the first draft, and the changes are being made as we speak. We hope to be able to review the second draft Thursday evening.

We are spending the first hour on supplementary estimates (A) and the second hour on version two of the report. It would be good if we could get the report approved Thursday evening, because that would give us time to table it in the House before the summer break. In any case, we have agreement to submit the report through an established process. It is possible to table a report when the House is not sitting and thus start the 180-day countdown to the government's response. That means that, if we are able to table it, even another way, the 180-day window will begin well before the fall, and we will receive a response from the government sooner.

We may not get the second draft of the report until five o'clock tomorrow, Wednesday, afternoon. That would give us less than 24 hours for review, but it would just be the changes.

Today, we are pleased to begin a study on a very interesting topic proposed by the Conservatives, clean technologies in Canada. With us are officials from four departments, the Department of the Environment, the Department of Industry, the Department of Natural Resources, and the Department of Agriculture and Agri-Food.

Ms. Meltzer, I gather you are ready to give your three-minute opening statement. Can you hear me?

I don't think she's online yet. I know she was having some technical issues, so we'll go to the next witness.

I assume Mr. Noseworthy will be speaking for the Department of Industry.

[*English*]

Mr. Noseworthy, you have three minutes.

Mr. Andrew Noseworthy (Assistant Deputy Minister, Clean Technology and Clean Growth Branch, Department of Industry): Thank you very much.

My name is Andrew Noseworthy, and I am the assistant deputy minister responsible for clean technology and clean growth at Innovation, Science and Economic Development Canada, or ISED.

My colleague, Kendal Hembroff, is here with me and will speak in a few moments about ISED's work to support clean technologies. In the meantime, I would like to give you a bit of background information on clean tech that may aid in our discussion today.

Statistics Canada has estimated that Canada's clean-technology sector grew by about 15% between 2012 and 2020, outpacing the overall Canadian economy, which grew by about 11% over the same period.

StatsCan further estimates that clean technology contributed about $26.8 billion to Canadian GDP in 2020 and provided over 200,000 well-paying jobs, with employment in clean tech growing by over 25% between 2012 and 2020.

While we're seeing clean technology develop into commercialization really right across the nation and in all elements of our economy, there are major concentrations of clean-tech companies in Ontario, B.C., Quebec and Alberta, and the vast majority of Canadian clean-tech companies, in fact over 90%, are small and medium-sized enterprises.

Canada has strength in a broad range of clean-tech areas, including clean energy and energy efficiency; hydrogen and low-emission transportation; batteries, smart grids and storage; carbon capture, utilization and storage; water and waste water; and agri-tech, to name just a few.

Canadian clean-tech companies are contributing to the decarbonization of both the Canadian and the global economies, and the vast majority of Canadian clean-tech firms are focused on exports.

Canadian exports of clean tech totalled approximately $7.1 billion in 2020, and our exports are expected to continue to grow as the global path towards a net-zero future is charted.

Indeed, Canada is already recognized globally as a leader in clean tech. Canada has always had a strong presence on the Global Cleantech 100 list, which tracks high-performing and high-opportunity clean-tech companies, and the 2022 list included 13 Canadian companies.

Among them are CarbonCure, a Halifax-based manufacturer for carbon utilization technologies for concrete, and GHGsat, a Montreal-based provider of satellite-based remote sensing technology for detecting greenhouse gas emissions from industrial facilities. Those are just two. Notably, all of the Canadian companies on the global list received support from the Government of Canada at some point in their development.

In that context, with your permission, I will now turn to my colleague, Kendal Hembroff, who will speak about ISED's specific efforts in supporting clean-technology businesses.

The Chair: Thank you.

We have about 30 seconds or so, but there will be rounds of questioning and opportunities to intervene.

Go ahead, Ms. Hembroff.

[*Translation*]

Ms. Kendal Hembroff (Director General, Clean Technology and Clean Growth Branch, Department of Industry): Thank you.

Recognizing the potential of clean technology to advancing Canada's environmental and economic goals, the Government of Canada has made significant investments in clean technology and clean growth, creating a robust ecosystem of programs and services that support Canadian clean technology entrepreneurs and adopters.

This includes providing funding and other support along the innovation continuum, through policy frameworks and initiatives that encourage investment in clean innovation, and targeted investments in research institutions, innovation centres and R and D networks.

As the department of innovation, science and economic development, many of these programs and services fall within our purview.

● (1110)

The Chair: Thank you, Ms. Hembroff.

You had your hand up, Mr. Mazier. Did you want to say something?

[*English*]

Mr. Dan Mazier (Dauphin—Swan River—Neepawa, CPC): Thank you, Chair.

The French and the English were at the same audio level. They weren't cancelling each other out.

I heard it, but if you can fix it for the next speaker, that would be great.

I'm on English.

The Chair: Okay.

I believe Mr. Ngan is going to deliver the three-minute opening remarks on behalf of Ms. Melzer, who's experiencing some technical difficulties.

Mr. Ngan, go ahead, please.

Mr. Vincent Ngan (Director General, Horizontal Policy, Engagement and Coordination, Climate Change Branch, Department of the Environment): Thank you, Chair, for your introduction.

I would like to begin by acknowledging that I'm speaking to you today from the traditional and unceded territory of the Algonquin Anishinabe people here in Ottawa.

[*Translation*]

I'm happy to meet with members of the committee today to discuss the clean tech study and, more broadly, the role that clean tech and innovation will have in meeting Canada's 2030 and 2050 climate objectives.

[*English*]

As you all know, the 2030 emissions reduction plan was introduced on March 29, 2022. The plan provides a credible road map to enable Canada to achieve 40% to 45% below 2005 levels by 2030 and reflects input from provinces and territories, indigenous peoples, the net-zero advisory body, stakeholders and interested Canadians.

The emissions reduction plan emphasizes the role that clean tech and climate innovation will play in Canada, achieving both its 2030 and 2050 climate change objectives, with an entire chapter dedicated to the topic.

Reaching net zero will require significant effort to accelerate both the development and the deployment of clean tech. There is increasing global recognition that such technological transitions must be accelerated through ambitious action if the world is to avoid dangerous climate impacts. Last year, at COP26, over 40 countries, representing more than 70% of global GDP, committed to accelerating clean-tech innovation and deployment in line with transforming major sectors of the economy. This represents both an opportunity to drive down emissions and a chance to generate clean growth, with global clean-technology activity projected to reach $3.6 trillion by 2030.

With a highly skilled and educated workforce, abundant access to the natural resources and energy sources critical for a net-zero future, and a thriving clean-tech industry, Canada already has the building blocks in place to seize this opportunity. However, deployment of commercially available clean tech must move faster, and innovation must also be accelerated as up to 50% of global GHG emissions reductions by 2050 will need to come from technologies that are still in the early stages of development. The future of Canada's clean -technology industry and climate commitments rests on scaling up the adoption of commercially available clean solutions and readying emerging climate innovations. The choices that Canada makes today will determine both its GHG emissions trajectory and its place in the global clean-tech market for decades to come.

Going forward, the 2030 emissions reduction plan signalled its intent to advance key measures to position the clean-tech industry for success, drive emissions reductions and spur net-zero innovation. To achieve this, the emissions reduction plan committed to strengthening federal coordination on clean tech and climate innovation through a whole-of-government clean-tech and climate innovation strategy. The strategy—

The Chair: Thank you, Mr. Ngan.

We now have to go to the Department of Natural Resources.

As I said before to Mr. Noseworthy, there will be a very large opportunity for exchanges in rounds of questioning.

I assume it's Mr. Leyburne who will be delivering the three-minute opening remarks.

● (1115)

[*Translation*]

Mr. Drew Leyburne (Assistant Deputy Minister, Energy Efficiency and Technology Sector, Department of Natural Resources): Thank you for the invitation, Mr. Chair.

I am pleased to provide some information on the efforts Natural Resources Canada, or NRCan, is making to advance clean energies.

[*English*]

Given that I'm coming to you from NRCan, you won't be surprised to hear that my remarks centre on the role of clean tech as it relates to energy and natural resources.

As you have heard from the examples my colleagues just gave, energy supply and use make up the single largest component of the clean-tech sector. For this reason, NRCan is the co-lead of the Clean Growth Hub that was just described.

Similarly, we work closely with the net-zero accelerator, with SDTC and with other agencies, such as BDC and EDC, on getting clean energy technologies into the world.

[*Translation*]

I want to spend a few minutes talking about how NRCan supports other parts of the clean tech value chain.

[*English*]

Renewable energy sources like wind and solar are now the cheapest and fastest-growing sources of new electricity in Canada. Batteries are getting cheaper too. To take advantage of this, the government is investing $964 million in the smart renewables and electrification pathways program to support projects that provide essential grid services. Budget 2022 announced another $600 million to further accelerate action on these projects.

Canada has a massive clean-power advantage, making it easier for Canadians to electrify their homes, their businesses and their vehicles. In fact, since 2015, the federal government has invested more than $1 billion to make EVs more affordable and chargers more accessible.

We're also making major strides in cleaner fuels, such as hydrogen. The hydrogen strategy for Canada was launched in 2020 as a call to action, and now we're focused on delivery, including through the $1.5-billion clean fuels fund. This fund will support at least 10 new hydrogen production facilities, along with facilities for other clean fuels, like renewable diesel, sustainable aviation fuel and renewable natural gas.

If we're going to be successful, this needs to be the most important decade ever, not just for the mass deployment of existing clean energy technologies but also for clean energy research, development and demonstration.

As my colleague noted, the IEA thinks that about half of the emissions reductions needed to hit net zero by 2050 come from emerging technologies. In Canada this figure could be even higher. That's why we're managing a portfolio of energy RD and D, like NRCan's energy innovation program. It supports federal research as well as first-of-a-kind projects like the Borden mine, which is Canada's first all-electric mine.

Most recently, budget 2021 provided $390 million to advance carbon capture, utilization and storage technologies.

We're also investing billions of dollars in areas like critical minerals and bioenergy, which will provide many of the building blocks for the energy economy of the future.

Finally, I'll just mention that to better understand the scale of these opportunities, the clean-tech data strategy was launched in 2016. Led by NRCan, ISED and Statistics Canada, it measures the contribution of the clean-tech sector to Canada's economy in order to provide evidence-based policy advice.

NRCan believes these measures, in conjunction with the others you'll hear about today, provide an important platform to ensure that Canada continues to punch above its weight in the clean-tech space.

Thanks very much for your time.

The Chair: Thank you, Mr. Leyburne.

We'll go now to Mr. Valicenti, from the Department of Agriculture and Agri-Food.

Go ahead Mr. Valicenti. The floors is yours.

Mr. Marco Valicenti (Director General, Innovation Programs Directorate, Department of Agriculture and Agri-Food): Thank you, Mr. Chair.

I'd like to begin by acknowledging that I am speaking to you today from the traditional and unceded territory of the Algonquin Anishinabe people here in Ottawa.

On behalf of Agriculture and Agri-Food Canada, I am pleased to speak to you about how clean technologies are being utilized in Canada's agriculture and agri-food sector to reduce greenhouse gases and other negative impacts, and about technologies that help to contribute to global emission-reduction targets.

Producing food to feed the world is already a challenge. We see that in the current context. Doing that sustainably is an even greater one. Farmers are stewards of the land and are taking great strides to protect the environment, but at the same time we know there is still more work to do. Supporting the development and adoption of clean technology is an important part of ensuring that farmers have the right tools they need to increase production to support global food security.

The best way forward is to identify practices and technologies that farmers can use to reduce emissions while maintaining yields. The good news is that farmers are already investing in new practices and technologies to keep their land healthy, productive and resilient. That is why the government's budget 2022 commitment of over $1 billion in new funding to reduce GHG emissions in agriculture, including $330 million for the agriculture clean-technology program, is critical as we work towards net-zero emissions. This builds on previous commitments that triple investments in the agriculture clean-technology program, supporting the development and adoption of clean technologies in this sector.

Since its launch in 2021, the agriculture clean-technology program has been well received by the sector, and 110 projects, representing $33 million, have been announced. To date, the program has supported a wide range of projects, including investing in upgrading and modernizing grain dryers; fuel switching, such as replacing coal barn-heating systems with wood waste-heating systems; and purchasing biomass boilers, to name just a few.

I would say, in the context of future agriculture clean-tech programming, there really are four areas of focus: nitrogen-reduction technologies, methane-reduction technologies, low-carbon energy systems and emission-quantification technologies, i.e., soil sensing with regard to soil carbonization. These investments will yield significant GHG reductions without negatively impacting yields. Creating an enabling environment for the development, commercialization and validation of emerging innovations that will position the sector to meet 2050 climate targets will also be instrumental. This includes finding transformative solutions like nitrogen-fixing crops, alternatives to synthetic fertilizers and low-carbon biofuels.

In closing, continued investment in existing and emerging clean technologies will help equip Canada's agriculture sector with the right tools to protect our environment, to grow the economy and to continue to build vibrant communities across the country.

● (1120)

The Chair: Thank you, Mr. Valicenti.

We'll go to our rounds of questioning. We'll have one six-minute round followed by however many five-minute rounds we can fit into our block here.

We start with Mr. Dreeshen for six minutes.

Mr. Earl Dreeshen (Red Deer—Mountain View, CPC): Thank you very much, Mr. Chair, and thank you to all the witnesses. It's certainly great to be here and to be able to talk about something that is so significant to Canada and, as we think about it, to the world as well.

Our study is going to be looking at clean technologies that are being researched, manufactured and utilized here in Canada, and how Canadian innovation and expertise can be marketed around the world to reduce global emissions. That's the goal of the study.

If we go back into the Government of Canada's Clean Growth Hub's definition of clean technology, it's where we're reducing the environmental impacts of “resource management activities that result in the more efficient use of [our] natural resources” and the “use of goods that have been adapted to be significantly less energy or resource intensive than [is] the industry standard”, and that is to be encouraged.

That's really where I want to start, because, coming from Alberta, I have seen what our oil and gas industry has done; I have seen how it relates to the technology around the world, and we should be so proud of what we have. I remember that a few years ago a spokesman from the International Energy Agency said that the difference between the CO2 intensity of traditional oil and gas developed in Canada and that of western Canada's oil sands would be equivalent to one day's worth of emissions in China.

When we try to look at the relationship between our normal oil and gas and oil sands-related intensity, there's not that much difference, but it is something that is a flashpoint for so many people, and I think that's really critical. Not only that, but we have seen such reductions in intensity, and it's because of technology; it's because of the clean...the desire for companies to say, “We are part of the solution,” and I think that really becomes something that is critical. If you listen to Canadian energy workers who ply their trade around the world, there's no country that meets our standards.

Just circling back to the Clean Growth Hub's definition of clean tech, if our oil and gas industry is already the global leader and is committed to doing even more—and, by the way, it does this without a consumer carbon tax to make it happen—I think that's something we should be concentrating on in really making this commitment.

What I'd like to see come out of this report—and this is where the departments are going to come into play—is an analysis of the full environmental impact of every type of energy source that we are looking at in the future and that we have at present, from the first shovel we use to dig it up to the last shovel we use to safely cover it up. We need to talk about electrical power transmission lines and hydrocarbon pipelines, and from flooded valleys for hydro dams to abandoned oil wells and to procurement, through to mineral exploration in our own backyard and the importation of products from countries with little regard for the environment or human rights. We can make the intelligent decisions if we are prepared to measure it all.

As someone who is involved in agriculture as well, I think that perhaps some of the starkest reminders of this are right in front of us. Ukrainian farmland is being mined; grain storage facilities are being bombed, and electrical grid systems are being destroyed. Countries are reverting to reliable coal to keep their industries functioning; plans to shelve nuclear plants are being thrown out the window, and countries that have put all their eggs in the “just transition” basket are scrambling just to stay afloat.

I think that our Canadian environmental ingenuity is going to make a difference, but we also have to make sure that we play to our strengths as well. As this vast northern country where the majority of us live below the 50th parallel, we have to look at all of what is involved in the country in general.

What I would like to ask—and I appreciate having been given the time to set the stage for what I feel this report is all about—and talk about is agriculture. If we look at the RBC report describing “Six pathways to Net Zero” and its focus on agriculture, the authors estimate that it's going to take $2.5 billion annually of spending in the sector, with the key focus on helping farms store carbon.

We don't see a lot of money coming into this from budget 2022, and certainly not enough to tie into what the RBC report says, so my question is, what metrics were used and what criteria were employed to pick the technologies that were being funded? Also, could you please provide the results so far—the breakdown between administrative costs versus actual technology investment—within this program?

● (1125)

Before I give you the minute left that you might have to answer that question, I want to focus on the concept of our fertilizer reductions. Coming from where I do, where Olds College is a main factor in new technology, I really think that people should be paying a bit more attention to the realities of agriculture.

To the agriculture department, could you fill me in on some of the thoughts you have?

The Chair: You have about 40 seconds, please.

Mr. Marco Valicenti: I would just mention that, in the context of budget 2022, we received $1 billion in environmental programming, and $330 million of that was in the clean-tech program, but also programming that looks at on-farm adoption. That's where we are looking at nitrogen reduction efficiency technologies in engagement with both manufacturing and processing. It's also with producers on the ground, through our on-farm climate action fund, as well as our living labs, where we're collaborating with producers to look at the best management practices in the context of...whether it's nitrogen fertilizer, or even methane reduction.

The Chair: Perfect. Well done, Mr. Valicenti. In the 40 seconds you had, you packed a lot in.

Ms. Thompson, you have six minutes, please.

Ms. Joanne Thompson (St. John's East, Lib.): Thank you, Mr. Chair, and welcome to the witnesses.

My first question centres around Impact Canada initiatives. I believe it's for the Department of Industry, but if there is someone else who wants to jump in, please do.

This initiative is a whole-of-government approach, led by the Privy Council Office. It uses a challenge approach to funding to encourage innovators to participate in solving collective challenges, and issues “prizes for whoever can first and most effectively find a solution to a defined problem, and/or mak[es] use of structured, open competitions to solicit proposals to fund the best ideas with the potential to solve thematic problems.”

The clean-technology stream announced in budget 2017 is one of the first program streams of this initiative. It was scheduled to conclude in March of 2021, but was extended into 2022, obviously, because of the impact of COVID.

My question is, to what extent did the clean-technology stream of the Impact Canada initiative further investment in and development of clean-tech enterprises in Canada?

The Chair: Who is that question for?

Mr. Drew Leyburne: I'm happy to respond.

The Impact Canada clean-tech stream was a program managed out of NRCan. I'm happy to report that, as we come up to the end of that first cycle of programming, it's been a very successful program in attracting new entrants to some of our traditional grant and contribution programming that we wouldn't otherwise have seen.

That initiative was split into initially five, but eventually six initiatives: Women in Cleantech; The Sky's the Limit, which was looking at green aviation fuel; Power Forward, which was looking at power grid; Crush-It!, which was looking at comminution, which is the crushing of rocks in a very energy-intensive industry; the Indigenous Off-diesel Initiative, which supported 15 indigenous communities in transitioning to clean energy; and Charging the Future, which was a made-in-Canada battery innovation program.

As you noted, we are just at the end of that program cycle. However, the initial results have been really impressive in terms of the leveraging we've been able to get from private-sector investment. In fact, I believe it's today that the winner of the final challenge, Crush-It!, which is the rock-crushing challenge, will be announced at PDAC.

The first of the challenges was announced in December, and Margaret Atwood revealed the winner, who was a Women in Cleantech recipient. There were a few members of that cohort who started their companies expressly to apply for this challenge. We found that by having a prize as opposed to a traditional grant or contribution, we attracted a new kind of player, and that's part of what we wanted to do with this program.

● (1130)

Ms. Joanne Thompson: Are there other clean-tech challenges planned? We're coming to the end of that cycle. Is there anything else that you hope to bring forward?

Mr. Drew Leyburne: The Impact Canada program is very active across government right now, with multiple departments, including, I think, the ISED portfolio, the Space Agency and a few others. We are just in the midst of looking at what the next generation of programming related to that might look like, because the program did officially sunset as of April 1 this year.

Ms. Joanne Thompson: If I lean back to another question that is similar to this, the Clean Growth Hub takes a whole-of-government approach to clean technology.

It's obviously co-chaired through your department, with 15 other member entities. How does the federal government ensure effective collaboration between the members of the Clean Growth Hub, and how can this collaboration be improved?

Mr. Andrew Noseworthy: Perhaps I could take that on, on behalf of the departments participating in the hub.

The hub is an interesting organization. It includes 17 departments and agencies. We collaborate in a number of ways. Pre-COVID, its most practical feature was that the majority of the departments working with the hub were physically located in one location and worked collaboratively on key projects. Since COVID, it's been a bit challenging to keep that culture moving among departments, but we have found that, in dealing with clients, the level of interaction on a day-to-day basis has been strong and consistent, notwithstanding the fact that we had to move most of our discussions to virtual ones.

The reality is, when you come to the hub, you don't just meet one department. You meet all the departments that might have any relative bearing on the project or proposal you bring forward. We certainly see ourselves, within ISED and NRCan, as the coordinators for all of that work bringing relevant folks together. Essentially, the hub is a mechanism that works as a “no wrong door” approach for all clean-technology companies seeking to gain access to the federal system. Our assessment, based on client feedback, is that it's worked relatively well. Approximately 2,300 clients have been through the hub to date.

Ms. Joanne Thompson: How effective would you say this whole-of-government approach is in reducing administrative burdens on clean-tech companies seeking opportunities with the federal government?

Mr. Andrew Noseworthy: My personal view is that it's indeed been effective.

One of the things we succeed in doing, through the hub, is taking the burden off companies as they figure out where they need to go and how they need to navigate the system. The folks from all departments working in the hub see a collective responsibility to ensure that companies get through the system efficiently, with all other relevant people around the table. This reduces the need for companies to navigate through and find their own path.

[*Translation*]

The Chair: Thank you.

Go ahead, Ms. Pauzé.

Ms. Monique Pauzé (Repentigny, BQ): Thank you, Mr. Chair.

Thank you to everyone who is here today to help us better understand this topic.

Mr. Noseworthy said that the clean technology sector grew by 15% between 2012 and 2020. Then, the deputy minister from the Department of Natural Resources told us that wind and solar were the cheapest and fastest-growing sources of new electricity in Canada.

However, according to a Library of Parliament briefing note, NRCan data show that, in Canada, renewable energy sources account for less than 5% of electricity generated by wind, biomass and solar power.

Is that accurate? Do renewable energy sources account for just 5%, even though they are the cheapest and fastest-growing sources of electricity?

● (1135)

The Chair: Who is the question for, Ms. Pauzé?

Ms. Monique Pauzé: It's for the deputy minister from the Department of Natural Resources, since I'm going by data he provided.

The Chair: Can you answer the question, Mr. Leyburne?

[*English*]

Mr. Drew Leyburne: I'm happy to jump in and perhaps have my colleague André Bernier add further detail.

Yes, renewable energy, particularly from wind and solar, are incredibly fast-growing in Canada, but they are starting from a small baseline. We have generations of electricity-generation equipment and infrastructure still making up the bulk of our power generation. However, with the trajectory we're seeing in some of these renewables, in terms of both cost and application, we expect those numbers to increase drastically over the coming decades.

André, did you want to add anything further?

Mr. André Bernier (Director General, Electricity Resources Branch, Department of Natural Resources): Thank you very much, Drew.

Putting aside hydroelectricity—which is, of course, the backbone of our system and a renewable source of energy—and focusing on wind and solar, it is, I think, in the neighbourhood of 6%, 7% or 8%. However, as Drew indicated, we expect these to grow very rapidly over the coming years, wind in particular.

I hesitate to make a projection as to what role it might play, but there's a lot of unexploited potential. Certainly, by 2035 or 2050, we would expect the capital stock of wind to be a significant multiple environment—

[*Translation*]

Ms. Monique Pauzé: Sorry to cut you off, Mr. Bernier.

Mr. Leyburne, in your opening statement, you talked about hydrogen, which can be produced from fossil fuels or water—water being a renewable energy source.

Which type of hydrogen were you talking about?

[*English*]

Mr. Drew Leyburne: Generally speaking, we're looking at any hydrogen that can be developed cleanly. While you will sometimes hear about various colour schemes, with blue representing hydrogen derived primarily from natural gas using carbon capture and storage, or whether you're using hydrolysis for what is sometimes called green hydrogen, we're really trying to move beyond colour-coding and focus on the carbon intensity of the fuel.

What we want are hydrogen and other cleaner fuels that are significantly cleaner than their current alternatives, so when we talk about the hydrogen strategy and about the work we're doing in R and D, we're talking about all forms of cleaner hydrogen.

[*Translation*]

Ms. Monique Pauzé: Forgive me, but that's not an answer. It's fine to move beyond colour-coding, but hydrogen can be derived from fossil fuels, and that doesn't help reduce our carbon footprint.

I have a question for Mr. Ngan, of Environment and Climate Change Canada.

You said that Canada already had everything it needed, including water treatment capacity and agri-tech. However, according to the information we have, in 2020, clean technology exports represented $7.1 billion, while clean technology imports were nearly double that.

I'm curious to know which clean tech products we import.

The Chair: Who's going to take the question?

Ms. Monique Pauzé: I would like Mr. Ngan, of Environment and Climate Change Canada, to answer that. He's the one who talked about it.

The Chair: All right.

The floor is yours, Mr. Ng.

[*English*]

Mr. Vincent Ngan: In my opening remarks, I talked about the importance of the deployment and development of clean technology in Canada. That being said, I do not have the information currently available at my fingertips in terms of the technology that is imported to Canada. That means that I would like to open the floor to my colleagues in Natural Resources Canada or Innovation, Science and Economic Development Canada, should they have any examples to provide of the types of technologies that are currently imported to Canada.

● (1140)

[*Translation*]

Ms. Monique Pauzé: Since I'm almost out of time, I would indeed like to get that information. I am very intrigued to know the answer. Would you mind getting back to us with the information in writing?

In terms of clean tech, we know that the government spent $276 million on renewable and non-emitting energy R and D, including nuclear energy.

My question is for the NRCan officials. What portion of that $276 million was spent on non-nuclear renewable energy?

All I want is the figure, please.

The Chair: Does anyone have the figure Ms. Pauzé is looking for?

If not, you can get back to the committee in writing through the clerk.

[*English*]

Mr. Drew Leyburne: If she's referring to the SREPs program that I mentioned in my opening comments, I'll turn it over to my colleague André Bernier, who can give a better sense of what technologies are in scope.

The Chair: We just need a number, though, I think.

[*Translation*]

You're looking for just a figure, Ms. Pauzé, are you not?

[*English*]

Mr. Drew Leyburne: I suspect that we would not have allocated it out by technology space, but I'll—

The Chair: Thank you.

If you have something, could you send it in writing to the clerk?

[*Translation*]

Ms. Monique Pauzé: I'll provide a bit more context to help the witnesses locate the right figure. The government spent a total of $758 million on research, development and demonstration. I'd like to know what portion of the $276 million went to non-nuclear energy.

I'll expect the answer in writing.

The Chair: Thank you.

Ms. Collins, we now go to you.

[*English*]

Ms. Laurel Collins (Victoria, NDP): Thank you, Mr. Chair.

Two weeks ago, the David Suzuki Foundation released a report, "Shifting Power: Zero-Emissions Electricity Across Canada by 2035". The report modelled clean electricity pathways and found that Canada can reach 100% zero-emissions electricity by 2035 by prioritizing "wind, solar, energy storage and interprovincial transmission", while avoiding the need for large new hydroelectric projects, new nuclear generation or carbon capture and storage technologies in the electricity sector.

The federal government has an objective of achieving a clean electricity standard with a net-zero emissions electricity grid by 2035. I'm curious: Does the government plan to achieve that standard using renewable energy technology, such as solar panels or wind turbines, versus using "expensive and immature carbon capture and storage" on electricity generated using fossil fuels? This is directed towards Mr. Ngan.

Mr. Vincent Ngan: Thank you.

My colleague Judy Meltzer is here, and I will turn to her to talk about the performance-based standard pertinent to our regulatory regime. I would also defer to our colleagues at Natural Resources to talk about the deployment of renewable energy.

Ms. Judy Meltzer (Director General, Carbon Market Bureau, Environmental Protection Branch, Department of the Environment): On that question, I would suggest that we're in the early stages. As you know, there is a commitment to develop a clean electricity standard. Details of the approach are in development and consultation. That said, it is expected that this type of regulatory initiative, combined with others that are already in place, including, for example, economy-wide instruments—

Ms. Laurel Collins: I have a very limited amount of time, and I'm curious to know whether you're planning on achieving it mainly through solar panels and wind turbines—

The Chair: Excuse me, Ms. Collins. You're too close to the mike.

Ms. Judy Meltzer: At this point, it's too early for the department to provide details on the approach, but we certainly will continue to provide details as the approach is developed.

Ms. Laurel Collins: Do you have a sense yet of how the clean electricity standard will recognize provincial jurisdiction over electricity mix decisions?

Ms. Judy Meltzer: I can't answer that question at this point in time.

Ms. Laurel Collins: Anything on the—

Ms. Judy Meltzer: I will say that there may be some additional follow-up from our department. That's not a lead file for me, so we can reconfirm. If we can provide additional information on that, we will certainly do so.

The Chair: Yes. If you can, please do, and in writing.

Ms. Laurel Collins: Please send anything you can to the committee.

Yesterday President Biden announced that he will be using the Defense Production Act to accelerate the manufacturing of solar panels in the United States and allow rapid expansion of power grid infrastructure like transformers, heat pumps and building insulation. If Canada doesn't rapidly scale up the adoption of available clean technologies, do we risk being left behind and missing the opportunity to be a leader in the green economy? Do you think Canada could use its Defence Production Act in a similar way?

Maybe the Department of Industry could start.

● (1145)

Mr. Andrew Noseworthy: We're seeing a rapid increase in the development and deployment of clean technologies across the spectrum. That is happening globally. In fact, it is happening so fast we're finding it difficult to track with reliable statistics what is actually happening out there, especially over the course of the last two years. We think there's been a profound change.

In that context, our ability to deploy any and all policy and program tools to take advantage of the market opportunity that's out there globally and also to allow for the transformation in the Canadian economy, is a good thing.

Ms. Laurel Collins: Out of curiosity, have any of the departments, or has anyone on this call, had a conversation around using the Defence Production Act to accelerate the production of these kinds of things—solar panels, heat pumps and so on? Has that conversation come up?

That question is for the industry, natural resources and environment departments.

Mr. Drew Leyburne: This announcement was made by the U.S. yesterday. I don't think there's been any detailed analysis of the similarities in terms of how the Canadian instruments could be used.

I will say that part of the President's announcement yesterday involved the important role that the federal government can play in the procurement of clean technologies. The buy clean initiative that was announced and supported through the emissions reduction plan in budget 2022 is very much in the same vein.

Mr. Vincent Ngan: To add to that, Canada will build on the greening government strategy to reduce GHG emissions and support the market of emerging climate innovations by developing procurement requirements for green federal buildings and construction materials, fleet fuels, electricity, and other high-carbon goods that the government buys.

It's definitely part of the emissions reduction plan and the greening government strategy.

Ms. Laurel Collins: Thank you.

Will the government be looking at the Defence Production Act, moving forward, as a possibility? Is that conversation coming up now?

Mr. Vincent Ngan: We do not have that information at this point, but we're happy to take it back.

Ms. Laurel Collins: Please follow up with any additional information.

The David Suzuki Foundation report on zero-emissions electricity, which I mentioned earlier, estimated the number of jobs that would be created by pursuing a renewable electricity pathway:

> There would be...1.5 million person-years of direct employment resulting from the construction, operation and maintenance of new wind, solar and transmission lines alone between 2025 and 2050, growing to support over 75,000 full-time jobs each year. This...does not include the additional jobs that could be created if wind turbines and solar panels were manufactured in Canada....

If the renewable industry had high levels of confidence that wind, solar and storage were going to be built out at the scale envisioned in these pathways, is it likely that more companies would find it worthwhile locating some of their manufacturing here in Canada?

The Chair: I have a feeling that's not a yes-or-no question, so we'll maybe have to get the answer in response either later on or to anyone else who's interested in this answer.

We'll go now to the five-minute round, starting with Mr. Carrie.

Mr. Colin Carrie (Oshawa, CPC): Thank you very much, Mr. Chair.

I am wondering if I could have a check on my audio with the translators.

The Chair: It seems to be okay.

Mr. Colin Carrie: Excellent.

Thank you very much to the witnesses.

As the member of Parliament for Oshawa, the automotive industry is a big deal for me. Recently, the auto industry gave the government a report card based on the seven priorities of the government. Unfortunately, we got an “F” on three of those priority areas. One that we got an “F” on was harmonization or alignment of regulations in North America. The other “F”s were on the status of our hydrogen fuelling stations and the luxury tax on zero-emissions vehicles. The government is moving Canadians towards buying these vehicles, and some of them can be very expensive.

The question would be for the Department of Industry first.

How are we doing in moving to align our regulations across North America? Having unique regulations here in Canada really affects our competitiveness. I am wondering if you could give me a status update on that.

Ms. Kendal Hembroff: The question that's been asked by the member in terms of harmonization of regulations across North America really falls outside the scope of my specific responsibilities. If it's helpful, we can either provide that information in writing or we can provide a suggestion in terms of another witness from our department.

● (1150)

Mr. Colin Carrie: Yes. If you could provide that, that would be absolutely excellent.

I hear over and over again the concern about jobs as we transition into the green economy. I believe there are over 300 communities that rely on the traditional energy supply—fossil fuels. I am wondering if you could update the committee on the plan for a just transition for these Canadians who rely on the traditional energy sector for their jobs. How is that coming along?

Ms. Kendal Hembroff: Again, Mr. Chair, my specific responsibilities are in terms of clean technologies and clean growth. I am most definitely not an automotive expert.

If it's helpful, I can certainly provide some examples of some of the work we've been doing in terms of mines to mobility and strengthening the battery supply chain, but I don't believe that's the specific question that's been asked by the member here.

Mr. Colin Carrie: All right.

I would be interested if you could comment on the mine situation. I hear the concern about having supply chains intact and ready to go, as the government is moving very aggressively to having Canadians adopt technologies such as zero-emissions vehicles.

Canada has resources here. I am wondering if you could update us on things like how we are we doing as far as getting a new mine opened up. What are the timelines for that? When automotive companies are making investments, they look 10 years out, 2030 to 2035, and they're looking for certainty.

Kendal, I am wondering if you could update the committee on the mining situation and getting those mines up and running.

Ms. Kendal Hembroff: Mr. Chair, I can certainly update the committee that Canada has adopted a whole-of-government approach, led by ISED, NRCan, and other government departments, in developing a robust mines-to-mobility battery supply chain. That is really aimed at establishing a new manufacturing sector in Canada to support our overall climate change and industrial goals.

We have seen a number of leading battery and automotive manufacturers that have moved very quickly to establish production hubs in Europe and North America. We have been very actively engaging foreign investments in the battery supply chain for electric vehicles, using programs such as the strategic innovation fund's net-zero accelerator, which is aimed at supporting this industrial transformation mandate.

Mr. Colin Carrie: I understand that there's money being put into it. My concern is that the auto industry said there's a challenge with battery supply, especially with 2024 approaching, and the scarcity.

Understanding the requirement to have these supply chains consistent and available for Canadian manufacturers, have there been any new mines opened up since we've moved forward?

The Chair: Go ahead briefly, please, Ms. Hembroff.

Ms. Kendal Hembroff: In this case, on the question of mines, I'm going to defer to my colleague, Mr. Leyburne.

The Chair: Go ahead briefly, please, Mr. Leyburne.

Mr. Drew Leyburne: On the question of mines, we can get back to you with a specific list of mines that are opening or have opened and the pace at which those mines are being created. Many of those are within provincial jurisdiction.

As part of budget 2022, we proposed $3.8 billion over eight years to implement Canada's critical minerals strategy. That will obviously help create the critical minerals value chain for the processing and battery precursors industry, which is essential to seeing some of those electric vehicle batteries produced.

The Chair: That's perfect.

We'll have Mr. Duguid for five minutes.

Mr. Terry Duguid (Winnipeg South, Lib.): Thank you, Mr. Chair.

This question will be for Industry. It relates to innovation, which is the source of clean tech, of course.

We have a very robust and aggressive emissions reduction plan. There are targets for emissions and very detailed plans for getting to our minus 40% to 45% targets, but, to my knowledge, there are no targets for market share of clean technology or a plan on how to get there. Our Industry colleagues will know, through budget 2022, that there was a pretty stark admission by the finance minister on our having work to do on the productivity and innovation front.

I wonder if Mr. Leyburne or Ms. Hembroff might comment on this.

How do we overcome the barriers in the innovation space? We have great research. We have the $15-billion growth fund, an AI strategy, quantum computing, genomics, and the Canada Infrastructure Bank, yet we don't seem able to put all of this together to create growth and wealth. As our Prime Minister and others are fond of saying, the environment and the economy go hand in hand. As Ms. Collins pointed out, there are a lot of jobs to be gained for our country if we excel in this space and set some goals and targets for ourselves.

I'd like a comment from either of you.

● (1155)

Ms. Kendal Hembroff: I'm not sure who should start, Mr. Chair, but I can start by discussing the fact that there are, indeed, a number of challenges faced by Canadian clean-tech companies, the majority of which are small and medium-sized enterprises. That really presents some fairly unique challenges in terms of accessing available financing, commercialization and scaling up.

We are also very aware of the fact that many clean-tech companies need to be able to demonstrate their technologies, either domestically here in Canada, in order to encourage adoption, or internationally, if they're pursuing international markets. There are a number of federal programs in place designed to address these types of unique challenges. I can speak about a few of these programs on the ISED side, and perhaps other departments, including NRCan, can talk about some of the other programs available.

One of these is Sustainable Development Technology Canada, or SDTC, which supports Canadian companies with the potential to become world leaders in their efforts to develop and demonstrate new environmental technologies. We also have the strategic innovation fund, which is an $8-billion initiative to support large-scale, transformative and collaborative projects. We have programs for the earlier, innovation stage of things, including the National Research Council's industrial research assistance program, or IRAP, which provides assistance in building innovation capacity.

These are just a few examples of programs designed to boost the competitiveness of our Canadian clean-tech sector.

Mr. Terry Duguid: My time is running down, so perhaps Mr. Leyburne can provide a comment to the next question I'll be asking.

I'm very interested in the international dimension of reducing emissions, which Mr. Dreeshen mentioned in his opening remarks. Canada recently signed an MOU with India on renewable energy and climate change, and we have an organization that partners with China on environmental co-operation. It would seem to me that our technology transfer policy is something very important to consider. In particular, I'm thinking of technologies like CCUS; we know India and China will be dependent on coal for some time.

I wonder if you would have a comment on that. Have we thought deeply about technology transfer that doesn't just benefit ourselves, with 2% or 3% of the world's emissions—one of the highest rates per capita? Have we thought about technology transfer in a deep and important way?

The Chair: Give a brief, 10-second response, please.

Mr. Drew Leyburne: The briefest answer is, yes.

The Chair: Good. That's what we've been thinking.

Mr. Drew Leyburne: There's multilateral collaboration. We're doing it through climate finance and we're doing it through the UNFCCC.

[*Translation*]

The Chair: Great. Thank you.

Ms. Pauzé, you have the floor for two and a half minutes.

Ms. Monique Pauzé: Thank you, Mr. Chair.

My question is for one of the NRCan officials.

The federal government has an objective of achieving a clean electricity standard with a net-zero emissions electricity grid by 2035. That means the government is establishing a federal standard.

How will the clean electricity standard recognize provincial jurisdiction over electricity mix decisions?

● (1200)

[*English*]

Mr. Drew Leyburne: I'll defer to my colleagues at Environment Canada, who are responsible for the development of the standard.

Mr. Vincent Ngan: Absolutely. This is Vincent Ngan. Although I'm not the lead on the clean electricity standard, Environment and Climate Change Canada has launched a consultative process by sharing discussion papers with provinces, territories and stakeholders.

At this point, we are still gathering input from interested parties and our partners in all jurisdictions, so on the question about compatibility and the recognition of jurisdictional standards through the regulatory development process, we'll be able to dive into that a bit more.

At this point, we do not have a specific answer to that question.

[*Translation*]

Ms. Monique Pauzé: Jurisdiction is always a very tricky issue.

My next question is also for the NRCan officials.

NRCan is responsible for the clean growth hub, an initiative that is co-led by Innovation, Science and Economic Development Canada.

This question is similar to my last. How does the federal government ensure that the clean growth hub team works effectively with the provinces?

[*English*]

Mr. Drew Leyburne: Yes. On this one, the hub is a joint leadership between our department and the Department of Industry, but I'll turn to my colleague, Anna van der Kamp, to talk about the NRCan perspective on this, and then perhaps over to Kendal.

Ms. Anna van der Kamp (Director, Policy Analysis and Coordination, Department of Natural Resources): Thank you very much.

Certainly, I can turn to Kendal, but we do have MOUs in place with several of the provinces, including B.C. at this point. That is our way of being able to share data back and forth about programs and companies.

Kendal, I don't know if you want to add more there.

The Chair: Be brief, please.

Ms. Kendal Hembroff: I don't have much to add. We have ongoing collaboration with the provinces and territories, including through the Clean Growth Hub and a number of other programs. I would say that collaboration is really quite high.

The Chair: Thank you.

Go ahead, Ms. Collins.

Ms. Laurel Collins: Thank you, Mr. Chair.

While some carbon capture or some carbon removal will be needed to reach net zero by 2050, the IPCC has said that carbon capture and storage is one of the least effective and most expensive options to address the climate crisis. This committee also heard in its last study on fossil fuel subsidies that carbon capture should be reserved as an option of last resort to reduce the emissions intensity of heavy industry sectors that are hard to decarbonize, such as concrete and steel. We heard that from a number of witnesses.

What rationale is there for the emissions reduction plan, released this spring, to rely so heavily on carbon capture, with relatively little investment in renewable energy in comparison?

What proportion of the $8-billion net-zero accelerator fund will go towards carbon capture technology?

Mr. Drew Leyburne: I'm happy to start on the general questions on CCUS and turn it over to my colleagues on the net-zero accelerator.

We are as interested in CCUS as we are because of its broad applicability across the Canadian industrial sector. Then, yes, the hardest to decarbonize sectors, like steel, cement and aviation fuels, will require some form of carbon capture, we think, in order to be compliant with a net-zero future.

That's also true of decarbonizing our economy today. That's why industries like oil and gas are looking to CCUS to tackle the real-world emissions that they would otherwise be making this decade and beyond.

We see this as a technology that is necessary. Yes, the cost of carbon capture needs to come down in a similar way to the cost of solar, wind and other clean technologies over the last few decades. We hope CCUS is on a similar trajectory.

Ms. Laurel Collins: How much of the $8-billion net-zero accelerator fund will go toward carbon capture technology?

Ms. Kendal Hembroff: Chair, there is no specific target or allocation in terms of the amount of money under the SIF NZA that will be allocated to CCUS. I can say, though, that just a few months ago, the Government of Canada launched a call to action for large emitters under the NZA, with the deadline for applications being June 30. We expect that we will receive some applications for CCUS projects, but at this point I can't comment on any—

Ms. Laurel Collins: I'm sorry to interrupt. It's just because I have a very short amount of time.

As of April 2022, the strategic innovation fund has funded two large emitter projects with obligations to reduce carbon dioxide emissions by six million tonnes per year by 2030. The cost per tonne of GHG reductions from the federal government is $66 a tonne for Algoma Steel and $133 a tonne for ArcelorMittal Dofasco. How will the government ensure that those investments will actually achieve the planned emissions reductions?

● (1205)

The Chair: Unfortunately, we don't have time for an answer at this point.

We'll go to Mr. Mazier.

Mr. Dan Mazier: Thank you, Chair, and thank you to the witnesses for coming out today.

The government's “adoption stream” of the agriculture clean-technology program was designed to fund “the purchase and installation of commercially available clean technologies” for Canada's agriculture and agri-food sector. In March 2022, the government suspended this important stream because of high demand. Why did the government suspend this program, which was obviously working for Canadian agriculture?

Mr. Marco Valicenti: There was a decision at that time to suspend the program intake, partly because of the budget available for that for the first two years. However, as I mentioned in my opening remarks, in budget 2022 the government decided to triple the amount of funding for the program for an additional five years, and we're very pleased. We're very pleased that it will be part of the money available to address the backlog.

Mr. Dan Mazier: Even if you do triple it, how do you know that's going to fit the demand? I think what I'm worried about here is that you have a bunch of farmers investing in this, and it's obviously working for them and it's reducing emissions, which is everybody's goal, but how do we know that this is not going to happen again? This builds a whole bunch of uncertainty into it. What's the guarantee that this won't happen to another program or to another industry, especially agriculture?

Mr. Marco Valicenti: Again, I'll say that we are diligently going through the applications that are in the system. Just to be clear, we're prioritizing those with the highest potential for GHG reduction. That's where we want to focus our attention in the context of the cost per tonne and reducing that from the various technologies we're looking at.

Whether we talk about nitrogen reduction, methane reduction, low-carbon energy use or emission qualification technology, we are looking at trying to identify the best potential of those that are in the backlog. That's where I would say we're focusing our attention right now.

Mr. Dan Mazier: Increasing fertilizer production and upgrading waste-water facilities are both very important, especially with water quality. There is an environmental opportunity between the two, by removing phosphorus from waste water and then using that phosphorus on the land for farming. Where I come from, in southwestern Manitoba, we have quite a deficit of phosphorus.

Could the departments get back to this committee in writing and provide information about how much federal funding has been invested in this clean technology since 2015? I'm not sure which department would do that, but if you could identify that and get back to us....

The Chair: Maybe the departments could speak amongst themselves and, if a joint answer is required, they can work on it together. If not....

Mr. Dan Mazier: Okay. Do I have a commitment for a report back, then?

The Chair: Yes.

Mr. Dan Mazier: That's good.

In 2018, NRCan and ISED launched the Clean Growth Hub, one of the core functions being to “[s]trengthen federal capacity to track and report on results related to clean technology investment”.

Can NRCan and Industry please get back to this committee in writing with all the results reports related to clean-tech investment?

I see some heads nodding.

Mr. Drew Leyburne: Yes.

Ms. Kendal Hembroff: Yes, we can do that, Chair.

Mr. Dan Mazier: That's excellent.

The Clean Growth Hub's website lists 37 clean-tech funding opportunities. Out of all the government funding provided for clean tech, what percentage of the projects reach commercialization stage after they receive government funding?

Ms. Kendal Hembroff: Mr. Chair, I don't have the answer to that question handy. We do an annual survey of clients of the Clean Growth Hub and can take a look to see whether or not we have data that could be helpful for the committee. For example, one of the key data points is the success rate of Clean Growth Hub clients and what success looks like in terms of scaling up, commercialization, sales or export. We'll see what we can find that would be helpful.

Mr. Dan Mazier: Yes—

Mr. Drew Leyburne: I'm sorry.

The only other thing that I might ask, through the chair, is whether there's a time horizon you would like to see. For some of these investments—I'm thinking of some of the earlier-stage RD and D efforts, for example—the payback period may not be in two or three years; it may be by the end of this decade, but it is nevertheless essential.

● (1210)

Mr. Dan Mazier: I mean perhaps for anything that got to commercialization from 2019 and forward, that kind of thing. We'll see where the data comes back, but I mean some kind of report. I think it's important to realize our outcomes and see if they are getting to commercialization, since that's probably the most important part of the whole plan. We have to get this technology to market and get it commercialized.

The Chair: We're now out of time, Mr. Mazier.

We'll go to Mr. Weiler for five minutes.

Mr. Patrick Weiler (West Vancouver—Sunshine Coast—Sea to Sky Country, Lib.): Thank you, Mr. Chair, and thanks to the witnesses for joining us today.

My first question is for Mr. Noseworthy, through you, Mr. Chair.

You mentioned that clean tech provided over 200,000 well-paid jobs in 2020.

I'm curious: Are those direct or indirect jobs?

Mr. Andrew Noseworthy: My understanding is that they are direct jobs. I don't know if Kendal has more specific information on the survey on salaries and employment from StatsCan. If not, sir, we can provide it to you later.

Ms. Kendal Hembroff: Yes. I think that would be best.

Mr. Patrick Weiler: For Mr. Leyburne, how does that compare to the number of direct jobs in the oil and gas sector?

Mr. Drew Leyburne: I think the direct number, from memory, is closer to 150,000, but I can get back to you with exact numbers on direct jobs.

As is the case with attribution of indirect, there are going to be some jobs that are both clean-tech jobs and oil and gas jobs, particularly when you are looking at indirect, in terms of how we classify it under the NOC codes.

Mr. Patrick Weiler: Absolutely.

One of the questions and ideas that came up before is about the challenge of commercializing in Canada. We have great research and innovation being done, but we've had challenges from a commercialization point of view. Ms. Hembroff mentioned some of the investment and incentive programs we have in place.

I'd like to ask Environment and Climate Change Canada what role they see for regulations and market-based systems for commercializing and deploying more clean tech within Canada.

Ms. Judy Meltzer: It's a really important question, because regulations are a critical part of that mixture of push and pull factors. Regulations create a very strong incentive and also demand for clean technologies.

I'll give one concrete example, since I recognize that we have the limited time.

One example is the forthcoming clean fuel regulations. These will create a strong incentive to bring forward clean technologies and low-carbon fuels across the life cycle, including large-scale projects in the upstream of oil and gas, for example, as well as low-carbon fuels and shifting end-use technologies.

I'll give one very concrete example. Federated Co-operatives Limited and their announcement to invest $1 billion in a renewable diesel plant is explicitly the result of this strong demand that is coming from the regulatory framework in this context. We know this works in conjunction with investments.

For example, NRCan's clean fuels fund ensures that there is significant support and de-risks investment in these technologies, and the regulatory framework has created a strong incentive and demand for these technologies. In this case, across the life cycle, carbon pricing provides a similar signal; it's technology agnostic and it's sending signals across the economy. Depending on the price point, it creates a strong incentive and levels the playing field for the clean technologies.

I'm happy to follow up with some other concrete examples.

Mr. Patrick Weiler: That's great. Thank you very much.

Another line of questioning that's come up is about renewable energy in Canada. Given that the provincial governments are in charge or have jurisdiction over developing and delivering electricity, it may not matter that we have world-class potential for solar and wind on much of the Prairies if the provincial governments don't want to pursue it.

My question is for Mr. Leyburne.

How will Government of Canada programs like the smart renewables program be able to incent more development and deployment of renewable energy in Canada?

Mr. Drew Leyburne: I'll say a couple of words and then turn it over to my colleague, André Bernier.

There are a few things at play. You mentioned the SREPs program, which is encouraging renewable power generation and interties, but there's also work with the Canada Infrastructure Bank and through the regional energy tables that Minister Wilkinson announced last week. I know that electricity interties and electricity generation will be major features of many of those discussions with provinces.

André, I'll turn it over to you.

Mr. André Bernier: Thank you very much.

A comment from the perspective of most provinces and territories, which are the primary decision-makers in this area, is that maintaining affordability is a top-of-mind concern. In that regard, renewables are increasingly competitive, if not competitive.

Always, from the perspective of a system, they need to be part of a system that also provides baseload. I don't know that there's a lot of resistance to their uptake; it's a question of what role they can play in the system.

Our programming does provide direct financial incentives for greater uptake of renewables, which also is helping to pull investments earlier in time, so that we see emissions reductions sooner rather than later.

The nature of the project affects the level of incentive. We were able to allocate the entire envelope for the smart renewables program in its first year of operation, so uptake has been very strong—there's no resistance.

● (1215)

The Chair: Thank you. We have one more round.

So that we fill up the time we have left, I'm going to add a minute to everyone's questions, so it's six, six, 3.5, 3.5, six and six.

Mr. Carrie, you have six minutes, please.

Mr. Colin Carrie: Thank you very much, Mr. Chair. I think my question will be for Mr. Leyburne.

I believe you mentioned a program that you have—power off or something like that—whereby you're partnering with the provincial governments in regard to the grids and upgrading.

Again, coming from Oshawa, I have the automotive lean on the question. The auto industry is stating that we need to have one charging station for every 10 vehicles. If the government is mandating 40 million all-electric vehicles by 2035, how is that going to work with our grid system?

Currently, if we all had electric cars, how many cars could be plugged into the grid we have now without causing brownouts? Do you know?

Mr. Drew Leyburne: We could get back to you with the numbers we have.

This is a major question that electricity planners around the country are trying to figure out: the appropriate demand management peak. They call it peak shaving, trying to create demand for electricity when it's least demanded to try to smooth out the curves. The smarter grids get, the better they will be at accommodating these mass fluctuations.

We have to remember that electric vehicles, as an example, are not a one-way street. There are situations in which electric vehicles themselves can be used as part of a smart grid and give power back to the system. That is something that we are seeing around the world.

André, I might just pause to see if you have any further commentary on what planners are doing to integrate the changes in demand that we see because of electrification of transportation.

Mr. André Bernier: Thank you.

Our electricity sector planners across the country have a very strong track record of adapting the system to innovations. I don't want to minimize the effect of electric vehicles; it would be transformational. The key thing is making sure that they are given sufficient notice of what the demand will be, and then the supply will be able to fill in to help meet that.

The overall level of demand, so long as it's managed over time, is one where I think the system could make that transformation. It's a matter of treating it as a marathon more than a sprint.

The Chair: Thank you, Mr. Carrie.

Can you hold your microphone closer?

Mr. Colin Carrie: Is that better? I'm sorry about that.

André, I hear the word “could” from you. I'm concerned because of large investments coming to Canada. I am wondering if you could get back to us to let us know how many public charging stations we have. The estimation is that we're going to need four million.

My next question will be on the status of the hydrogen fuelling stations. The auto industry has given Canada a big “F” on that one. Eventually, if we're looking at clean tech, if we could convert our transportation industry over to something like hydrogen.... How are those talks going with the provincial governments?

Can you give me some numbers? How many hydrogen fuelling stations do we have in Canada now, and what are the projections for the requirements?

Mr. Drew Leyburne: We'd have to get back to you with the latest numbers of how many have been installed.

Over the last few years, the federal government has had numerous programs to support the deployment of charging infrastructure, both electric but also hydrogen charging. I know that with the electric vehicle infrastructure side of the green infrastructure program, this was a major feature.

Within my own RD and D, we funded a pilot project between Edmonton and Calgary, called the AZTEC project. It's running a hydrogen truck between the two cities. Most recently, in budget 2022, Transport Canada was given money to do more heavy- and medium-duty vehicle hydrogen demonstrations of that technology.

● (1220)

Mr. Colin Carrie: I'm very worried about timelines. The government is very aggressive. We have to have zero-emissions vehicles, I think, by 2035. That's just 13 years away. One truck going between Calgary and Edmonton right now.... I'm not really optimistic about that.

I would like to see the data. What have we achieved? We can do all of this talking about “coulds”, “shoulds” and “woulds”, but government puts these regulations in. Yes, they may create demand, but they can also create an exodus from our country. We have trade among North American partners, but if we don't have equality of regulations and costs, we may lose a lot of these jobs as well. I'm very concerned about that, coming from a manufacturing province.

Maybe I'll just change the topic to federal buildings. The federal government is a major real estate holder in Canada. Since 2015, I've spoken to different unions about the insulation side of things and how we could improve the efficiency of federal buildings. Could you give us an update on how the federal government is doing with its own real estate and improving the efficiencies of those buildings?

Mr. Drew Leyburne: I'm happy to jump in to start.

NRCan works really closely with all of the departments here in an effort that's led through the PSPC department and Treasury Board to green government operations. Anecdotally, I know that, overall, government is on track to meet its near-term targets for this decade, but a lot of the heavy lifting, as you note, will come in the outer parts of this decade, as we move towards 2030 and beyond. We have set the target for ourselves to get our house in order and to meet that decarbonization challenge ahead of target, and it's going to involve....

We can get back to you with the exact update. I think it's reported annually, through the sustainability plan.

Mr. Colin Carrie: Perfect.

If you could get the data to the committee, that would be awesome. Thank you.

Sorry, Mr. Chair.

The Chair: It's all right.

Just before we continue with Mr. Longfield, I've been asked by the interpreters if we could just maintain a distance from our microphones of about one arm's length. That would be appreciated.

We'll go to Mr. Longfield, for six minutes.

Mr. Lloyd Longfield (Guelph, Lib.): Thank you, Mr. Chair. Thanks for managing our time so well.

Thank you to the interpreters for the work that you're doing for us.

My questions are going to centre around the role that the federal government is taking in clean technology and the basis that these witnesses, thankfully, are giving us for our study.

I'm looking at the output-based pricing system fund, the price on pollution and the returning of money to provinces, as well as to Canadians directly, to try to spur on clean technology development.

Maybe starting with Environment and Climate Change Canada, could you comment on the role that the government is playing in trying to stimulate investments in clean technology through this fund?

Ms. Judy Meltzer: Briefly, the output-based pricing system, which is the federal pricing system for emissions-intensive, trade-exposed industries, applies in some parts of the country, and some provinces are implementing their own similar system. The actual pricing instrument itself creates that incentive. I'll also speak to your question about the revenue return piece.

Facilities regulated under this system have a limit on emissions. They have flexibility in terms of compliance, including through a credit market. If they out-perform the limit, they get surplus credits, and this creates a strong financial incentive and reward for adopting clean technologies. The cleaner they're able to produce their product, the lower their cost, the greater the recognition they get and the greater the financial incentives they get, for example, through clean technology adoption or improved energy efficiency.

Here I'll speak to the federal system specifically, because provinces return proceeds from carbon pollution in different ways. From the federal system, there remains the commitment to return all revenues generated to the jurisdiction of origin. This is done in different ways in different provinces. For the OBPS funds, where it is returned directly to industry, it is to be invested in decarbonization projects for large emitters, to help with that transformation.

We're still in the early stages. The compliance cycle for the output-based pricing system is an annual cycle. We're still in the process of setting up those funds to return that revenue. The expectation is that it's going to work in tandem with the output-based pricing system itself to further help de-risk and support investments in technologies to then further decarbonize. We'll have to follow up, as this—

● (1225)

The Chair: Excuse me, Ms. Meltzer. Could you raise your microphone a bit?

Ms. Judy Meltzer: This program is still in the process of being implemented as these proceeds are coming online. The system has been implemented since 2019. It has a one-year compliance cycle and then time for regulatees to be able to comply. Therefore, we'll have to follow up with concrete examples, but we are returning to decarbonize industry in provinces where it applies. That includes Manitoba, Saskatchewan and P.E.I., where the federal output-based pricing system was in place.

Mr. Lloyd Longfield: Great. Thank you very much for the detailed response.

In part of that response, you mentioned that we're in the early stages on a lot of this. Five years isn't a long time in the time of a planet, but in terms of the challenge we have to save the planet, it's an urgent thing that we're working on together.

Carbon capture and storage has been mentioned a few times this morning. We now host five of 21 global facilities in the world. We're number four for patents on carbon capture and storage. It's early stages on that technology, but it's something that is being used by the industry to look at how to get to net zero by 2050 and faster.

Could you comment very briefly on the role we're playing in trying to encourage external investments from companies such as Shell?

Mr. Drew Leyburne: Yes, Mr. Chair. I'm happy to start on this one.

NRCan is in the midst of developing a CCUS strategy for Canada that was foreshadowed last year. In budget 2021, we received $319 million to address some of the RD and D challenges related to CCUS, including bringing down the cost and broadening the application to technology. We know that it has had a major impact on reasserting Canada's global leadership in the CCUS space. As you said, we have a 20-year head start vis-à-vis most countries, with one of the world's first projects being initiated in Weyburn-Midale in 2000.

The NRCan work on the strategy is a cross-departmental effort. As you've heard from some of my colleagues, the net-zero accelerator, the Canada Infrastructure Bank, which was given new authorities to deal with CCUS in the most recent budget, and other funding programs can also contribute to this.

Mr. Lloyd Longfield: Thank you. I want to sneak in. I think you got us to what I needed.

I have only 30 seconds left. Maybe you could continue on with the Clean Growth Hub and how we're working across departments to try to address the horizontal issues of trying to coordinate things like carbon capture and storage.

The Chair: Answer in 15 seconds, please, Mr. Leyburne.

Mr. Drew Leyburne: I would say we don't treat CCUS any differently from any of the other clean technologies you've heard about before. This is truly a cross-departmental effort. The hub co-locates federal employees from multiple agencies and departments in a single place, so they can make sure we're making it a smooth path for clean-tech players, including in CCUS.

The Chair: Right.

[*Translation*]

Ms. Pauzé, we now go to you for three and a half minutes.

Ms. Monique Pauzé: Thank you, Mr. Chair.

I'm looking for some clarification, so I have a quick question for the NRCan officials.

NRCan shared a table that shows the percentage of electricity generation by source in Canada and in each province. My understanding from the table is that nearly all of Prince Edward Island's electricity is wind-powered.

Is that true or false?

The Chair: Can Mr. Leyburne, from Natural Resources Canada, take that question?

[*English*]

Mr. Drew Leyburne: Yes, P.E.I. would be among the provinces with the highest variable renewable proportion of their electricity.

André, do you want to jump in, if you have the specific details for P.E.I.?

● (1230)

Mr. André Bernier: Thank you. That statistic is correct for the electricity that's generated in Prince Edward Island, but they import a fair bit of electricity from New Brunswick. You can imagine that as the wind goes up and down, their imports from New Brunswick vary as well.

[*Translation*]

Ms. Monique Pauzé: Thank you.

My next question is for you, Mr. Noseworthy. According to our information, the net zero accelerator initiative will provide up to $8 billion in support of projects—a huge amount of money.

In response to one of Mr. Longfield's questions, we heard that part of the $8 billion will support carbon capture and storage.

As Mr. Longfield pointed out, the situation is urgent—we are in a climate crisis. It will take years for carbon capture and storage technology to get to where it needs to be. Out west, Shell's Quest carbon capture and storage facility emitted more greenhouse gases than it captured.

Aside from the portion that will go towards carbon capture and storage projects, will other Canadian industries receive any of the $8 billion?

If so, can you name some?

[*English*]

Mr. Andrew Noseworthy: The strategic innovation fund is, in fact, available to all industries. As it is technology agnostic, we will fund any project that ultimately seeks to decarbonize an industry and reduce its GHG footprint from the existing situation.

We're doing two things at the moment to try to drive industry into the program in a productive way and drive new projects. As Kendal mentioned, we have a call to action to try to drive projects across industry to meet our 2030 targets. We've also established something called the industrial decarbonization team—

[*Translation*]

Ms. Monique Pauzé: I'm going to stop you there, Mr. Noseworthy. I'd like you to send us a list of companies that received some of the $8 billion in funding.

I'm moving on to my next question.

Sustainable Development Technology Canada, or SDTC, is the largest funder of small and medium-sized clean tech businesses in Canada, having invested $1.38 billion. Are the companies subject to some sort of follow-up assessment, to determine whether the funding actually helped to lower greenhouse gas emissions?

When the commissioner appeared before the committee, he told us that the 2030 emissions reduction plan had not met its targets at all and that, on the contrary, industries that had benefited from funding continued to produce a significant amount of greenhouse gases.

Does SDTC conduct a follow-up assessment to determine whether the funding met the objective?

The Chair: Please provide a brief answer.

[*English*]

Mr. Andrew Noseworthy: SDTC was the first organization to actively track GHG emissions across the federal government. Our understanding is that all of the projects they funded to date have material GHG reductions.

Kendal, I don't know if you can provide further detail.

Ms. Kendal Hembroff: For example, since SDTC was created, it has achieved an estimated 22.4 megatonnes of annual GHG emissions reductions, which I think is a fairly significant achievement. We can also provide numbers in terms of the jobs that have been created, both directly and indirectly, as a result of SDTC investments. We can provide some examples of success stories of SDTC. If it's helpful, we can also provide information on the criteria that SDTC uses for assessing potential projects.

[*Translation*]

Ms. Monique Pauzé: Mr. Chair, the witness just offered to follow up in writing with the number of jobs that were created and other information, so I would very much appreciate getting that.

The Chair: Of course.

Please send us that information, Ms. Hembroff.

We now go to Ms. Collins for three and a half minutes.

[*English*]

Ms. Laurel Collins: Thank you, Mr. Chair.

I just have a quick follow-up to some of Mr. Longfield's comments.

A 2021 study found that more than 80% of CCS projects attempted in the U.S. ended in failure. One of Canada's flagship projects, the Boundary Dam, promised a capture rate of 90%. It didn't come close to reaching that, so SaskPower lowered its expectations to 65%, which is a target the facility still regularly fails to meet.

The emissions reduction plan doesn't leave a lot of room for error to even meet the low end of the government's emissions target of 40%. Is the government relying on CCS projects to meet their promised capture rates, which, so far, have not been achieved?

● (1235)

Mr. Drew Leyburne: I'm happy to jump in about the generalities, but maybe my colleagues from ECCC could talk about the climate plan itself and the role of CCUS there.

What I would say is that Boundary Dam, Weyburn-Midale and some of these projects we're looking at that were initiated over a decade ago have experienced many of the things that most clean technologies face when they're being demonstrated for the first time.

We know that if you were to build another Boundary Dam now, you would be able to do it at significantly lower cost as a direct result of the learning gained from projects like Boundary Dam. That's the same cycle we see from solar PV, from wind and from all the other technologies that are now commercial. They had this awkward—

Ms. Laurel Collins: Because I have such a short amount of time, I'll just remind you that the IPCC has said that carbon capture and storage is one of the least effective and most expensive options.

I just want an answer around the emissions reduction plan and the fact that there's not a lot of wiggle room for it to meet that 40%.

Mr. Vincent Ngan: Absolutely, and I would like to address the member.

I also refer the member to the “2030 Emissions Reduction Plan” and its modelling annex. That is a breakdown of reductions by sector and technological pathways. Policies and measures incentivizing fuel switching to primarily electricity, greater use of biofuels and hydrogens, and the adoption of zero-emissions vehicles account for 50.6% of the total reductions, whereas the deployment of CCUS and solvents account for 12.9% and 7.8% of the total reductions—

Ms. Laurel Collins: Thank you so much.

On that 12.9%, I would just say that if that is unproven technology, expensive and least effective, that's concerning given that the emissions reduction plan aims only at the low end of the target, at 40%.

I'll go back to my question on the strategic innovation fund and the two large emitter projects. How will the government ensure that those investments will achieve the planned emissions reductions?

Mr. Andrew Noseworthy: We have regular contact with the proponents. Our assessment of the projects requires them to bring forward very specific GHG emissions commitments associated with the projects. As part of our contribution to those projects, we actively track them during the full period of investment.

Ms. Laurel Collins: The strategic innovation fund also committed $47.5 million to Moltex Energy to develop SMR technology in New Brunswick, and $25 million for the development of carbon capture technology.

How does the government factor in how those technologies will help achieve Canada's goal of net zero by 2050, especially given that the Department of Industry has said that these are early-stage technologies and they can't currently compare the GHG impacts directly to projects focused on emissions reduction prior to 2030?

Mr. Andrew Noseworthy: Our investment strategy to date with the strategic innovation fund is to understand that while we need to put significant emphasis on large-scale projects that can scale up quite quickly, if we don't invest in early-stage technologies that can also help us meet our climate goal, we may not get there.

We have done a number of early-stage investments, like the ones you have mentioned around Moltex and SMR technology generally, with the expectation that if we do not make those investments now, they will not be in a place to help us meet our goals, ultimately to 2030 or 2050. We anticipate that if we do not make those investments—

The Chair: I'm sorry. We're out of time here.

Mr. Dreeshen, you have six minutes, please.

Mr. Earl Dreeshen: Thanks again, Mr. Chair.

As a former math and science teacher, I'm mostly focused on things you can measure. I know there have been a lot of numbers put around about goals and so on, but there was a report out of the U.S. in 2020, entitled “Mines, Minerals, and 'Green' Energy: A Reality Check”. It compared hydrocarbons with green technology, which had, on average, about a tenfold increase in the quantities of material extracted and processed to produce the same amount of energy.

I know that Canada has an amazing mining record and that we do some amazing work. Of course, that's as long as the mine is going in somebody's else's constituency and not their own. There's always that concern.

When it comes to things like average battery life, this study stated that “each mile of driving an electric car 'consumes' [about] five pounds of earth” over the life of that battery, whereas with an internal combustion engine, “about 0.2 pounds of liquids” are used. Non-recyclable solar panels by 2050 will “double the tonnage” of all of the global plastic waste we have now. Over that time, there will be “3 million tons...of unrecyclable plastics from worn-out wind turbine blades”. As well, “By 2030, more than 10 million tons per year of batteries will become garbage.”

That is something we have to be looking at. We just finished our study on nuclear waste. Where is it going to be buried? How are we going to deal with that? Somebody has to be responsible for that.

My first question is this: Do we have a plan that is going to deal with how this material will be managed once it has gone past its useful life?

NRCan, perhaps it's best for us to discuss this with you.

● (1240)

Mr. Drew Leyburne: Maybe I will make a general point first, one that I think you alluded to a couple of times. The real importance of life-cycle analysis when you're doing climate or other environmental modelling is that you can't just look at the end use. You have to look at the full lifespan, cradle to grave, where it came from. That applies whether you're talking about a critical mineral, a renewable resource or a fossil fuel.

Specifically, on the critical minerals strategy, we are expecting, for example, a tenfold increase in the demand for rare earth elements by 2030 across the globe. An explicit part of the critical minerals strategy is to look at that full life cycle, including manufacturing and recycling applications, so that we can try to make this critical mineral economy more circular, as we say.

Mr. Earl Dreeshen: Thank you very much.

Of course, I think people have to get a perspective on this. Most of us, as members of Parliament, would probably have a community with 3,500 people in it. If you were to squeeze them all into a big arena and put them on a giant teeter-totter, you would find that the amount of earth moved that would balance that out is equivalent to one electric vehicle battery. We talked about P.E.I. earlier. If you took all the people who live in P.E.I. and you wanted to have the same amount of earth that would be required, that gets you 44 electric vehicle batteries.

There's a lot that has to be done, but we have to think about everything that is taking place, and that, I'm afraid, never gets put into the context of what is taking place. Take a look at the oil sands, for example. The reclamation that is expected there—and expected by legislation—and any oil sands development has to go back into a form that is even better than it started with.

If anybody ever wants to go up to Fort McMurray and take a look to see what it has done, then I think you'll understand that people are going to expect that same thing from mining programs throughout the country. Is the government prepared to make sure that the commitment is there?

Mr. Drew Leyburne: I could jump in here. The mining sector is represented within the Department of Natural Resources. I focus more on the energy side, but what I can say is that things like water management and tailings management are a huge part of our energy RD and D and our mining RD and D in this department, but they also create the possibility of making things even more circular. You can extract rare earth minerals from mining tailings. It's a viable industry that we're starting to see crop up around Canada. Bringing that concept to circularity is a crucial part of what we consider to be truly sustainable development for natural resources.

Mr. Earl Dreeshen: Thank you.

It's so important. All I want is to make sure that everybody pays attention to all sources of energy and everything that is associated with it. That's why I get a little frustrated, as one might imagine, when people attack one type of energy source in the country, because there are lots of reasons why people deal with it. First of all, it's in their backyard, and there are ways of transmitting it and ways of transportation that are different. Those are critical aspects of this.

What I'm hopeful for is that all four of the departments we have here today will commit to a full life-cycle analysis of all types of technology, both the new ones coming up and the old ones that we have, so that people are able to look at all aspects.

With that, I yield my few seconds that are left.

Thank you, Mr. Chair.

The Chair: Thank you, Mr. Dreeshen.

Last but not least, we have Ms. Taylor Roy for six minutes.

Ms. Leah Taylor Roy (Aurora—Oak Ridges—Richmond Hill, Lib.): Thank you very much, Mr. Chair.

It's been a very interesting discussion. I actually wanted to go back and ask a couple of questions about something that Mr. Carrie mentioned earlier regarding electric vehicles. I was surprised by the number of one to 10 for the public charging stations.

I was wondering whether there are any estimates from ISED or other places in terms of what we require, whether charging stations at home are incorporated into that number, and also whether there is any new clean technology for providing stand-alone charging stations. For example, in my riding we have a proposal and a solar panel prototype for covered parking places that can charge electric vehicles.

I'm just wondering how we're going to deal with that number, if that's correct, if you have any other estimates, and also what other kinds of clean-tech solutions are being put forward to address the need for charging stations for electric vehicles.

● (1245)

Mr. Andrew Noseworthy: I'm sorry. We don't have any information specifically on that in front of us.

I don't know, Drew, if you do, from your side.

Mr. Drew Leyburne: I think we can get back to the member with the specifics about current charging infrastructure. I would heavily suspect that the larger number, the one in 10, would include home charging as opposed to more public-facing stations.

What I can tell you is that through the green infrastructure electric vehicle infrastructure demonstration program that I run, we looked at some very novel technologies, not only for charging but also for interfacing charging with the broader grid. We'd be happy to send you the examples of some of those projects that really are pushing the envelope for how and where you charge vehicles, including things like in colder climate situations.

Ms. Leah Taylor Roy: That's great. I'd appreciate that. Thank you, Mr. Leyburne.

I know that SDTC is the largest funder of small and medium-sized clean-tech enterprises. We've heard questions about commercialization and our success rate. I'm actually concerned about the other side, which is that sometimes we put too much emphasis on investing only in technologies that we know will be successful or will reach commercialization, and we miss out on a lot of the opportunities to look into ideas because we want to make sure that we have high rates of success.

I was encouraged, Mr. Noseworthy, to hear you talk a bit about investing in early-stage investments. I'm just wondering, how do you balance that? I'm sure that many people look at these numbers and ask how well we have done and how many have been commercialized, as opposed to how many risks we have taken. Really, I feel that's part of the role of government, especially in this clean-tech field.

Mr. Andrew Noseworthy: Certainly, from our side.... When we look at a project, we obviously look to determine what material impact it will have on GHG reductions, what the potential efficacy of the technology is, and what the commercial business plan is, moving forward. Not all projects we see funded, either directly by us or through SDTC, are necessarily at that point. As you are probably aware, there's a scale called the “technology readiness level” scale, put forward by NASA to assess technology projects. Not everything we see is laid in that scale or will achieve results in the short term, so we have tried to create a practical balance across the technology and innovation spectrum to ensure we're funding, at all stages, with a lens that looks practically, at all times, at whether there's any probability of commercialization. Obviously, we would not want to fund projects that give false hope.

Ms. Leah Taylor Roy: No, but one can't always tell, at an early funding stage, what is false hope and what is a viable project, so I think taking some of those risks is important in enabling us to meet our goals.

Mr. Andrew Noseworthy: Generally speaking, our approach uses the best information possible to determine the potential future market and bankability of the project, as well as the efficacy of the technology. In doing that, we use the talents of all the folks around the virtual table with us today.

Ms. Leah Taylor Roy: That's great.

Do you—or somebody else from Industry—feel that the right balance is being reached? Are we funding ideas that may result in good, new clean technologies, or are we too conservative?

Ms. Kendal Hembroff: Mr. Chair, perhaps I can interject by giving some examples of specific success stories SDTC has funded.

There is a brand new SDTC list called "Canada's sustainability changemakers", which was announced in May 2022. It highlights very specific SDTC portfolio companies that have shown outstanding growth over a few years and a track record of delivering on SDTC's mandate in terms of environmental and economic benefits. I think that's a really good cross-section of the types of companies SDTC has funded.

There are also rankings established internationally, which I think provide some good examples of Canada punching above its weight on the innovation side of things. There's a list called "Global Cleantech 100", which includes a number of Canadian companies and shows that Canada ranks second in the world in innovation.

Our challenges are primarily in how we commercialize and eventually scale up that technology. That's something we're really trying to put a lot of focus on.

● (1250)

Ms. Leah Taylor Roy: That's great. Thank you very much.

Mr. Chair, how many minutes do I have left?

The Chair: You have about 20 seconds.

Ms. Leah Taylor Roy: Okay, I'll use the time to thank all the witnesses very much for coming today and sharing the work we're doing in the government. It really is impressive how many different funding sources we have and how much you're working together, through that Clean Growth Hub, to advance this industry. Thank you.

[*Translation*]

The Chair: Thank you, Ms. Taylor Roy.

Thank you to all the witnesses.

I know we've given you a lot of homework. We do expect you to follow up in writing with the details and data discussed. The information will be very useful to us and inform our report. Once again, thank you.

I imagine that we will see you all again, although not necessarily in a big group like this. In some form or another, we will see you again as we carry out our work in the months ahead.

Thank you to the committee members, as well.

I want to remind everyone that we are meeting Thursday at 6:30 in the evening. We will be discussing the supplementary estimates for the first hour, and we will be in camera for the second hour.

Thank you everyone. See you Thursday evening.

The meeting is adjourned.