HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

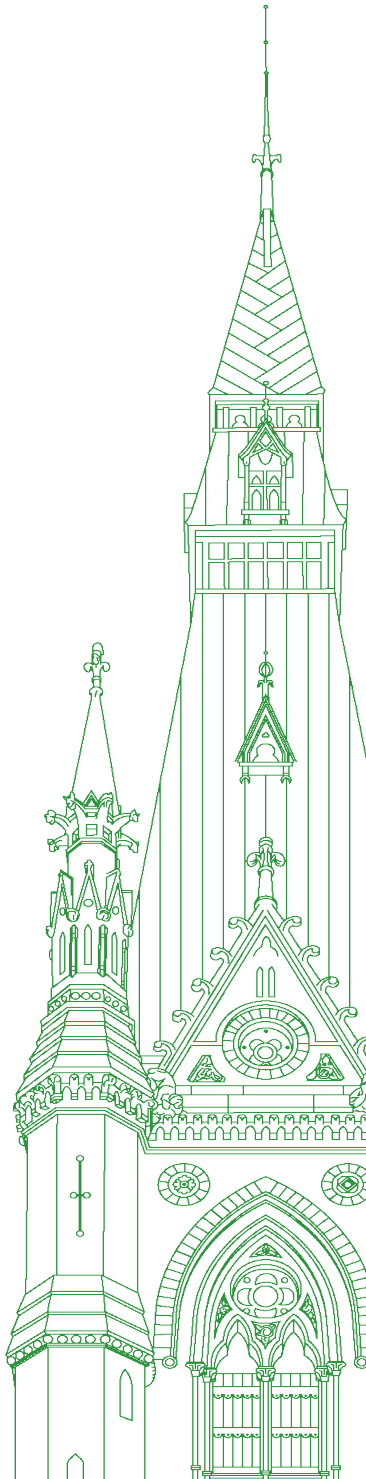
44th PARLIAMENT, 1st SESSION

Standing Committee on Environment and Sustainable Development

EVIDENCE

NUMBER 028

Tuesday, September 27, 2022



Chair: Mr. Francis Scarpaleggia

Standing Committee on Environment and Sustainable Development

Tuesday, September 27, 2022

● (1545)

[*English*]

The Chair (Mr. Francis Scarpaleggia (Lac-Saint-Louis, Lib.)): We can start the meeting.

For our first panel, I'd like to welcome Steve Barrett from eDNAtec, Randy Wright from Harbour Air, Christopher Morgan from Hoverlink Ontario, and Frédéric Côté from Nergica.

Each witness will have three minutes to make an opening statement, and then we'll go to rounds of questioning.

I'll remind the witnesses, especially those online, that they can choose the language of interpretation. There's an icon at the bottom of the screen. Of course, you may use either official language. When you're not speaking, if you could put your mike on mute, that would be appreciated.

Without further delay, we will start with Mr. Barrett.

[*Translation*]

Ms. Monique Pauzé (Repentigny, BQ): Excuse me, Mr. Chair.

The Chair: Ms. Pauzé, you have the floor.

Ms. Monique Pauzé: I apologize for interrupting, Mr. Chair, but given that the meeting is starting 15 minutes later than scheduled, I'd just like to know if it will be extended.

The Chair: The meeting will end at 5:50 p.m., so we won't lose any meeting time.

Without further ado, I invite Mr. Barrett to give his opening remarks, for three minutes.

[*English*]

Mr. Steve Barrett (Chief Executive Officer, eDNAtec Inc.): Good afternoon. I'm Steve Barrett, the CEO of eDNAtec, and I thank you for this invitation today.

Our company uses DNA technology to measure, monitor and characterize the environment. We analyze environmental DNA, or "eDNA", as we call it.

My first point is that biodiversity loss is the next megatrend. We were slow to recognize climate change, and now the next wave is biodiversity loss, which is accelerating. Today, one million species are at risk of extinction, ecosystems are being devastated, and our Arctic is warming four times faster than the rest of the planet.

Given this trend, how can eDNAtec help Canada with its ambitious environment goals, such as conserving 30% of our MPAs by 2030, supporting indigenous self-determination and reconciliation, net zero, and numerous DFO mandates, such as stock assessment, invasive and endangered species, and marine spatial planning?

The thing is that the environment is notoriously difficult to measure. Traditional "catch and look" approaches haven't changed for decades. Scientists watch for whales, catch some fish and listen for birds, but only a handful of organisms are considered. It's very costly and it takes months to analyze the information. These techniques are entrenched and simply cannot scale. You can only manage what you measure.

We measure the environment with environmental DNA. We take samples of the environment, such as water, soil, sediment and even air. A litre of water can identify thousands of organisms—everything from bacteria and plankton to fish and marine mammals—and provide a highly granular baseline of biodiversity. It's 10 times faster and 10 times cheaper, and it yields 10 times more information. It's no joke—our customers tell us this. It's non-destructive to nature, and it's easy to take water samples.

We are a St. John's, Newfoundland company. Over $23 million has been invested by industry and government. We are the inventors and globally recognized experts in this area, and we've conducted hundreds of projects with DFO, the oil and gas industry, and three Atlantic indigenous communities. We are currently raising $10 million to fuel our own commercial growth.

Here are our recommendations for the government.

First, we urge you to embrace a new approach and new thinking, and to partner with SMEs like eDNAtec, with our private sector expertise.

Second, we urge you to support the expansion of the BlueGene eDNA ocean management system, currently under way. It's an indigenous-led eDNA program that incorporates traditional knowledge with advanced eDNA science, specifically in the regions of Nunavut and Nunatsiavut. It supports indigenous self-determination, reconciliation and capacity building, and we're seeking a $10-million investment from the government to the first nations-led program to support this—

● (1550)

The Chair: Thank you, Mr. Barrett. You'll have an opportunity to share more information and insight in answers to questions.

We'll go to Mr. Wright.

Mr. Randy Wright (President, Harbour Air Ltd.): Good afternoon, Mr. Chair. Thank you to you and your colleagues for having me here today.

I would like to begin by acknowledging that I'm speaking to you from the traditional and unceded land of the Lekwungen-speaking people here in Victoria, British Columbia.

My name is Randy Wright. I am the president of Harbour Air Seaplanes and have been overseeing the operations, business development and overall growth of the company for the last two decades.

Harbour Air is the world's largest all-seaplane airline and has extensive operations throughout British Columbia, providing safe, reliable and convenient transportation to the travelling public. Our B.C.-born company flies 500,000 passengers a year on 35,000 flights across 14 scheduled destinations, and we employ over 400 people throughout the province. We provide a key link with the Cascadia corridor and are a central component in the connectivity to this crucial economic and innovation gateway.

Over the past 40 years, Harbour Air has become renowned for our award-winning safety culture, excellent customer service and commitment to sustainability and innovation.

As Harbour Air expands, we are committed to green destination development. In 2007, Harbour Air was North America's first airline to become fully carbon-neutral. In 2019, Harbour Air announced its partnership with Washington-based magniX, the company powering the electric aviation revolution. Together, we connect communities with clean, efficient and affordable electric air travel by converting Harbour Air's seaplanes into an all-electric fleet. We are uniquely positioned to be a leader in commercial electric flight due to our short flight missions, single-engine aircraft, low-altitude flights and access to renewable electric power.

After the successful development of our first ePlane in December 2019, we successfully flew the world's first fully electric aircraft. It was a historic event that made headlines around the world. This was a proud moment for Canada, and especially for our company. Since then, we have performed over 50 test flights, exploring improvements to overall performance and reliability. The second ePlane is now being built, which will act as our prototype and certification aircraft as we work with Transport Canada civil aviation toward flying the first ePlane for commercial use by the second quarter of 2024.

Our goal is to convert our entire 40-aircraft fleet to electric planes and become the first zero-carbon airline fleet in the world. Upon completion, we expect to reduce our carbon footprint and current noise pollution by 80%. As you can imagine, this is a large project with significant capital costs, and we are in discussions with all levels of government to ensure that the appropriate financial support is there to fully realize this initiative. Harbour Air has heavily invested and will continue to invest our own money in this initiative.

Ultimately, our hope is not only to transform our own fleet, but to see the adoption of clean technologies by other airlines and aviation partners throughout our industry. Achieving this outcome will require true collaboration between industry and government.

The Chair: Thanks very much, Mr. Wright.

We'll go to Mr. Morgan now.

Mr. Christopher Morgan (Chief Executive Officer, Hoverlink Ontario Inc.): Good afternoon. My name is Chris Morgan. I'm the CEO and founder of Hoverlink Ontario.

Hoverlink Ontario is launching, in the summer of 2023, a passenger service that connects the two largest tourist regions in Ontario. The service is fast, reliable and affordable.

I want to expand on that. The service will see two craft of 180-passenger capacity crossing 48 times per day, 365 days per year. They are not impacted by ice, cold or heat. The amphibious vehicle design creates an advantage over traditional marine vessels. It's designed to meet the needs of an ever-changing world.

Hoverlink's mission is to launch a sustainable transit option for the congested Golden Horseshoe and very quickly accelerate the move to an EV platform.

The passenger service is game-changing. Since our press release, we have had over 150 million digital impressions and received significant support for the service from constituents and all levels of government. There is an obvious need for a rapid hovercraft solution.

Why are hovercraft a superior option? Hoverlink’s craft have been modified to enhance their ability to operate in extreme and urban environments. They are significantly quieter than the older predecessors. They are energy-efficient and have reduced sound transference to protect our marine life. They are shoreline-positive as they create no wake or wash.

The assumptions are that the average C02 per car is 0.21 kilograms per kilometre. A 1:1 ratio of passengers on the craft to automobiles provides us with a significant and immediate reduction of GHG for route one at the launch. Our efficiency is unmatched. As we hover over the water, the energy requirements to mobilize the craft do not change with the gross tonnage on board.

In the example that we have listed in our deck, which you all have a copy of, the blue line represents the same volume of our business modelling of cars and freight travelling by traditional means. The orange line represents our craft's emissions moving that same volume of passengers and freight. We assume modest volume for this phasing, with only four passenger craft moving over six million passengers per year, and 12 cargo craft.

This also accounts for Hoverlink using biodiesel at launch, which sees the cumulative GHG emission reduction improve. We are currently working with Mercedes, Rolls-Royce, Siemens and Marconi to facilitate the move to electric propulsion engines and ensure that we create an end-to-end sustainable transit solution. This represents a move to EV and we are actively developing this technology to meet a net-zero goal by 2028.

Our R and D platform is robust and has us designing, through these models, end-to-end sustainability and a renewable EV platform in an eco-friendly manner. Our infrastructure planning not only sees us providing sustainable passenger and cargo options, but it also ensures that our infrastructure builds are sustainable, renewable and eco-friendly.

The hurdles noted, when asked about this when interfacing with government, are silos of decision-making; navigating the funding programs, champions and electoral changes; reluctance to change; and communication barriers between all governments.

Our business plan is centred around people, planet and profit. We have a value proposition that includes expansion on the Great Lakes and other regions of Canada and North America, sovereignty protection, and a solution for the impacts of climate change on the Great Lakes and surrounding waterways, like the melting of ice roads and the flooding of lowlands and environmentally sensitive areas—

● (1555)

The Chair: We will have to stop there.

Mr. Côté, go ahead.

Mr. Frédéric Côté (General Manager, Nergica): Before I begin, I would like to thank you for inviting me to this committee to testify before you and for undertaking this important work.

[*Translation*]

Allow me to introduce Nergica, an applied research centre in Quebec that stimulates innovation in renewable energy through research, technical assistance, technology transfer and support for companies and communities.

Nergica is a member of the College Centre for Technology Transfer network affiliated with the CÉGEP de la Gaspésie et des Îles. We work specifically in the areas of solar and wind energy and in the integration of renewable energies through storage on microgrids, among other things. We are the only centre in America to own full-scale research infrastructure in a cold climate conditions and complex terrain. We have unique expertise developed over more than 20 years, making us a choice actor for energy transition from coast to coast and internationally, both for industry and communities.

As I've said, we've developed unique cold climate expertise because of the nature of our research site, which faces harsh conditions. We also represent Canada in research groups at the International Energy Agency. That work develops and transmits scientific and technical knowledge on renewable energies internationally.

In our work, we support companies and communities in their energy transition projects through renewable energies. For example, we support Tarquti Energy in the energy transition in Nunavik.

Our findings and recommendations are as follows. According to the scenario from the Canada Energy Regulator, Canada will need to produce 50% more electricity by 2050 to meet its targets. Wind and solar energy and storage represent between 82% and 85% of that new capacity.

We believe that electricity is the energy of the future, and that the future of electricity is wind energy, solar energy and storage. For a successful transition, both businesses and the federal government must invest more in research and development in these areas. Although they're generally more mature technologies, there's still work to be done to adapt to climate, environment and large-scale integration of these technologies from variable sources to the electrical grids.

These technologies will also support exports, since we're seeing the same type of transition and changes outside Canada. In addition, the volume of projects will also force us to rethink how we plan and deploy renewable energies. Instead of a project-based approach, we'll need to develop a proactive territorial approach based on energy potential. That should be done in co-operation with the provinces, municipalities and Indigenous communities.

Finally, we believe that it would be good for Canada to adopt a national industrial policy to govern the extraction of raw materials to deployment, in order to have greater influence and reach in international markets. Quebec's development of the wind sector in the Gaspé region is one example that could serve as a model.

Thank you for your attention.

● (1600)

The Chair: We will now begin the first round of questions.

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

[*English*]

Mr. Earl Dreeshen (Red Deer—Mountain View, CPC): Thank you very much, Mr. Chair.

Thanks to all the witnesses today.

Ms. Laurel Collins (Victoria, NDP): Mr. Chair, on a point of order, just for the sake of clarity, I heard you say that we are ending at 5:30. Did I mishear that?

The Chair: I believe I said 5:50.

Ms. Laurel Collins: Okay, I'm sorry. That's my mistake. I was hoping we could end the meeting on time and potentially just reduce our second round of questioning. Is that a possibility?

The Chair: The committee decides.

I thought I had unanimous consent. I didn't hear any objections.

Do we end at 5:30? Is that what you want to do?

Mr. Colin Carrie (Oshawa, CPC): No, I would not like to end at 5:30. We have some good witnesses here. It's already four o'clock. I don't think we'll get them all in if we end early.

The Chair: When I said 5:50, no one objected, so I took that as unanimous consent.

Can the committee reverse that?

Ms. Laurel Collins: Mr. Chair, I apologize for wasting more time. I just wanted clarity.

The Chair: I'm going to consult with the clerk.

Basically, we don't need consent to go to 5:50; however, if at 5:30 there is a motion to adjourn and the motion carries, we adjourn. We'll see what happens at 5:30, I guess.

Mr. Dreeshen....

Yes, Ms. Thompson.

Ms. Joanne Thompson (St. John's East, Lib.): I'd just like to get some clarity around the time, because we have phenomenal witnesses.

The Chair: Unless someone moves at 5:30 that we adjourn and there is a majority decision, we continue to 5:50.

We'll start over, Mr. Dreeshen, because we had just started. You were into it four seconds, I think.

Go ahead. I'll give you back those four seconds.

Mr. Earl Dreeshen: I'm up to six right now, but thanks.

It's great to hear the witnesses. There's some great innovation from all parts.

I'd like to circle back to something I've raised in previous meetings with respect to the full life cycle and the importance of measuring the total impacts for whatever process, procedure or new invention we have.

I say this because I was on the public accounts committee and we were studying the F-35s. The biggest thing was the full life cycle. The problem, of course, was that the Department of National Defence had a different time frame than the Parliamentary Budget Officer did, who had a different time frame than the Auditor General did. It made it very difficult for anybody to agree with any of the numbers that were coming. There was great sport made of that.

What I would like to do is start with that same premise: It doesn't matter what it is that we are looking at; we should be measuring it from the first shovel we have to dig it up to the last shovel required to cover it up. That's where the types of energy sources that we are going to use for electricity have to come into play, because if we are going to massively increase the amount of electricity required in a particular area, we have to get it there. We have to find ways in which it would be best suited for that part of the country. It's for that reason that I want to delve into that to see whether or not it's possible for us to get those metrics out there before we start having the government make massive investment decisions, and to go from there.

Perhaps, Mr. Morgan, you could start off with a bit of an idea of where you see the electricity coming from and how you consider ways in which we can get those metrics out in the open.

● (1605)

Mr. Christopher Morgan: I've been saying for about six years now that we need to be completely off the grid. It takes a number of steps to do it. Even with moving to electric, I have concerns about how we manage our electrical sources, even in battery containment, and even how we waste and what we do with that waste. It should be net-zero.

I had the luxury of building a facility with my father in the Caribbean. He was the chief medical officer of the British Virgin Islands. We built a home down there that actually took all the rainwater and moved it into the largest cistern on Tortola. We put it into two cisterns, and it went through reverse osmosis. We managed to do that supply. We also did a wind turbine system very similar to the typhoon system that the Japanese have, because the propeller units that we use.... You don't have to look far to find out the damage they do. They interrupt sleep cycles and REM sleep for people. They kill bee populations.

When we're doing these terminals off the grid, we're doing a number of things. We're looking at things like having beehives on the rooftop to help our friends who have lost...to help the plants in germinating. China is an example of where they have to artificially germinate things.

We need to look at that sustainably, same with how you manage the power. It's solar power; it's wind power. With those things, we don't have much of a waste when we're done, so I think that's really where we're headed.

Mr. Earl Dreeshen: Thank you very much.

There are 53 windmills that start around six miles from my place. They've been up for probably 10 or 15 years. They have another few years left, and then somebody will have to deal with them, and they have to deal with the components right now. If it wasn't for oil and gas, if it wasn't for hydrocarbons, those products wouldn't be available.

That's what I'm getting at when I say that we should look at the full life cycle of any of these things. We have this approach that says if it came from hydro, then it doesn't matter. Well, it does matter, and we have a lot of land that has been flooded and all of the different types of things and ecosystems that have been changed because of it. It does matter, and I think it's important that we deal with it.

I know, Mr. Côté, that you were speaking specifically about how we need to have solar and wind power. The discussion Mr. Morgan indicated, with bees disrupted by windmills with propellers, the same sort of thing happens with birds and so on. It's not a zero sum. I'm curious whether, in what you are working with, Mr. Côté, you have taken into account or are able to take into account those particular ideas.

[*Translation*]

Mr. Frédéric Côté: Thank you very much.

We have access to data on greenhouse gas emissions during the life cycle for each industry, be it hydroelectric, wind energy or solar energy, including for the manufacturing of components. You're right.

The challenge we face is so big that a single solution will not be enough. All renewable energy sources need to be considered. The energy source best suited to the project can be chosen on the basis of good impact study. There are different aspects that must be considered when a project is being analyzed, including birds, plants, wildlife and land. Once the project is implemented, it must fit well with the particular characteristics of the site. I should add that all projects carried out were subject to an impact study first.

You're right in believing that all available renewable energy sources must be examined.

The Chair: Unfortunately, time is up.

Mr. Duguid, you have now have the floor.

[*English*]

Mr. Terry Duguid (Winnipeg South, Lib.): Thank you, Mr. Chair. I'm going to give my last two minutes to Ms. May.

It's good to see you again, Mr. Wright. We met in Victoria in 2019 or maybe 2020. I think it was the last conference I attended before COVID hit, and I was very impressed with the concept and the reality that you are promoting.

I'm just wondering. You didn't get a chance to go deeper into this, but what do you need from the federal government? It sounded like financing was a challenge. I wonder if the Infrastructure Bank is something you have explored, or are there other government mechanisms that could be helpful in scaling up your very worthwhile enterprise?

● (1610)

Mr. Randy Wright: I would say that number one would be assistance in funding. It's a large project. As I said, we put our dollars in and we will continue to put our dollars in. Transport Canada itself has been very slow. I understand that COVID happened and people were working from home, but I remember a few years ago, when we first started to explore this, that the gentleman in charge of Transport, the ADM, told me that we had no team and the FAA was 14 months ahead of us. Now they have assembled a team, but it's been slow. They've been working well with us, but we would like to see more initiative on that with the government agency.

Yes, we've been exploring. We have two chargers ourselves now. You probably heard Mr. Biden announce down in the U.S. that he's going right across the country in a big initiative on charging stations. Our hope is that the governments would follow suit. The provincial government in B.C. has been suggesting that and is working on that, but it will be important to have charging stations at 14 different locations on the docks to charge these aircraft.

Lastly.... Oh, go ahead, sorry.

Mr. Terry Duguid: No, finish up and then I'll go to my next question.

Mr. Randy Wright: I was just going to say that billions of dollars are going into battery technology. I used to have a brick phone; I carry an iPhone now. The key with aircraft is the lift, the weight. Our bet is that the batteries are going to get smaller and the ultimate would be a power pack that you can unplug and take out of the aircraft and plug a new one in after it's been charged.

Mr. Terry Duguid: Thank you, Randy.

My next question is for Mr. Côté. It could also be for Mr. Morgan.

It sounded like there was some sense of frustration with government: with silos, coordination and working efficiently with technology companies. We want more renewable energy. Our grid is supposed to be net-zero by 2035. What helpful hints can you give us in terms of dealing with tech companies like yours more efficiently?

[*Translation*]

Mr. Frédéric Côté: Indeed, we do a lot of work with small and medium-sized enterprises, or SMEs. A lot of support is available.

The fact remains that the Canadian market is still relatively small and that SMEs in the renewable energy sector must quickly turn to export markets as well. It's very important, then, to leverage innovation and ensure that programs are offered, many of which already exist and must be maintained.

College-level applied research has a direct impact on SMEs and its funding concretely supports market access and technology development. We're of the view that this must continue and that our businesses must be supported to allow them to export.

[*English*]

Mr. Terry Duguid: I'm afraid I'm going to have to pass my time to Ms. May, but maybe you could respond to the issue of government coordination in another response.

Go ahead, Elizabeth.

Ms. Elizabeth May (Saanich—Gulf Islands, GP): I'm more than grateful that you're afraid to pass your time to me.

My question is for Randy Wright at Harbour Air. I will fully disclose that I'm a regular Harbour Air passenger. This is in my and Laurel's neck of the woods.

I well recall huddling around a laptop in 2019 to watch the test flight that took place. We were in Madrid at COP25, gathering people around us to say, "Look, the first electric plane is taking off. That's in Canada." I know it stalled with COVID.

You want assistance in funding. Could you sketch out for us the potential globally? I think a lot of people will think that an electric plane is not going to make a big difference in the global carbon situation, but if this stat is right, half of all flights globally are less than 800 kilometres.

Mr. Randy Wright: That's correct. There are short stages and a lot of small airports around, so you're absolutely right, Elizabeth, that opportunity strikes there.

You saw that Air Canada just made an announcement about their 30-seat aircraft, so there are going to be short stages. There are many airports throughout Canada and the United States that are within a short distance. That will help with congestion at the larger airports and into the smaller communities. Short-stage lengths are key in how we see that going, and with the rest of the aviation world.

● (1615)

The Chair: Thanks very much.

[*Translation*]

Ms. Pauzé, you have the floor.

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

Mr. Côté, my questions are for you. Thank you for being with us.

Your website shows the progress that your organization has made in helping small and medium-sized enterprises in the clean technology sector. Nergica seems to have a role that I'd call key, because your expertise and your partners really seem to serve people who want to innovate, at an affordable cost.

When change is discussed, it's often said that attention must be paid to the workforce and a fair transition must be allowed. I'd like to hear from you on this model, at Nergica, and its benefits, but particularly its effects on the workforce.

Mr. Frédéric Côté: As I've said, Nergica is a member of the College Centre for Technology Transfer. What makes Nergica unique in terms of its activities is both its unique research site and its team of leading researchers. We have about 40 professionals dedicated to supporting businesses. In addition, because of our ties to post-secondary education, we work closely with all colleges in Canada, including the CÉGEP de la Gaspésie et des Îles, to ensure that the workforce of tomorrow will benefit from the most recent developments.

College teachers work with us in our research projects. We also bring in numerous interns to work with our researchers and in our businesses, ensuring that this future workforce will have expertise in applied research in innovation. We offer various programs, including the one in research and innovation at the CÉGEP de la Gaspésie et des Îles. In that program, students can complete their training by taking part in placements at college centres like ours.

Ms. Monique Pauzé: Thank you.

A lot of people are involved in your organization. I also understand that there are jobs.

You're surely familiar with the Clean Growth Hub, which is intended to promote growth in clean technologies. I see the services you offer, combined with specific expertise, and your knowledge in the field, and I wonder whether some services are being duplicated.

Is the Clean Growth Hub an appropriate mechanism for harmonizing clean technology programs, or should existing coordination models be leveraged?

Mr. Frédéric Côté: The challenge we face is so big that there's room for a lot of people. I can't talk specifically about the Clean Growth Hub, but I can talk about the programs we administer, including in co-operation with the Natural Sciences and Engineering Research Council of Canada, a federal agency. One of those programs aims to establish technology access centres, and we're recognized by both the Government of Quebec and the federal government as that type of centre.

The challenge is really to support as many actors as possible and as closely as possible in the field. My recommendation would be to support college-level applied research at Canadian colleges and institutes. That would really ensure good coverage because we're well spread out in all regions, including rural areas, where there's also innovation and where projects are deployed in communities. I'm of the view that this model is relevant for all Canadian provinces and that it certainly merits greater attention. Although there's been progress in this area in recent years, there's still work to be done.

● (1620)

Ms. Monique Pauzé: My next question is related somewhat to the point you just raised. We know that subsidies to the oil and gas sector are in the billions of dollars and that there's a lack of transparency. Canada provides 14 and a half times more assistance to those sectors than to renewable energies. However, the renewable energy sector is the one that we should be helping to come up as soon as possible, as you've said.

What means do you think the federal government could use to reverse that inequality in terms of available supports? I know investment is needed in applied research, but is there another way we could reverse that inequality?

Mr. Frédéric Côté: In terms of assistance, it's important to ensure the continued development of an electrical grid that uses renewable energies at competitive costs. That's very important.

We must also train the workforce. The workforce needed to work in wind farms and solar farms includes on-site technicians who have the necessary skills. Other industries in the natural resources sector already employ those types of technicians, who could retrain to work in new types of businesses.

In Canada, the challenge lies in the fact that natural resources are under provincial jurisdiction. Each province has a different approach, which is a good thing because each has its own geography and resources that it must work with.

That said, we'd certainly benefit from greater integration at the federal level, if only for electricity, in terms of transmission projects. Although we already have a lot of interconnection with our neighbours to the south, we'd benefit from more between provinces to increase the capacity for renewable energy integration.

All these elements must be considered, in addition to support for research and innovation.

The Chair: Your time is up, Ms. Pauzé.

Ms. Collins, you have the floor.

[*English*]

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

I want to thank all of the witnesses for being here.

My questions are for Randy Wright.

Thank you so much for being here and highlighting some of the amazing work of Harbour Air. Not only are you folks the first net-zero airline with the first electric airplane, but I'm just so proud that Harbour Air has put out colonies of bees—another witness mentioned bees—to help support our urban ecosystem in Victoria.

I want to ask about that first successful flight. As Elizabeth mentioned, I was also in Madrid watching, and I was just so proud of what was happening. Can you tell us a bit about the significance of that successful test flight?

Mr. Randy Wright: Sure. Thanks a lot.

By the way, I learned a lot about bees. I was actually putting them up on the roof. I didn't know anything about it, but I know a lot now.

That was a huge day, really, in aviation and in the world, and on the Fraser River. We could only fly, with the permit, 10 miles an hour or less, and it was right at nine when the takeoff happened. There were at least 500 people on the bank watching us take off. We had good hopes that everything was going to go fine, and it did. It was the founder of the airline who actually piloted the aircraft.

We took the plane into the hangar, in which we had a stage. I've done the media for the past 20 years and I have never seen a media scrum like that before: Popular Mechanics, CNN, the front page of the The New York Times, The Mirror from London. Everybody was there, and it was a big deal for Canada in the aviation space. We were very proud and knew we had something going here.

We soldier on. That was 1.0, and we're now doing 2.0 as we speak. That plane just came out of the paint shop a week ago. We're assembling that, and we hope that Transport can move along at a faster pace with us. I have to say that they've been really good, but they did not have any people at the start of this.

Ms. Laurel Collins: I understand that you're currently going through the certification process with Transport Canada for the second electric airplane. Can you talk a little bit about how that process has worked and any hurdles you have had to overcome?

Mr. Randy Wright: Yes. Again, it would be Transport itself, just in the personnel and getting them out to inspect the aircraft. The supply chain has hurt us. We all know about the supply chain. For the batteries, we have now switched suppliers to H55 in Switzerland. We're going out to Switzerland to meet with them in the next few weeks. They're a much better provider. The batteries are getting smaller. We're excited about that, getting back to weight and lift.

Really, it's the supply chain and just government moving along. Again, it's new to them, so that's not to criticize them. They have been very good, but it's all new to them and new to Canada. As I said, the FAA was way ahead of Canada on these projects.

● (1625)

Ms. Laurel Collins: Looking to the future and the possibility of electrifying your entire fleet, what are the necessary steps to make that happen? Is there adequate funding available from the federal government?

Mr. Randy Wright: There's not at this point right now, but we have been in several discussions with the government about trying to get some funding for that. We've estimated it to be between $38 million and $40 million. As you scale up, building the aircraft is going to get cheaper. Once we have it all set and the government has agreed on the safety.... The plane has to be safer or as safe as what we're flying right now. That's the key.

We just did our first point-to-point, which was another “world's first”, a couple of weeks ago. It was interesting; the aviation museum at the Victoria airport asked if we could do something “electric plane”. We had a meeting and said, well, we have to do a point-to-point for certification, which is an 18-minute flight, so let's fly into Patricia Bay. We did that, and then we towed the plane up into the hanger of the museum. We were the star of the show. The people at our booth with the plane could not go to the bathroom it was so busy.

Ms. Laurel Collins: That is very exciting to hear.

Where do you think Canada is in relation to our global peers on electrification? Is there anything we could be learning from what the Americans are doing?

Mr. Randy Wright: Yes. Again, we're behind the curve versus the Americans. I just think we need more resources from Transport, as this is a new space, or new to them, to work through these curves. I think that would be the first step—to have more resources in going down this road.

On battery technology, again, the Americans are in there too. We're hoping it will become lighter and more powerful, which we have already started to see.

I would say that we need more resources in what I will call the electrification division of Transport. We're dealing with only a few people.

The Chair: You have time for a 15-second comment, Ms. Collins.

Ms. Laurel Collins: That's okay. I will let the next questioner have it.

The Chair: Thank you.

Mr. Carrie, you have five minutes.

Mr. Colin Carrie: Thank you very much, Mr. Chair.

I want to thank the witnesses. This is an extremely exciting study. We really appreciate your input and the possibility for recommendations.

I think my first question has to be for you, Mr. Morgan. Living in Oshawa, the golden triangle, it's very exciting to hear about your company and to see your company's announcements. In Oshawa, we go back and forth to St. Catharines, where your business is located. One little accident on a bridge or a road can cause havoc, with cars idling and time constraints. I'm wondering if you could take a moment to give the committee an idea of how many cars you take off the road, how safe your service will be, and how dependable it will be in relation to weather.

I know that a lot of the technologies we're hearing about require resources from government and partnerships. I'm wondering if you could comment on whether you've received federal government funding and what you think about the red tape.

Let me leave it at that, Mr. Morgan.

Mr. Christopher Morgan: The value of cars passing.... One particular pinch point would be the Skyway Bridge, which connects Burlington and Hamilton. The "Transportation Tomorrow" surveys, which are six years old, pointed at 279,000 cars moving over it in one direction. I was here a number of years ago talking about our carbon emission reduction and where we were with the biodiesel and DEF systems. It worked out that in one day we equate to 33 kilometres of cars parked bumper to bumper. Whether we go from combustion cars to electric cars, we're still going to have people backed up in gridlock. For electric cars, we know that their length of time is not where it should be. I think if you're in a combustion car, you might be on the highway longer just because you have fuel, whereas with battery you may not. That's a question to concern ourselves with whether it's combustion or electric, so I think that's a big piece.

Then you start looking at other components. If you look at something like the Ohio Valley trucking that comes through the Lewiston-Queenston Bridge, 90% of that trucking—I worked with a professor at Brock University—is destined for Ottawa and Montreal, yet it goes around the Golden Horseshoe. We need to find ways of redirecting it. They don't want to go on the toll highways through New York State to Ogdensburg—they just don't—so it's about managing that piece and, again, connecting the two biggest tourist regions in Ontario, arguably in the top three in Canada. That's a piece that we look at and understand.

If you go to an education piece—I'll step even further—the province of Ontario and the school systems averaged 179 bus trips to Toronto a week, which has stopped. The hard line used to be Stoney Creek heading to Toronto, and it used to be Oakville and Burlington heading to Niagara. Those don't happen anymore because students, parents and the education system don't want to have their kids or students in buses for four to six hours. They get a one-minute piece. I'm not here to throw anybody under the bus; that's not what I do. I want to put the energy into fixing it. The solution is not pointing fingers at it.

When it comes to government.... I was here almost six years ago. I met 67 MPs in two and a half days. I was called before Patrick Gosselin and Frank Stendardo from the bureaucratic side, policy advisers for the St. Lawrence Seaway. They grilled me on December 22 for two and a half hours. They loved it. We moved through to January 8. We were approved and moved through. It went through to the director general, Jeffrey Heynen. He said, "I love it. Let's find you buckets. We're going to put you in the NTCF." We got an invitation to submit to the NTCF. The NTCF had five threads of payment. We were good for four of them, but we are not a port and they only paid out for a port. But I don't give up. That's a result I'm not comfortable with, and I will not give up, because this makes sense. Just as Mr. Wright is working on electric engines for his planes, and Mr. Côté on funding, we need to work on it.

A classic example of where we don't put enough thought into it would be measured around what happened at the winter Olympics, particularly the buses that they used in Whistler. They were going to use hydrogen—great—but we trucked the hydrogen in from Quebec—not great. We need to manage that end to end. We need a circular economy. We need to be ESG—environmental, social and governance—in all that we do, and end to end. We need to look at that. For example—

● (1630)

The Chair: Unfortunately, we're out of time.

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

Mr. Patrick Weiler (West Vancouver—Sunshine Coast—Sea to Sky Country, Lib.): Thank you, Chair.

I very much appreciate all the witnesses and the passion they're bringing to the discussion today.

I'd like to start with my first question to Mr. Côté.

You mentioned that your organization is working on renewable electricity solutions in cold weather climates. Of course, that's really fit for purpose for the environment we have here in Canada. One of the challenges we have from the federal government's point of view is that most of the electricity in Canada is distributed by provincial utilities. One area we need to focus on is electricity provision in the north, where right now we have communities relying on diesel for their fuel and for their electricity, which is both highly emitting and highly expensive.

I was hoping you could speak a little bit about the work you're doing in this area, particularly around setting up microgrids with renewable and storage, and maybe what lessons the Government of Canada can learn when we're going to be administering our off-diesel program.

[*Translation*]

Mr. Frédéric Côté: Thank you for your question.

Currently, close to 200,000 people in Canada use diesel to generate their electricity in off-grid systems.

I spoke about a project we're involved in with Tarquti Energy. It's an energy transition project in Inuit communities in Nunavik, in northern Quebec. We're working hard to improve the energy capacity in communities.

It's interesting to note that federal policy puts a lot of money into project hardware. However, the challenge is the lack of future projects, since communities are not well equipped to implement such projects and need support in that process. That's what we're doing in several indigenous communities in Quebec.

Colleagues at Yukon University have somewhat the same approach out west, working with communities so they can build their expertise and then take over their projects. They want to be stakeholders in the energy transition, but to do so, they need training.

Federal programs are very helpful, but they fail to address travel expenses. Whether it be bringing community representatives to our educational institutions or sending our trainers up north, the costs are significant and hinder our ability to deploy solutions. I encourage you to consider these elements.

In the last few years, Natural Resources Canada and Crown-Indigenous Relations and Northern Affairs Canada have launched great programs. That's great, but it's something that deserves special consideration. It's necessary to go out into communities and engage with them if they are to properly take over projects.

● (1635)

Mr. Patrick Weiler: Thank you very much, Mr. Côté.

[*English*]

My next question is for Mr. Wright.

It's very exciting to hear of the progress and the breakthrough technology that you've been leading on here. You mentioned that you're now at version 2.0 of your plane.

I'm wondering, with the projections you have for the development of the technology, when do you see the performance of electric air transport catching up to match the performance of fossil fuel-powered aviation?

Mr. Randy Wright: Thank you. It's an interesting question.

We're shooting for the first flight commercially, and we see that as a sightseeing flight. We do tours and whatnot in Victoria and Vancouver, and we would carry passengers on a short flight. It's only a 20-minute sightseeing flight. I think there will be a lineup on the dock to take that first flight.

How long will it take to convert? The way technology is going—every day—I'd probably say within five years. The technology is getting better and better daily, so hopefully I'm wrong on that and we can convert fairly quickly, with the rest of aviation following, getting back to what Elizabeth mentioned about short stages.

Mr. Patrick Weiler: That's very exciting to hear.

I've had the pleasure of flying on Harbour Air. However, I'm wondering, in terms of flights that are going to require a larger load, where do you see the potential for electric flights in terms of the amount of weight they can carry, such that they may displace...? We're not just talking about float planes in Canada, but some of the larger trips of maybe one hour. When do you see being able to catch up with that level?

The Chair: Could you give us a precise date, because we're out of time?

Some hon. members: Oh, oh!

The Chair: Or you can answer the question in response to someone else, if you don't mind.

Mr. Randy Wright: Again, I'd say within five years. Those are my thoughts.

The Chair: That's perfect.

[*Translation*]

Ms. Pauzé, you have two and a half minutes.

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

Mr. Côté, you talked about government coordination because it involves both levels of government.

In your opinion, is the link between research and commercialization supported enough by current federal policies?

Mr. Frédéric Côté: I'd say that the link could be better supported. Our Canadian technology companies have significant competency in engineering and sciences. However, they're not nearly as strong in commercialization. The move from idea to market needs to be better supported. We believe that research—

Ms. Monique Pauzé: I'm going to interrupt you to throw out an idea. Do you think that conferences on clean technology could fix part of the problem?

Mr. Frédéric Côté: Basically, we find that the challenge is so large that we need to bring all potential stakeholders together, whether it be renewable energy producers, inventors or entrepreneurs.

Some participants at today's meeting are at the forefront and are making a concrete contribution to the transition. It's really important to look at the big picture when it comes to the extraction of raw materials, the production of equipment, the production of energy, the electrification of transportation and the use of public transit. It would be good for everyone to sit down together. In Canada, we still have the reflex of working in silos.

● (1640)

Ms. Monique Pauzé: You mean in isolation, in silos?

Mr. Frédéric Côté: Yes, in silos. I think the energy transition requires that we work in a much more cross-disciplinary manner.

Ms. Monique Pauzé: In your experience, what stage of clean technology development is the most difficult in Canada? Is it development, deployment, market saturation? Where does the process stall?

Mr. Frédéric Côté: There are challenges in terms of demonstration, particularly in relation to the nine technology readiness levels, the highest level being commercialization. I'd say the challenges really come up as commercialization nears, when the time comes to carry out demonstrations, figure out regulatory issues and address access to the grid. That's when testing sites are needed, as well as programs for demonstrating technologies and their effectiveness.

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

The Chair: Thank you, Ms. Pauzé.

[*English*]

Ms. Collins, go ahead.

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

I'll follow up with Randy Wright again.

I'll give you an opportunity, if you want, to say more about that "five years". You had only a moment to answer the last question.

Mr. Randy Wright: The discussions with this committee and the government on funding have been interesting. The Prime Minister announced, on climate action, quite a large budget and an initiative, but when we talk to all the folks, they say that's for vehicles and whatnot. We don't have anything for aviation. I want to put that point on resources back in. I said, "That's crazy, because it's a Canadian airplane and a Canadian company, and it's right in the wheelhouse of the agenda", and they said, "You're right, but we'll have to get back to you." I needed to make that point.

Ms. Laurel Collins: I want to thank you for making that point. Air travel accounts for about 22 megatonnes of CO2, which is the equivalent of five million cars, annually. If the government had a more transparent and ambitious plan to reduce carbon emissions from the aviation industry, how would that impact the work of your company and of other people in the aviation industry who are doing electrification?

Mr. Randy Wright: Well, it would be tremendous if we had boots on the ground helping us on the certification and funding. To the question before, about how many years I figure, well, that would escalate it. So back to resources on what the goal of the world is right now, yes, that would be important.

You may have seen that there was a flight of Alice today. You may have seen the headlines. They did their inaugural flight, but they're still saying they're four years away from launch, and that's a nine-seat aircraft—back to the weight we were referring to and the question I got before. That's why I say it's in that wheelhouse. If we can get everybody onside to understand what the goal is and what we're trying to do, and get the resources, we can escalate this. No disrespect to Transport—they have a team and I'm working with them—but it's been a minefield, I have to tell you, to try to navigate through this.

The Chair: Thank you, Mr. Wright.

We'll go to Mr. Mazier, please.

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

Mr. Morgan, I believe we can significantly reduce emissions through technology instead of taxes, and I think the testimony we've heard throughout the study confirms that, but we also heard about how difficult it can be to commercialize technology in Canada. How do you believe we can commercialize more clean technology in this country?

Mr. Christopher Morgan: Reduce red tape.

Mr. Dan Mazier: Okay.

Mr. Christopher Morgan: It's common throughout governments, not just the federal government. It's provincial. It's about managing those expectations.

I think the bigger question—and it's happened many times throughout the centuries—is that necessity is a catalyst for change and innovation. That's where we're at. Even with the COVID epidemic, we were very fortunate to have drug companies that made vaccines so quickly.

Randy Wright is right on: It's four or five years. I don't see our craft.... The engines are not a problem; it's the battery technology, the weight ratio, all of it. It's more critical for airplanes. For us, it's a little different; it's the burn that we use.

It's about having clear, direct communication.

● (1645)

Mr. Dan Mazier: What will happen to the intellectual property that we've developed if we're unable to commercialize in Canada? Is it something that you worry about?

Mr. Christopher Morgan: Sure. I'm a proud Canadian. We're the proudest people when we drop a puck, but boy, we sure get humble and quiet when other things happen. World War II was an example of what happens when we roll up our sleeves. We need to be stronger.

At the end of the day, if Randy doesn't get the help, if I don't get the help, if Frédéric doesn't get the help, we have some friends south of the border who would say, “Hey, great.” It's the same with investors as well. Investors are more savvy, less risk-oriented. They say, “Come on, this is the future. We need to move on with it.”

Mr. Dan Mazier: Perfect.

Mr. Wright, you said that we are behind compared to the Americans. Can you expand on that?

Mr. Randy Wright: Well, they have this aircraft that flew today, and we're not even close to that. They have that through the permitting stage, the FAA, as I said. Transport admitted to me that they're a year and a half to two years in front of us, and they continue to be. They have a big agenda that they're trying to.... They have teams to help with this.

Again, it's new technology, but they've put the resources in there.

Mr. Dan Mazier: Would you say they have a more friendly business environment?

Mr. Randy Wright: Yes.

Mr. Dan Mazier: How so? Especially when it comes to commercialization, that seems to drop off the face of the earth when it hits in Canada, as compared to the States.

Mr. Randy Wright: I was born and raised in Victoria—a true Canadian, as Chris said. We're so nice as Canadians, but the Americans have always been way more aggressive. They continue to be, and they're outpacing us. However, if we can get the resources and the people behind it, I think we can escalate it quite a bit.

Mr. Dan Mazier: Okay.

Mr. Côté, we seem to invest a lot of money in the research and development of clean tech. Do you think it would be in Canada's best interests to obtain data and information on the number of projects that have reached commercialization after receiving government funding?

[*Translation*]

Mr. Frédéric Côté: In my opinion, the more data that are available, the more improvement is possible. As I said earlier, the last stages are the most difficult, those related to commercialization of the technology.

Work is needed both to push the technology toward the market by helping it achieve maturity and to draw it into the market by supporting entrepreneurs through incentives and creating more advantageous market conditions.

The energy transition is also related to infrastructure and consumer habits. There's inertia to overcome to promote adoption. We need to continue to focus our efforts on that continuum to push technology to the market and draw it into that market.

[*English*]

Mr. Dan Mazier: Thank you.

Mr. Wright, if the world adopted on a commercial scale the technology that you are developing, how many emissions do you think could be eliminated?

The Chair: We need a brief answer, please.

Mr. Randy Wright: I think it would be 80% from our fleet. I don't have the exact numbers in front of me.

The Chair: Eighty per cent is good.

Thanks. The time is up.

Mr. Longfield, you are next.

Mr. Lloyd Longfield (Guelph, Lib.): Thank you, Mr. Chair.

Thanks to all the witnesses. In particular, thanks to Mr. Barrett. It's good to see you again, my friend. We've done a lot of volunteer work in mentoring businesses in the Guelph region. It was a surprise to see you on the panel.

We finally get to you, Steve. I want to explore the KPIs that are involved with climate change. One of them has to do with the species that we're losing at an alarming rate. We've had a good discussion about innovation today. We talk about climate change in terms of weather impacts or climate impacts, but we often ignore the fact that we're losing species. Could you expand on how we can turn that around, in terms of measuring this critical part of our climate agenda?

Mr. Steve Barrett: Thanks, MP Longfield. I appreciate that. It's a great question.

The reality is that species are being lost at an alarming rate, and the ecosystem consists of many interdependent species. It becomes a very complex dynamic. Our approach is to measure the entire ecosystem by looking at all the species that are there—anything from plants and bacteria to fish and even marine mammals—and really being able to establish a baseline to see how that biodiversity is changing.

For example, some of the work we've done is with the oil and gas companies—ExxonMobil in particular—in looking at site remediation. Toward MP Dreeshen's question earlier, this is what we call “life of field”: What is going on with that industrial enterprise, whether it's the structure of a mine or infrastructure, and how is that affecting the ecology over the life of the field? With our technology, which is an order of magnitude cheaper, faster and easier to use, it becomes an affordable reality.

● (1650)

Mr. Lloyd Longfield: Thank you.

I don't think we've ever had a five-minute conversation, and at this time of day usually we're supporting microbreweries as well, but I'd like to try to get us to the.... For this report, we really haven't dived into the measurement of results and the trajectories we're on. Do you see your technology being able to be scaled up fast enough to get us the measurements we need, and what's standing in the way?

Mr. Steve Barrett: That's a great question.

First of all, we are not a start-up. We are at TR level 9. We are an active commercial enterprise, and we have to thank our early customers, such as ExxonMobil, Shell, the Department of Fisheries and Oceans and also the indigenous fisheries in Atlantic Canada, for really proving out our technology, so it is exceedingly scalable.

Actually, the biggest choke point for expanding in Canada is the acquisition of samples. It's about 80% of the cost, if you think about the cost of chartering a ship and sending it out to collect samples, but with our partnering program, we've developed SOPs that allow non-scientists to collect samples—whether that's in Atlantic Canada and the ocean or in Canada's north, by the people who live there, like hunters and trappers.

Mr. Lloyd Longfield: Time is of the essence right now. In terms of the work you're doing, what can we have for our report on what we need to accelerate? How can the federal government help you?

Mr. Steve Barrett: We need to accelerate a program that we have under way right now with the Nunavut Fisheries Association. We call it “BlueGene”. BlueGene is a multi-stakeholder program led by the indigenous groups. We provide the technology. We provide the tech transfer.

We need sponsorship that can go directly to those indigenous groups. We are prepared to make our facility indigenous-oriented and embed indigenous scientists and training right inside our facility. We think it's a multi-ministry approach: It's collaboration not just with DFO but with other ministries to make this happen. Once we establish that template that's happening with Nunavut, we can expand that throughout Canada's north and also the west coast.

Mr. Lloyd Longfield: Thank you.

I'm a college grad, a mechanical engineering technologist from Red River College. Thank you for the work you're doing with colleges. We need to bring that hands-on into the discussion, but we've run out of time this afternoon, unfortunately.

Thanks to both of you for being here as well.

The Chair: Thank you, Mr. Longfield. Thank you for always keeping track of your time. It makes my life so much easier.

That takes us to the end of this panel. It's been really interesting, I must say, to listen to the talk about these radical new technologies.

Yes, Mr. Morgan, go ahead.

Mr. Christopher Morgan: Can I just ask, in closing, for everyone in this room to please spend some time to watch three documentaries?

In order, the first one is *A Life on Our Planet* by David Attenborough. The second one is *Chasing Ice* by James Balog. The third is *Breaking Boundaries* by David Attenborough. As much as he shows us what we've done, he shows us the opportunity to get out of what we've done. His brother was an actor on *Jurassic Park*. I think we find ourselves smarter than dinosaurs. I don't know. Right now we're destroying our ability to live on this planet. It took a meteor to knock out the dinosaurs.

The Chair: Thank you very much. Those are good recommendations.

Again, I thank our panellists.

We will break for a couple of minutes while we bring in the next panel.

Thank you.

● (1655)

_____(Pause)_____

● (1655)

[*Translation*]

The Chair: I want to welcome everyone again.

We are going to start the second half of the meeting down. With us are four witnesses: Zsombor Burany from BioSphere Recovery Technologies Inc.; André Rochette from Ecosystem; Kathryn Moran from Ocean Networks Canada; and Camille Lambert-Chan from Propulsion Québec.

Each witness will have three minutes for some opening remarks. We'll begin with Mr. Zsombor Burany.

[*English*]

Mr. Zsombor Burany (Chief Executive Officer, BioSphere Recovery Technologies Inc.): Thank you very much. I appreciate it.

My name is Zsombor Burany, and I'm coming to you as a patriotic Canadian who has had no other choice but to accept very large funding from American and European sources. I'm currently working on a very large carbon removal project and the de-acidification of the oceans. I've exhausted all funding avenues in Canada, whereas foreign investors were very eager to proceed.

BioSphere Recovery Technologies' intention is to remove vast amounts of carbon from the environment through the intentional development of algae blooms in the ocean. This is not an initiative that we are taking lightly. We have a very large research facility planned that will be going through a detailed scientific review of all the processes involved over the next half a decade.

The processes are well understood and tested at scale, but have never been deployed at a commercial level. Our project involves thousands of people, dozens of large development and research vessels, and the co-operation of leading universities from around the world.

Unfortunately, BioSphere Recovery Technologies is no longer a Canadian company. We will still engage as many Canadian participants as possible, but we have effectively lost ownership and control of what would have been a top 50 Canadian business, ranked somewhere between Hydro One and Magna.

Very few carbon projects have the potential to scale and make a significant dent in climate change. Even large numbers of small initiatives barely move the needle. Large projects that typically get funded are preventative in nature, which means they deal with carbon capture at the source, not with removing carbon already in the environment.

Unfortunately, CO2 levels are now so high that preventative solutions only slow global warming but do not reverse it. Overall, we have virtually no impact on climate change. The funds being spent today are literally negated by global feedback loops. In plain language, most of the projects we are planning have no benefit to the globe, even though they may have a temporary positive local impact.

Canada has an economic opportunity to set legislation and practices that would allow Canadians to manage the global carbon economy. This economy is still the Wild West, and soon there will be many active players involved who will and must eventually come into conflict with each other. There are several proven remedies to these problems that we could implement, which would effectively put us in a leadership or control position.

No one oversees carbon recovery on a global scale, and we are perfectly positioned to fill the gap. Canada has all the support infrastructure needed already in place to build a dominant carbon economy, but it is unable to bring it into play. Well-meaning but misguided policies prevent the Infrastructure Bank and other programs from enabling—

● (1700)

The Chair: I'll have to stop you there, Mr. Burany, but you'll have a chance to share your ideas in answers to questions.

We'll go now to Monsieur André Rochette for three minutes.

[*Translation*]

Mr. André Rochette (Founder, Ecosystem): Good afternoon. Thank you for the invitation. I'm pleased to be here in person, in Ottawa. That way, I avoid any microphone or other technical problems.

Ecosystem is a Quebec company with about 200 people who are passionate about reconfiguring and rebuilding energy ecosystems in buildings. We work across Canada and in the United States, which now accounts for over half our revenues.

[*English*]

I started Ecosystem with a strong belief that everything can be more efficient. Real estate and the construction industry are not efficient, mainly for what we believe to be three reasons.

The first is that everything gets built on a cost-plus basis, so we pay good people to become cost and systems maximizers. In that, there is no incentive for creativity and innovation, and if you combine that with the context of mainly low-cost energy in North America, we get what we have.

[*Translation*]

We believe that the industry needs fewer prescriptive measures and more results-based measures.

[*English*]

We recommend focusing on the “how” and not the “what” to make sure that there is clear accountability in the bidding process, the procurement process and the contracting process, and aligned financial interest. We're only going to get what we want if our partners in the equation get rewarded for it.

I like to give NASA as an example. NASA moved their procurement and contracting process to an outcome-based one 20 years ago, and they've achieved a great cost reduction with that initiative, mainly because they reconnected people with results. Their partners' engineers are now working with a purpose and they are motivated to reach greater goals.

[*Translation*]

A lot of emphasis is put on technology. It's important, of course, and technology like the one Mr. Wright discussed earlier is certainly needed. However, it's important to know that, in Europe, with the same building technologies, 50% less energy is used in the built environment than in Canada.

Amory Lovins, in the United States, has said for dozens of years that consideration should be given to paying professionals based on the money they're able to save, not the money they spend. That means rethinking our purchasing methods and the alignment of financial interests in everything we do. That's clearly true in the construction and real estate sectors, but also in everything we do. Interests must be better aligned with the desired outcome.

If there's one area of technology in which Canada should be a leader, it's heat pumps. We live in a climate and environment in which electricity is affordable and clean. I read in your report that most of the energy we consume is used for heating. Heat pumps are therefore the best technology for the future.

The Chair: Thank you, Mr. Rochette.

I'll now give the floor to Ms. Moran.

[*English*]

Dr. Kathryn Moran (President and Chief Executive Officer, Ocean Networks Canada): Thank you very much.

I have the privilege of being the president and CEO of Ocean Networks Canada, an operator of world-leading ocean observatories. I am an ocean engineer and have over 30 years of experience in ocean science and technology.

ONC systems host over 12,000 sensors that monitor the west and east coasts of Canada and the Arctic for many benefits, such as research, societal, etc. Our ONC infrastructure studies all aspects of the ocean, but it is now positioned to advance research in a wide range of technologies for ocean-based carbon dioxide removal, which I'll refer to today as negative emissions technologies, or NETs.

You all know well that for us to sustain human life, rapid and aggressive reductions in atmospheric CO2 are urgently needed, but the top conclusion of the U.S. National Academy of Sciences in 2019 was that NETs must also be implemented, especially if CO2 emission reduction goals are not reached. Recently, IEA identified the need for widespread NET deployment as early as 2038.

NETs have been under-explored to date. The international consensus that NETs are imperative reinforces the urgency to move forward now so that integrated systems can be deployed globally in the next decade. Because the ocean covers 70% of the earth's surface and has already marshalled its natural processes to remove more than 30% of human-caused GHGs, it holds potential for enhanced uptake of even greater removal of CO2 from the atmosphere. This could potentially total more than five gigatonnes per year if investments are made now for advancing the research needed for these mitigation solutions.

With increases in the price of carbon, these ocean-based carbon dioxide removal technologies have good potential to generate income and advance our blue economy, not only with credit revenue, but also through technology export, as you've heard from the first speaker. The IEA forecasts that the carbon removal market will exceed $1 trillion by mid-century.

ONC infrastructure is ideally positioned to support the wide range of ocean-based carbon dioxide removal research areas that span six different solutions. In addition to ocean water-based NETs, Ocean Networks Canada is leading a project called Solid Carbon, which is a climate mitigation strategy that can provide safe and secure CO2 capture from the atmosphere and sequestration that can be scaled to have significant impact in the time frame needed. It combines six existing technologies and is based on the fact that ocean basalt reacts with carbon dioxide injected into rock pore spaces to form solid carbonate minerals at greatly accelerated rates. Basalt abundance in the ocean creates the potential for substantial storage capacities. Solid Carbon thus has potential to sequester 20-plus gigatonnes per year of CO2, which is up to half of what needs to be removed from the atmosphere.

Thank you.

● (1705)

The Chair: Thank you. That's very interesting.

[*Translation*]

Ms. Lambert-Chan, you have three minutes.

Ms. Camille Lambert-Chan (Director, Regulation and Public Policy, Propulsion Québec): Thank you very much.

My name is Camille Lambert-Chan, and I'm the director of regulation and public policy at Propulsion Québec, the industrial cluster for electric and smart transportation.

Propulsion Québec began operations in 2017. It catalyzes the entire sector around joint projects aimed at positioning Quebec as a global leader in developing and implementing smart and electric transportation, for the benefit of Quebec's economy and environment.

Starting with 20 founding members, Propulsion Québec now has more than 260 members, from start-ups to large companies across the province, including institutions, research centres and mobility services.

What role can the electrification of transportation play in clean technology? To answer that question, I'd like to share the findings of the latest report by the Intergovernmental Panel on Climate Change, the IPCC. It found that electric vehicles powered by electricity with low greenhouse gas, or GHG, emissions have great potential to reduce GHG emissions from ground transportation on a life cycle basis.

Technological advances in battery production could facilitate the electrification of heavy goods vehicles and complement the conventional electric rail system.

Again according to the IPCC, electrification, combined with low-carbon energy and the transition to mass transit, can improve health, employment, energy security and equity outcomes.

Transportation accounted for 43% of Quebec's GHG emissions, so there is great potential to improve our environmental record by transitioning from traditional ground transportation to electric and smart transportation. To do this, we need to reimagine the way urban areas function, by reducing energy use, rethinking our supply and transportation routes, and electrifying the vehicles on our roads.

Quebec has what it takes to carry out this energy transition and stands out thanks to its abundant clean energy produced through hydroelectricity, including energy rates that are among the lowest in the world.

Thanks to the expertise of Quebec manufacturers, we build all types of electric vehicles in Quebec, whether for individual transportation, public transit, freight transportation, recreational transportation, special purpose transportation or rail transportation. In short, we do it all, except cars.

To support the deployment of zero-emission vehicles on our roads, Quebec organizations are working on developing charging facilities, smart infrastructures, smart vehicles and mobility services.

While our ecosystem has seen rapid growth for several years, our companies are facing major labour, supply chain, financing and regulation issues, just to name a few. Propulsion Québec's role is to address these issues across the electric and smart transportation ecosystem and Quebec's economic development sector.

Thank you, and I will be pleased to answer your questions.

● (1710)

The Chair: Thank you Ms. Lambert-Chan.

For us to end at 5:50, I'm going to cut 25% off the time each member has for questions. I've done the calculations. For Ms. Pauzé and Ms. Collins, the reduction will only be 20%.

We'll begin with Mr. Kyle Seeback, who has four and a half minutes.

[*English*]

Mr. Kyle Seeback (Dufferin—Caledon, CPC): I'm going to try to talk very quickly.

I agree with my colleagues here who have said that technology is the answer to meeting any of the net-zero targets globally. The IEA has put out a special report. They said that "35% of the cumulative CO2 emissions reductions [needed to shift to a sustainable path] come from technologies that are currently at the prototype or demonstration phase". A further 40% of the reductions "rely on technologies that have not yet been commercially deployed" on a mass-market scale.

All of you are in this space of technology. Why are we not succeeding in the technology here in Canada? What's wrong with the investor environment? It's not always about government spending.

I was hoping that Mr. Burany could answer, then Mr. Rochette and then Madame Moran.

Mr. Zsombor Burany: Thank you very much for the question.

Look, I'll give you an example. I built a telecommunications company here. It was the fastest Internet in Canada and a $250-million investment. I couldn't get anything out of Canada. The Americans invested. They bought it, and they own it now. Where did they get the money? It came from the Canada pension plan. The funny thing is that we're happy to invest our currency into foreign markets, which then reinvest in Canada.

We don't have policies here that would push the funds to the people who need them. The Infrastructure Bank doesn't support small initiatives. It's very difficult to get funding from them—even we couldn't get funding from them. They're geared towards large corporations, so we have the ability to get funds, but our institutions aren't pointing them at us. They're pointing them abroad, so the small corporations that are trying to grow can't access them.

Mr. André Rochette: I would say a few things.

The first one is that I don't think we have enough outcome-based.... I heard Randy say today that something is prescriptive—we're subsidizing cars but not airplanes. This is not outcome-based; this is a recommendation to look at one thing. I think we should tell the market, "This is the goal. This is what we need to accomplish", and become more outcome-based.

The second thing is that technology is great, but efficiency is better. The more efficiency we have, the smaller the problem becomes. By the time we have all the technologies we need, if the problem is smaller to solve, it makes it easier.

Mr. Zsombor Burany: I'd just like to point out that a policy change to the way the Infrastructure Bank...is all that's really needed. You don't need more money from the taxpayers. The funds are already sitting there to be applied to all of these initiatives, whether they're airplanes that are being built or electric vehicles, all of these. The money's already there. We just can't get it.

Dr. Kathryn Moran: I would also say that there's a new awareness of negative emission technologies. People are just realizing it—scientists have known this—so it's a new area of research that needs to advance technology rapidly.

In the U.S., when there is a high-risk, high-reward technology that needs to be developed, the first tool they use is government procurement. They buy it first and get it funded, and that moves it further to have, then, investments from venture capitalists going forward. Let's use our procurement tool and get some of these technologies going.

The Chair: You have about a minute and 10 seconds left.

Mr. Kyle Seeback: Wow. Four minutes seem a lot longer today than they normally do.

I'm just going to ask if anybody wants to add anything more to that. To me, this is the real focus: How are we going to actually commercialize these technologies here in Canada so that we have well-paying jobs and solve some of these problems?

Does anyone have anything else to add?

Dr. Kathryn Moran: Sure, I can add to that.

I've mentioned Ocean Networks Canada. We have the research infrastructure to advance early-stage technologies to a higher technology readiness level. Supporting SMEs in doing that research would advance our technologies. It's low-hanging fruit.

● (1715)

Mr. Zsombor Burany: We do get a lot of research out. We have great ideas. We have great technology that comes in. The problem is converting it to large-scale commercialization.

The large corporations will reinvest in their own research—that's not a problem. The issue is how you take these small corporations and commercialize them on a large scale. Almost invariably that goes overseas.

The Chair: Thank you.

We'll go to Ms. Taylor Roy for four and a half minutes.

Ms. Leah Taylor Roy (Aurora—Oak Ridges—Richmond Hill, Lib.): Thank you, Mr. Chair, and thank you to all the witnesses for being here.

I want to talk about the same issue that Mr. Seeback just raised, which is getting to commercialization and why more Canadian companies aren't able to do that.

In the last panel, one of our witnesses spoke about the need for a kind of push-and-pull. Ms. Moran, I think you also mentioned that the high price on carbon helps to make it feasible to produce and to commercialize some of these technologies because it requires that much. However, there's a lot of controversy around whether it's just about investment in clean technology or whether we actually need to have that push as well with the price on carbon and perhaps with encouraging pension plans to put more money into Canadian corporations. That's more of a push from the government.

I'd like to hear your thoughts on that. It's for all of you, but perhaps we could start with Mr. Rochette.

Mr. André Rochette: When I say outcome-based, one of the great examples is New York City. We do a lot of stuff in New York City. They came out with a new regulation that's called the LL97. It's an outcome-based regulation. It's basically saying to the market that it needs to reduce emissions by a certain date; otherwise, it will be penalized.

I think once you do that, you really let the market figure it out. It's outcome-based, but you let the market figure out the solution. It drives everybody in the same direction. Instead of saying that it's maybe that solution or this other solution, it tells the market that this is a problem we're trying to solve and if the market doesn't solve it, it's going to cost them that much. People get creative and they solve it.

Ms. Leah Taylor Roy: Thank you.

That's similar to what the government is proposing right now with the 30% reduction of carbon emissions from fertilizer. You're just saying it's output-based and to let the technology develop to meet that regulation.

Ms. Moran, Mr. Burany or Ms. Lambert-Chan, do any of you have comments on that?

Dr. Kathryn Moran: I agree with what the previous speaker just said.

Ms. Leah Taylor Roy: Thank you.

Mr. Zsombor Burany: I think we're missing an opportunity. These technologies are going to be developed, but it's the Wild West right now. Everybody is trying to figure out their own way. The problem is that nobody is taking a leadership role on where we're going to go with this industry.

We've done a lot of work in the past, setting up quotas and being able to establish rules in the way people are trying to extract carbon. The problem is that these pollutants aren't bound by our borders, so whenever one of these large initiatives is kicked off, it's typically international. What happens is that you will have players that come into conflict with each other because they have to. They will be stepping on each other's toes. I think it would be very helpful if Canada was able to take the leadership role in trying to bring together and align the policies that other countries have—because even they are sometimes in conflict with each other—in order to establish the rules and the parameters of how we can do carbon extraction down the road. Once you've established that, then you can set goals and targets for these companies that are trying to do these things. That would then drive the rest of the industry.

There's really a lot of policy work that needs to happen in conjunction with our partners and trading partners to make this work.

Ms. Leah Taylor Roy: Mr. Burany, it's very interesting that you say we need to be setting these targets. Are you talking about carbon markets and trying to set the rules around that? What specifically are you referring to?

Mr. Zsombor Burany: I'm talking about both, actually. There are no clear guidelines and the industry needs them.

You have to take into account political, geographic and economic circumstances. They all need to be crafted. There needs to be a convergence of policies among all nations, including our trading partners in particular.

Once you've established that, you've set the ground rules. Everybody is looking for ground rules. Everybody wants to know how to get into this sector, how to get into that sector, or how to get their airplane in the air. All these are things we don't know. Every country is kind of running off in its own direction right now and they are occasionally aligned.

● (1720)

The Chair: Thank you.

Mr. Zsombor Burany: I think Canada has a great history of being able to do this, so if we took the leadership role in this, we'd be able to establish ourselves—

[*Translation*]

The Chair: Thank you.

Ms. Pauzé, you have four and a half minutes.

Ms. Monique Pauzé: That's not much time.

I'll speak to you, Mr. Rochette. First, I'd like you to know that finally hearing talk of energy efficiency was music to my ears.

Last week, I went to New York for Climate Week. There, I learned about the Empire Building Challenge, a project involving several large buildings in Manhattan that want to accelerate efforts to achieve energy efficiency. I was also quite proud to discover that your company is a partner in that major project and is also involved as a consultant.

Under the public responsibility of the State of New York, the New York State Energy Research and Development Authority, which has an incredible portal, is a true hub for all programs in almost all applicable sectors to accelerate the energy transition and achieve carbon neutrality.

Now let's come back to Canada. Do you think that the Clean Growth Hub, administered by the federal government, should draw inspiration from that portal and offer something similar to potential partners? Also, is that Canadian hub useful in any way to your business?

Mr. André Rochette: What always surprises me is that work is done in silos almost everywhere. The problems we're trying to solve in Quebec and Canada, and even those being addressed by the New York State Energy Research and Development Authority, are similar. A number of think tanks are discussing the problems, each on their own, and a lot of information is coming out of those discussions. However, that information is fragmented. It needs to be consolidated to be more effective.

Ms. Monique Pauzé: It's not exactly progress.

Despite the fragmentation of all those data, are you able to assess whether these transformations toward energy efficiency could also have economic benefits for future users of these technologies?

Mr. André Rochette: That's a good question. The financial benefits of better energy efficiency no longer need to be demonstrated. Do we need to aim for efficiency, create technologies or both? I think every solution is needed. The goals are so ambitious that the choice cannot be limited to efficiency or technology.

Ms. Monique Pauzé: Accordingly, the company's clients will see economic benefits too.

Mr. André Rochette: Yes. We wouldn't have any clients if there were no economic benefits for them. Economic benefits often come before gains in the reduction of greenhouse gases. Regulations also have an impact on projects. The more regulations force clients to reduce their emissions, the more our projects will include elements in that respect.

Ms. Monique Pauzé: Since you've been in business, have you seen the process grow? Do you see a link between opportunities for financing clean technologies and the evolution of government procurement policies? Are governments able to make that link?

Mr. André Rochette: We've been in business for 30 years, and there has been a lot of backwards and forwards movement. For the past five years, things have been moving in the same direction a lot more, whether in terms of financing, technology development or regulations promoting energy efficiency.

To answer to your question, then, I would say yes. As for whether it's enough, I'd say no. Based on results to date, we're still very far from the goal.

Ms. Monique Pauzé: What are the hardest obstacles to overcome, in your opinion? Is it still the fact of working in silos and not coordinating efforts?

Mr. André Rochette: The obstacle is clearly the lack of coordination in calls for tenders for federal government energy efficiency projects. A lot of projects are carried out based on a cost recovery formula, such that costs are maximized. Unfortunately, no exceptional results will be achieved if we constantly focus on project costs rather than results. More and more focus needs to be on results, not inputs.

[*English*]

The Chair: We have Ms. Collins for four and a half minutes, please.

● (1725)

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

I want to thank all of the witnesses for being here today.

My questions are for Ms. Moran.

You mentioned that soil carbon has the potential to sequester over 20 gigatonnes a year of CO2. That is a massive amount. I was trying to find something comparable. If you took every single vehicle in the world off the road, that would be only between five and six gigatonnes a year. I really want to emphasize how huge 20 gigatonnes a year is.

I was also really interested in what you said about the carbon dioxide removal research areas, those six different solutions. I'm wondering if you could talk a little bit more about those six areas.

Dr. Kathryn Moran: Sure. First of all, with carbon, this is bringing six different technologies together, including direct air capture. It does rely on the fact that direct air capture technologies are now being invested in tremendously, and their volumetric capacity, and their costs are going to be reduced.

The capacity in ocean basalt globally is 250,000 gigatonnes. That's what we've estimated in ocean basalt. It's been demonstrated in Iceland that CO2 reacts with the rock, forms solid minerals and is durably sequestered, but most of the basalt is in the ocean, particularly young basalt like this. That's our estimate right now, that it has a giant sequestration reservoir capacity, but it does rely on advancing direct air capture, which we're not doing research on but many others are investing in.

In terms of ocean technologies and Canada, we have great infrastructure, so we have great potential to actually grow these six different technologies in various ways. It's iron fertilization in the ocean, enhanced upwelling, electrochemical solutions in terms of both alkalinity and removing CO2 from seawater, and kelp growth. Some of it is nature-based solutions that don't have a huge capacity to sequester carbon, but they do have other benefits.

It's that range of technologies that we can advance. We're already being contacted by U.S. companies and start-ups that want to use our infrastructure to move their technology along. It would be great to see some Canadian tech start-ups actually use our infrastructure to advance that research and get that technology readiness higher. Because we already have infrastructure, we're way ahead of the game internationally.

Ms. Laurel Collins: It sounds like Ocean Networks Canada is doing some really exciting work. In your view, are the projects that you're working on getting the kind of stable, long-term funding they need to be successful?

Dr. Kathryn Moran: The government has supported us in our operating funds, so I'm happy to say that we have a runway ahead of us. What we're talking about now is really showcasing the fact that we operate this infrastructure, which then can be used in new ways, such as for carbon dioxide removal.

Ms. Laurel Collins: There are some folks who argue that we can kind of rely on negative emissions technologies to meet our climate targets and that we don't need to act now on efforts that bring our emissions down quickly. In fact, they were arguing in the House today to get rid of the price on carbon.

Can you talk about the role that negative emissions technologies can play in our efforts to keep global temperature increase below 1.5°C, in both the short term and the long term, and the frame around that?

Dr. Kathryn Moran: Sure. It was started in 2017, when the UN environment program put up that first declaration that no matter how fast or how slow we reduce our emissions, negative emissions technologies will be needed. At that time, they said it was sometime by mid-century. We now know it's sooner, because we haven't been reducing our emissions, which is essential. We have to ensure that our emissions are reduced, whether it's through efficiency, as just discussed, or through direct reduction of greenhouse gases into the atmosphere.

There's no question that's needed, but of course now we know from scientific research that the negative emissions technologies are needed. We're seeing it. A paper that came out last week updated the tipping points. Even at just slightly greater than 1°C, we're going to start seeing these major tipping points in the climate system.

The Chair: Thanks very much.

We'll go to our second round now, with Mr. Carrie for three minutes and 45 seconds.

Mr. Colin Carrie: Thank you, Mr. Chair.

I want to thank the witnesses for this very exciting testimony.

We just heard Ms. Moran talk about these carbon removal technologies and negative emissions technologies. From what I read in your opening statement and your material, Mr. Burany, it sounds like you're actually doing it. You're a Canadian company. It's very disappointing, and you sounded very disappointed, that you had to commercialize and move out of Canada, because I think this is an opportunity to change not only Canada but the world. For me, it's all about jobs. I'd like to keep jobs in Canada.

Could you explain to us what your initiatives are with BioSphere Recovery Technologies, what you're running, and how your company is structured? Could you give us a little insight into the projects you're involved in?

● (1730)

Mr. Zsombor Burany: ONC, ironically, is working on many of the same initiatives we're doing, but our focus is bringing them to a commercial level. Our research facility has a $250-million budget for ocean research and a $500-million budget for plastics research, the extraction of polymers out of the ocean—which, by the way, are as dangerous to us as carbon, if not more so.

It's a multinational initiative. There's an extraordinary amount of funding coming out of the U.S. and Europe for this. We're expecting to have between 3,000 and 5,000 employees. Many of them will be in Canada. We will be working with universities and other institutions here. I would like to get as much support as possible from the University of Toronto, Simon Fraser and Dalhousie, because they have a lot of background in this type of industry.

The biggest thing I want to point out is that we want to have a lot of scientific rigour around the planning and the work that we do, with continuous feedback and a very open process that would allow us to be able to take the next step in carbon capture and removal. We're looking at all kinds of technologies, but the first one really is carbon and plastics.

Mr. Colin Carrie: It really does sound like game-changing technology. Again, I noticed in your opening that you sounded like you're very disappointed we couldn't get the job done here in Canada.

Mr. Zsombor Burany: It's devastating to me.

Mr. Colin Carrie: It is to me, too. This is a great opportunity to lead the world, and we kind of dropped it.

You mentioned how we could change the Infrastructure Bank, and your recommendation here doesn't sound like it would cost us anything as a government. Could you elaborate on that? It would not only help you, but.... The panel before, in their testimony, were saying over and over that they couldn't get assistance and that the red tape in Canada was stopping them from getting the job done. Could you elaborate on that recommendation, please?

Mr. Zsombor Burany: The Americans and the Europeans provide 100% project funding at pretty much 0% interest for 20 years. The Infrastructure Bank has the capability to do that. All you have to do is match what they do.

These projects are very important, and most of them make quite a bit of money. We need to loosen up the criteria; that's all. It's just a policy change.

The Chair: Thank you.

We'll go now to Ms. Thompson for three minutes and 45 seconds.

Ms. Joanne Thompson: Thank you, Mr. Chair.

Welcome to the witnesses.

I'd like to begin with Dr. Moran.

I was really interested to read that you have six permanent buoys as part of your research outreach around the island of Newfoundland, which is my home province. Certainly, in light of the adverse weather system we witnessed over the weekend, practical information, to me, is quite important when we really begin to understand how important ocean health is to a climate crisis.

Could you speak about what information or data is being gathered from those buoys, how that knowledge is being used, and then, ultimately, the practical applications going forward?

Dr. Kathryn Moran: Yes, of course. Those buoys give real-time information in the first go-ahead with marine safety. Ship operators use those data to make decisions, of course.

They are also used to understand the changes in the ocean climate system. What we're doing along the coast of Canada is basically using that data to feed into what we call inundation models. We stitch together the bathymetry and the topography, and then we drive ocean inundation, like what you saw in Atlantic Canada just recently. We drive those waves into the coastline to forecast what could happen in these areas that are going to be impacted by sea level rise. We're working on that now in B.C. and in the Arctic, and our next phase will be in Atlantic Canada. Obviously, it's certainly needed.

● (1735)

Ms. Joanne Thompson: Thank you.

Do you share this information at this time, or is it something that you're projecting at a later date, the application of the information?

Dr. Kathryn Moran: We share all the information about the inundation models. It's openly shared. We work with Canadian companies to help us do that work, so it's a private-public partnership, but all of our information is openly available on our website, and then the results of these inundations are through reports, mainly, that we can provide openly.

Ms. Joanne Thompson: If you could expand at this point how that information is shared, or the application of the information, what would you like to see, in an ideal situation, in terms of forecasting and the realities of the adverse environment systems we are witnessing?

Dr. Kathryn Moran: I think we need to be doing these forecasts in all of the areas along Canada's coast that are at risk of inundation from these incredibly stronger storms we're seeing, and on top of that the increasing sea level rise. It's really about understanding where the sea level rises, maximizing it and combining it with these storms. We need to be doing this on all our coasts.

Ocean Networks Canada has now done it for much of Vancouver Island and some of the southwest coast of B.C. We're starting to do it in the Arctic. As I said, we need to move faster and do something in Atlantic Canada.

Ms. Joanne Thompson: Thank you.

Do I have any time left? I believe I should have a few moments.

The Chair: You have 30 seconds for a comment, I guess.

Ms. Joanne Thompson: Very quickly, I want to ask the other witnesses if they have looked for any funding from the clean growth hub. I will throw that out there for anyone to answer.

Mr. Zsombor Burany: We didn't qualify.

The Chair: That just about covers the time.

We will go to Madame Pauzé for two minutes.

[*Translation*]

Ms. Monique Pauzé: Thank you very much.

Ms. Lambert-Chan, thank you for being with us today. I know you have an event in October at the Montréal Science Centre. Can you tell us about the potential your organization is developing with youth in terms of training?

I'm always interested in the development of the workforce and how to make the most of a fair transition for everyone. I think you have some good ideas on that. Could you share them?

Ms. Camille Lambert-Chan: Yes, absolutely.

Thank you for talking about this, because labour is probably the most important issue for all our businesses at this time. The event you mentioned for October is known as En Route 2022. It's a networking event for graduates and jobseekers, and the purpose of the event is to promote the electric and smart transportation sector and fill many vacant positions.

The workforce issue is important because we're talking about a transition and training programs that often don't exist, either at vocational training centres, universities or CÉGEPs. A lot of the focus is on engineering training, but it's also important to keep in mind the technical component behind that. That's where there are major issues for the growth of our businesses.

The issue of financing for start-ups was mentioned earlier, but there's also the issue of the workforce. This event will bring together about 1,000 people at the Montréal Science Centre to present different career paths and jobs that are currently less well known.

Ms. Monique Pauzé: With the previous panel of witnesses, we talked a lot about the lack of networking and coordination between people because too much work is done in silos.

Has the response been good?

The Chair: Unfortunately, your speaking time has ended, Ms. Pauzé.

You may answer yes or no, Ms. Lambert-Chan.

Ms. Camille Lambert-Chan: The response has been good, but it's still a lot of work.

The Chair: Thank you to both of you.

Ms. Collins, you have the floor for two minutes.

[*English*]

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

Dr. Moran, you talked a little bit about what makes Solid Carbon different from other negative emissions technologies and why storing carbon in the subsea floor is so promising. What other opportunities do you see for Canada in the blue economy?

● (1740)

Dr. Kathryn Moran: There are many. In some of the areas, we're working with SMEs in Canada. For example, we've worked with JASCO and other companies in Atlantic Canada that are developing very high-quality sensor systems like hydrophones. In working with them, we have been able to help them develop basically the capturing of information about ocean noise so that it can be used in real time to make policy decisions on the fly—for example, about moving shipping lanes to protect southern resident killer whales, or just plain old reducing noise. That's one of the examples that are really important for the future. Everywhere in the ocean we need to begin to reduce that impact on marine mammals in the country.

In addition to that, as I mentioned, there is the technology to forecast inundation. That kind of technology and know-how need to be exported so they can be used in many of these small island states in the world where they don't have the know-how to forecast and make plans as to how they need to either retreat or put in protections for their work.

We're also looking at new ways of observing the ocean for expanding the marine protected areas and monitoring, and that is through autonomous vehicles that then would be hosting sensor systems that are built and marketed by Canadian SMEs. I would say Canada has the best collection of ocean sensor technology companies in the world, so through that work we can be showcasing those sensor systems to help market them, because their market is mainly international.

I think I've touched on a few.

The Chair: Thank you.

Mr. Mazier, you have three minutes and 45 seconds.

Mr. Dan Mazier: Thank you, Mr. Chair.

Mr. Burany, if Canada wants to be the hub of clean-tech investment and commercialization, how important is it for the government to create an investment-friendly business environment?

Mr. Zsombor Burany: I think it's critical. You need the investment environment, and you also need to establish a leadership role in the regulatory process. Once you've established the path for that, you will see an influx of innovators, not an exit of innovators.

Mr. Dan Mazier: You commented before about your experience with the clean growth fund and how you were denied that. Can you expand on that, or tell us the story of your experience with the clean growth fund?

Mr. Zsombor Burany: Yes. The problem is that the type of technology we're doing isn't a commercial technology. Right now, it's primarily research. After the research, there will be commercialization. With commercialization, we'd be getting carbon credits. It doesn't fit neatly into the box you need to tick off.

I think that's a problem everybody is facing. We're in a new industry and it doesn't fit perfectly in the box. Everybody agrees it should be funded, no question about that. The problem is that nobody has the capability to do it.

Mr. Dan Mazier: Would you say that's a perfect example of the government not being supportive of the business environment?

Mr. Zsombor Burany: It's just not flexible; that's the problem. They pass down mandates that have a very specific path to follow, and if you're just outside of it by one inch, you don't qualify.

Mr. Dan Mazier: You mentioned a few different points about reducing red tape. There are some suggestions on policy change, but give me the top one or two things we could do to get commercialization going here in Canada, in clean tech.

Mr. Zsombor Burany: I think you could change the problem overnight by just restructuring the Infrastructure Bank. I've had a lot of experience with these guys. They're great guys; there's nothing wrong with them. The problem is that they cannot change the way they do their lending because of the policies in place. It's onerous for these types of businesses to meet the requirements they need to meet. I think we need to change the Infrastructure Bank. I have an open letter I can share with you.

Mr. Dan Mazier: If you could please forward it to the committee, that would be great.

Mr. Rochette, do you have anything to add to this conversation?

Mr. André Rochette: For green businesses to take off, I think we need the right context, the right policies and the right regulations. What we see, right now, is the world going to New York because of Local Law 97. We used to compete against local companies, and now we see companies from Norway going to New York. We see carbon capture companies going to New York because of the right context. They know that context is going to create opportunities.

I would say, again, that outcome-based regulations geared toward the long term set up the right context for these technology companies to thrive.

Mr. Dan Mazier: Mr. Rochette, it's my understanding that your organization works to design and implement energy retrofits for buildings. Do you have any idea how many emissions could be reduced through retrofits in Canada?

● (1745)

Mr. André Rochette: I don't, sorry. I would say that there are similar buildings in Europe. We go to Europe and we visit their buildings. In many buildings, we see the energy intensity is halved, and I think that's achievable. Amory Lovins and the Rocky Mountain Institute have been saying over and over, for 30 years, that with better integrative design and a better context, we can basically reduce energy consumption by 50% or more.

The Chair: Thank you very much.

Last but not least, batting cleanup, we have Mr. Duguid.

Mr. Terry Duguid: Thank you, Mr. Chair. I'm batting cleanup in clean tech.

My first question is for Mr. Burany.

The story of your company going south of the border is not a new story. I think we've all heard it before, and there are many critics of our innovation ecosystem. We do incredible R and D and we develop the IP, but we can't get the money to scale up and we get scooped up. That's happening with big tech all over the place. It's happening in water technology and energy technology.

I wonder if you could amplify a little bit on Mr. Mazier's question. If you were innovation minister for a day, what would you change, and how would you change the Infrastructure Bank? Perhaps be a little more granular. We have the clean growth hub and the net-zero accelerator. We seem to have a lot of stuff, but, again—per Mr. Rochette—results could be better.

Mr. Zsombor Burany: It's not that hard. I would allow the Infrastructure Bank to fund between 75% and 100% of projects. I would allow the infrastructure funds to provide a 0% loan for 20 years, and I would allow them to adjust the payback rates to zero for that period of time.

A lot of these projects are long-term and they are very lucrative. The problem is that you can't get them off the ground. If we can do that, they'll be able to support the growth in this industry.

The U.S. already does this. They have a $105-billion fund that is doing exactly this, and it's a fund that we've tapped into.

Mr. Terry Duguid: Could you send that to us in some sort of communication? It would be very useful for the committee as part of your testimony. I can tell you that we will take a very close look at it.

Thank you.

Mr. Zsombor Burany: Yes, I will share that with you. I can also tell you that the Federal Reserve in the U.S. directly backs $20 billion of that fund through gold reserves.

Mr. Terry Duguid: Okay.

How much time do I have, Mr. Chair?

The Chair: You have one minute and 15 seconds.

Mr. Terry Duguid: Mr. Rochette, buildings are 13% to 18% of our emissions profile, so they're a place where we can get real gains on reducing carbon pollution.

You are the minister of procurement for a day. Again, as I understand it, all the technology that can get us to our goals exists, but it may take more innovation and processes, and being creative about how we do things. Minister, what would you do?

Mr. André Rochette: Yes, we do buildings. We also do industrial. Again, I think outcome-based procurement and contracting are great, because they tell the market, “We have a problem with this building. We have a problem with this industry. What would you do to solve it?” That's what they said to SpaceX and Boeing: “We need to go to the space station. How would you do it? How much would it cost?” The engineers competed against each other for the best solution, and they have to deliver it.

This is night and day. You incentivize creativity and innovation—

Mr. Terry Duguid: We're in a cost-plus straitjacket.

Mr. André Rochette: Exactly.

The Chair: Thank you.

That takes us to the end of a very interesting set of panels.

I want to thank our panellists for this discussion about individual technologies that will help us make progress against greenhouse gas emissions and so forth. Thank you very much.

Thank you to the members for your patience today. We'll be meeting next Tuesday, because Friday is, of course, a holiday.

Thank you again to everyone. Enjoy the rest of your evening.

The committee is adjourned.