Building Back Better With A Green Power Wave: Roundtable #2

HOST-Diana Fox Carney: Welcome to everyone who's joined us this morning for the second in our series of events around Building Back Better: The Green Recovery series. My name is Diana Fox Carney and I'm delighted to be your host along with Toby Heaps for this conversation today which is around green power and the opportunities within the power sector.

You'll see here that we have once again and I know those who were with me last week, we had a lot of people and we have a lot of people again today. This is a big topic and we will endeavour to bring everyone in and also get to your questions. At any time during this event please feel free to type questions in the panel at the bottom.

I just wanted to start today with a quote which many of you will have come across in the last few weeks but if you haven't I thought this really set the scene well for our series and it's a quote by Milton Friedman and it goes as follows, "Only a crisis, actual or perceived, produces real change, when that crisis occurs the actions that are taken depend on the ideas that are lying around."

That I believe is our basic function: to develop alternatives to existing policies to keep them alive and available until the politically impossible becomes the politically inevitable. I think that very well sums up what we're trying to do here, which is to develop ideas with your help to ensure that we build back better.

So with that introduction I'm going to pass this morning to the Honourable Catherine McKenna, the Minister of Infrastructure and Communities. Thank you for being with us Catherine.

Hon. Catherine McKenna: Well thanks very much Diana and it's great to see you remotely I'd love to see you in person so hopefully this summer.

First of all thank you to Toby for inviting me, but also I have so many friends I can't…the way I've set up my screen because like everyone else I'm struggling my kids took my laptop so I'm using my phone so I can't see everyone who might be on but hello because I know it's a lot of friends and a lot of people I've worked with.

So I'm thrilled to be part of this. Obviously this is something I think a lot about a lot I did think about green power but more broadly the clean economy in my past role. So now I'm in a new role and as I say I know with money you can get things you can get things done.

I'll just start with a maybe with a caveat yet like where are we right now as the government? We're in the full throes of the pandemic which is going to last a while until we get a vaccine. So the focus of our government has been on the immediate health and economic crisis.

I know people are very excited and talking about stimulus and everything else. I mean our focus is really how do we float an entire economy? How do we make sure we flatten the curve? That has to be our top priority but of course as Minister of Infrastructure I mean I'm still moving forward on my agenda and for those of you who are a bit nerdy you probably read my mandate letter which includes green infrastructure also sustainability and resilience. I'm gonna give you some comments and they're a little bit personal to me so this is maybe less than my official role but in terms of areas where I see those opportunities.

I think first of all Diana I like this idea that the ideas that are lying around, we should be looking at and the good news is we have extremely smart people who have lots of good ideas that have been feeding our government good ideas since 2015 and continue to do that so thank you for that. I think that there's some reflections that we need to make about how things have changed as a result of COVID-19 and I'll just give you some that come to mind.

I'm also Minister of Communities and I suddenly have a new appreciation of that title because local community has become very important. We've seen challenges with supply chains, we've seen challenges on the agricultural side but more broadly. We've seen the importance of spaces, of being able to get outside and be able to appreciate a nature in a way that you're able to socially distance.

I think we've also seen the critical importance of high-speed broadband. There is a climate angle to that but it's also an equity issue, and it is a productivity issue. I think there are particular reflections that we need to make but what I am doing right now is we have an existing infrastructure program so of course looking at our existing infrastructure program and how do we maybe even accelerate the investments that have been made in the partnerships with provinces and territories. That includes public transit, it includes green infrastructure which includes reducing emissions broadly. So we can include renewables, it includes also things like retrofits, natural infrastructure I know there's many folks who really care about

national infrastructure obviously I do too. Then there's the Canada infrastructure bank an existing tool many you would have seen that Michael Sabia is the new chair of.

I think that's a very positive development when….he certainly understood the clean economy piece. Then of course there's the future and areas that I think are really important. So we had spent a lot of time talking about electric buses, that was a campaign commitment, 5,000 electric buses. That's still something that is a commitment and I think there's some real opportunities there. Resilience is so critical and I think resilience takes on even broader meaning when you have a pandemic like COVID-19 but certainly there's resilience to the impacts of climate change adaptation.

I think that we should be thinking about manufacturing and as I said supply chains have highlighted how important it is to also be doing manufacturing here. I'm from the Hammer, as many of you know, so manufacturing and clean manufacturing what are the opportunities to do upgrades, retrofits just generally. How do we do retrofits of our building, schools, hospitals.

I've mentioned broadband already electrifying everything clean power a huge part of my mandate finally getting inter ties between provinces but electrifying everything. Public transit is a huge piece we've made we've made historic commitments to public transit and moving ahead with provinces like Ontario, Quebec, BC and beyond. And then the natural infrastructure piece.

So obviously I could go on and on but these are areas that many of you have great ideas so I would continue to ask you continue doing your deep thinking so think about this in terms of COVID-19. What has changed because I think even people's perceptions or priorities may have changed and I don't mean away from climate because I think we've seen some very good polling that says the Canadians are still… I put it out on on Girls Environment Day which made me very happy because Abacus said you know 65% of Canadians still support action on climate change which is I think is very positive but maybe the frame is more resilience just broadly.

So, many things to talk about. The good news is I did virtual Parliament today but I have not been called to go into real Parliament so I can actually participate for a bit longer.

DFC: Fantastic, thank you so much Minister I really appreciate that broad welcome to this really thinking that we're doing here today.

I'm gonna pass over now to Toby Heaps whom you all know from Corporate Knights to give a bit more of an introduction to what we're doing.

Toby Heaps: Thanks Diana. I just want to say thank you Minister. We all appreciate and recognize how fortunate we are to have you in this in this position at this defining moment in our country's history so thank you.

I just have two brief points before we get into the presentation of the analysis by Ralph Torrie.

The first point is if the Minister said this recovery is going to be the overriding priority, this recovery is going to be people. Specifically getting people back to and laying down the foundations for future prosperity which we're going to need to dig ourselves out of this death hole. And that, if we do it right, is gonna work out just fine for the climate. And the reason for that is even though it sounds kind of counterintuitive that putting a climate lens on economic stimulus could be a good thing and not a distraction and not a constraint. It actually is probably the most effective strategy, most effective x-ray glass, to envision that we could put in place to cut through the fog and identify those opportunities to get the most people back to work in the quickest fashion as we saw last week with retrofits and to lay down the foundations for future prosperity is what we're going to be talking about today with respect to the power lines and the power infrastructure.

So without further ado it's my honour and pleasure to pass it over to Ralph Torrie. Many of you will know Ralph. Ralph over the last few decades has been one of the essential analyst energy environment experts laying down low carbon scenarios and how that could all come together to make us more resilient nation and he's put all of that might and experience into this analysis that he's going to share with us today so over to you Ralph.

Ralph Torrie: Thank You Toby. Good morning everyone. What we've been trying to do in preparing briefings and backgrounds for these weekly panels is develop quantitative sort of proof-of-concept scenarios of what future sustainable pathways might look like in the various areas that we're exploring and how they intersect with an agenda for restarting and stimulating the economy in the post-COVID period.

So last week it was building retrofits. This week we're looking at the possibilities for essentially a carbon-free renewable electricity system in Canada from coast to coast. And so to support that I developed this little scenario and as I said this is broad-brush proof of concept that's both its strength and its weakness. All you million dollar modellers who might be on the line don't worry this is not what you do this is looking at what a big picture might look like, what it could do, what it might cost.

So what we did in this case is we looked at our current system. The good news is that on a national basis we're most of the way to a emission-free electricity system. The bad news is that it's all vulcanized. Provinces have very good inter-ties with their U.S. neighbours, not so much with their Canadian next-door neighbours. And so the result of that is that we have a lot of renewable carbon free electricity that's basically not able to move east-west in Canada and ends up being exported while some Canadian provinces in particular Alberta, Saskatchewan, Nova Scotia fall back on coal-fired and gas-fired power plants resulting in the power sector continuing to make a fairly big contribution to Canada's greenhouse gas emissions.

So the question we asked ourselves: What would it take if in the post recovery we made that final push to make Canada a hundred percent renewable carbon free electricity system for everyone for all Canadians for every province? So we started with the system that we have. We included things like sightsee and Muskrat Falls in the scenario that are already either built or are fully committed to and that also brought in some wind and solar which is underway.

And then we built a number of key transmission links between Alberta and BC, between Manitoba and Saskatchewan, and the second link from the Maritimes through New Brunswick and an upgrade and a new connection between Ontario and Quebec. All for the purpose of expanding the markets for the carbon free electricity that we do have while at the same time getting an additional option to the provinces that are still burning fossil fuels in their power sector to get access to Canada's surplus of carbon free electricity.

When we did that there was still a significant gap between where we were trying to get to and where it took us so we added in additional investments in solar and wind power particularly in the Prairies and Alberta and Saskatchewan where the challenge of getting completely off fossil fuels and the power sector is most severe. And we found that yes we have the sufficient wind and solar resources to close that gap and so as you can see in this infographic and there's a little bit more detail in the article that's been posted online we ended up with a scenario that costs about a $100 billion dollars let's say over a 10-year period.

The cost is dominated by that wind and solar but what makes it possible is a relatively small contribution in the big picture of about $8 billion dollars for those transmission links. Those are what will leverage the opportunity for the solar and the wind power to make the contribution that we need if we're going to have a clean and carbon-free electricity system. So that's what we ended up. with needless to say it creates a huge number of jobs, it would reduce the greenhouse gas emissions from Canada's electric power sector to zero effectively by 2030. And finally just by way of context Canadians spend over sixty billion dollars every year on electricity so as expensive as this may seem at first blush when you stand back and look at it in the context of our ongoing spending on electricity it doesn't look quite so insurmountable. This is not the only thing that that can and should be done there's lots that needs to be done at the distribution level and I think someone's going to address that later but we really focused on this agenda because we were looking for the opportunities where it could and perhaps should overlap with the federal government's post recovery stimulus agenda. That's it in a nutshell, Toby.

HOST-Diana Fox Carney: Thank you so much Ralph that was a great introduction. I think when you think of Canada from the outside I mean there's a lot of envy for the fact that we are at 82% renewable energy and it would be great to get that up a bit further. To talk about the finance flows that might be required for this, I'm now going to bring in Celine Bak, President of analytic advisors.

Celine Bak: Thanks very much Diana.

So as Ralph has described we put together a scenario for what we can call the Canada clean power transmission system. The opportunity with that clean power transmission system is to take an approximately $8 billion investment and convert that through a really robust backbone for 100% carbon free power into very significant investments over a 10-year period in the order of $92 billion dollars to completely decarbonize Canada's electricity system.

There are some important benefits that come with that and I think it's important for us to raise the fact that health is one of them especially in the midst of COVID-10 pandemic. Pollution from combustion of coal in power plants in some parts of this country really have a significant negative effect on the health of Canadians and it's the case that now the most recent research suggests that burning of fossil fuels is actually a greater danger to give human health than tobacco smoking. So as context I think it helps us understand that this is about all of our well-being in addition to the decarbonization of Canada's electricity system.

The way the money would flow in this in this instance is actually similar to that which we described last week with the federal government, it's a crown corporation in this case, the candidate infrastructure bank making guarantees specifically to address risks associated with the development of interprovincial and intra-provincial transmission lines. Those guarantees would basically unlock public financing and perhaps also political will to accelerate the construction of those inter-ties and transmission lines such that we would be able to commission them in 2025 rather than later this decade around 2028 or 2030.

By doing that the utilities would be in a position to contract and to engage the engineering, procurement and construction companies to get the job done and would be in a position to commission those transmission lines within the next five years.

The one way that the federal government could flow its guarantee for these projects is by buying off the carbon credits or the cost of carbon for the emissions associated with the first two years of the electricity transmitted by those new transmission lines. That would, we did the numbers, and that would work out to something in the order of twenty percent of the cost of those transmission lines. We believe that that incentive would get people to the table, would provide motivation to get these projects done more quickly because the incentive would only be available for projects commissioned by 2025.

There would be similar benefits to those we discussed last year. Impacts on local manufacturing supply chains and procurement, obviously significant impacts on jobs and careers because these are initiatives that would be ongoing over a significant period of time, five years, and then obviously the pull through employment that would result from attracting renewable energy investments to Canada because of the extraordinary robust nature of Canada's clean power transmission system. Over to you, Diana.

HOST-Diana Fox Carney: Thank you Celine. Just one question. You talked about the federal government buying the carbon effectively from these projects. What kind of pricing are you using for that carbon in the model?

CB: That's a great question so we used $50 a ton because that's the price legislated by the government of Cnaada but should the price change then obviously that new price would be considered as part of this incentive.

DFC: Thank you for that clarification. Before we move on to the panelists, it's this great group, I want to draw your attention for those who haven't seen it to the question and answer panel at the bottom.

There are some very specific questions which I see coming up and I'm going to ask Ralph to type responses to some of the very specific questions about his work. And then towards the latter half we'll get to some of the broader questions and we'll post those to the panelists.

But at this point I wanted to bring in Anne-Raffaëlle who is the President and CEO of WaterPower Canada for her views on what's been laid out and how her part of the sector can contribute.

Anne-Raphaelle Audouin: French comments.

I'm going to switch back to English here but as was mentioned just now I'm very happy to be on this panel today my name is Anne-Raphaëlle Audoin and I represent the hydropower sector.

As many of you know hydropower in Canada provides more than 60% of the overall electricity that is generated in our country so it is it is very significant. And as was just said by Minister McKenna and by you Diana and by Ralph, our primary focus as an industry on the response and on making sure that the health and safety of employees was maintained but also making sure that we were maintaining that safe and reliable generation, delivery, transmission, distribution of electricity to millions of Canadians around the country.

Now as I dive a little deeper into our conversation today and highlight you know the short term opportunities that exist as part of the green recovery I'd say that it's interesting because maybe a lot of people are surprised that hydropower is part of that discussion on clean stimulus. When people hear hydro they think about long-term planning you know the decade-plus planning that goes with the feasibility studies and the execution of our projects and it’s certainly true of large reservoir or runoff for the Greenfield hydropower.

But there are a number of I would say ancillary works and projects that still fall under our industry that are constantly ongoing and that should definitely be part of a very strong green recovery for our country. As a matter of fact you know before the pandemic started, before COVID-19, as an industry we have

started looking specifically at the refurbishment and redevelopment opportunity so looking at the eighty-five thousand megawatt of hydropower that we have within Canada. What could be leveraged within that fleet through refurbishment and redevelopment so that we can add megawatts basically at a lower cost and also with minimal environmental impacts and still benefits for First Nations which is absolutely critical. And what would be the dollar value associated with those opportunities.

So I feel that we are moving ahead with that plan still but of course adjusting how we are collecting the information so that we can we can still of course respond to the crisis that we're in now.

I'll get into more details, I don't want to take all the time now as we go on with the panel discussion on the hydro projects but there they range from pump storage opportunities in Ontario and Alberta to transmission into ties and of course the refurbs and redevelopment opportunities.

And maybe just to wrap up very quickly I'll just say that you know the reason why we're involved in the discussion as a sector on green recovery is not necessarily because we are seeking financial support. I think it's important to identify that this is going to have be a very case-by-case specific discussion, a very regional discussion, but what we want to highlight is that this government has been fantastic at leading climate action and that we want to make sure that whatever clean stimulus the federal government comes up with and puts on the table continues with that ambition of tackling climate change, continues with clean fuel standard, with the national price on carbon, and puts in place regulatory streamlining for clean and renewable projects. I'll leave you with that Diana, thanks.

HOST-Diana Fox Carney: Thank you so much and you know it's obviously great I think the Minister who we have with us today is responsible for setting a lot of that direction so thank you again for that Minister McKenna and I take your point on making it coherent going forward.

Let's hear now from the wind power side so we've got Robert Hornung who is the President of the Canadian Wind Energy Association. What's your thinking in this space?

Robert Hornung: Well thank you very much Diana and I appreciate the opportunity to be part of this here today.

Wind energy has been the largest source of new electricity generating capacity in Canada over the last decade and we've still only really scratched the surface of what's possible. So we can make a significant contribution towards recovery in the transition to a low-carbon economy.

The one thing that wasn't mentioned earlier is that we can also do that in a way that reduces costs for consumers. Wind energy today is the lowest cost source of new electricity generation available in Canada, less than 4 cents a kilowatt hour, and we can grow and expand that for the benefit of all Canadians.

In the short term our opportunities though are somewhat limited and focused in Alberta because of its unique market structure, it's greenhouse gas intensive grid. There are a number of wind energy projects that are permitted and ready to go and frankly are looking for customers and the federal government can help to facilitate that through its greening government initiative. It's taken some initial steps in that regard. It can help to support other consumers who would like to purchase renewable energy but are now challenged to do that in the current economic circumstances with COVID-19 so there are ways to help that as well.

But fundamentally the biggest challenge in terms of developing new renewables at this point in Canada is a lack of demand for new electricity. We have surpluses for electricity across the country and that really points to the importance in terms of stimulus funding to support investments that will enable us to grow renewables going forward in the future because we all know that renewables are going to play a critical role in meeting a net zero target.

And that's why I'm very pleased to hear a discussion here around transmission. It's absolutely critical, it's not just transmission inter-ties between provinces, it's transmission within provinces, it's investments in distribution grids to support the development behind the meter renewables as well. There are also opportunities to look at mechanisms to support the integration of renewables through energy storage and we're going to hear about that a little later as well.

But overall I would say it's important that the stimulus package includes a good emphasis on electrification. We know that electrification is going to be key to meeting our carbon targets. It's what's going to create a demand that will open the door for investment in renewables in this country. There's a lot of untapped potential, it's not going to be a challenge to get financing to come in and support the renewables sector, we just need a market to serve.

And the last point I'd make is just to highlight that on the behind the meter side I know last week this project focused on energy efficiency retrofits, a clear part of any stimulus package. But we shouldn't just think of it as energy efficiency, we should also use it as an opportunity to pursue energy self-sufficiency. When you're looking at doing a retrofit in a home and you're looking to use as little energy as possible also use that retrofit as an opportunity to support self-sufficiency through installation solar PV panels, battery storage within the home, these are all things that will put us on the path towards 2050 and a net zero economy while growing the economy as well. Thank you very much

HOST-Diana Fox Carney: Thank you. You make an important point there about the sort of foundational nature of these technologies and as you said last week we address things like the electrification of home heating and air source heat pumps for example. Later on in the series we'll be talking about electric vehicles more and all the things they're going to build up demand for renewable energy and we need to have that there obviously to develop in a clean way and meet the targets so they've been laid down.

At this point I'm just going to bring in the participants and put up our first poll we have a couple of polls and these events to keep you on your toes so now if you'd like to put up the first poll for us today. This is a sort of general question about whether do you believe now is the time to accelerate the clean power sector in Canada. Okay while that's going on and I'll let you know the results I think we're getting we're getting agrees more than disagrees but that doesn't surprise me I'd like now to turn to someone who knows a lot about the grids and the transmission lines and that's Bill Strohecker who's the country managing director of ABB Power Grids and perhaps Bill you can talk a little bit about what you see as the opportunities and the constraints in moving towards the type of thing that Ralph and Celine have talked about.

Bill Strohecker: Sure, thank you Diana it's a real pleasure to be with all of you today.

As Robert just said the challenge that we're facing isn't around generating enough green energy, it's really about transmitting, distributing and storing that energy and getting it from where it's generated to where it's needed. The reality is no matter how big it is that the green power wave is that we create if it cannot be connected to the grid in a shorter time then we are not going to be able to achieve the scope of the transformation that we desire.

So what I'm going to talk about here and introduce here is that what we really need to do in adopting this green power wave is we need to reduce the amount of time it takes for the interconnection of renewables,

electric transport and new enterprise and growth industries to the grid. When it comes to the shift toward renewable energy as Robert said the technology to support generation is here, it's mature, it's cost competitive and Anne-Raphaëlle said the same. Canada being the renewables resource rich country that it is there are a lot of jobs to be had by taking advantage of the opportunity to build renewables. But the frankly the amount of time that it takes for an interconnection with the power grid can be quite lengthy.

Electric vehicle technology is developing quickly but when it comes to the electrification of municipal and business fleets such as buses and trams and delivery and service vehicles adoption could be more rapid. The challenge is putting the needed charging infrastructure in place and establishing connections to the power grid faster than four to five years which is an average interconnection speed or an average interconnection time to a distribution grid in this country.

Finally, there are several growing business sectors that rely on substantial reliable supply of electricity to operate. I've had conversations with companies in the data center and agriculture space and greenhouse space where demand is particularly strong here and these industries and many others would prefer that this industry comes from renewable sources.

But the common thread that runs through all of these scenarios is the challenge of interconnecting with the grid. Today establishing a connection to the grid one that's sufficiently robust to support the power requirements of a large server farm or charging capabilities at a city bus terminal can take several years at a minimum. This is an impediment to the potential green recovery.

So to make these project happens I think we need to find a way to accelerate the process of establishing new power grid connections. One creative strategy we might want to explore is the use of build operate and transfer arrangements. This could enable private organizations to develop such projects, develop the interconnection project, get the needed infrastructure up and running, and then transfer those assets over to the appropriate utility in the future according to some predetermined criteria.

This could present an opportunity to address pent up demand on the part of both private and public entities, speed up the further introduction of renewable energy sources to support decarbonisation efforts and associated targets, and help to create new jobs in a shorter time frame that is currently envisioned. Okay those are my thoughts toda, thank you

HOST-Diana Fox Carney: Thank you can you just say one thing about transmission loss and how big an issue that is in Canada in your sector.

Bill Strohecker: I'll give you a subjective view Diana and with some time I can of course calculate something but there are massive transmission losses. A lot of our utilities or provincial utilities are attempting to do something about those losses through the introduction of technologies like HVDC transmission for moving bulk power over long distances or through the application of technology like static VAR compensators to improve the transmission. It is a problem but there are technologies that can help to solve that problem.

RT: Just going to chirp in on that from the point of view of our scenario. The average losses are between 7 and 9 percent of end use consumption in Canada and we took that into account in our scenario.

HOST-Diana Fox Carney: Thank You Ralph.

One of the questions we've had is around smaller scale distributed power systems and the person I'm going to bring in next is Matt Jameson and Matt is CEO of the Six Nations of the Grand River Development Corporation that's been involved in the energy sector. Matt perhaps you can tell us a little about what you're doing, what you think's ready to go, and what contribution the Indigenous community can make.

Matt Jamieson: thanks Dan and thank you for having me this morning I really appreciate the opportunity to share our perspective at six nations.

If you don't know Six Nations is the largest by population Indigenous community in Canada and we take our role as one of the largest seriously. What we've actually done with respect to the renewable energy space is we've jumped at opportunities quickly because it does align w with our values and our priorities and our principles as a people.

We've done that by deploying over 60 million dollars of our own equity to help invest and create construct and develop more than 500 megawatts of renewable energy that's happened here in our region in southwestern Ontario.

Bill touched on a great point and that I think that right now certainly in Ontario the green energy space is taking a little bit of a bad rap because there hasn't been an opportunity to unlock some of the efficiencies and opportunity that exists in the grid today. Before I talk a bit further about that I will say that the COVID pandemic has created for us obviously a challenging environment to test our resiliency but it's strengthened our determination and it's also caused us pause and opportunity to reflect on what we've done not just in our own community what we can do in the region through partnerships to build a new economy.

I've characterized the pandemic as you know a not unhealthy reset opportunity. It's no secret that the renewable energy business or industry it wasn't created in a vacuum it was created by a reflection that at times in the past the things that haven't worked for us. Now more than ever we have an opportunity to reset and recalibrate our views.

I think that what you'll see in Indigenous communities around the country is that we are not just a consultation checkbox. What we've proven at Six Nations is we have the ability to be a participant to add value to bring solutions to the table. Look no further than our recent project where we helped electrify and the Niagara reinforcement transmission line which was an asset that said stranded for over 10 years.

We've actually deployed our own equity and our own workforce to electrify that line to bring value and system reliability to the grid where we live. I think it's to those types of relationships where the federal government and the provincial government can work collaboratively with Indigenous communities to unlock untapped partnership opportunities. Gone are the days I think that Indigenous communities are treated through a patchwork of policy across the country. There's different consultation standards in every province in the country and I think that that's a shame. The federal government can make a significant change by adopting federal practices or best practices that would unlock these grid efficiency opportunities.

We've been a partner in change and we are a solutions provider we stand ready to participate in those solutions. I know that's Annette's coming up next and Annette's a good friend of mine and we are working on an exciting project which will tackle some of the inefficiencies that we see in the grid today.

That's what we're doing. I think we're doing our part I think we're putting our money where our mouth is and we're bringing solutions to the table.

HOST-Diana Fox Carney: Thank you so much Matt that's also very optimistic.

Two things here I'm going to report on the poll I know you're all on the edge of your seats. We have 85% people who either agree or strongly agree and 7% who strongly disagree who don't feel that this is the right time or do not feel that the federal government should be using stimulus funds in this direction and 3% agree or disagree a little bit. So we are strongly weighted towards the agree but it's not universal so perhaps as we go on we'll tease out some of the issues that are giving people cause for concern.

You mentioned Matt that we're going to pass to Annette but actually just very quickly I'd like to bring in here Terri Lynne Morrison who is Director of Strategic Partnerships in Indigenous clean energy just to see if she has any follow ons directly from what you said from her perspective about what contribution the Indigenous communities can make in this space and how the federal support can be of value.

Terri Lynn Morrison: Thank you Diana just echoing off of some of the comments that Matt had made and speaking from the experience and what I've seen working with Indigenous communities across the country.

Certainly the way to do projects and the way moving forward the future does involve have a heavy opportunity for Indigenous communities to engage and the infrastructure that's going to be set up to transition us towards this clean future I see that you know a lot of the topics that are being discussed are at the forefront. We've engaged with Indigenous people from across Canada and energy efficiency and retrofits keeps coming up in terms of how we deal with the energy crisis. How do we better provide healthier homes for communities that are safe that are secure that have a lower cost of operating? So doing those retrofits install I like the idea of installing the energy storage and the solar panels into the homes so that they're not only efficient but they're also independent.

We certainly have seen and we're anticipating coming as we're moving into the summer with the pandemic that's in place how are people going to keep comfortable in their homes you know providing the HRVs and those type of equipments that'll definitely add value and extend the life of the community infrastructures in terms of their housing and their buildings.

So very nice to hear from you Matt in terms how Indigenous communities can be engaged. We actually have a lot of experience, we are the largest owner of clean energy infrastructure in Canada aside from

corporations and utilities. We have an opportunity, we want to be engaged, there are ways to do projects in the right way and that is by working and collaborating with Indigenous communities.

I recently built a 150 megawatt wind farm for three Mi'gmaq communities in the Gaspé coast and our partner told us that it was the best project that they had because it was done in collaboration with the Indigenous communities.

I think it's something that we should explore more moving forward and would definitely look forward to continuing this conversation with you all.

HOST-Diana Fox Carney: Thank you.

Fantastic, thanks for that. Now on to you Annette. Many of you will know Annette Veschuren, she's done many things and been a business leader but she is also now as CEO at NRStor she is one of Canada's pioneers of energy storage and perhaps Annette you can explain why energy storage is important in this whole equation and also what you think the opportunities are.

Annette Verschuren: Look energy storage is the glue to help make all of what we described above before me work.

A very exciting opportunity my team and I have been working in energy storage for eight years and we started with smaller projects: flywheel installation, case installations, battery installations.

Battery seems to be in terms of cost-effectiveness really ahead of the game at this stage but I want to compliment and talk about a project that I'm doing with Matt Jameson and the Six Nations team. It's a 50-50 partnership. I believe that there is big opportunity on the grid to manage integrate renewables, manage capacity, manage frequency regulations and other services and what's really cool about energy storage is that it's both a load and a generator. And so the capacity to you know take that energy hold it put it on the grid at the right time and do the reverse it really really makes a difference and I would say that in Ontario we could easily put 2,000 megawatts of energy storage in that market alone.

So Matt and his team and our team have been working for a couple of years on this project and it's very exciting, it would be one of the biggest energy storage installations in all of North America.

I do believe that the leadership has got to come with the Indigenous people on this on the energy front. I see enormous opportunity across the board. I see opportunity in Alberta and Saskatchewan to do big installations maybe compressed air technology battery technology to support the integration of renewables.

I see opportunity on the East Coast we've got to get off coal in New Brunswick, in Nova Scotia and some of the ideas that that have been presented before also terrific ideas. But also you know getting the government to work with us. CIB is an organization that we have been working with in terms of the oneida project is what we call it in in Ontario and getting the organizations to work with us.

We have to be bold this is a really important and critical time on the other side of COVID I know that the immediate issues are really serious and we're addressing them as a society but this is also a great opportunity to filter our investments going forward to recognize not only clean energy but waste products and all kinds of things associated with the air or the water or the food in our society.

I think that filter system has got to change and it starts with the grid. But other big opportunities I see there's 220, 250 Indigenous communities that are on diesel you knowin Canada we got to get them off diesel. We are working we with TK which is a Nunavut community in partnership 50% again we believe that the partnership with Indigenous people is key to our future and we're getting off diesel with that community.

So we have to do this big time. We have to do this in about 250 communities and we have to be bold and we have to figure out how to do this for the communities that are that are off-grid this way.

The other area that I'm very excited about we're doing a little project in Toronto we're installing power walls the Tesla powerwalls because there are problems in and around in terms of electricity stability.

I was in the customer service business part of my life and I'm driven by that and customers want this customers at residential level commercial level customers all across the supply chain want this from from from utilities to distribution to residential and micro grids in the middle and that is all happening and so we've got to be gutsy and we have to move forward and make some bold moves here and I think there's a lot of great ideas here talking about those opportunities. Thank You Diane.

HOST-Diana Fox Carney: Sorry I'm cutting in a little bit we're running out of time as usual I wanted to bring in direct response to that very quickly bring in Roger Peters who's the former president current board member of the Ottawa renewable energy co-op.

Let's just think a little bit about that that demand you say people are people are very you know positive about this what can you say from the grassroots Roger?

Roger Peters: Thank You Diana yes I mean we found that like community investment is a really untapped source of capital. I mean we found that you know across the world has been a huge appetite for people to invest their savings into clean energy projects particularly those that are secure. For example in the Ontario fit program there are a hundred million dollars put into community projects distributed energy projects and in Minnesota there's 630 megawatts of community solar and it's still increasing.

I think it taps into what Robert and Carolyn was saying about the need to look at behind the meter and distributed energy itself. There's a lot of opportunities there to to bring in those those kinds of technologies there at the same time that retrofits are taking place. In terms of what the federal stimulus could do it could through the federal procurement process which is its trying to get a hundred percent renewable energy by 2022, ear markings that for community financing would be a big step. Also there's a lot of green opportunity for stimulus funds to be used to to for direct support for like utility community partnerships to accelerate the development of smart grids which would include storage solar. When the provincial rules were slackened were apparently changed to for virtual net metering and wheeling ring from outside the community so these are all things that would have a big impact. It would drive down installation costs locally, engage Canadians in the recovery it would build local support reduce the name usage syndrome and also provide a local multiplier effect so there's a real interest in trying to invest locally rather than invest in the larger system so we don't we shouldn't forget that and make sure that any stimulus tries to leverage those large funds in the community thank you.

HOST-Diana Fox Carney: Thank you now I'm gonna bring in these three people here you haven't spoken I'm gonna each ask them to give a crisp response to what they've heard so far before we get to do you know a tiny bit of time for these questions that you've been asking so first of all you go to Lisa DeMarco who's worked with a number of green power projects any reflections on what you've heard so far Lisa.

Lisa DeMarco: Three very quick points Diana. The first is when we talk about expanding the grid we have to be clear that the definition of the green is smart grid and includes non wires alternatives so distributed energy resources energy storage so we do first our homework about optimizing addressing electron waste. We have now about 6,000 megawatts of power in Ontario alone. The cheapest cleanest hydropower that's spilled and if we can capture that first let's start addressing waste first and then optimize and enhance further the grid.

Secondly affordability is a very real issue and more so in a post pandemic recovery time. So making sure we're utilizing existing financing mechanisms. Rogers spoke very directly, Annette spoke very directly, to capturing rate regulation mechanisms that we've already got in place to make sure we're putting in place the cheapest most efficient and effective grid solutions many of which include distributed energy and cooperative energy programs.

The third is in relation to the importance that our First Nations play particularly not just in an east-west context but in a north-south context. Many of them have traditional territories and rights associated with some of the most important electricity export interconnections so capturing those in a way that's efficient and effective like we've seen in the end wanting to First Nations in hydro one energy storage projects that have been approved and rate regulated by the Ontario Energy Board very important so those are my three quick comments,

HOST-Diana Fox Carney: fantastic Dave Sawyer your from you're the chief economist at the Canadian Institute for climate choices I didn't get you last week this week I am what's your reflection.

Dave Sawyer: Well we haven't talked about building vulnerability into the into the grids. We're talking a lot of production you know decarbonized electrification and electrifying end uses and sure they align with nets or objectives. But also building resiliency into you know transmission distribution and use helps with compounding vulnerabilities writing. With COVID 19 what's changed we're seeing increased vulnerability sort of piling on and we can see into the future floods in Fort McMurray right now we can see an increase sort of risk associated with these compounding vulnerabilities.

The second thing I think about is you know we've moved away from grant programs especially for electrification because of free ridership meaning we're giving out free money people are going to do stuff anyway and we've moved therefore to more of a lone model and that sort of needs to probably change in the short term because people don't want to don't want to take credit on. So we may want to sort of set

aside our cost-effectiveness thinking about a little free ridership and maybe get some grants going in the short time term just to stimulate and then in the long term go back to a more stable loan based system.

And finally the big export sector right the electricity equipment sector in the country is growing very rapidly our exports are actually going crazy rates you know multiples of the sort of goods and service exports. So we have to think about our clean economy objectives and this electrification sector is quite large and I think we need to sort of understand that a little better so that's it.

HOST-Diana Fox Carney: Last not but not least Pierre-Olivier Pineau from HEC in Montreal you've been in this space for a long time so you get the last word now on what's going on and what are the opportunities.

Pierre-Olivier Pineau: Thank you very much I think we heard a lot of very interesting stuff but they were mostly addressing hardware, like transmission lines and storage. Very important issues but we've missed in this discussion the software of the industry, the institutions and sadly in Canada we have 20th century institutions. Regulation is outdated, tariff structures are updated and before making huge investments we should also consider how to upgrade our institutions to have shared institutions in how we plan for transmission, how we plan for storage across Canada, how we plan for new wind farms across Canada. If we don't do that shared planning with shared institutions then we will basically we may have good projects but will they will always be suboptimal. So that is very important to update our institutions and we are very provincially-based institutions we have to break that model which is an old model and to upgrade it to a 21st century model where there's more shared planning. We need also in terms of tariff structures to reshuffle all that to make sure people pay for what they get in the future which is not what we they used to get in the past. So there's a lot of work to do on the software side and institutional side of the sector.

HOST-Diana Fox Carney: Thank you so much that that's a very important reminder. I'm gonna launch this the final poll which really talks about the level of ambition that we should have in this space and while I'm doing that I'm just going to ask Ralph a couple of questions about some of those original numbers and whether your job numbers take into account potential job losses in fossil fuel in oil and gas space.

Ralph Torrie: You know actually I was addressing that question in my type responses. The fossil fuels that are currently used to make electricity in Canada are coal and gas. So I don't think there would be any

impact really on the oil production industry from this particular scenario. As for the coal industry it's already on the way out. The loss of jobs in the coal production industry is part of our business as usual baseline at this point. It's national policy it's being pursued vigorously across the land including in the oil patch province of Alberta.

So that brings it back to natural gas and yes the natural gas consumption for power production will be phased out in this scenario and to the extent that the utility sector represents an important market for Canadian natural gas producers there would be a corresponding impact on employment in that industry. Relatively minor in the big picture even for the gas industry I would suggest and also bearing in mind that there's been a shift in eastern Canada as you know to the new sources of gas from the Appalachian Basin so if there were job losses in the eastern part of Canada in the gas industry some of those would actually not be occurring in Canada.

HOST-Diana Fox Carney: thank you very much Ralph listen we're getting to the end of this there are a huge number of questions and I think again we've we probably had a little bit too much time up front and not enough time on your questions.

But we are taking them into account and they will feed into the process that is going on.

The answer to the poll the final poll the level of ambition we have 74% either agree or strongly disagree that Canada should make it a national goal to be the first G20 country with a hundred percent clean power.

I think when one gets into that space you can really think about the multipliers for jobs in clean tech and people who would be attracted to bring their manufacturing to Canada to take advantage of that. So I think it's a really important area if we can raise that level of ambition. What I heard today and is that this is an extremely complicated sector really. We all you know use the grid daily but there's lots of different issues involved here whether it's about the provinces versus the federal jurisdiction in this space, whether it's about communities and their involvement, whether it's about transition loss the different types of renewables that feed in and how we can kind of upload them to the grid.

But also how we think about demand for power and demand in particular for renewable energy and whether we can get all these pieces working together. I think there's lots of good thinking that's come out of Ralph's work and otherwise and I think there's lots of refinement to think how we can make progress in

an integrated way without being doubling down on one area without not thinking for example about the institutions as we were reminded at the last minute by Pierre Olivier, and making sure that we have the right tariff structures, the right approaches so that when we get that connecting transmission lines up between provinces the whole thing works in the way we'd hoped it would.

So I guess what I'm saying is thank you for being here today and thank you for your thoughts that you fed in. We will be distributing these papers as we go and we will be updating them with your talk so please don't hesitate to be in touch. Please join us next week as you know this series is going on for seven weeks and this is week number two. Send any thoughts in between and thank you to all the panelists thank you to the minister and thanks to everyone for being with us today and thinking about this area of great opportunity but also a great challenge for the country thank you.