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Chair

Mr. James Maloney

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● (1615)

[*English*]

The Chair (Mr. James Maloney (Etobicoke—Lakeshore, Lib.)): Good afternoon everybody.

Thank you to our witnesses Mr. Martin, Ms. Thompson, and Mr. Kent for joining us this afternoon. I apologize for the delay; we had some votes in the House. We're going to jump right into things now.

Each group has up to 10 minutes to present, to be followed by a round of questions. There are earpieces available if you need interpretation services. You will almost certainly be asked questions in both official languages, and of course you're welcome to answer questions or deliver your remarks in either.

Mr. Martin, we will start with you. I'll start on my right and open the floor with you.

Mr. Steven Martin (Chief Executive Officer, Pond Technologies Inc.): My name is Steve Martin. I'm the founder and CEO of a company called Pond Technologies. I have to confess, I may have misunderstood the format of this presentation a little bit, from the discussion I had earlier. My impression was that we were meant to discuss sort of broadly those kinds of innovation vehicles and policy instruments that could be implemented by government to help assist the adoption of new and sustainable technologies.

In that regard, my impression was that it was to be more of a discussion than a formal presentation. I do have a formal presentation, which I can give, but I think it would be more useful if you heard my comments more directly from someone who's doing innovation on a daily basis, developing technologies that can help the environment.

My company, Pond Technologies, uses algae to mitigate carbon emissions from smokestacks. We take untreated stack gas emissions and put them through bioreactors that were designed and built in this country, using technology that actually came out of the fibre optic industry a number of years ago.

Surprising as it may seem, the key technology that we have came from a heads-up display of a fighter jet, designed by me about 20 years ago. That technology allows us to grow algae, strange as it sounds, faster than anyone else, and to take carbon emissions out of any arbitrary smokestack and turn them into something that's green, literally.

The algae that results is useful for any number of purposes. It's a very high protein animal feed; it can be used for soil amendment; and it can be used for biofuel.

We have a number of partners across the country that include Canadian Natural Resources on the oil sands. Most importantly, our partner is the National Research Council of Canada, through the algae carbon conversion program announced a number of years ago. We are the sole technology provider to that program.

We have an ongoing demonstration site at St. Marys Cement in Ontario, where their stack emits over half a million tonnes of carbon dioxide per year. We're able to take a small portion of that—small because of some of the impediments in existence for innovation adoption—and turn it literally into a green product. The National Research Council participates with us on that.

In answering the questions that were presented to me, I was asked what the risks were that government could take on within its jurisdiction to help with the adoption of clean technologies. One of the things I like to say is that industry is very much looking to adopt clean technologies. It just has to make financial sense.

One of the unfortunately realities is that, in the absence of regulations or other instruments wielded by government, there is nothing cheaper than polluting. The cheapest thing you can do is pollute, and accountants like cheap things.

If the government has an opportunity to implement real taxation, carbon pricing, or something in a universal way that doesn't impede industry but in fact rewards the adoption of new innovations, I think you'll find very willing participants across all the jurisdictions that you oversee.

We are not limited to our work with Canadian Natural Resources, the National Research Council, and St. Marys Cement. We have also worked with U. S. Steel Canada, now Stelco, and we've also used our technology on very small combined heat and power plants. Our solution is applicable across the board, but we're only one part of an ecosystem of solutions that are available to help mitigate carbon emissions.

The next question I was asked was what the best practice policy instruments are for de-risking clean technology in the natural resource sector. I would say it is a direct understanding of the limited capital available for implementing technologies.

All of the large final emitters across this country, resource-based or otherwise, exist in largely commodity-based industries. They're squeezed at both ends. They don't have free capital for implementing technologies, particularly if they're new.

We have a solution that works. It has been validated. The National Research Council is behind us. We are semi-finalists in the Carbon XPRIZE. We're recipients of many government dollars in terms of support. There is still a barrier to the application of our technology for industry. They just can't bear the cost.

The term best practice implies that there's an answer. I don't think there is a best practice; I think there are practices.

In terms of looking at new policy instruments, governments need to be very open-minded, see what other jurisdictions have done, and be flexible. Do what works, drop what doesn't, and don't stick to any one plan. I think the best policy in this case would be to be innovative.

● (1620)

I was asked what instruments exist in Canada. There are direct taxation and carbon pricing, either implemented or proposed. The direct taxation, as it was implemented in British Columbia, gutted the cement industry. I don't think that was the intention, but it nevertheless did it. Whether that had a positive impact on environment or not due to reducing carbon emissions is questionable. It's not really known to me if that's the right way to go; nevertheless, that is one of the instruments the government has.

Regulations in general have to exist, though, within the confines of what's available to industry. We could simply regulate now that industry no longer emit carbon, but we all know that what you're doing is regulating them out of business, so there has to be a way to foster innovation.

One of the things that's come up in my own company—and we've raised tens of millions of dollars—is that government likes to invest in new technologies. They're terrific. One of the problems is that government wants to be the last dollar in. There's a dearth of investment in Canada in technologies. It's been the same for years. When fibre optics exploded, we found this technology to be very interesting to Canadians, and we developed many companies that were very good. Since then, however, we have been really good at investing in mines.

When I go out to seek investment, I meet with investment bankers, and they say to me, "You're not a mine." I say, "No, we do technology. We can help the mining industry." They say, "That's fantastic, but you're not a mine. We don't have models to invest in you. We don't really know what we're doing." If there were a government program or a government initiative that could encourage investment at the front end—and I'm not talking about dollar-for-dollar matching, I'm talking about venture capital from government—that would be very helpful.

What institutions can the federal government leverage to de-risk clean technology adoption by natural resource firms? I'll tell you: the National Research Council. They've been an extraordinary group of people to work with. I can't believe the researchers they have there. Industry—and you probably hear it a lot—does not have a very high expectation for government in terms of their productivity and what they're doing. I think that's entirely wrong, as evidenced by the work done by the NRC. I've never worked with a bunch of people who were as good at what they're doing. They have a 60-plus year history in doing the work that I do. I discovered them by accident. Any support that can be provided to the National Research Council....

One of the things I would recommend for this committee is to start to advertise what they do. When I go to meet with investment bankers and I say, "We work with the NRC", they say, "Who's that?" That's a big problem. It's a billion-dollar organization with 4,000 researchers who are very good at their jobs.

The last thing is what recommendations I have for the Government of Canada that the committee should consider for their final report. I think they should consider an ongoing consultation with heavy industry, the people who know what they're doing in terms of emitting carbon and what they have to do in terms of the realities of business. If you can have a permanent committee that looks at these regulations and is quite flexible in how they move forward, you'd be well served.

I would say that's the end of my little monologue.

The Chair: Perfect. Thank you, Mr. Martin.

Ms. Thompson.

Ms. Alison Thompson (Chair of the Board, Canadian Geothermal Energy Association): Thank you for inviting the Canadian Geothermal Energy Association. We call ourselves CanGEA.

I'll be presenting on behalf of CanGEA. I'm with my colleague Alex Kent, who is the policy manager. I'm the chair of the association.

Bonjour from our membership. I'm excited to see here so many of the MPs from our constituents' project bases. Right now, we have projects in Saskatchewan, the Northwest Territories, Yukon, Alberta, British Columbia, and Nova Scotia, so we truly are a pan-Canadian resource.

We also represent the whole supply chain. When you look at our membership, as shown on our slide, you'll see that we have everybody from the explorationists' side and the engineering to the people who drill the wells, as well as the accountants, financiers, and lawyers, and also the people who build turbines, equipment, and piping. If you didn't know that I was talking about geothermal, you might think that I was talking about oil and gas. That's one of our main comments today. Through the energy transition, it's about looking at what geothermal can do not just for the renewable economy, but also in terms of a job transition economy for out-of-work oil and gas workers across the country.

One of the things we find, though, is that most people just don't understand what geothermal is. It's hard to understand the promise of geothermal if we don't yet know how it can be used. The slide in front of you now is a really quick snapshot of the different types of geothermal.

One of the first things we say is that geothermal itself has a really bad name. As an industry for oil and gas, we have become more sophisticated, and now people don't really call it “oil and gas”. We'll maybe call it “tight oil”, “oil shale”, “oil sands”, “sour gas”, or even “peat moss” or “coal”. Think about all the different types of hydrocarbons. They all exist in different types of rock. All the different hydrocarbons are also harnessed by different technologies and at different costs.

For geothermal itself, we're disfavouring ourselves, really, by using just that one word “geothermal”, because what we really mean to say is that geothermal can be many things. Later, I'll have a slide showing where it exists across Canada.

Like the oil and gas industry or the coal industry, we do need a bit of a specialized policy because, again, we need different technologies, and there are different costs to harness them. The best thing to know about geothermal is that we're not just about electricity. Canada is actually doing a wonderful job with renewable energy. Usually when people are talking about renewable energy, they mean renewable electricity, but we also offer renewable heat. I'll go into what renewable heat is.

We have three advantages. The first one would be heat. Heat itself is a larger market in Canada than electricity is. I've mentioned that we are doing I think quite a good job with renewable electricity programs, but we've barely scratched the surface for renewable heat, if at all.

We can look at the statistics. About a quarter of all energy used in Canada is non-fossil-fuel based, so that's a renewable base. Our market share would be about 75% more to support more renewable electricity and heat. We can look at an average household. They spend more money on heat than they do on electricity.

In the north, almost all of their heat comes from oil or diesel. You hear about ice roads or people flying in diesel. It's quite polluting to have a diesel generator, and it's noisy. Also, of course, it's just giving us that one product: it's either electricity or heat.

With geothermal, though, we can have micro power plants that are the right size for communities and for small communities in the north. We can provide all the power they need, as well as all the heat they need. We can right-size these projects across Canada as well.

I don't think that geothermal will be a large electricity-based utility, but in places that are looking for both electricity and heat, our “co-gen” makes us very affordable and also gives two products.

If you're thinking about why we haven't heard about this in Canada, just this morning, Paris, France, announced another 200,000 homes right in the city of Paris that will be converting to renewable geothermal heat from natural gas. Right now, in terms of geothermal heat progressing in their city, they're about 30 years in. France itself has very supportive policies, which we'll talk about later in the presentation. Poland also announced just this morning that 30% of their country can be heated by geothermal heat.

While we don't know very much about it in Canada, the industry itself is over 100 years old. There are 80 countries around the world, many of them in Europe, that are using renewable heat from geothermal. Around the world, about 25 of them use it for electricity.

● (1625)

Of course it's wonderful to have climate change mitigation methods and get off fossil fuels. The natural gas industry might say it can take care of that and burn natural gas and it's clean burning. However, we can do all the things that natural gas does at a similar price; do it at a renewable, sustainable level with no emissions; and give jobs as well. Canada itself has grown up as an oil and gas country over the past almost 100 years, and we have a lot of stock built up in human capital. People have gone to university; they've had jobs; they've trained maybe as a geophysicist or a geologist or a pipeliner, and it's hard to ask them to retrain to be a dentist. These people are the best at what they do and better than in most other countries in the oil and gas industry, and that technology and expertise exists in Canada.

Our energy forum maps 100% on oil and gas so you will find all those professions in oil and gas can also be deployed in geothermal. The best part is shown on this graph, and these graphs are not CanGEA statistics. With the industry being so emergent in Canada, we have to rely upon other countries; we're speaking about France, Germany, and the U.S.A. You can see in the slide about jobs that for the same amount of heat or electricity output several times more jobs are created, and again, the right type of jobs in the professions: geologists, geophysicists, geoscientists, drillers, pipeliners, tradespeople, field staff. You can have your cake and eat it too, which is what the other countries are finding. We're thrilled to have a very close partnership with the oil and gas industry. They don't see us a threat; workers themselves see us as the next step in their career. Certainly our industry couldn't even exist at the technological level that we have had the oil and gas industry not come first. We're not here to shame the oil and gas industry; we're here to stand on their shoulders and take Canada in the same direction using the skilled workers toward a more renewable and sustainable, and we believe lower-cost, future.

Another advantage, of course, is what do you do with all this heat? You may hear in the wind industry or the solar industry that sometimes there's too much of it and at other times there's not enough of it on the grid. It's the same thing with geothermal; there's so much of it that when you drill a well, you often have to find things to do with the heat. That's why you don't just need the engineers; you need the entrepreneurs. We need the people who are the imagineers to figure out what they might do commercially with heat. We think one of the most poignant things that Canadians can think about with this excess amount of heat from these drilled wells would be to use it for food; especially in the north where there are issues of food affordability, food diversity, and food security. Imagine having a well, and it just takes one well, in every northern community—and there are over 200—that are now able to provide heat economically to a greenhouse or a fish farm or any other imaginable thing they would like to do commercially in their village. We know how to drill wells; we have all the infrastructure and all the drilling rigs and all the personnel. The technology is not the barrier. At times, cost could be a barrier but with the carbon tax in Canada, as well as people just simply saying no to fossil fuels, this comes into play. Again, even before the Paris agreement, these other countries around the world had been aggressively building their geothermal for things like food security, jobs, and food diversity for over 100 years.

We believe this is not just a Natural Resources Canada issue. This could be an agriculture issue as well; something we could all agree on. Here you have an energy form that is liked by the oil and gas industry, the workers, NRCan and Environment Canada, agriculture, and of course, the ministry of northern affairs as well.

Why are we not doing this more in Canada? Simply, like many things, as our colleague Steven just said, sometimes policies stand in the way. We have an associate here in the room today who wrote one of these reports and this is the “International Geothermal Policy Mechanisms Best Practices”. Again, we can stand on the shoulders of other countries that have already gone further. We have excellent resources in Canada; that's not the issue. We have excellent technology in Canada, and we have the people to do it. We're coming up against the policy disparity. We don't quite have the things in place to help either bring people awareness about what geothermal can do or how we can help foster it. Looking at international policy, we have CanGEA reports and we also have European Union reports. They're all pointing to how to support geothermal energy to get going.

We went through the benefits, that geothermal gives not just electricity but heat. We talked about the jobs, we talked about food. I now have three areas of policy I'd like to go through.

Supportive technologies would be having things like the geological survey of Canada and CanMET Energy support more demonstration and de-risking for the industry in the same fashion they have for oil and gas in the past.

● (1630)

We also have the financing tools. Two weeks ago in the budget we saw that geothermal heat is now considered a renewable resource. However, there are at least four or five other things we do not have parity with. They're pretty basic things—things that oil and gas, or wind and solar, already have. These are things like the Canadian resource property, the ability to claim test equipment, the ability to use transmission expenses as eligible expenses, and having supportive incentives such as the wind power production incentive program, which later became the renewable power production incentive and then became the ecoENERGY innovation initiative program. These are things that our industry, geothermal, missed out on. We call that the activation energy that's missing.

For financing tools, we're also looking for low-interest loans or grants that convert into low-interest loans if we're successful. A large one the federal government and the provincial and territorial governments could do right now would be to buy renewable heat. Most of the bills for energy are not actually electricity, they're for heat. One way the government can step in right now is to create a market for our members that have several projects in the pipeline, to get them off the ground.

In North America, America is a number one producer, Mexico is now the number five producer, and Canada still stands pretty much at zero on the world scene. We do have lots of heat available. We just need to go after it with our skilled workforce and take advantage of that resource.

Thank you.

● (1635)

The Chair: Thank you very much.

Mr. Harvey.

Mr. T.J. Harvey (Tobique—Mactaquac, Lib.): Thank you, Mr. Chair.

I want to start by touching on something that Ms. Thompson said. I agree with you 100% on the future of central-based heating. That's something we've seen a shift away from in North America over the last 75 years or 100 years, the idea of central heating projects, which is something that's broadly accepted and has actually flourished in Europe. This is something I think we need to pursue as a country. The financial viability of central heating is there—right there for the taking. Whether it's done through geothermal or other means, that's up for debate. I'm just saying I totally agree with the theory in general. That's really not my question, though. You caught my eye on that, so I just wanted to say it.

I want to talk with you, Mr. Martin, about the implementation of your technology. At what stage is your technology now, the algae growth technology? Where would you say you are in the development chain?

Mr. Steven Martin: We're ready for commercial deployment. We've done a full-scale commercial demonstration at U.S. Steel Canada and have achieved commercial growth rates. You mentioned combined heat and power plants. Markham District Energy Inc. is a combined heat and power plant system, and we are a partner with them. They're a Carbon XPRIZE co-contestant with us. Our technology's applicable to that as well.

The issue is that it is a capital-intensive technology. Everybody's racing and everybody wants to be first to be second. If I'm a decision-maker in a large final emitter—say, I work for a cement company—and I'm making a decision, what I really want to see is a full-scale commercial implementation someplace else I can point to. The fact that I'm an early adopter is not really recognized by me, as a professional working in the field, as anything advantageous. It's just a risk. If I'm a middle manager making a decision on whether I'm going to put in a more efficient pump or invest in an algae plant, even though the algae plant has a thousand times the impact, I know I'm not going to get fired if I implement the pump. That's a little bit of the reality we work with. There is a race to be second, not to be first.

Having said all of that, I can tell you that we have a project under consideration with the Ontario Centres of Excellence that includes Stelco—it was U. S. Steel, but is now Stelco—and we will be building the first commercial-scale plant, we hope, in Hamilton over the next couple of years.

Mr. T.J. Harvey: In terms of decarbonization, what's the percentage, roughly, of the amount of carbon you remove from the emissions when you deploy this technology?

Mr. Steven Martin: It depends on how much you put in. The only source of carbon for the algae to grow is the carbon that comes out of the stack gas. Importantly, we take the untreated stack gas emission. We don't just take carbon dioxide—we take the oxides of nitrogen, the sulphur, the volatile organics, and the algae eats it all.

One of the interesting things is that we talk about an oil and gas industry in Canada, and what we're actually talking about is an algae industry. I'm kind of old, so they taught me in school that it was dinosaurs, and they even showed me the pictures of oil domes with dinosaur bones and ferns. It's all algae. All the oil, coal, the natural gas—it all started out as algae, which makes a lot of sense. Algae grows, dies, ends up at the bottom. A layer of silt forms and you get an oil dome. What we're doing is short-circuiting that, and we're just doing it industrially and quickly.

Mr. T.J. Harvey: Bearing that in mind, I understand that the costs are large, but how do the costs compare to the profits?

Mr. Steven Martin: We make money, but one of the interesting little asides is that the algae has value. It's worth $2,000 to $200,000 per tonne, depending on what you're growing and what the use is.

Human nutraceuticals are up to $6 million a tonne. You can't grow that on a stack gas, but the same technology allows you to do it. The issue is that the capital costs are very high.

If we compare ourselves to carbon capture and sequestration, we're about one-fourth the cost. We're a quarter of what it costs for a similar capacity of carbon capture and sequestration, but if you're looking at carbon capture and sequestration it's normally co-located within enhanced oil and gas recovery, which is where the real value is derived. I think it's actually quite a sensible solution.

I see ourselves as part of an ecosystem of solutions, not a single source. I have nothing against carbon capture and sequestration. I think it's actually very smart.

Weaning ourselves off an oil economy may take time. Again, I'm also not here to denigrate the oil economy. I think it's terrific.

What we need to do is close the carbon loop, and that's what we can do.

● (1640)

Mr. T.J. Harvey: Absolutely. In terms of tools that the federal government or provincial governments can provide to assist companies in getting over that “valley of death” or the significant capital that it takes to get from the step you're at to the next stage, what are your recommendations? What do you see are the most viable for you?

Mr. Steven Martin: The most viable for me would be direct investment, if governments were in a position to make a direct equity investment into technology. I mean equity investment. I don't mean a forgivable loan or grant; I mean a direct equity investment. Become a stakeholder. Become a partner with us. Bet on somebody. Bet on a technology.

If that's not possible—and it may not be, and it may not make sense for a government to be doing that—then there are other tools. The next step down would be things like grants to implement the technology on a larger scale, and coming in early rather than coming in late.

As I said, in many cases government doesn't want its money matched by private money. It wants it the other way around. If government could lead with the investment rather than following private investment, that would be very helpful.

There are some things that are quite inexpensive for government to do. If government could promote its successes.... I've mentioned the National Research Council several times. My company wouldn't exist without the National Research Council, and it was sheer luck that I met them at a conference in Israel. What they were doing—their 60-year history of growing algae, the stuff that we do for our business every day—was unknown to me. In fact, I'm not alone. It was unknown to a lot of people, and they're the best at it there is.

If that could be celebrated a little bit more, so that when I meet with a banker who's looking for due diligence sorts of markers and things they can do for validation and I say I work with the NRC , if I didn't have to follow that up with a 10-minute explanation of who they are, that would be very helpful.

Mr. T.J. Harvey: You mentioned an ongoing conversation with heavy industry. In terms of technology development and the path forward, can you offer some thoughts on that? If we don't have time now, then maybe somebody else will pick it up later.

The Chair: Take a very, very quick shot at it.

Mr. Steven Martin: I can take a very quick shot. When we present our technology to the industry, it's not as though people say no. They say yes, and they say yes very quickly.

We have relationships with Canadian Natural Resources, with U. S. Steel Canada, or now Stelco, and St Marys Cement, which is part of a large international conglomerate called Votorantim based in Brazil. It's actually our single largest shareholder and investor.

It's not as though there's an unwillingness to look at the technology. The rub is that industry moves very slowly. It takes it a long time to implement.

The Chair: Thank you.

Mr. Barlow.

Mr. John Barlow (Foothills, CPC): Thank you very much to our witnesses for being here with us today.

Your timing is excellent. Certainly over the last several months my Alberta colleagues and I, including Ms. Stubbs, did an Alberta jobs task force. One of the ones who spearheaded that was the member of Parliament for Edmonton Riverbend, Matt Jeneroux.

We had a lot of discussions and feedback from that. One of those topics that came up a great deal was diversifying Alberta's economy and creating jobs. One of the things that Mr. Jeneroux really pushed forward was the potential on the geothermal side. Actually well before the budget, he had tabled Motion No. 122, which was asking the government to support regulations and policy changes to encourage geothermal development in Canada.

I recall Matt actually saying we're one of the only...or maybe the only Pacific Rim country that doesn't produce electricity from geothermal energy, which I should have known. We should have known that, Alison.

What Matt was talking about and what we heard from a lot of our constituents during the Alberta jobs task force round tables was about the ability or the potential for geothermal to address the more than 80,000 plus abandoned oil wells that we have in Alberta as a way to potentially turn them into electricity-producing projects or some ways to address that, create jobs and also maybe address an environmental concern. You didn't have a chance to talk about that. Is that a potential there, Ms. Thompson? Is that something that geothermal can do?

Ms. Alison Thompson: I want to maybe broaden the discussion to include Ontario, Saskatchewan, Alberta, northeast B.C., and wherever we have a robust oil and gas industry.

MP Barlow, we just talked about abandoned wells. Abandoned wells, or end-of-life wells, have actually been cemented. There's been money spent on them to put them to rest. Before they get to be abandoned, they're producing, so one of the easiest things to do is co-production. Have your cake and eat it too. Have the oil and gas still being produced and—as opposed to using the waste water as a waste and having to pay money to dispose of the waste hot water—actually use that hot water.

You can pipe hot water and keep its heat anywhere from three to 10 kilometres, but of course the piping costs would be fairly high, or you can bring people to your wells. If you think about these oil and gas wells, they're already on farmers' fields. They're not in urban centres. They're in the agricultural areas of our country. Asking the agriculture industry to do more with what is already on their land to begin with, through co-production, would be a wonderfully low-hanging-fruit activity. It would increase the economy of the wells. Now they're not just selling oil and gas, they're probably selling CO2 credits as well as the heat, and also perhaps paying the farmer some more royalties or rent for the infrastructure on their land.

Before we get to the abandoned ones, though, what happens with an oil and gas well is that if a company goes bankrupt—and there's lots of that going on right now—or even if the well itself waters out and it's the end of the life, they become suspended and possibly even orphaned. Those wells are still viable candidates, but the ownership or the economics can slip below zero. They're now negative. The idea of bringing the suspended and orphaned wells back to life by using them as renewable heat wells, or perhaps even electricity wells, just allows that infrastructure to be repurposed and those employees who are already working on the well to go back to their jobs.

Abandoned wells are a subset, but they're actually probably the hardest thing to do. They could be done once we get a vibrant industry going, with the co-production and the suspended and orphaned wells, which are growing in numbers as well—I think now we probably have more suspended wells than we do abandoned wells. Attacking that allows us to reimagine and rethink infrastructure.

Again, we can use those exact same workers. For sure, we can do it in Alberta—and we thank MP Jeneroux for having the foresight to represent that initiative—but it also can be used in Ontario, Saskatchewan, northeast B.C., and anywhere we have the oil and gas infrastructure right now.

● (1645)

Mr. John Barlow: Thank you.

Certainly in my riding we have the Drake Landing development, which is Canada's first geothermal-powered subdivision, I guess. It's celebrating its 10th anniversary this year.

We had officials from Natural Resources Canada here earlier this year. I asked them about the potential for taking that technology to other areas. We just haven't really heard much about taking that model and moving it to other areas and to other jurisdictions to reuse.

Do you have any update on the success of the Drake Landing model? Has it shown that it's economically viable? Is there potential for it to be used in other communities? Are there other municipalities that are looking at that model to maybe use it in their jurisdictions as well?

Ms. Alison Thompson: Drake Landing is a hybrid. They collect solar energy and store it in a geothermal field. The field is very shallow. That technology is more properly described as geoexchange. The wells that they drill are really just exchanging energy between the solar energy that radiates down on earth and what the soil can absorb. They pass energy back to the houses when they need it in the winter, and they store it in the summer when there's excess sunshine and excess heat.

What we're speaking about, though, is actually drilling fit-for-purpose wells, or repurposing oil wells. Our typical depth is about three kilometres, so we're more akin to oil and gas, not necessarily urban activities where heat exchange is.... There are about 300 installations already across Canada, mostly in Ontario and Quebec.

Can we do more in heat exchange or geoexchange? Absolutely, but we're trying to imagine an entirely new industry—geothermal energy proper—which are these three-kilometre-deep wells. We go down to a reservoir of hot water, versus having to just store it in the shallow earth.

Mr. John Barlow: Looking at your map, you showed some of the areas that had potential. Certainly, during our previous study on mining, one of the major issues that was brought up was that they rely on diesel power in some of these northern, remote communities.

What is the potential for geothermal to be able to replace that diesel as a more environmentally friendly power option? Do they have the potential to be able to power a mine? Is it something we're talking about? How far down the road is that? Is it possible?

Ms. Alison Thompson: I think this is really the crux of what makes our energy different because we have about 200 remote communities. Some of them are off-grid. Then we have the mining installations, and the mines themselves have a much bigger load than even the small communities. The small communities may have a megawatt or less. In some cases, they just have a number of hundreds of kilowatts.

Because we can attack both the electricity needs and the heat needs, you can get rid of diesel altogether. Right now when you have wind, solar, or battery storage, you still have to run diesel for heat. This technology, this renewable, allows you to do both heat and power, and it really does enable economies. Right now there is a carbon tax for mines. Obviously, we'd have to pay it if they're bringing in diesel. This avoids having to pay carbon tax but also avoids having to pay for two different infrastructures. Right now they have to pay for heating and for their processing, but as well there is electricity, and geothermal can take care of all of that.

We do have the technologies to drill those wells, and like any natural resource, some areas are a better geothermal resource than others. But Canadians—I say this with confidence—know how to drill. In that last cartoon about Iceland, they didn't even know how to drill. Now they have nine in 10 homes heated by geothermal. Now, they have great resources there. Maybe we have fewer great resources in Canada, but we have better talent in Canada in the intersection of our marginal resources and perhaps our better resources, but with that talent, that speaks to what the oil sands used to be. The oil sands are not the world's best, easiest oil to get out, but we applied technology to it in our skilled workforce. That's why I'm very confident we can apply our technology with our resources, no matter what quality they are and no matter where they exist in Canada. So mines, coupling us with other heavy industries.... We really are a solution, not just for communities, but for heavy industry as well.

● (1650)

The Chair: Thank you.

Mr. Davies.

Mr. Don Davies (Vancouver Kingsway, NDP): Thank you to all the witnesses for being here today.

Ms. Thompson, I'm quite surprised to see that geothermal does not qualify for the accelerated capital cost allowance, as wind does, nor the renewable and conservation expense, as other renewables, since clearly geothermal, to me, fits squarely in those categories.

Have you ever received a policy explanation from government as to why geothermal doesn't quality for those two tax credits?

Ms. Alison Thompson: Please, Alex.

Mr. Alex Kent (Policy Manager, Canadian Geothermal Energy Association): To clarify, it's only a portion of those two tax credits that it doesn't qualify for. Within the ACCA transmission expenses, from speaking to persons at Natural Resources Canada, it's because the original Meager Creek test facility in southern British Columbia was too far to load, and that scared off the government from wanting to become a transmission company, paying for 200 or 300 kilometres of transmission. That is now not the case. In fact we're proposing that a lot of geothermal development can happen in communities, adjacent to communities, with minimal transmission distances because a valuable product is the heat, and you can't send that 200 kilometres.

The wind-powered test facility of the wind power industry did the legwork, and they told the government, Natural Resources Canada, why they needed it. They were excellent lobbyers and they got there first. They have to prospect an uncertain resource. They were able to demonstrate that the ability to claim their test equipment would materially benefit their industry. Now geothermal is making the same case. We have an uncertain resource. It's three kilometres beneath the surface. Just as we don't know when the wind blows, we don't know exactly how hot a reservoir is or how well it flows until we do it.

Mr. Don Davies: So you see no material difference that would justify the discrepancy between the way they are treated?

Mr. Alex Kent: Yes, I can go with that.

Mr. Don Davies: Ms. Thompson, I want to ask you about geothermal in an urban environment. I live in Vancouver and I'm thinking of the possibilities of geothermal heating for Vancouver. Can you draw me a bit of a picture of how that would work in an urban environment? Where would the geothermal hole be drilled? What kind of area would that serve?

Ms. Alison Thompson: The best example to look at is what Paris is doing. Vancouver being on a tectonically active area, we definitely want to make sure that we are using geoscientists and that we are not overly stressing and causing seismic events, but with wells for heat you need only about 30°C. You can look at the slide I have up here. For power, you need to make steam, which then would turn a turbine, but for heat you're looking at just 30°C. That's about a kilometre deep, and when you're a kilometre deep you're not really into that seismically active zone.

What communities in Paris do is literally go to a street corner, or maybe a park, and set up a drilling rig. They have perfected how to drill within a tight area. You would drill down, and you would have infrastructure pipes going into the homes. It's better in apartment buildings. You don't really want to get into lots of pipes. Pipes will sink your economics. To your comment earlier, what you want to do is make it denser. In an urban environment, you really want to go after apartment buildings or large buildings, as opposed to individual homes. If you're going to do it more for individual homes, you really want to have an individual home and then another user, like a greenhouse or a fish farm. You need to do it more on a district heating basis.

We would suggest that new builds are far easier than retrofitting, because if it has already been piped one way, it's going to be very costly to install pipes. We definitely want to walk before we run, but with the explosion in growth in Toronto and Vancouver, there are lots of new builds to target.

● (1655)

Mr. Don Davies: Thank you.

Mr. Alex Kent: I'll qualify one thing. An old build can be put to a geothermal heating purpose if it already has a heat distribution plant, such as at a hospital or a university. It already has centralized heating, and it is a single, large client as well.

Mr. Don Davies: Thanks.

Mr. Martin, what kind of energy input is required in order to transform carbon dioxide into other products using your method, and how does that compare to other energy sources?

Mr. Steven Martin: Obviously, we are using a photosynthetic process. We use light to trigger the photosynthetic reaction fixing the carbon. When the overall thing is done and we do the carbon balance, we have a net benefit in terms of carbon load, but that is jurisdictionally dependent. We do use electricity to pump, as well as to power certain aspects of the plant. If you are powered 100% on coal, it's probably unlikely that you're going to get much benefit from what we are doing. On the other hand, if you have a typical mix, as we do in Canada and most of the western world, you actually have a net carbon benefit. Additionally, you produce a product that has fixed the carbon.

There are some detailed studies we can provide, but you have a net carbon benefit from implementing the technology.

Mr. Don Davies: Mr. Martin, according to the briefing document that our analysts have prepared, your platform, which you just described, “uses the...photosynthesis process of algae to transform carbon dioxide...into algae-based bio-products, including biofuels.” What kinds of biofuels would this produce, and how do their emissions compare to other biofuels already on the market?

Mr. Steven Martin: The emissions are a little better. Essentially, you're going to end up with a synthetic diesel. It's a fatty acid methyl ester, FAME. Simple transesterification gets you biodiesel, but it's a second- or third-generation biodiesel, depending on how you look at it. Oil is squeezed out of the algae as any soy oil would be squeezed out of soy.

The remaining biomass can be used as a relatively mid-grade coal, around 9,000 BTUs per pound, but the emissions profile in both cases is better than the emissions profile you would typically find in a similar fossil-derived diesel, because there is less sulphur in it.

Mr. Don Davies: There has been reference to Canada having a cold climate and to some of the applications in cold weather parts of our country. We know that diesel fuel can gel in the deep cold. Are there any similar concerns with your product?

Mr. Steven Martin: You have a cloud point problem with biodiesel. The algae oil, as it comes out directly from the algae, can be used as a direct one-to-one substitute for diesel fuel in appropriate climates. In Canada, you have to do a transesterification reaction. It's relatively simple and straightforward. With the expertise in Canada, as we've heard, in terms of dealing with petroleum-like products, it is very easy for us to do that.

Mr. Don Davies: Finally, back to you Ms. Thompson—

The Chair: You're right on the button.

Mr. Don Davies: I guess I'm not back to you.

The Chair: We will get back to you, though.

Mr. Serré, go ahead.

Mr. Marc Serré (Nickel Belt, Lib.): Thank you, Mr. Chair.

I want to direct my first question to Mr. Martin. You talked about the National Research Council, with 4,000 researchers and $1 billion, and the need to promote the agency. We've heard this often. We have not done a good job overall in Canada of promoting our natural resources industry, and we need to do better.

I want to ask you whether you have any specific recommendations related to the National Research Council. Also, when you talk about your product being ready to be commercialized, do you have any recommendations especially linked to the mining industry?

Mr. Steven Martin: I'll start with the second half. We align very well with the mining industry. There was a question over there about fallow or end-of-life oil wells, etc. One of the very big interests that companies like Canadian Natural Resources Ltd. and Imaginea, a smaller oil player in the oil sands, have expressed is that we fit very well with their initiative to produce a lower carbon oil, something of great benefit to them. So we align very well. In terms of deployment, again, it's all about capital.

With respect to the National Research Council, I think their communication policy is poor. There's not much that they do in terms of self promotion. They have somewhere in the order of 7,500 Twitter followers. I'm not actually a major Twitter user myself, but I do understand that the kids like it. They could do a much better job of celebrating what they've done. There is this humility that seems to be built into all Canadians where we don't really like to stand up and say look at me, we do great work. They could do that more regularly and more continuously. Accounting associations promote themselves. Engineers promote themselves. The National Research Council doesn't do very much. I've never seen a commercial.

● (1700)

Mr. Marc Serré: Thank you.

Ms. Thompson, in your presentation you mentioned that the geothermal industry in the U.S. is a world leader. I think you said Mexico is number five. Could you give us a scope of the industry—the number of jobs, revenue—in the U.S. and also the scope in Canada currently?

Ms. Alison Thompson: We'll start with Canada. In the electricity industry there are currently zero megawatts of geothermal electricity. That hopefully will change very soon. There is a demonstration project planned for MP Zimmer's area and also for MP Nathan Cullen's area. There are two projects in B.C. that probably will get to electricity in the next couple of years. That would represent the first jobs.

Even though there is zero electricity being produced, there are tens of dozens of jobs that are already in the exploration phase. We talked about having explorationists, drillers, and all the financiers. So as an emerging industry, unfortunately right now in Canada we're still measured at below 1,000 jobs in geothermal.

In America and worldwide there are about 300,000 jobs in geothermal. We're still very niche, although we punch above our weight class in the sense that because we create those sophisticated, quality jobs, we don't have to retrain to be dentists, we can redeploy the geoscientists and geophysicists as well as involve the trades-people. It's the quality of the jobs.

If we can get some megawatts purchased—both electricity and heat—we will actually start to outpace even the natural gas industry. We are a complete, 100% substitute, but we come with zero carbon footprint. We come with food and other security things that we can address, such as food diversity and the quality jobs. It's emerging, unfortunately, right now.

Mr. Marc Serré: Thank you.

I want to follow up on my colleague Mr. Barlow's question related to powering a mine site. Obviously when we look at the Ring of Fire in northern Ontario, we look at northern Canada, and the issue with diesel and the communities.... Mr. Barlow asked about how far are we or you? Are we three years away, 10 years away, from powering a mine site?

In the committee's last study, we had small module nuclear in looking at the possibilities in alternative for some of these remote areas. How far are we and what can the government or the National Research Council do to help implement that faster?

Ms. Alison Thompson: One of the things to understand is that, much like for oil and gas, the resource itself is governed by the province or territory. As much as what Enercan or the geological survey of Canada or CANMET can do, they can be supportive. We need your help to bring the provinces along at the same time. If they are the ones giving the permit for the resource, you can't drill without the provincial or territory permit.

British Columbia does have a Geothermal Resources Act, so companies like mine were able to get these permits and start financing and do the exploration.

For a mining company to also do geothermal, they'd have to go back to the territory or province and get that piece of paper that gives the company the exclusive use of the resource. For that privilege they may pay royalties as well, possibly to the federal government as well as to the provincial government.

It is a type of industry that needs federal support the same way you've supported oil and gas, but at the resource level it's owned by the province or territory. We'd like to have parallel meetings, such as this, with our counterparts in the provinces and territories. It's a little bit of the cart before the horse. We need to see that the federal government is in place and supporting it.

When they look at our slides and we have so many points of not having parity with the other industries, that becomes a challenge, I think, for the provinces to see that the feds are serious. Right now you can have, again, the Canadian resource property, and if you're a natural gas well you get to write off or claim the expenses for the very same permit I'm talking about, that lease. However, if I'm a geothermal person trying to sell heat against natural gas, they inherently have an economic advantage and so on.

We have the technology, the people, and the resources, but we don't have policy parity and we don't yet have the provinces and territories where they need to be, with the exception of British Columbia.

● (1705)

Mr. Marc Serré: You talked about oil wells and abandoned wells. Obviously with mining there are tailings ponds. I'm wondering if you've worked on any of the tailings ponds with mining.

Ms. Alison Thompson: As much as MP Barlow was bringing forth the idea of abandoned wells, and I expanded that to mean orphaned and suspended wells, mines are.... Cumberland Energy Authority in Nova Scotia is actually Canada's premier example of repurposing an old mine. We have thousands of mines. They're not very hot, but we all know that they fill up with water. When they fill up with water, because that water is terrestrial, coming from the earth, it is actually about 30°C, and 30°C is all you need for heating.

We don't necessarily want to make power everywhere. I think wind and solar are doing a wonderful job helping us transition to renewable electricity, but renewable heat is something that we're not addressing at all. In fact, we're actually pumping it and paying to dispose of it, as you know, from abandoned mines.

Working mines and abandoned mines are some of the lowest-hanging fruits we could go after. The towns are in place. The customers are in place. We've already drilled, in some cases, or done open-pit mines. We've flooded the mines and are pumping to get rid of it. Now you need one piece of equipment, which is a heat exchanger, to take the heat from that water and put it to purposeful use.

The Chair: Thank you.

Mr. Strahl, you have five minutes.

Mr. Mark Strahl (Chilliwack—Hope, CPC): Thank you very much, Mr. Chair.

As you can see, for our side of the table this is a very popular panel. We have a few extra members. Mr. Zimmer, Mr. Kitchen, and Mr. Eglinski have joined us today of their own accord, just out of interest for this file.

We had previous testimony from other witnesses. Before I quote from Dr. Pierre Desrochers, perhaps I'll start with what Mr. Jeneroux said in his release when he introduced his motion, "Geothermal is the most affordable renewable source of energy with a per-kWh cost half of hydroelectric or wind."

Dr. Desrochers, in his testimony before this committee, said:

> ...if there were promising technologies, plenty of venture capitalists and investors would invest in those things. I don't believe government funding overall is very significant in terms of funding innovation for promising technologies. If you look at the history of the development of greener technology practices, as soon as something looks really promising, capital will flow. That won't be a problem.

To both witnesses, is government intervention required? If these are good ideas that companies will benefit from, why haven't the private sector companies themselves made these investments already?

Ms. Alison Thompson: Would you like to go first?

Mr. Steven Martin: Sure.

First of all, I would disagree outright with the conclusion. "If you build it, they will come" is sort of the theory. That's not been my experience in fibre optics and it's not my experience in this.

There has to be a clear understanding of how the dollars will be returned before anybody will jump in. The cost of coming in second is far less than the cost of failure, being first. Realistically, this is true for mature technologies. Once something is well understood, where everybody knows the costs and what will be required to implement it, then absolutely; when that is done, all the bankers are knocking on your door trying to hand you money to go to the next step. It's when you have the nascent technology, where it's proven at some level—whatever that level is—that you end up with this chicken-egg problem. You're told, "Just prove to me that it works, and then I'll invest." If you tell them you need their investment to finish proving that it will work, they'll just tell you, "Come back when it's proven."

That's the reality of being an entrepreneur in this field. It's not just with this technology. I would argue that innovation across the board has always suffered from that. I think direct government intervention at an early stage would be beneficial to government in terms of developing new technologies, and also to industry in terms of getting those technologies implemented more quickly.

Mr. Mark Strahl: I guess as my follow-up to that, the budget was deemed an innovation budget by the government. In advance of that someone did an analysis of the plethora of government programs that specifically claim to deal with innovation and the billions of dollars of funding available.

If governments of all political stripes have utterly failed...knowing the issue, knowing about the valley of death, as we've heard it explained. If money was the issue and if well-meaning programs were the solution, surely we would have reached it by now. I'm frustrated, because it seems like we're the hamster in the wheel here, running around trying to find a solution. Clearly the money has been there. The political will has been there but it hasn't resulted in getting companies over that gap.

● (1710)

Mr. Steven Martin: I think government finds itself in a difficult position. Innovation as a sort of science is misunderstood entirely.

There's this view that innovation equals invention It's promulgated in the popular media. We watch *Dragons' Den*, somebody has a better mouse trap, "Give me money, we'll move forward." It has nothing to do with innovation. Innovation is slog; it takes decades to get from beginning to end.

The work that we are doing at my company began in the United States in the 1970s and ended in 1998, when the U.S. government declared that, well, you know, we don't need this because there's an infinite amount of oil and it's always going to be $10 a barrel, so why bother with this biofuel mess that you're dealing with?

It sat on the shelf for 10 more years. I discovered reading the *Washington Post*, and decided I was going to try to do it. Lots of people have tried what we're doing, we've just gotten the furthest.

There's this idea amongst legislators that they can legislate innovation. On Thursday, we will all be creative and we will all find a solution, and this will result in the next generation of jobs. That's kind of not how it works. There are innovation investment models that do work. The problem is that they're unfortunately difficult for governments to adopt, because they require a lot of failure, and governments don't really like failure on their investments.

I don't think the understanding is there that there is no failure in innovation. What you have is a lack of success, which is very different. If government were willing to lose money on its investments in innovation, it would be much more successful in achieving the innovation it seeks. That's not how programs are designed. They're designed so that they have....As keepers of the public purse, quite correctly, government works hard to make sure it is not throwing good money after bad, but most innovation occurs by throwing good money after bad.

The Chair: Thank you very much.

Mr. Lemieux.

Ms. Alison Thompson: May I make one comment on that?

The Chair: I apologize, we have time limits we have to follow.

Mr. Lemieux

[*Translation*]

Mr. Denis Lemieux (Chicoutimi—Le Fjord, Lib.): Thank you, Mr. Chair.

Ms. Thompson, I'm going to let you finish your answer because it was quite interesting.

We are all ears.

[*English*]

Ms. Alison Thompson: It's the same question, really fast?

[*Translation*]

Mr. Denis Lemieux: Yes.

[*English*]

Ms. Alison Thompson: Emphatically, I disagree with your witness, because clearly this is not a level playing field, when I can show you that we don't have the same provisions in place as the other renewables, or as oil and gas, and yet I have all of these members.

All of these members are not making any money, but they know how to do it. They've brought their enthusiasm, they've brought their prospecting, they brought their technology, and they brought their financiers as well, but they can't spend a dollar, because they can't get the permit. They can't get the actual right to tap into the resource, and so we need to level the playing field.

The other thing that's a bit of a punch line here is that on this slide we have done all these things in Canada for the oil and gas industry. We already know how to do it, we know how to provide that incentive, but we can't take geothermal energy with all the promise of jobs and food security, electricity and heat, and give it one thing in the budget, but then leave out all the other things that would bring it parity.

Now, we're going to be cherry-picking. We made great strides in getting the ability to have renewable heat classified as renewable energy from geothermal, but we can't leave out all the other parity pieces that the other renewables, oil and gas, get, There needs to be a focus group, and a sweep of dealing with geothermal in the sense of bringing it as a credible energy form the way that many European and other countries have that are combatting climate change, but at the same time creating jobs and doing it in a sustainable way.

[*Translation*]

Mr. Denis Lemieux: Thank you.

In fact, we saw that quite clearly in the oil sector. The research done in eastern Canada helped people in the region realize that it was absolutely unacceptable for Canada to have dirty oil. Research has shown us that we are one of the cleanest oil producers in the world.

My first question is for Mr. Martin.

Mr. Martin, I'm very interested in your work. Have you explored the possibility of using algae to produce renewable natural gas?

[*English*]

Mr. Steven Martin: I apologize, I got some of it, but my French is not good enough.

● (1715)

[*Translation*]

Mr. Denis Lemieux: I'm very interested in the work you do. I'd like to know whether you've explored the possibility of producing natural gas renewably using algae.

[*English*]

Mr. Steven Martin: Yes, we have.

In a previous innovation effort, we were working on gasification of various biomass materials using some fancy technology. Algae, as it turns out, is a perfect feedstock for gasification technology, so producing a synthetic natural gas, SNG, or a natural gas-type product, a gasified fuel, is actually very effective.

Additionally, the algae does ferment very well. I know, I made wine for my staff at one point. It worked really well. There is a plethora of opportunities for algae. It's a fairly ubiquitous product.

One of the very big interests for folks on the oil sands is for site remediation. As I understand, Alberta has quite a big overhang in terms of remediation that's carried on their books—$36 billion-plus. Algae can form the organic phase to make the boreal forest come back after the mining operation ceases, so it's a pretty big play in terms of its capacity.

It's also a perfect animal feed, in terms of food security. The by-product we make is consumable by livestock basically, which is a very good thing for us, rather than relying on unsustainable sources of protein from South America, such as anchovy stocks.

There is a pile of different applications we can use, and natural gas is certainly one of them.

[*Translation*]

Mr. Denis Lemieux: You know, Canada actually produces a surplus of natural gas. We are currently working on projects to export liquefied natural gas. Just imagine how incredible it would be for Canada if we could export liquefied natural gas that was renewable.

[*English*]

Mr. Steven Martin: Yes, very much so. Algae, in essence, becomes a bit of a currency of energy, because the algae itself can produce these different products, which include a direct biofuel—biodiesel. You can gasify it to make these various other products as well. So yes, I would agree.

Additionally, by implementing the technology on a cement plant, for example, the manufacture of one tonne of cement releases about one tonne of CO2 just in making it. Human beings are actually in the business of not making steel or cement or food; we're in the business of making CO2. If there is a way you can take that carbon dioxide and reuse it, which is what the algae does for us, you're really in business.

[*Translation*]

Mr. Denis Lemieux: As I see it, the work you are doing in this sector has a very bright future.

I'd also like to hear from our two witnesses on the repercussions that the new carbon tax will have on the development and implementation of their technologies, both geothermal and algae-based.

[*English*]

Ms. Alison Thompson: People in Alberta woke up on January 1 and had to pay a carbon tax for their home heating needs. B.C. has already had a carbon tax for fuels such as natural gas or propane or diesel.

One of the issues is that we haven't given consumers a choice. You can pay a carbon tax and keep on supporting a fossil fuel-based industry, or you could have purchased renewable heat, but we haven't yet caught up to being able to supply renewable heat, so consumers are stuck with having to pay a carbon tax.

What we like to show is that we can compete at a lower cost and have no exposure to a growing carbon tax or to commodity fluctuations, because we're more like a utility, in that what comes up, Mother Nature provides for millennia. It never runs out, so we can have very, very stable prices.

I think it's a bit challenging for consumers to have to pay a carbon tax when they would choose not to and to use a renewable alternative. We haven't yet had enough demonstration projects or build-out for them to actually make that choice. I think many consumers, especially when they're modelling what their costs may be in the future, would choose something renewable that, again, has no exposure to carbon tax and no commodity price risk.

The Chair: Thank you.

I'm going to have to stop you there, unfortunately.

Ms. Stubbs.

Mrs. Shannon Stubbs (Lakeland, CPC): My colleague Jim will speak.

Mr. Jim Eglinski (Yellowhead, CPC): Thank you, Mr. Chair.

Welcome, Alison, Alex, and Steve.

Alison, we spoke briefly just before you sat down. One of your co-partners, Epoch, is working very closely with a community in Yellowhead called Hinton.

I wonder if you could explain to the committee the potential of some of our abandoned wells. Right around the town of Hinton, we have a number of old abandoned gas wells, which have tremendous heat in them, enough to operate a steam turbine. I wonder if you could maybe update them.

Before you go there, to kind of bring it to where we could go as a government in leading this technology, the federal park, Jasper, has to replace its power generation. They're going to close down their current system, from which they produce power on site, and they're going on the grid. For the grid, the closest place they can go is to the community of Hinton itself, which has the potential to geothermally produce electricity. Maybe you could take it from there.

● (1720)

Ms. Alison Thompson: Absolutely.

We've talked about having to address some of the risks with geothermal, but in one sense geothermal is very predictable. Every three kilometres it's about 100°C no matter where you go on earth. I could be drilling in Poland or I could be drilling in Hinton, and if I go down three kilometres I'm going to hit about 100°C. In the Hinton area, and all across Alberta, in the Rocky Mountain Trench, some of the wells are five kilometres deep, so they're already at the 150° level. There are some wells in northeast B.C. that approach 180°C. In our industry we'd say they found geothermal, but what they're after, of course, is natural gas.

I'll go back to this idea about using infrastructure for more than one thing. The well has already been drilled, mainly for natural gas prospecting, and now we want to co-produce that well to not only use the natural gas and pipeline that away, but to send the hot water waste from that well first through a community. We do a heat exchange at the community, so their heat is transferred into something more benign, like a glycol loop. They can use that for productive measures as opposed to having to burn fossil fuels, and then that water is returned to the oil well or the gas well, where it had come up originally, and the oil and gas company itself was already processing it and dealing with it on site. It is a very closed loop. We're sending heat away to a community in the form of water, but the water itself comes back to the disposal well of the oil and gas site.

We have, literally, 800,000 wells that have been drilled in Alberta alone, not to mention Saskatchewan and northeast B.C. Right now there are several tens of thousands that are abandoned and several tens of thousands that are suspended. The producers have gone bankrupt because of commodity prices, not because the well went bad. We can repurpose what's coming out of those wells to perhaps just be a geothermal product, or the geothermal product may add enough revenue to now allow the operator to also sell its natural gas at a profit.

We're looking at having more revenue per infrastructure, so you get more capital intensity, in a positive way, out of the infrastructure. Hinton is really the poster child in Alberta, as well as northeast B.C., for infrastructure that's already penetrated useful temperatures to make both power and heat.

The Chair: You have about a minute and a half left if you want to use it.

Mr. Jim Eglinski: Go ahead.

Mr. Bob Zimmer (Prince George—Peace River—Northern Rockies, CPC): Thanks for the opportunity.

My area of Valemount is a region that is looking at geothermal as potentially closing the loop. It's at the end of a transmission line, and one of the weaknesses is if a power line goes down, you lose all your power, and you don't have the benefit of a backup loop. I see geothermal as potentially addressing these kinds of energy needs wherever.

You said when you drill down 3,000 metres, you're guaranteed to have that certain level of temperature. Can you talk a bit about that ability to really put geothermal wherever? Costing is a concern as Mr. Strahl had been mentioning. We'd met before and we'd talked, too, about needing government funds to make it profitable or make it viable. Can you speak to current projects that are viable today, and that are occurring, as you said, the two that you mentioned?

The Chair: Very quickly.

Ms. Alison Thompson: Sure. Again, there's that analogy... geothermal anywhere...3,000 metres or three kilometres down will be at 100°C. But like oil and gas, oil and gas is more plentiful in some areas and geothermal is more plentiful in other areas. In this particular location in Valemount, it's a triple point of three mountain ranges, and very active for geothermal, so you're probably going to have to drill wells that are well less than three kilometres. Valemount is on the end of a long radial line, a 300-kilometre line, of BC Hydro. Even though it's grid-connected, it's very unstable, and having another form of baseload power.... We're not like wind and solar. We actually produce all the time. We're more like a dam. But what MP Zimmer didn't mention is that Valemount itself is not on a natural gas line. It trucks in propane from Alberta. In that way it's off-grid for heat. With the ability to have a baseload power to back up a BC Hydro transmission system and to avoid having to bring in propane, and then all the extra emissions with just the transportation, you really get two birds with one stone, and, of course, increase the vibrancy of the community with whatever they do with the heat. In this case it might be food; it might be for resorts that may be going into the area. It's an enabler. Geothermal energy is an enabler, which is why the countries that are using it really use it in the merit order. They use geothermal energy first, then hydro dams, and then things like wind and solar and natural gas peaking. On the merit order, it's usually sought after and it's a primary form of energy.

● (1725)

The Chair: Okay, thank you.

Mr. Casey.

Mr. Bill Casey (Cumberland—Colchester, Lib.): Thank you, Mr. Chair.

Thanks very much for attending the committee today.

I'm going to focus on geothermal. You mentioned Cumberland Energy Authority. That's in my riding. Just for the committee, for 100 years miners dug coal mines in Springhill, Nova Scotia; and there are miles of mines that go down miles.

Ms. Alison Thompson: Yes.

Mr. Bill Casey: They're now sealed off after explosions and fatalities. They were sealed off in the 1950s. They're filled with water at 20° to 25°.

There are several industries that have used that incredible resource, but it's never seemed to me that we've maximized the purpose. You've outlined a broader vision of the use for that geothermal energy. Could you just expand on some of the opportunities that might be there that we've missed?

Ms. Alison Thompson: Sure. Springhill was a beneficiary of geological survey of Canada funds. This is going back a few decades. It was one of the poster-child projects they funded. Currently Springhill, Nova Scotia, through the Cumberland Energy Authority, has a district heating system. There are many small businesses on the system, including a greenhouse and a plastics manufacturer. You can see the variety of different commercial and industrial uses for that heat.

If you think about a place like Nunavut, a couple of weeks ago it was -26°C. Maybe Nunavut doesn't have Canada's greatest geothermal resources, and maybe Nunavut cannot make electricity, but can they get 30°C water that can bring, as a preheat, energy up to that level, and then perhaps still need diesel to top it up to take it to a more useful level for electricity? Absolutely. What we've done is we've taken it to about 50°C. A diesel would have had the supply; instead, it does it more naturally with geothermal. So even in places where you can't replace diesel or natural gas with geothermal, you can at least do it as a pre-treatment and significantly address the volume of fossil fuels that are being burned.

Back to the question around imagineering, there are currently over 200 uses of geothermal in the world, everything from livestock heating to the greenhouses, the fish farms we talked about, cement kilns, pulp and paper, and even heating roads and sidewalks to cut down on accidents and insurance claims as well as to make main street more vibrant so people could actually shop at any time. That's what Iceland has really pioneered. If you go there at any time of the year, there's no snow in the downtown core, because they're piping this kind of waste heat that costs very little to use, but it actually increases their economic activity downtown.

If you can think about it, it can be done. Why don't we do it in Canada? Sometimes it's permitting and sometimes it's this kind of parity we don't enjoy with the other renewables. But really, we're not being entrepreneurs in this sense. We need to tell people that the resource exists, the skills exist, and it's available. We say, “What would you do with the heat?” The best answer I ever heard to the question, “What would you grow with geothermal energy?” was “a whole community”.

Mr. Bill Casey: For years we have tried to attract attention to this geothermal. A funny thing happened a couple of years ago. Five scientists came all the way from Chile just to see the geothermal in Springhill because it's so unique. They learned a lot from that visit. They were fascinated by our ice stadium where every seat is heated because it doesn't cost anything.

Ms. Alison Thompson: That's right.

Mr. Bill Casey: I think it's probably the only one. It was amazing to me that they came all the way from Chile, but it's hard to get people from the capital city of our province, Halifax, to come to look at this geothermal and consider the advantages.

Can your organization, CanGEA, help find a way to utilize this incredible resource and reduce emissions in a sustainable way? Is that what CanGEA does?

Ms. Alison Thompson: We do. Because there is a dearth of reports available, we filled that gap for some of the provinces and territories and did a gap analysis of what you would grow, the most profitable thing to grow, or other uses of geothermal. Our most recent publication is for the Yukon government. That was funded by CanNor, which is obviously a federal fund.

We're just stealing ideas from other countries and Canadianizing them. That's certainly the inspiration. Also, the workshops we give really give people the tools to think out of the box and help them work through the economics of it and the policy barriers that may be in place.

● (1730)

Mr. Bill Casey: What can the Government of Canada do, more than they are now, to put a spotlight on geothermal as an alternative energy source?

Ms. Alison Thompson: I think we need to get a bells and whistles demonstration going. It is a little bit of "build it and they will come". People need to—

Mr. Bill Casey: Like Springhill?

Ms. Alison Thompson: Like Springhill. There are also projects in British Columbia that are permitted and ready to go. Just show people what you can really get out of a project: again, the heat, the power, the diversity of jobs, the main street activity, and perhaps these other side industries. Show people that it's a Canadian resource and a Canadian talent that can drill with less risk and less cost than some other countries and how it can help in strategic locations like our north, communities at the end of a transmission line, or communities that may be off-grid for natural gas.

Mr. Bill Casey: You mentioned a plastic factory.

The Chair: We're out of time. You can do it really quickly.

Mr. Bill Casey: You mention a plastic factory and it's Ropak Can Am. They have factories all over the world and the one in Springhill is the most efficient because of their very low energy costs. It wasn't a question, but a comment.

Ms. Alison Thompson: Absolutely.

The Chair: Thank you very much to our witnesses. Your evidence is very helpful and I think we can all agree we're performing up to the ideas.

We will adjourn for the day. Thank you.