Roundtable #6 Transcript: Building Back Better by Fueling Innovation in the Energy Sector

DIANA FOX CARNEY: Good morning, everyone. My name is Diana Fox Carney and I'm delighted to be the host of this series on Building Back Better. I know people are still joining, but we're going to get going because we have a packed agenda today to talk about building innovation in the energy sector.

Obviously, this is critical to the post-COVID recovery — it's critical to the economy of Canada throughout—and I think it's interesting that we're hosting this webinar on the day that the International Energy Agency has flagged that there's been an unprecedented 400 billion dollar fall in investment in energy systems this year. They thought that there was going to be an increase in investment this year, but there's been a contraction by 20 percent in the last few months. So this is a moving target, and we have a fantastic panel here to discuss it today.

We're going to be very busy. We do encourage your questions and comments. This is a collaborative exercise of trying to get to the right answers. We may not have time to answer *all* of them in real time, but we are very grateful for them and will think about them afterwards. So, without further ado, I'm going to pass over to the Minister of Natural Resources, Seamus O'Regan to welcome the panel today. (Pause) The minister remains muted. Are you with us? Well, I'm going to pass to you then Toby, and then we can bring the minister in afterwards if that works.

TOBY HEAPS (CORPORATE KNIGHTS): Sounds, good. Thanks Diana, and welcome everyone. For the sixth segment in the *Building Back Better with The Green Recovery* series, we saved fueling innovation in the energy sector for last, and for good reason. It's really where the rubber hits the road and, for me it's also personal.

Although I live in Toronto now, I was raised an Alberta boy, so I care a lot about what happens there, and in other resource rich provinces as well. I think one of the silver linings of the COVID crisis is that it's given us an opportunity to step back from what has been a painful and polarized discussion in the past few years and really take stock of the magnitude of the opportunity that is staring us in the face of being a global leading supplier of zero carbon commodities. I think with the unprecedented surge in public investment we were expecting from the federal government—which is one of the few actors left with the ability to take on the risk and the capital to deploy for research and development—and disruptive commercialization of new technologies to tap into the resources that we have an abundant supply and competitive advantage for I'm hopeful that our federal government will show leadership, which has been it’s want and is its mandate. I'm looking forward to the discussion here with everybody today, so thank you for joining.

DIANA FOX CARNEY: Fantastic! Thank you, Toby. We're now hopefully bringing the Minister for his welcome. Is Mr. Regan on the line? Okay I'm sorry about that we seem to have lost him again. Apologies. I think we don't have time to wait at the moment, but should he come in we

will bring him in at a later stage. I will then pass to Celine Bak, who's President of Analytica Advisors. She's going to lay out our general thinking in this area before we get to our discussion. Thank you Celine.

CELINE BAK (ANALYTICA ADVISORS): Thanks very much, Diana. Like Toby, I have a strong connection to Alberta. I'm very proud (with Sarah Hastings Simon) to be a director of Emissions Reduction Alberta, and delighted that Steve McDonald is able to join us today. Thank you all for having joined us in the sixth webinar of the Corporate Knights Build Back Better series. It's great to be together in spirit.

We've been working hard these past weeks to build strong proposals to support Canada's commitment to net zero emissions by 2050. As we build back better from the COVID-19 pandemic, we made sector proposals that were intended to push the boundaries, including three areas directly under the leadership of Minister Mr. Reagan. As we know, we live in extraordinary times, and we've taken to heart the Eisenhower admonition: “When you can’t solve a problem, make it bigger.”

We’ve proposed strategic paths for the public sector to act in ways that it has not done before to enable a two-thirds decline in carbon emissions from our homes and workplaces while providing career opportunities to 230,000 people. We've established a pathway for the full decarbonisation of Canada's electricity grid by 2030, which would attract 85 billion dollars in private sector investment in renewable energy into the Sun and Wind belts of Western Canada. We've also proposed infrastructure that would support a shift to 50% of new automobile sales being electric vehicles in just a few years.

So we've pushed beyond the tried and the true, and we hope that you'll forgive us Mr. Regan for these vigorous proposals that do stand up economically for the oil producing provinces of Alberta, Saskatchewan and Newfoundland. These proposals generate 140,000 full-time jobs over a 10-year recovery period based on 200 billion dollars in investments. All combined, the lion's share of this activity would be in Alberta. About 140 billion dollars of investment and a hundred thousand full-time jobs.

MINISTER SEAMUS O’REGAN: Here we are.

CELINE BAK (ANALYTICA ADVISORS): Welcome Minster O’Regan! Perhaps I’ll just finish up quickly. Today we're taking a different path with a proposal which is a return to a tried and tested approach: one that's been proven in Alberta, and that has delivered so much to all Canadians. On the basis of a $140 billion investment in today’s dollars, the Alberta Oil Sands Technology Research Authority (or AOSTRA to those familiar with it) led to the successful commercialization of the oil sands a resource which has helped unlock 313 billion dollars of investment into companies which at their peak employed 400,000 people directly or indirectly and provided 800 billion dollars in annual revenues to government.

According to the research conducted by Sarah Hastings-Simon—who has joined us today—AOSTRA was characterized by three important qualities. It had the right goal by targeting disruptive innovation that went beyond immediate commercial interests. They had the right structure through the full backing of long term funding from the government, but independently delivered. And it had the right scale to realize the goal while taking into account the capacity of people, as well as available natural capital and industrial infrastructure. That's why we're proposing that the federal government create a 25 billion dollar energy innovation fund.

The fund would be for zero carbon technology, such as rain, hydrogen, geothermal and carbon, fiber. The 25 billion dollar energy innovation fund would reduce greenhouse gas emissions from the oil sands by about 23 billion tons by 2030, and from oil and gas more generally as zero carbon technologies are deployed in Canada. It would leverage 100 billion dollars in total investment (including private sector funds). And, most importantly, it would catapult Canada to be a supplier of choice for 120 billion dollars annually of zero carbon commodities by 2030, and in the process it would create 500 thousand a person years of employment by 2030.

The fund would be fully endowed to insulate it from changing political priorities, and would take advantage of today's very low interest rates. The Energy Innovation Fund learns from AOSTRA in another key dimension, and that is that the fund would invest 100% of the requirements for R&D to the point of deployment. This would confer IP ownership to the funds for any research that it would finance. Industry co investors would have the right to use, but not own the IP. The fund would be designed to deliver a legacy to Canadians just as AOSTRA did. Back to you Diana, and to Mr. Regan and our experts and panelists today.

DIANA FOX CARNEY: Thank you very much Celine. Minister I'd love to bring you in now. You've heard a little bit of the proposals. I'd love to bring you in just for a general welcome and a word on your thinking at the moment.

MINISTER SEAMUS O’REGAN: Okay everybody can you hear me?

DIANA FOX CARNEY: We can, indeed.

MINISTER SEAMUS O’REGAN: Okay, good. I don't take anything for granted these days. First of all, it's a great pleasure to be here. I've been a big fan of Corporate Knights for a long time. I think you've been well ahead of the curve I think in many respects. Not only in pointing out the imperative of climate change, but also the imperative of businesses working closely in order to make it happen. And also, I think, pointing out what a leader Canada can be. So I'm deeply appreciative of the invitation.

I have to leave early, but you're probably used to hearing this from ministers by now. We've reached an agreement with the other parties so question period is back which means I've got to go to leave to show up for the virtual House of Commons. So, my apologies. Frankly, I would have liked to have been here all day, and I know members of my staff will be.

If I could give you a bit of where I see things: I think first of all, it has to be noted that we've made a commitment now that Canada will reach Net Zero by 2050. I think that that's very important. That makes us partner with 77 countries around the world, and a growing number of corporations. I'm very proud of the fact that my province yesterday announced it would be making a commitment to net zero. And as one of the three oil-producing provinces in this country I think that's important.

And for its part, we put a price on pollution, we're phasing out coal powered electricity, and we are making and will continue to make, particularly now, some generational investments in clean energy technologies and green infrastructure. In my departments we are supporting over 900 clean technology projects across the country, nearly a billion dollars in cleantech initiatives. That's now; we all fully appreciate that there may be ramping up as we come out of COVID-19. The total value of those projects generally runs around four times that we've invested. More than three billion dollars since 2017 in clean energy capture, carbon storage, wind, solar power, alternative fuels, energy storage, smart grids, energy efficiency.

I'll save you all the details but one thing I always make sure to mention and to allow to sink in is that we are the fourth largest oil-producing nation on the earth right now. Fourth largest. We are behind the U.S, Saudi Arabia, and Russia. We are ahead of Iran, Iraq and Kuwait. And I say that not to entrench ourselves and say we're an oil country. There's a responsibility that comes with that. I think we are a country that is blessed with a bounty of natural resource wealth and an enviable quality of life as a result. How we meet the urgency of combating climate change is the challenge for age, with that in mind. That we are a natural resource country, that there is no democracy on the planet that is as blessed with a wealth of natural resources as we are. Importantly say both of those things: democracy and wealth of natural resources. Nobody else is dealing with this on the level that we are.

So we need a plan to reach Net Zero by 2050. Right now we do not have one. We are working very hard on it. Oil and gas production is an essential component of our national economy in 2020. It will continue to be an essential component of our national economy in 2025 and in 2030. Sorry, I've just been told I was my video is not on. I don't know how that happened, because it says it is. Can you see me?

DIANA FOX CARNEY: Yeah we can see you know, yeah we appreciate you.

MINISTER SEAMUS O'REGAN: I don't know what happened there. Okay. I think in every scenario under the Paris Accord, fossil fuels remains a necessity for the short and the medium terms. There's no getting around it. Recognising the importance of oil and gas to our current national economy doesn't mean that we hide from the reality of climate change. It just means we need to have a plan. I think it's very important to understand a few things. I think that the plan has to be honest and we have to confront the reality of our economy. I always say that does not hinder us, though, from making bold moves. It just means that we have to make smart ones.

You know there comes a time when I make these points about the present state of our national economy, and how much we still are very much an oil drawer and user. Those are some of the most high value and high-tech jobs in the country, as much as people think natural resources are some sort of retrograde thing. It is not. Most of these positions are very well played, very high value. It just means that we are at that point now where we are making the necessary compromises in order to put these things in place. In a democracy it means that we have to maintain a critical mass of people. It means that we have to have people on board. It means that we have to ensure that we keep people on our side and that they understand that transition, while it does mean change, is not a scary thing. It is actually something that will guarantee our future prosperity. I have said to many of my provincial colleagues, and repeated to the premier he agreed in his commitment to Net-Zero here in Newfoundland and Labrador, that net-zero is not just a plan for our environment, it is a plan for our economic competitiveness.

And increasingly we know that's where markets are going. Of course the Norwegian sovereign fund, and before that it was BlackRock. In between there was Sweden and it's sovereign fund. Investments are changing. Mark Carney and what he's been saying for the past he's right. Ultimately, you follow the money and the money is increasingly steering us towards net-zero solutions, and companies are looking for net-zero solutions.

And I've said this. I actually attended Globe (and I think some of you were there) and I gave a speech about the importance of keeping every region in this country on side. The importance of not leaving workers behind but making sure that they are part of this transition. I gave that speech and made the point that there was no way we were reaching that zero without including our oil and gas industry. You can model it any way you want: there is no way you're getting the net-zero without that very important promise and without including oil and gas.

Now the next day, after Globe, I flew. I co-hosted, with the Minister of Energy, a clean tech summit with oil and gas. All the senior execs were there. Did that in Calgary and I said there will not be a viable oil industry in this country unless we make commitments to net-zero. That's the flip side. And at that time Blackrock had just made its decisions, and they were reeling about from that. But the biggest concern was that Canadian oil and gas Canadian energy becomes a box to check for investment houses. It becomes that box to check, that the portfolio manager looks down the table and says “What are we doing about climate change?” over “We're writing off Canadian oil. We’re no longer investing in Canadian oil. We're seeing that happen.

What's on the other side of that ledger, what's the other box to check? That increasingly, for a lot of investors, is net-zero. Seeing a commitment to net-zero. So it is an imperative I think for our economy from an economic point of view to get on board with this. And when that happens, and money starts flowing through those areas I think that we are going to see some significant investments in this country. And I think that is very much to our advantage.

So I'll stop there. Waxed on a little long and my apologies, but it is very important that we are honest with Canadians about change, about pace of change, and about our commitments to making sure that we're not leaving people behind. I think it's very important that we're thorough, that we see this through, and I think it's important to be bold. I think that there's an incredible amount of potential in this country. I think that we're at a point where people recognize its importance. I know that in industry and government there's great willingness to start looking at significant investments we need to be making at this juncture in order to prepare us for 2030 for 2050.

DIANA FOX CARNEY: Thank you so much for being with us, Minister. We really appreciate that and we will be feeding back our thoughts. We're delighted to hear that you are ready to be bold and you're focused on zero, because there's a lot that needs to be done in the next 30 years. So thank you for joining us today.

I'm going to pass over now and get going with the panel. We're many, and we have a short period of time. I wanted to start with Chad Park from the Energy Futures Lab just to pick up on the point that the minister made there about the structure of the conversation that we need to have moving forward. And I knew you've been thinking about this a lot, Chad.

CHAD PARK (ENERGY FUTURES LAB): Thank you very much, and thank you for the opportunity. The first thing I want to say is that there is a huge network of people in Alberta specifically who are ready, active and engaged in finding the solutions: clean tech entrepreneurs, oil and gas organizations, and people from a whole diversity of backgrounds. We've been fortunate with the Energy Futures Lab to be connected to a lot of them, and several of the partners of the lab were represented in this panel as well. And the thing that we've learned there is that the polarization of these issues represents a problem in achieving any objectives. While technology innovation is critical in solving these problems and the deployment of technologies is, of course, a big part of the solution, social innovation needs to be just as prominent as technological innovation. There's a real opportunity there to create new forms of new pathways to the solutions by careful attention to cultivating trust and social capital among diverse actors in the system.

When we do that we can find breakthrough opportunities. We've found that the elephant in the room is often disagreement about the future of fossil fuels for the Canadian economy. Which is maybe obvious, but what we have also found is that there's the potential for common ground when we dive deep and understand that there could be a role for hydrocarbons in the transition and in the future of a low-carbon future. We refer to that as future fit hydrocarbons, and I think some of the speakers that are going to come down are probably going to talk about some of the opportunities related to that.

So that's what I'll offer up. There's not often the voices that get heard from Alberta but there are a whole army of people working on solutions in Alberta that are keen to be engaged.

DIANA FOX CARNEY: Fantastic. A really thoughtful constructive start to our conversation today. I'm going to pass now to Sara Hastings-Simon. She's from the Payne Institute for Public Policy, with which she's done a lot of research on AOSTRA, which Celine mentioned in perhaps you can tell us what we can learn from that initial support of innovation in Alberta.

SARA HASTINGS-SIMON (PAYNE INSTITUTE FOR PUBLIC POLICY, COLORADO SCHOOL OF MINES): Thank you Diane. Celine did a great job summarizing some of the main findings from the work looking at the history of government support of innovation. First and foremost, it really makes the case that there is a strong role for the government in creating markets and creating industries. That's not a theoretical proposition; that something that's happened in our own backyards. One of the things that was really important in AOSTRA's success and in the provincial government's success in developing the technology for Institute oil sands production was that at the time they took on a pretty bold goal.

With hindsight we see it a little bit differently because the oil sands industry has obviously become such a big part of the oil industry writ large but at the time this was really seen as a different sort of resource underneath the ground. It was even referred to as alternative energy, interestingly enough. There's some lessons there, I think when we look at the resources that we have in Alberta and other natural resource provinces. When we look at the resources that we have, we need to think big and bold beyond those incremental improvements, which are also needed but we need to make sure that we're also targeting these bigger, longer, seemingly further away type goals.

In order to actually do that and achieve that there's a couple of key things that a structure needs. That's independence: you need to walk the fine line of having an organization that's able to pursue its own ideas and really push beyond the shorter-term where industry is likely to focus. AOSTRA did that well. You need to, obviously, have the highly qualified people that know the details and are able to bring in knowledge. One of the other things that I think really contributed to the success that we can learn from is that innovation often comes not from a bunch of things that are brand new from first principles, but rather applying technologies and ideas that are well-established in one field into another. We saw that with the development of the integer resource really applying techniques from mining to the oil industry. That cross-pollination is where you've got a lot of those breakthroughs at the end of the day.

And that's not unique to the AOSTRA story. We see that over and over again in innovation. Overall, the history of building up the oil sands industry in Alberta shows us that there is a role for government in times like these where we're facing some kind of massive disruption to step in to make, fund and really drive bold innovation research towards creating new industries and economic development for the province.

DIANA FOX CARNEY: Thank you so much Sarah. It's obviously not simple. There is a lot of social innovation. It's very difficult to get from where we are to where we need to be even if we can all say nice words about it.

Now we could bring in Dan Wicklum, who's CEO of the Transition Accelerator, because I know he's been thinking a lot about how net zero emissions, can frame our direction going forward and really focus the mind on what we have to do. Because it's not just more of the same and add a few nice things on top, it is a really different way of thinking about things.

DAN WICKLUM (THE TRANSITION ACCELERATOR):Thanks! So the Transition Accelerator is a new organization we launched about six months ago, and what we try to do is take a different framing to emissions reductions. So our framing is that we want to deeply understand transformations in disruptions that are happening, and not slow them down, but actually accelerate them. And accelerate them in ways where Canada could win economically.

So when we apply this paradigm to the Canadian economy a couple of things pop out. One of them is the potential demands of a hydrogen economy. One of the framing issues around hydrogen is net-zero. Now everyone understands the Paris Climate net-zero commitment. 77 countries have this type of commitment. In Canada, or only some parts of Canada, we tend to think of that as an election promise or a communication strategy by an individual company, but much of the world is taking this as a necessary objective and I think increasingly we're doing the same here. But if you really dig into that net-zero paradigm it's remarkably clarifying. We've been trying to reduce emissions in the world and in Canada for many decades with some success. I think one of the problems is that there's so many ways to reduce emissions. We get into these circular debates about whose technology we should use or what approach we should use, but if we actually really ground into net-zero that clarifies things.

Because there are few ways you can actually get to net-zero. Many technology systems and many companies and their solutions, frankly, drop off the table because they can't be part of a net-zero solution. So this is really why it seems like the whole world is doubling and tripling down on hydrogen, using hydrogen as a zero-emission fuel, because it is one of the few technology platforms where not only people can make money but it can actually be a part of a natural system. So where does that leave Canada? We just happen to be independently benchmarked to be about the cheapest place on the planet to make hydrogen. So if we're looking for a win-win where we can use the disruptions that are happening in the world, whether they’re business model accelerates them so that we can not only deliver good environmental performance so that we can win economically, hydrogen could be a fantastic option for us.

So what does that look like? A blue hydrogen where we take natural gas, and all we're doing it when we make blue hydrogen is upgrading it. So this is not actually leaving our fossil fuel sector behind; we're just evolving it based on new competitive forces in the world. So we're taking our natural gas resources anywhere in Canada, upgrading that natural gas into blue hydrogen. Of course, we capture the carbon and we store it and then we can use that zero emission fuel

domestically. A picture of Canada where we become the global dominating exporter of this zero emission fuel that the world can't get enough of.

So a fundamental paradigm shift from Canada as being a carbon intensive part of the problem to global supplier of choice for zero emissions fuel that the world can't get enough of. Think of how that would change Canada. You know we're working with some other groups that in the past have been quite negative on Canada's oil and gas sector, but as soon as they understand that this current gas like could pivot and evolve to being a critical part of the problem, we're starting to make remarkable, new and quite amazing bedfellows. Where parties in the past have been pitted against each other based on carbon are now completely aligned with each other and scoping out a future for the oil and gas sector just happens to be with blue hydrogen.

DIANA FOX CARNEY: Thank you very much, Dan. There's a couple of questions in the panel about blue hydrogen. Obviously, if it's going to be zero carbon you have to have pretty much 100% carbon capture at the moment the rates are about usually about 95 percent even with carbon capture. So we've got work to do in that space. There's also possibilities for green hydrogen produced through renewable energy. Let's not get into the technical details. Let me just say that hydrogen is the future, I believe. And there's been announcements this week from a variety of Danish companies who are beginning to collaborate to build out the hydrogen industry in Europe.

I want to pass now to Mark Little who is CEO of Suncor, obviously, one of the incumbents in the oil industry and ask whether net zero is concentrating your mind and how you are responding to all these potential avenues for innovation in your sector?

MARK LITTLE (SUNCOR): Great, thanks so much I appreciate it. It's nice to be here. I'm thankful we're not in it all together, because it'd be kind of like “Pile on that guy!” Being the largest oil oil sands producer in the country.

You know I think Dan actually said it really well. This isn't about a marketing brochure or a political campaign, this is about taking real action and turning it into innovation. As a company we define our purpose as providing trusted energy that enhances people's lives, while caring for each other and the earth. All of that drives us around the whole issue: how do you drive down emissions? What are the technologies of the future now? I think the great news in all of this is that if you go back over the history of the industry, and it's been talked about here with AOSTRA and such, innovation is at the core of the industry. That is actually what's allowed us to compete in this global market. As was pointed out, there's only two Democratic nations on the surface of the earth with lots of oil, and we have a lot of it. The challenge is that it's heavy and it comes with lots of carbon.

But if you go back to the start of the industry in Canada we used all the gas because nobody even knew what to do with it. Today, it's a booming industry of significance within the country. And then we had all of this oil sands resource, we didn't know what to do with it and we didn't know how to operationalize it. I'm quite confident I'm the only one on the panel today that

walked underground in the AOSTRA mine and recovered the drilling rig because we didn't know how to drill horizontal wells. All of this was the birth of the industry.

The great thing about Covid-19, which is hard to attach anything positive to, is that we've seen us come together across political lines, across industries, across geographies in our country to pull together to attack this terrible disease. I think one of the great opportunities we have is to come together and leverage things. Like, how do we deal with hydrogen? Trust me the industry today makes a lot of hydrogen. Not the way we want to make it in the future, the blue and the green hydrogen that we've talked about. But we have the skills, technology, and know-how to handle it safely, and the logistics in place. We're excited about being part of the future. We're involved in things like Enercare, where we're trying to convert municipal garbage to fuel, then it's in the gasoline pool today. Or whether it's converting and trying to do things like Lanza jet where we're recycling carbon emissions to be able to come up with renewable jet fuel exciting opportunities that's the challenge in front of all of us.

DIANA FOX CARNEY: Thank you so much Mark for that. I think this will be a great point to bring in Steve McDonald who's CEO of Emissions Reduction Alberta, just to ask you how it looks from your side and where you think the big opportunities for emissions reduction from the traditional industry are and the opportunities for innovation for a low-carbon future.

STEVE MACDONALD (EMISSIONS REDUCTION ALBERTA): Thank you, Diana. Emissions Reduction Alberta has really been in the solution space for about 10 years now. We invest the carbon levy paid by our large file emitters in identifying clean technologies that drive the outcomes. In terms of cutting cost and cutting carbon, we've invested about 500 million dollars in about four billion dollars' worth of projects so far, and about half of those have been in cleaner oil and gas. There's lots of people on this panel that'll talk about specific technologies. I thought I'd spend my three minutes talking a bit about what are the other pieces of the puzzle that need to be in place to successfully advance the solutions that are needed. We like to talk about complete solutions. It's much more than just investing publicly and picking the right technology. You need all the pieces in place to make the business-case work. We like to say that we need to pick the projects that are not just shovel ready but shovel worthy.

So what I'm there for is things like policy innovation. You need those predictable policies and regulations that are pushing industry and innovators in the right direction. You need innovation in terms of the structures and the partnerships between big companies, like Steve mentioned there, and the innovators to partner and then actually drive the ideas from the early stage to scale up to an actual deployment. And we need financial innovation especially in the energy sector where there's large capital requirements, and innovation in the tax system. New debt instruments, green loans, those kinds of products.

And I'd also say we do need what Chad mentioned: cultural innovation. We need the behaviors and the beliefs that allow us to take the risks we need to deploy these technologies. And above all I think we need that shared goal that many have talked about. You can't drive a pathway without the shared understanding of what the final destination is. Where is that common ground

between “Oil is dead’ and “We want to be the last barrel produced”? That's something we've learned. And how you sequence these pieces and understanding the causes of the effects is really important. The last point I'd make is that the issue is emissions. That's the villain, not an industry. This series demonstrated that the solutions can come from multiple sources, because every sector is struggling with similar challenges. Be it waste heat, or industrial process efficiency, water treatment, fuel switching. Carbon capture and storage. We've got to understand that if we focus on one of the problems and that's the mission and share those technologies we’ll be very successful.

We also got to remember we got to work across multiple time scales. We've learned that from Emissions Reduction Alberta that we got to focus on solutions that are doing the same things better around current production. But if there's gonna be growth you also got to identify better things and that's where we're going to hear more comments around hydrogen, like Dan mentioned, carbon utilization and things like that. I'll stop there.

DIANA FOX CARNEY: Thank you so much Steve. At this point I'd like to bring in Linda Coady, who's the executive director of Pembina Institute. Most of you all know the work of Pembina, and what they do around the social space and thinking about the future of these technologies. So Linda, how would you think we best move ahead in this space? (pause) You’re muted Linda.

LINDA COADY (PEMBINA INSTITUTE): Sorry! I promised myself I wouldn't do that but I did. Hello, everyone. Well I'll just pick up on a couple of themes that have already been identified. I want to back Chad's point about the importance of social innovation. Here I think that a lot of the work that we've done at Pembina over the years on polarization around climate and energy issues in Canada indicates that a lot of that polarization is there because the resource sector and its workforce does not clearly see a pathway forward for itself to the clean economy. I think we're all learning from the pandemic here as we deal with the economic fallout, and the fact that some of that economic fallout is disproportionate on some groups: women, minorities, jobs in the service sector, jobs in the oil and gas sector. That those issues around social and economic inequality and inclusion are coming into greater release. So I just like to make a pitch here for jobs. For the importance of jobs being created from all of the technologies and new policies and ideas that are being discussed on this panel today. I know that people are going to be talking about jobs and clean fuels and heavy-duty transportation that uses those fuels. New climate-resilient infrastructure will create new jobs, as will the materials that need to be that go into building that infrastructure. Energy storage, decentralized grids, jobs in renewable electricity, but also jobs in reducing the emissions that are not going to be electrified away as Dan was just talking about—like jobs in hydrogen drilling, in geothermal, methane reduction, monitoring and measuring carbon capture and storage. New jobs in emergency response to extreme weather events, and last but not least jobs and ecological restoration and new nature-based climate solutions that can help sustain rural unity.

So I think these are all part of the equation here as we talk about these net-zero technologies and policies. I think the challenge before us, coming out of the pandemic, is to create the confidence in Canadian workers so that they can see themselves and their family, they can see a role for them in this decarbonisation and transformation that we now have the opportunity to achieve.

DIANA FOX CARNEY:Thank you so much, Linda. I think you've brought up two really important issues. One is the jobs piece, which has been at the beginning of each one of these events. We have talked about the number of jobs that might be created, but it's always worth bringing us back to that. We have to focus on how this all looks from the jobs perspective and how this looks and feels to people who've lost their jobs in the current crisis and are struggling at this moment in time. So thank you for that. The other thing which I think you did very effectively give a sense of the scope of possibilities in this space. I mean everything is wide open now. Costs for renewables have fallen through the floor, but the innovation around new types of fuels, around storage technologies, around different ways to capture carbon whether it's outsourced from industry or in biological storage, it's a really exciting time. We have innovation. We're not yet there but we have possibilities. So on that note I'm going to bring in Jeremy Baines. He's from a company which you may not know, so he can tell us a little bit about it, called Neste. They are doing something very immersive and innovative in this space.

JEREMY BAINES (NESTE US): Thank you for inviting me to this discussion. Neste is the leading producer of renewable diesel. I think we are the largest producer in the world of renewable diesel made from wastes and residues, and we also provide sustainable circular solutions. I might like to disagree with some of the comments that have actually been said here today. By 2040, 70% of light, medium, and heavy-duty vehicles will still be running on internal combustion engines. Although I think it's right that we are looking at what future technology could bring, climate change is not going to wait for the perfect solution to arrive. So we need to do something to decarbonize and reduce those emissions today. That's where some of these advanced biofuels can play a role today. These are drop-in solutions. They work with existing engines and they work with existing infrastructure. This is technology that we are familiar with that the oil and gas industry has masked for decades. This is something we can do now and I think, therefore, any government action should focus on building these future jobs, not yesterday’s jobs. That means encouraging the development of sustainable low-carbon energy and transport solutions that power our lives. We need to have that action now. We just can't wait on the some-day solution when there is a today solution that works.

We talked about the abundance of resources in Canada. Canada is well-positioned for these kinds of sustainable transitions today. You have those oils, those fats, those greases, that can be converted into advanced fuels that can be put into diesel engines that can be put into planes. I mean how we haven't even talked in this discussion about how we are going to decarbonize these hard-to-abate sectors. There's no electric cable long enough to power a plane. These

planes will be flying for decades to come so I think we also need to focus on what can be achieved in the short term and medium term while also thinking about how to create the future world. A future world where there are going to be many different solutions. It'll be a poly fuel world. There are going to be solutions in different niches, in different sectors, and I think therefore good policy action today is so important.

DIANA FOX CARNEY: Thank you, I think that is a valuable reminder that we can't wait for the perfect solution. We have to start with where we are and make the best of it. I'd now like to turn to JP Gladu. I'd like you to bring you in to discuss the indigenous concerns in this area. This is an area of conflict but is also an area of opportunity and perhaps you can talk us through your thinking.

JP GLADU (FORMERLY CANADIAN COUNCIL FOR ABORIGINAL BUSINESS): Thank you. There's massive opportunity here, and I think Alberta, as far as the provinces go, has been a leader with regards to indigenous relations, from a private sector to indigenous community and indigenous business relationship. We can see that as far back with Eric Newell, who over 30 years ago was contracting indigenous communities, who built up the capacity over time to participate, a couple years ago, in signing a massive deal with Suncor. I love talking about that because it's a prime example of how you create partnerships, and how you create, more importantly I think in this country, certainty.

We've had a lot of conversations around disruption right now and acceleration. If we put that through the indigenous lens, all I have to say is Wet'suwet'en, and you get a good picture of what disruption can look like on the LNG project. And that because there hasn't been a solidified approach between the government, industry and communities to put down a pathway to what our country is going to look like in 40 years from now. I find myself, I mean I have a few friends on the line here, having heard this messaging over and over, and I feel like I'm having to keep telling this to Canadians and sharing these stories and it just doesn't get the pickup. And all due respect to Linda and your comments, but I was waiting for the indigenous portion in the social impact of our communities that were not mentioned in your remarks. And this is often the case across this country. If we can't start to embed these conversations into everyday meetings like this when it comes to our effectiveness and our competitiveness globally we're going to continue to struggle with issues like Wet'suwet'en. So it really gets down to being innovative.

I think it was Steve talking about innovative ways of actually creating capacity. I think what the Premier's done is incredible, creating the billion dollar fund for the indigenous, the Alberta indigenous opportunities. That's how you adapt to our community, that's how you get more capacity to participate in the jobs, participate as partners, and participate in the supply chain. So this just needs to be a common conversation within our country. I don't think there's a better champion, again, than what my friend Mark and Suncor's been doing within our indigenous community. That's the type of innovation that we need to be doing, that's the type of effort that it takes.

DIANA FOX CARNEY: Thank you so much JP. Teri Lynn, do you have anything to add to what JP has said?

TERRI LYNN MORRISON (INDIGENOUS CLEAN ENERGY): Yeah sure, thank you Diana. There's just three points that I want to speak about in terms of solutions, one of them being putting a premium on talent and innovation, especially for our younger professionals including the indigenous peoples. The recovery needs to be focused on the future and the economic prospects of Canada's young professionals by utilizing their energy, their passion and their education. Another thing, in terms of private investment, the focus should be on funding to deliver multiple impacts. So we need to optimize the deployment of capital to have multiple impacts being thought of, including a spectrum of economic opportunities like indigenous communities. We're talking about local employment using their ongoing knowledge-base. There's regional and Canadian economic development that can happen. There's project and venture earnings and generation of reinvestment for clean growth. We talk about social outcomes, community resilience, improving health outcomes, healthier homes and then bringing in the environmental component so having carbon and reduced pollution. And another point is just going on to the indigenous and local communities being critical on-the-ground partners for a post-COVID economic recovery, similar to what JD spoke about. We as a country are going to maximize the local and indigenous impacts of public and private investment as a core elements of the post-COVID economic recovery. By doing this, not only will the economic impacts be more substantive but will have a much higher public support through the indigenous communities as well. Thank you.

DIANA FOX CARNEY Thank you so much for that important piece of this puzzle. I'm going to turn now to Laura Kilcrease who has the honor of being CEO of Alberta Innovates. Alberta obviously is at the core of many of these discussions. It's not just about Alberta. We heard from a minister at the beginning that Newfoundland is committing net zero, being an oil-producing province, of course. But tell us a little bit about what the view is from your seat, because Alberta there's a lot of bitumen there but there's lots of other possibilities too. There's a scope for geothermal, a scope for solar, there's lots more to be done. So how do you see this whole puzzle going forward?

LAURA KILCREASE (ALBERTA INNOVATES):Thank you Diana. We in Alberta Innovates are really the innovation engine for the province, and as such we've worked with many of the people on this broadcast today and continue to work with them. I think the whole issue of net-zero is going to come from a multitude of innovations that are going to be applied to the market at the same time. It's not gonna be any one innovation. It's the collection coming together in a way that makes sense economically, or to our ESG scores and goals in terms of environment and social and policy. Ultimately it has to have an economic output that is viable for not just Alberta but viable very much for Canada as a whole. So today we've talked about hydrogen and we've talked about the indigenous funds. We've talked about many different areas: biofuels, reworking

all of these, geothermal, carbon capture. In fact in Alberta, outside of Calgary, we have one of the largest carbon capture plants in the country that we're using for X Prize winners.

But today, very briefly, I want to talk to you about bitumen beyond combustion. In other words, I'd like to have you think about bitumen as a raw material for other materials that would be important. We believe we can take bitumen today and reduce greenhouse gases by at least 126 megatons per year just by, instead of burning all of the bitumen, taking the carbon fibers from the bitumen, taking activated carbons from the bitumen and taking asphalt binders. So let's look at the big one. Big one is carbon fibers. Today we have an opportunity to take these fibers that have high strength, a great stiffness, a low density, low corrosion rates, and apply them to many of the existing industries as an alternative material, whether that's aircraft or automobiles or other areas. Today the future market is predicted at 212 billion by 2030 for carbon fibers, and the bitumen we find in Canada is absolutely perfect raw material from which to take those carbon fibers.

Second would be the activated carbon. Why is that important? Because it's got very high surface absorption, and we can use this in applications of methane and hydrogen storage that we'll need to undertake air purification and many other applications. And today activated carbon is the market that's growing at 13 percent per year globally. So again this could be just a mere 15% of our demand from oil sand could go to produce this activated carbon you know thirty six thousand barrels a day and this could give us an enormous new product opportunity in the marketplace.

And third, the asphalt binders obviously mainly used for roads today, but asphalt binders are estimated to be about 50 billion dollars annually. You start putting those things together and taking the raw bitumen, and instead of burning it or combusting it, making it cleaner by taking the materials out of it (and there are a few other materials I should say like vanadium and so forth) we believe we could easily have in Alberta alone 84 billion dollars of new markets in new materials that are clean. So I think as we look at this I'm only bringing in BBC up today: Bitumen Beyond Combustion, because we have a wealth of opportunity at this table. But if we look at that, and we can save 126 megatons of co2, and we just still keep burning, as Jeremy has said, some percentage of our bitumen (basically our balance of about two million barrels a day) we suddenly have a meaningful market that creates jobs, that meets our ESG scores. I say this in all honesty because innovation, as was said earlier, has been at the forefront of what's happened with our oil sands since time immemorial, since AOSTRA, since SAGD, since the filaments that have been developed, and we've been involved in most of those things. So I'll leave you with a BBC, really it’s the other BBC, Diane. Lots of markets, and one last point is that we have the largest single source of raw material in our oil sands that can produce these new materials in North America. This is not an opportunity we should lose in Canada. Thank you for my colleagues here because I think working together is what's going to be important here. Thank you.

DIANA FOX CARNEY: Thank you. Well I think that BBC has a slightly brighter future than another one I know, but I'm interested in the activated carbon. So you're saying that that can draw down other gases and be stable as a form of carbon storage?

LAURA KILCREASE (ALBERTA INNOVATES): Yes, absolutely Diana. So whether it's methane, hydrogen, it can even actually be used in gold purification, metal extracts, water purifications, air filters for gas masks, a number of other areas that it could be used more in if we could produce more of that activated carbon. And that's a nearer term opportunity for using some of our bitumen.

DIANA FOX CARNEY: Fascinating. Now the one question that's come up a little bit in these in the chat panel is around LNG. We haven't talked about it but it is something that people have heard about, and has been promoted by some parts of the industry. I'm not sure who I should be asking actually about LNG. If anyone would like to sort of physically raise their hand and would like to come in on LNG. Thank You Sara.

SARA HASTINGS-SIMON (PAYNE INSTITUTE FOR PUBLIC POLICY, COLORADO SCHOOL OF MINES): I'm actually just doing some research on the LNG potential and I think it's important to recognize that yes there is a potential for Canada to export LNG and there are climate benefits obviously of displacing coal with natural gas, but there's a couple of limitations to keep in mind. One is what is the size of that market? We're looking at two key limiters: one being actually the import capacity from companies that would be purchasing LNG. There is a crossover point where the export capacity of those under construction will actually exceed that import capacity. The second is the global carbon budget. While LNG is lower emitting than coal it still does have emissions when burned. So again, as you start to look to the mid-century you would start to fill up the global carbon budget almost exclusively with LNG if you really expand that market dramatically. Then the third is more of a geopolitical question. Some of the countries that are being targeted for imports like, for example, China as well as others may be reluctant to hand over you know a very significant portion of the energy supply to another country. So overall I think there's certainly a potential there for some LNG exports but I think the lifetime of those projects as well as the total demand is going to be more limited than some people are considering.

DIANA FOX CARNEY: Thank You Sara. That actually eats up all our time for today. It's been a really interesting discussion. There's been very rich commentary in the panels. Lots of optimism about the kind of solutions that have been proposed and the innovation that abounds in this industry in the near term and longer term potential solutions, but also a realistic assessment of really the quite limited progress that has been made in some areas thus far. Even though we know what we can do we haven't always done it. We haven't done the right thing. So I think the hope is that now that COVID does give us, not quite sure how to say it lightly, a kick up the ass to move into a new sphere, and not just be incremental in our approaches but really redefine the

energy future for Canada, for the world. To be serious about getting to those Net Zero targets, not just pay lip service. And figure out how Canada can be part of that. So I'm really grateful to everyone who's attended today. There may be some people there have been here for the past six weeks, not just Toby. So if that's you,thank you for coming. Thank you for all your participation. We do have one final event next week and that is a wrap-up where we can think about bringing all these different ideas together and we can draw on what you've contributed during these hour-long sessions each week. So with that I'm going to say goodbye. We did have a poll and the poll is about the energy future and I've forgotten to do it. I'm not going to do it now, I apologize. Maybe we'll bring it on next week. But thank you so much to all our panelists for taking the time. Thank you to everyone who came and hopefully we'll see you next week. Goodbye.