

## **Building Back Better With a Green Mobility Wave**

### **Roundtable #3 Transcript:**

May 6, 2020

DIANA FOX CARNEY: Welcome everyone ,my name is Diana Fox Carney and delighted to be the host of this series on Building Back Better with corporate nights. We have a great group of people here today. Before we go any further I'm going to pass over to Steven Guibeault, the Minister of Canadian Heritage. He has to leave us fairly soon so I wanted to pass over to him to welcome us and to introduce this event today.

STEVEN GUIBEAULT: Thank you Diana for this introduction. I want to thank all of you present here with us today. I'm very pleased to see how through a time of crisis, which I'm sure is keeping everyone very busy, so many people are still taking the time to look beyond tomorrow - similarly here in Ottawa, although we are still very focused on short-term immediate support Canadians need right now. We have started to think about next steps - how these can help us achieve our 2050 carbon-neutral goal as well as the commitment to go beyond our 2030 Paris objectives. We too are reflecting how to ensure we have sustainable, more resilient futures that leaves no one behind. As provinces progressively open their economies again, the focus will slowly shift from income support and health care to stimulating the economy while of course always keeping public health of Canadians as our number one priority. So I'm very happy to see people gathered here today to start thinking this through, more specifically today on electrification of cars, trucks, and buses and maybe of our entire society.

As some of you may know, following recommendations of an advisory committee that I co-chair with the most amazing Tamara Vrooman from Vancity, which issued a report just before the last federal election, before I decided to run and eventually become the MP of Laurier–Sainte-Marie, we made a number of recommendations of around electrification and and some of them were introduced in the 2019 budget and some were part of the Liberal platform last election and those measures that have already been introduced have shown very encouraging results so as Diana said, unfortunately I cannot stay with you - parliamentary business is calling upon me but I will be looking forward to receiving your ideas and feedback. [...] I hope you have a great session. Thank you very much.

DIANA FOX CARNEY: Thank you so much Minister for being with us today and thank you for emphasizing that this is a conversation that we're hosting today. We are delighted to feedback to your office and we're delighted to have input from anyone who is on this floor today either in real time questions during the call or afterwards. We'll be posting the paper that will be discussed today that Ralph Torrie will be discussing after this event and again we do invite you to comment and send us your thoughts on how we can move forward in this area. Thank you for joining us and welcome for those for whom it is their first time today in this series, this is our third event in this series so welcome back to those who have been in the webinar so far.

We have a great group of people here and we're discussing, as the minister said, we're discussing a greener transport option and I think this is a really critical piece of the net zero solution for Canada. Transport greenhouse gas emissions account for about a quarter of Canada's total emissions so we have to tackle this sector if we're going to get to that net zero target. I think it's important to also think of Canada, as Ralph will do, [...]an important producer of autos - we all use cars we all use transportation, so there's two sides to this problem for Canada - what we produce and how we consume transport and how we can make both of those net zero. I would just say that this is an area I think that, well it's not just my belief, but Canada is perhaps lagging some other countries in this space which is a shame given that we are, as discussed, an auto producer ourselves. But we have a reasonably low penetration of electrical electric consumer vehicles in this country, a reasonably slow movement towards electric mass transport options although there have been some important commitments from the TTC and others, and although the target is to have 30% electrical vehicles by 2030 and 100% by 2040, the projections are for a much more derisory 10% by 2030 and 15% by 2040 if we don't do something serious about this sector. So we're talking about the recovery now, we're talking about the possibility of building back better and there's lots of jobs in this sector as we know there's lots of opportunities in our economy in this space. So, I will pass over to Toby now who will give his introduction but I'm looking forward to hearing how we can make this part of Canada's future.

TOBY HEAPS: Thank you, Diana. As the Minister was speaking I was reflecting on the first time that I saw him come onto the national stage nearly 20 years ago for scaling the CN tower to to protest and raise the profile of climate change and I think it's a nice metaphor in terms of thinking big and seeing that the sky's the limit because there's a lot of opportunities in front of us.

This whole Building Back Better Green Recovery series got a shot in the arm last week when the management director of the International Monetary Fund came out and said the green recovery is not a nice idea, it's not a nice to have, it's a must-have. and the reason it's a must-have is that's where the jobs are and that's where the future growth and livelihood prosperities are going to rest. Where else are you gonna get job multipliers like you get on building retrofits, where else are you going to get growth rates like you get on clean energy, on the electrification of transport, on smart buildings and on biodiesel, on renewable jet fuels - there's nowhere that offers comfortable growth rates from the older types of industries that are are now in decline. So this is where the money and the prosperity and the jobs are going to be and that's why it's going to be taken seriously for economic recovery.

Coming back to Canada to Diana's comments and it'll be interesting to hear some of our panelists including Jerry Dias from Unifor and Marcelo Lu, President of BASF. One of the bulwarks of Canada's middle-class prosperity is our strong automotive manufacturing sector and that sector right now is under siege. It's not playing much of a role in the electrification of transport, which is the dominant megatrend and in as little as 10 years time many of those good jobs that do exist now could be gone if we don't do something. So now's the time to invest big

time in the electrification of transport and crowding as much investment as we can into that sector because we have a thriving ecosystem- we have people, we have resources, we have proximity to markets, we have everything we need to succeed except the the boldness and the conviction. So now is the time to be bold and pragmatic and with that I'll pass it back to our host Diana.

DIANA FOX CARNEY: Thank you Toby. Without further ado I'm gonna pass you now on to Ralph those of you who've joined us before will know that Ralph is our resident expert and he's going to talk us through the possibilities in this sector and in particular job possibilities.

RALPH TORRIE: Thank you. You know when the pandemic hit, Canadians were spending over 200 hours a year in their cars whether as passengers or drivers, traveling 300 billion kilometers a year. You could go to the Sun and back 2,000 times - that's how much human activity we're talking about here in spite of the fact that the cars are parked 95% of the time. It's a enormous component of our economy as has already been mentioned, both in terms of the production of the cars and all of the entourage of infrastructure that goes with them. In terms of its presence in household spending, we spend probably I think it's seventy or eighty billion dollars a year on new cars, we spend another thirty billion dollars through our local and provincial governments mainly on roads and bridges, we spend another several tens of billions of dollars on top of that on the maintenance the fuel, the insurance and all the rest of it. It adds up to well over ten percent of our entire economy and that's just the personal transportation component. On top of that is all of the activities surrounding freight, so there isn't any question that this sector, which has become so important in our economy needs to be healthy after the recovery. The questions then are how can we help it to be as healthy and as sustainable as possible. We know it's not sustainable - its contribution to GHG emissions has already been mentioned. A lot of us who live in cities are well aware that the system itself is having more and more trouble delivering on its central promise, which is clean, fast access.

So we need a reset in this system and I think one of the things that pandemic has done, this is from my perspective, there's a couple of things. One is we've got back in touch with walking and cycling. There are no destinations right now - although when I look out my window at the park next door, there's more people out for walks than was the case before the pandemic. Part of what I think we need to do is get back in touch with the importance of walking and cycling as a way of getting around and as a way of also maintaining public health. SO part of what you'll be hearing about later today are ideas that we've been talking about for improving the infrastructure to support walking and cycling. It's quite important. For a species, which until a hundred years ago, most people never went more than a few kilometers from wherever they lived, it's pretty remarkable just how little walking and cycling is in the day-to-day life of the average Canadian. So that's one focus and then the other of course, and it's already been referred to, is the electrification of the vehicle fleet. We know that this is going to happen, that it must happen. We can't address the greenhouse gas issue without getting the fossil fuels out of the vehicle fleet and there's quite a bit of good news here. The vehicle technology has advanced both in its performance and its costs have been coming down - the cost of owning electric vehicles is now

cheaper than fossil fuel vehicles, the sticker price is heading towards parity probably by 2024 and so the conditions are right for an expansion of electric vehicles.

Interestingly enough, and I'll just end with this insight, exactly a hundred years ago when the world was recovering from a global pandemic known as the Spanish flu, very few Canadian households owned automobiles and yet ten years later by the onset of the Great Depression in 1929, half the households in Canada had cars. Another interesting parallel with that rate of growth was that governments struggled to keep up with the infrastructure that was needed - the roads needed paving, the traffic rules of the road needed redesign. All of that activity had to take place in order to support the growth of the automobile that took place throughout the 1920s. We have a similar issue here with the electric vehicle - the cars are ready, the costs are right there at the threshold of being ready, Canadians are ready for these cars, but the infrastructure and particularly the financing and the charging infrastructure investments are lagging behind. The other component of some of the suggestions that we've been working up is how can we accelerate the putting into place of the financing and infrastructure that's needed to support the electric cars, which we need both for sustainability and for ensuring that this continues to be a healthy and important part of the Canadian economy. So that's it in a nutshell for me, thanks.

DIANA FOX CARNEY: Thank you so much Ralph, as you can see we've got a fantastic panel of people here today to discuss these issues. Before we start I'm going to put up our first poll question of the day. So this is a yes-or-no question, we should perhaps test you afterwards and see if we persuaded you by the end of the event, whether you change your mind. While we're doing that, and I'll report back on that, I wanted to turn first to Marcelo Lu who's president of BASF Canada and he's a part of obviously of a major global company that is evaluating its options at present in terms of investing in the battery supply chain in Canada. Marcelo, how does Canada appear to you as a place where you want to encourage your company to put money?

MARCELO LU: Thanks for the opportunity to speak today and of course I will focus on the areas where we are mostly involved which is in the battery stage. Electrification is a very broad segment but for us what we're really talking about, what I would like to talk about, is the battery space and a main component of electrification. So if I can just parallel the potential that Canada has in the battery space, I will compare it to the [agricultural] sector. So if you think about the AG sector basically we are not only producing food here in Canada for ourselves Canadians but also we help feed the world. I think the aspiration that I think Canada should have is we should not be only thinking about battery and electrification and storage capabilities for Canada but also for the world. The resources are very ripe here to be able to do that. When we look at electrification, we always need to look at market size and there are always incentives that need to be put in place - why would you invest something in Canada given its market size? But if you look at Norway, it has done very well on the market side. On the industry side, there could also be a discussion: "well the industry is too small for it to be able to be developed in a way that you have a lead position in technology to be able to drive this", but I would say Japan, Germany although Canada has a smaller economy than those, but I would argue that this is something

that we need to aspire to. It doesn't have the market size but it does have the industry capability which I think we can all agree and maybe can get into here.

There are four main aspects that would argue that would drive electrification and and let's say battery investments going forward, and of course one is the regulatory framework. There needs to be a regulatory framework from a national level, trickling down to cities on how electric vehicles are put in place and also of course how the infrastructures are regulated. The other one is charging infrastructure, which is a main one and I think that's an obvious one before you get customer acceptance. It's also very important and not to be forgotten. I think there are a lot of car types that we use in Canada which are very difficult to electrify, at least with the current range the batteries have at the moment, like the pickup trucks. If you think about a lot of the working sites on the construction side but also in rural areas [those are] used and of course then you have the technology and cost that is associated with this. The cost of batteries need to come down in order to be able to make it affordable.

If I do a rapid firing of some figures which I want to put into context. If you look at China and of course this is an outlier but just think about this: China has injected already as of end of 2018 5.5 billion dollars into subsidies that go into this. They have five million charging pole stations, 61 brands of EV vehicles and have 60 percent of the capacity of lithium-ion battery production. If you look at the market opportunity, I think you mention a bunch of these numbers but from 2018 to 2023 that would be a growth from 12 models being issued a year to 72 models being issued every year by 2023. The growth rate is expected to stay at 22 percent compounded growth rate, so this is an enormous opportunity.

Now, going back to - I think one of the topics that Diana you mentioned and I think Jerry - would be very interesting is how this is going to be a shift in the manufacturing. If you look at the powertrain for an internal combustion engine, 70% of the engine makes up that cost but that is only 25% of the cost of the vehicle. In comparison for the vehicles that are EV, instead of 25% of the cost of a vehicle it's actually 60% of the cost of the vehicle which puts an enormous amount of pressure to be able to drive down the cost of the battery itself. If you think about that, Canada really has all the ingredients: it is rich in nickel, in cobalt, which is our main ingredient for lithium-ion, it has lithium. [...]

And one thing to just finish before I talk about one policy idea is we all talk about electrification but it's very important that we don't lose the circular aspect when we electrify vehicles. People usually buy vehicles for four to five years but batteries are useful for 10 to 15 years. So there needs to be an ecosystem developed that we are reusing recycling before we're thinking about disposing of the battery itself. So that is, again, further jobs that can be created on this reuse and recycling side.

Now to the investment and then I finish, we are of course looking at jurisdictions where we can put some money and investment in thi. In Europe we have a good foothold. Of course, the market size of Asia is very attractive but we must have a hub also in North America to address

the North American needs and I believe that Canada is ripe, more than soUS and Mexico to contribute to this, because, again, it has the resources. So one of the ideas that we've been discussing and floating is [that] we need to tip the scale that it comes to Canada. With all the stimulus money, all the recovery money that is being put into the system, one idea is to share some of the burden that companies would have, so at least have an anchor to start this ecosystem. I think that there is a domino effect once you have the anchor. We are happy to try to be that one, and what we are saying is that there needs to be a sharing of the cost to really shift the scale, whatever that may be. So I leave it at that - the job multiplier numbers for the chemical sector, for the manufacturing sector is around seven to ten, so for every one job that we create there are seven to ten created directly or indirectly. So from that I think we're in a good position. Hopefully I addressed most of the topics needed. bghd

DIANA FOX CARNEY: Thank you Marcelo, and thank you for pointing out the issue of circularity. I think many people know that Canada is actually ahead on that side too and that Li-Cycle is one of the only companies in the world that's actually doing commercial lithium battery recycling in Ontario and moving into New York State, so that's good too. I'm going to go straight to Jerry now, Jerry's head of Unifor, as Toby said. In terms of the jobs, I mean there's two sides - one is if we lose out on this market entirely because we're not making the EVs that people want, but the second is the relative labor input relative to internal combustion engine vehicle. Your thoughts on those questions, please, Jerry?

JERRY DIAS: Well, first of all, we have to deal with a simple fact that all the decisions made on the types of vehicles manufactured in Canada are made by other countries - they're made in Japan, they're made in the United States, so it's not as if we have this large Canadian manufacturer of vehicles where they're making the decisions for the home market. So based on the fact that all these decisions are made elsewhere - look at what they're doing. You've got for example Fiat where we build the hybrid Pacific, [...] but that's it. FCA will be launching the 500e, they'll be launching the Panda but that's it, they have nothing outside of the Pacific earmarked for Canada. If you look at Ford, Ford is launching the Ford Mustang E in China, it is announcing 16 other vehicles - not one of them is earmarked for Canada. General Motors announced twenty billion dollars that they could invest in EVs. They just announced that Hamtramck will be home to the first electric vehicle. How many do they have earmarked for Canada? Zero.

So if you take a look at Canada overall, the biggest impact with the transition to electric vehicles is that a) we need the commitment on the vehicles but b) the negative impact that it will have over time if we don't start to get into the game. If I take a look at Honda, if I look at Ford and General Motors, they all have powertrain operations here in Canada. Overall Canada's auto industry is about 105,000 direct jobs, 80,000 in the auto parts and 40,000 in direct assembly. We do know that if you're switching to an electric vehicle, you're going to have a complete change in the powertrain. Obviously there's not going to be a requirement for radiators, transmissions, exhaust systems. Instead of 20,000 parts at a typical powertrain, you may end up with as little as twenty parts in the transition to battery-operated vehicles. If you look at the big players today, there's no question China is moving significantly as Marcello said. China right

now is ratcheting up to have about 80 % of the EV market as it relates to power trading without talking about electric motors. And then you've got the United States, it is investing money in a significant way as well. So we need to move, we need to move quickly. One of the things that we have always been critical of here in Canada is we don't have any sort of a national auto strategy. Ottawa's number three in Canada as it relates to export money, it's an 80 billion dollar a year industry, yet we really don't seem to have any sort of a strategy. Then I want to even take it one step further and deal with the Canadian mindset as it relates to governments participating in the manufacturing sector. I mean, I get sick and tired of hearing about "the manufacturing sector is gone, we've lost 55,000-60,000 manufacturing jobs in Canada in the last 15 years". That's true, but there are those that are saying that it's inevitable. So whenever the government participates and will assist in the auto industry, people yell and scream they shouldn't be making the investment, same as aerospace, same as in general manufacturing. Yet when we hit a pandemic, thank gosh we still have some manufacturing here in Canada because the gig economy is not making masks today, they're not making personal protective equipment. It's the manufacturing sector, it's the Fords, it's the General Motors, it's the auto parts players, because these are the industries that can transition. So I'm concerned that we're pretty slow in getting into the game and some of the other comments made, I mean, if you take a look at electric charging stations, there's still so few and far between here in Canada. So we have a lot of ground to make up, because once decisions are made, these are long-term decisions.

So here's one thing about us as a nation having the raw materials and natural resources, which we do, in order to make the batteries but as a nation we have always been very comfortable giving other nations our raw materials and natural resources, letting them develop it and then buying back finished products. I mean, we do it all the time. I can't believe a nation that's surrounded by three coasts with water and having all of the riches that so many nations around the world would just glamour and beg for - how are we so reliant on everybody else? So we haven't historically used our natural resources and raw materials, the backbone of our economy so this ought to be a wake up call. COVID-19 has to be a wake-up call, because it shows that we are so reliant on everybody else for our basis. So now if we're starting to have a conversation, which we need to, on post COVID-19 and what are the opportunities. I mean, the auto industry was a number-one export industry for so many years in Canada, now we've dropped a number to number two, the aerospace industry was number four in the world now we're sitting at number 12, so we keep giving away our capability. Our ability to manufacture in the future is greatly reduced when you just let our existing manufacturing footprint leave so I'm concerned. I welcome this discussion but there has to be a demonstrated push by all involved so that the government understands that it's not just a great conversation to have but it has to be a conversation about what the role is going to be and whether or not they're going to take advantage and utilize the raw materials that we have that are so necessary for the changing economy.

So we're planning on being a part of the debate, we already are, but we're gonna need a lot of help, or this will go down in history again as another lost opportunity. So I'm relying on so many of you that are participating on this panel and those of you that are listening to ensure that the

government doesn't miss an opportunity to create many jobs in the long-term. Do I see the inevitable transition? Yes. Do I think it's going to be as quick as everybody is saying? No. I mean there's different projections. If it'll be 50 percent EV within the next twenty years, that means they're still going to be a requirement for gas-powered engines. But ultimately we have time but we need to get into the game now and the government is going to have to put up their hand and say we [...].

DIANA FOX CARNEY: Thank You, Jerry that was that was very helpful. Pointing out what we can do and I think what you didn't mention is the fact that the renewable power potential in Canada is also very helpful in this space, if we're going to be we have truly zero carbon vehicles coming forward. We've got loads of questions coming in, we really welcome those. Some of them were going to answer online, some of them we'll get to afterwards. Please do ask them, we're very full in these webinars so we can't always just get to them verbally but please do continue to ask questions and make comments. I want to turn over now to Josipa Petrunic who is the executive director of the Canadian Urban Transit Research and Innovation Consortium and and switch the conversation slightly to talk about rapid urban transport and how that fits into this whole picture particular with regard to investment opportunities, jobs, and the new shape of society as we emerge from the pandemic.

JOSIPA PETRUNIC: Thanks Diana, I'm gonna build off something that Jerry mentioned, we don't have an automotive strategy. I would say it's even more important that we don't have a transportation-energy strategy, because the future is not automotive or car or rail, it's transportation mobility/energy matrix. So that's what's missing and such a strategy would explain and set targets for how people and freight in this country will move, what fuel will propel them, and which jobs will be created out of that sector. So I'm gonna switch gears out of the automotive focus and look at where we do make electrified vehicles and alternative propulsion systems in the country - in the heavy-duty sector. So when we look at our membership at CUTRIC, if we just add up the folks in Novabus, New Flyer, Bombardier transport, Siemens and ABB, Hydrogen X and Ballard [...] and the slate of companies that works in heavy-duty bus and coach electrification, including hydrogen fuel cell and battery electric, with the systems integrated, the chargers, the storage devices and the systems controls. And we add in the utility workers and the transit workers, we're at over 300 000 jobs. So that's not classically identified as purely clean tech but we would argue that the low-carbon smart mobility landscape is the cleantech landscape of the future. Hundreds of thousands of jobs that are already being created and a lot of those companies have, year-on-year, for the last five years, been growing. So this is a growing landscape to invest in.

Now, if you look at the GHG picture, because if we're talking about all of this it's not to talk to ourselves as acolytes and believers in the GHG landscape, it's because we believe that actually we can reduce greenhouse gas emissions and save the planet. So if we're taking a look at it, folks might say well why focus on transit or coach electrification as shared mobility, it's really only about one megaton of the overall 700 megatons of this country belches out. Yes, but if you electrify, or you alternatively propel transit, it is the same infrastructure that supports trucking



and freight and that is about 70 megatons. That is a huge chunk of our emissions profile, so the reason we're looking at electrification of transit through hydrogen and battery electric at CUTRIC is because the high-powered chargers, the energy storage devices, the distributed charging, the smart controls, are exactly what the trucking industry would utilize. The benefit of using public transit to do this and invest in this sector is that you have an immediate fleet that doesn't buy one vehicle, it buys 20 or 50 or 100. You have an immediate engineering platform upon which to integrate Canadian made, Canadian designed technologies in the system deployment. So that brings me to some of the concluding points in an example that I'd like to highlight. Our view at CUTRIC is really that investment in the low-carbon smart mobility sector, as it pertains to shared mobility, public transit, and shared mobility applications is really where the rich job growth is, the GHG reduction potential is and where the future economy of this country is, because it translates into trucking and freight electrification which is a huge piece of that pie.

If we take a look at some of the recommendations we've made to the federal government, in which I believe the federal government is aligned with, first and foremost I do not believe that this government is going off course with climate change. I am 100% convinced - I'll bet my mortgage - on the fact that climate change is here to stay in terms of advocacy and investments. You just have to look at Michael Sabia as an appointment at the CIB to understand that that's where this government is going. So if we build on that what is CUTRIC looking at, we're not looking at EV incentives to buy an electric bus, we're looking at government getting involved from NRCAN to transport to ISED to Infrastructure Canada and getting involved in systems engineering and systems planning. What does that mean? Incentivizing to get to 5,000 electric buses, incentivizing the integration of the buses, the chargers, the storage device, the smart controls, the blockchain distribution of energy units, the whole system. So that we get to a system design of electrification that supports an overall job growth jawbridge, systems zero emission network and that's where we're headed. As an example, just looking outside at Mississauga, we've been working on a hydrogen fuel cell bus project out there for years now. It is not about getting fuel cell buses into Mississauga, it's about getting Canadian designed and made hydrogen fuel cell buses with Enbridge and Hydrogenics producing hydrogen from electrolysis down the road in a distribution network that supports hydrogen trucking that has zero emissions across the 401. That's the kind of deployment we're looking at and that translates into freight and passenger rail electrification. So for looking at that 70 megatons of transportation and that piece of the pie, we're also looking at the transference of these technologies from bus to truck to train and that is the future of our economy in this country.

DIANA FOX CARNEY: Fantastic, I think that was really important to point out that systems need the requirement for platforms that take us to the next level in this space. What if I could just bring in Céline now because she's gonna talk a little bit on where the money might go in this area and how we can move things forward. As Josipa mentioned, it's not just about, you know, handing sacks of cash over in different areas but it varies between the private vehicle market and obviously the mass transportation and freight. What are your thoughts amidst this Céline?

CELINE BAK: Thanks very much Diana. [We've proposed some recommendations today, Ralph and I]. We've addressed Marcelo your focus on driving and Jerry driving the increase and the take-up of EVs through investment in the whole value chain and the supply chain in Canada. What we need is work building out the EV supply chain that starts with rich materials and goes all the way to EV manufacturing as a core profitable business and in both new and established terms, as just mentioned. We've also proposed a broader set of recommendations as Ralph described in the beginning. So the first is for the federal government to provide a one-time grant to transit operators to provide free transit to all users for one year. This will ensure that the public transit system continues to operate at the level of service that is needed to get people to work and to school while they maintain social distancing. [...] It's a six billion dollar free transit fund which would be complemented by a two billion dollar healthy active mobility fund to build on what Ralph was saying. The second fund would put people to work in the next 12 months to enable municipalities and towns to build cycling and pedestrian quarters for us to use both for work and leisure as we maintain social distancing.

The second proposal is to increase ambition to make EVs 50% of all cars sold in Canada by 2030 rather than the current goal of 30% and also to increase the electrification of freight. To do this we propose that the federal government accelerates the plan to electrify the Trans-Canada highway by launching a bid for proposals that can be built over the next 12 months. This project would make charging up electric vehicles and trucks as fast as filling them up today with gas. To do this we propose that the existing incentive for electric vehicle infrastructure program continues at subsidized installing electric charging infrastructure, but it be modified in two ways. The first would be to provide grants upfront for projects that will be built over the next 12 months and the second be that the grants be opened up to all classes of charging infrastructure to really pick up things that Josipa had mentioned.

The third part of our proposal is to make battery electric vehicles 50% of all cars sold by 2030 by leveraging existing programs but switching the incentives by putting the cash in people's hands first, so that they can have it in advance of buying an EV or installing a charging station. In addition to just injecting the money into the incentive programs, we're also recommending that the incentives for EVs be immediately extended to vehicle fleets, because as you know some fleets like nonprofits cannot use the current tax incentives available for fleets. These are cars that are on the road many hours of the day including through car sharing services which are used by Canadians who look to car sharing as an affordable solution to their mobility needs. The program would double the incentives for rideshare fleet operators - they're currently at \$5,000 to \$10,000 for a ZEV federal rebate to about twenty thousand zero electric vehicles and would remove the cap on rebates per year for those fleets. We also propose that the loan guarantees be provided for up to eighty percent of the value of the loans to purchase at ease so that the EV credit market can catch up with the efficient lending markets for ICE (internal combustion-powered engines) that are as we have them today. So finally, in conclusion, as we drive to increase the take-up of EVs to purchase and charging incentives, we want the federal government to step up with very clear grants and loans equal to 50% of proposed investments, like those that Marcelo outlined, so that we can put Canadians to work, building out the

Canadian EV supply chain that starts with rich materials and grows the place of EV manufacturing as a profitable business for both new and established firms.

DIANA FOX CARNEY: Thank you so much - that was very comprehensive please do comment on that. We could go lots of different directions but you're gonna turn to Amarjeet Sohi who used to be the minister of Infrastructure and communities and with Céline's backdrop of a range of proposed measures, how do you reflect on that from your personal experience and your knowledge of what's going on in government?

AMARJEET SOHI: Well, first of all thank you so much for including me in this discussion. I want to build up on what Josipa was saying earlier on about the alignment of governments and what you're proposing to do. This government is very serious about taking action on climate change - that is not going to change. I think it's going to accelerate as part of the response for the recovery after COVID-19. So how do you tap into that ambition and push forward on the electrification agenda? There are a number of challenges. When I was Minister of Infrastructure we tried to put a few things in place to help overcome those challenges. One of the institutions that we created was the Canada Infrastructure Bank to unlock the potential of building large infrastructure projects that will allow massive scale electrification, for example each province has their own utility system in place, so why would we not build [...] transmission lines between each of the provinces. So that's where the potential lies. There's a lot of potential in the electrification of big vehicles, buses, transportation systems, trucks.

Jerry mentioned in his comment are we gonna be leaders in that or we gonna lose race in electrification of this sector. I also want to talk a little bit about what Marcelo was saying - the potential that Canada has in creating jobs as we transition to a more greener economy. We have 16 of the metals that are required to build batteries, to build electrical wires and for electric vehicles. The challenge is lack of infrastructure to access those metals and minerals. The same thing with the ambitions for electrification. We don't have charging stations that will give people the certainty that they can get from A to B without feeling that anxiety about whether they're gonna be stuck in the middle of nowhere. I think that's where the challenge. I think this government along with many people in the sector that you can tap into these potentials. So those are the kind of things I want to highlight, that there's a natural alignment in what you are trying to do, what you're proposing and what the government visions are on climate change.

DIANA FOX CARNEY: Thank you so much for that contribution. I'm going to turn now to Daniel Britton who is the president and CEO of Electric Mobility. How do you reflect on this? this is your day job thinking about this - what are the biggest multiplier effects, the biggest constraints that you think we have to overcome.

DANIEL BRETON: Well first of all I've been at this for about 20 years now, talking to you about electrification of transportation and I remember having discussions with people in government 14-15 years ago talking about having an electrification of transport and industrial strategy. When there was the financial crisis in 2008, I don't know if you guys remember but I mean there was a

bailout for GM and Chrysler, in the U.S. that included the obligation for them to invest - and the Obama government invested - in electrification of transportation and the development of batteries and electric vehicles. There was no such thing north of the border so I think we lost a lot of time. I totally agree with Mr. Dias says that we need an industrial strategy which means that we go from mining to research and development, from battery technology, from industrialization of vehicles made here for the world, and commercialization. I think the Canadian government has an amazing opportunity right now to develop a strategy not just for cars but for light trucks, for medium trucks, for heavy-duty vehicles. I mean, we have a lot of assets and I think that considering what's happening right now, we have to rethink the way we work, the way we commute, the way we'll communicate, the way we travel and all that has to be taught in that industrial strategy. So, to me, I think - Winston Churchill said 'never waste a good crisis', I think this is now the time to think about this in a way that we can create jobs in Canada, because whether we like it or not it's gonna happen. There's gonna be more and more electric vehicles whether they're light duty vehicles or heavy duty vehicles. So the real question is do we want them to be made in Canada or do we want to import them. So do we want to create jobs here or do we want to let other countries and other companies create jobs elsewhere. So for me this is the real question. Since EMC has utilities as infrastructure providers, fleet managers, we have those ecosystemic discussions right now and I think that this is a perfect platform to talk about that but I hope that this is going to go beyond just that.

DIANA FOX CARNEY: Absolute, that is what is necessary. I should say that in the first poll we only had ten percent of people who disagreed that this should be an important part of their recovery so that's good, but as you say you know we need action not talk. I'm just gonna switch gears a little bit now and go to Sidney Ribaux, who is Director of the Bureau de la transition écologique et de la résilience in Montreal and I think he knows a lot about bike paths and those kinds of things. So can you talk us through that part please?

SIDNEY RIBAUX: Hello everybody first of all, thanks for organizing this. I think Ralphs talked about the importance that walking and bicycling is now taking up, especially in cities. We've noticed much more how much space the individual car takes up in a city and the resources that we need to commit to making sure that all these roads are maintained and snow is removed and so on and so forth. So I think going forward for sure in the city of Montreal, we are thinking about how active transportation can play a role. I would add to what Ralph was saying, we're doing that in the short term by temporarily closing streets and making more room for pedestrians and cyclists right now in the city. Hopefully that will spark a renewed interest for mobility when eventually we get back to work and people get back to moving around. I would add in in the in the context of the electrification of vehicles - the electric bicycle I think is something that we are we're all going to need to look at more seriously and it's going to be used using the same infrastructure as is presently being put forth for regular bicycles, but it has the capacity for people with reduced mobility, it obviously has the capacity for greater distances and it's something that's gonna be really important that we're certainly looking at in this city. Obviously the job creation and the whole question about creation of jobs in Canada is very

important and the government of Quebec is obviously looking at that, the city of Montreal is looking at that.

I think we need to have a broader conversation in terms of electrification with regards to the impact in cities and talking about local air pollution. I'm talking about noise for example, noise reduction, and these are elements that we are not talking about a lot or enough. I would say when we talk about this issue of electrification but I think they're extremely important and down the road, they're going to be issues that citizens actually care very much about. Climate change obviously is very important to us as people who have thought about this and working on this but for the regular citizens noise is a much more present and local issue and they're going to be very interested in understanding what the impact of electrification will have on local issues like that.

DIANA FOX CARNEY: Okay thank you, you'll see that we have another poll and you also see that we haven't given you the possibility of strongly agreeing, we seem to have an error. So you can disagree twice, apologies for that but we're trying to correct that. Thank you that we're getting lots of questions in a number of them around hydrogen versus electric vehicles which is a technical question which I considered a lot recently and everyone I know, and you may disagree, but everyone I know seems to believe that hydrogen will not really break into the electric vehicle. You know the battery vehicles will at the light end of the scale be better than a hydrogen simply because of the steps that you need to take to get to hydrogen, it's quicker and easier and cheaper to get to make a battery and recharge a battery with your renewable energy. But there's a lot of possibility of heavy vehicles. I want to bring in two commentators from Pembina and also from Clean Energy Canada's Carolyn and Joanna. You've heard a lot, what are your reflections from your organization's perspectives? What can we do that's going to make the biggest difference in these spaces?

CAROLYN KIM: Thanks so much Diana. I'll just say a few words and pass it over to Joanna. I fully concur with what was said by other commentators: we need to have a solid national policy and investment framework in place in Canada that's what it's going to take to stimulate and rebuild the economy. We need to increase demand for electric vehicles and at the same time make sure that we're meeting and matching that demand with the supply of zero emission vehicles. In Canada, we know from research the clearest path of boosting domestic ZEV manufacturing is increasing demand. So we should hold steady on any sort of policies that are going to do that whether it's financial incentives for consumers, carbon pricing, ZEV mandates and emission standards.

Building off of what Josipa mentioned around the importance of focusing on commercial heavy-duty vehicles. That's something that is quite important we know at the Pembina Institute that freight sources represent about 42% of transportation emissions and it's really great to see the leadership that is happening in the transit industry. We know that most electric heavy-duty vehicles sales in Canada are primarily transit vehicles and we want to see that eventually transport towards other markets, for example commercial freight and goods movement vehicles.

So in addition to increasing demand making sure that we are working together across different ministries - Infrastructure, Environment, Canada Infrastructure Bank, Transport and NRCAN, to really make sure that we are investing in our manufacturing sector. A study that was done by Navius research did kind of look at what a strong national policy framework would have on our economy if we include for example a national ZEV mandate for light duty passenger vehicles. We do the same for medium duty trucks and buses and we provide a subsidy for manufacturing, which reduces the cost of production. We can reach related GDP increases to the magnitude of 152 billion by 2040. That's up from 43 billion under current policy conditions and we could see electric vehicle related jobs reach 1.1 million up from the 300,000 or so under current policy conditions. So I think, just to recap, we need to have a strategy that looks at both the supply and demand.

DIANA FOX CARNEY: Fantastic thank you. Joanna, your thoughts?

JOANNA KYRIAZIS: Sure so I'd like to highlight two opportunities that I think are some of the most important ones we should be thinking about right now. It sounds like the group is in agreement that there's a lot of opportunity around electrification of public transportation. We are leaders on electric bus manufacturing, battery technology, hydrogen fuel cell technology and even battery technology for electric ferries. If we invest in these technologies and use our technologies at home, we can help our electric vehicle ecosystem remain competitive. Another important piece around focusing on public transportation is that it allows for our public dollars to be invested in a more equitable way. Now millions of Canadians are relying on public transportation and will continue to do so, so there's no such thing as a first-class bus or subway car. So focusing our recovery efforts here are really going to help the Canadians most in need. Of course electrifying public transportation is going to improve air quality, help to create healthier communities and help Canada to get on the path towards net zero emissions by 2050.

The second opportunity I want to highlight relates to the electric vehicle charging network that we've talked a little bit about today. We need to do more to build out this network and make sure that drivers of electric vehicles have somewhere to plug in. I think that we should be using the power of procurement and installing electric vehicle charging infrastructure in all government parking lots. This is going to create and save jobs along the entire electric vehicle charging station value chain, from Canadian mining and aluminum production to the providers of the EV charging technology itself, to the electricians that are installing the chargers in every province and territory. So that could go a long way and inject immediate stimulus into the the Canadian economy. There's obviously a lot more that we can do on clean transport but those are the two opportunities that I think could create and save jobs now to stimulate the economy and put us on a path to a clean and resilient recovery.

DIANA FOX CARNEY: I say thank you. As is the wont in these sessions, we're kind of running out of time. We haven't really got to questions. I tried to bring them obliquely into some of the things I've been saying. I also have two out of three times not asked Dave Sawyer to contribute

even though he's there for us and has great things to say. I just had one question here I wanted to raise which is a question to Jerry, it's about ownership of the auto manufacturing business in Canada, obviously foreign owned in large part. If the government's getting involved you see any you know different steps being taken by the government? Do you see any more opportunities for workers to become more involved and actively involved in managing these areas or not?

JERRY DIAS: When it comes to worker ownership, it sounds philosophically wonderful but it takes a ton of money if you're going to play. If you're gonna play in the EV transportation industry - I represent workers in Nova Bus, New Flyer, so we've got a lot of members that are in this industry. But then I take a look at our members of Bombaried at Thunder Bay - if a plant was almost a complete layoff, we've just brought back some of our members to make personal protective equipment during the pandemic. So there's opportunities out there but the government is going to have to make some hard decisions about what type of industries do you want to invest in. So as it relates to individual ownership worker ownership, I don't think it's a viable alternative - like I said it's just too much money. But I never did buy the argument that the government should never pick winners and losers - I never bought that argument because I think that government's need to make strategic decisions about where jobs are heading, where the future is heading and be active participants. If you take a look at some of the successful nations around the world so many nations that have a lot less than we do as relates to natural resources, raw materials, they do so much better - why? Because there's a strategy. They pick the industries that they know are going to create a lot of jobs that are on the leading edge of technological advances and they play. Then they also make it the cornerstone of all of their trade deals. If I take a look at the TPP that Canada just signed with Japan for example or I take a look at the trade deal signed with Korea before that, both Japan and Korea highlighted the autothrottle industry as number one export. So they make sure that they design trade vehicles to enhance their global footprint - not Canada. We negotiate trade deals that will allow people to import into our nation while giving no access to their market so there has to be a shift in strategy. I think the government is gonna have to be pretty aggressive by identifying where it is we want to be and what's the strategy to get there.

DIANA FOX CARNEY: Fantastic, thank you for being with us today, thank you to all the participants who've come. You won't be surprised to hear that you all agreed on this on the second poll, even though you couldn't strongly agree 70% of you agreed with this statement. I'd want to thank the panelists for being here, this was a rich discussion, there's a lot in this space. I just want to say that what strikes me again and again is the opportunities for Canada and in this area in particular. We're there in every part of the value chain, we can do the minerals, we can make the batteries if we put a bit more effort into it. We have the auto manufacturing capabilities, we're in mass transit, you know leaders in mass transit production even if not really in deploying it domestically. So there's so much opportunity and when you look at Canada from outside the country, we've got renewable energy, we have everything that it takes in this space. So what I've heard repeatedly from people today as a plea for a real strategy, bring it together, be concerted about it and let's use this opportunity of the pandemic and the shift and

discombobulation we're seeing now to kind of rise as a phoenix - not from the ashes I guess - and making this a real competitive advantage going forward. We need it for net zero and I think we need it for the economy of the country. So thanks for being with us today, thank you for the the participants for making all these great questions which we will answer offline we will continue the dialogue and I hope you'll join us next week for the fourth in the series, Great and the last thing, this paper will be available to you so you can comment in more detail. Thanks Toby, thanks to everyone who came and see you next week.