Audio file

Carbon Pricing and Border Adjustments.mp4

Transcript

Thank you for the opportunity to speak with you today.

TD Economics recently released a report on carbon pricing and carbon border adjustments and as part of our series of ESG learning sessions, I thought I would take the opportunity to walk you through some of the key findings.

In addition to that, however, I think it's important to set the table a little bit and provide a bit of context as to why these two tools are going to be critical in the fight against climate change, so I'll actually be stealing a bit from our upcoming report on understanding the clean energy transition to hopefully provide a bit of that context before diving into the details of the border adjustment report.

Just to go through the agenda, we'll be discussing the macro picture of what the clean energy transition looks like, including an overview of emissions where they come from in order to provide some perspective on the scale and scope of the challenge before us.

I know that information is often talked about quite extensively, but I'm hoping to provide a little bit of additional detail and data so hopefully we'll all be able to learn something new.

And after that, we'll head into a discussion about carbon pricing, Canada's framework, a bit of a discussion on comparing our carbon pricing system to other international systems and why it's difficult sometimes to actually make that comparison before landing on the discussion about carbon border adjustments.

So the first chart you see here shows global carbon emissions alongside those of Canada and the US. You know, a few observations here. They're all indexed to 1990 to show the progression of emissions over time.

And the level of emissions for each region as of 2019 are on the right hand side in the text boxes and you can see globally we produced 36.4 giga tons of carbon in 2019. In Canada it was about 606 hundred or so megatons, and in the US it was 5.3 giga tons.

The important thing about this chart is that I think it highlights the scope of the challenge before us. You know, I think it's well understood that we need to reach net 0 by 2050.

But one of the key observations here is that there's actually been no real reduction in emissions.

Basically ever.

Not only that the rate of increase in emissions has actually grown dramatically over the last 20 years, due almost exclusively to the growth in emerging markets, notably China, Brazil and India, both Canada and the USA, and quite frankly.

Most of the advanced world have done a better job at keeping emissions growth in check, with the US having done a slightly better job over the last two decades than we have, which we'll discuss a little bit later.

But I think what often gets lost in simply looking at the headline numbers is how difficult it is to actually change course. You know, despite all of our talk about climate change and climate policies here in Canada, we've seen next to no reduction in emissions since the early 2000s.

Again, the US slightly is doing slightly better, but we're going to return to that point in a little bit.

And the following charts are the reasons why in that the world continues to rely on burning fossil fuels to meet its primary energy demand. Globally you can see here 84% of primary energy demand still comes from burning fossil fuels. 83% in the US and 66% in Canada. Now when we say primary energy demand, what we're really talking about is the entire energy system and how we power that. From how we produce electricity to what fuels our cars, heats our homes and offices, and powers our industry.

You know, it's not said enough that most of our emissions come from burning fossil fuels as part of this energy system. So the clean energy transition and reaching that zero at its very heart is about taking that energy system and shifting every single piece of it to something cleaner.

Moving electricity generation to 100% zero emission sources or renewable sources. Electrifying activities where possible and where that's not possible, finding a zero emissions fuel source.

In Canada, we actually already do a decent job of this, mainly because we have a historical reliance on renewable and zero emission sources already, namely hydro and nuclear, both of which you can see on the chart on the right.

Hydro being the kind of dark green shaded area and nuclear being that blueish section of the chart.

So we have this great historical reliance on those things, but there also hasn't really been any kind of wholesale shift towards renewables over fossil fuels.

You know, we've seen actually an expansion of almost every fuel, from solar, to wind to hydro, etc.

You can kind of see those small sections start to grow in the renewables.

But that has been matched by an equal amount of growth in oil and natural gas.

Mainly that's because where the demand is. We still continue to burn, you know, gasoline in our cars.

We still heat our homes with natural gas, and as we've seen, you know household and population growth.

We similarly see demand growth.

So we continue to see that continued reliance on fossil fuels.

So if at the heart of our clean energy of weekly that clean energy transition is about shifting our energy system, then the nuts and bolts of how we get there is in turn in the nuts and bolts of the energy system itself to reach net zero, we need to be changing the fuel source of every single activity that burns fossil fuels today.

Now I have to apologize here in that the chart you see here is a bit difficult to read, and what this chart describes is it looks at Canadian greenhouse gas emissions as of 2019 and breaks it down into its kind of constituent parts.

You know you have stationary combustion sources, including you know oil and gas, manufacturing, residential and commercial heating sectors.

You have transportation sources, including road transportation, aviation, et cetera, and then you have the remainder, including agriculture emissions waste which actually have nothing to do with fossil fuels, but those we'll have to get to in a little bit.

The complexity of this chart, though, I think, is actually an important part of the story.

You know the fact of the matter is that even within each of these buckets there are hundreds of different activities that need to be decarbonized and each has its own specific pathway of how to get there its own unique challenges.

Technology requirements, financial support needs, infrastructure needs.

And will require a different set of government policies to help move the ball downfield.

And each sector is also at a different stage in this decarbonization pathway.

Consider how much further along you know electric passenger vehicles are relative to aviation where clean fuels are still very very early stage.

So personally I actually find this chart very helpful despite its complexity in understanding the clean energy transition.

Because I can essentially go down this list of different sectors and different activities and look to understand each of those individual challenges and what policies will be needed to alleviate those challenges.

Now I think that also provides the context needed to understand the recent evolution of increasingly stringent interim emissions reduction targets that advanced economies have recently made.

At Biden's climate summit this past April, governments around the world, mostly in the advanced block upped the stakes significantly by setting these very strong or certainly stronger interim targets, hoping to show a united front against climate change again, at least among advanced economies.

I'm not going to go too deep into the details of the table, as you can see them here, but what is important about this is understanding how it is we're going to reach these targets.

You know these are quite aggressive targets.

I mentioned earlier that so far we've seen little to no structural reduction in emissions ever in history.

So how are all of these countries, how do we plan on reaching these things like reaching these strong emissions targets?

Where in this previous pie chart that we saw are we going to get that level of emissions reduction?

Where's the low hanging fruit that, for example, Canada is going to be able to reach a 45% emissions reduction in nine and a half years.

Going forward, TD economics is hoping to produce research on these specific topics.

And how we're going to get there by sector.

However, for the time being the discussion at hand is well, if we wanted to reach these things, what policy tools do governments have to actually make this a reality?

Overall, there are three main tools that governments can use with the first two of being the primary tools.

The first is command and control style regulation, which basically you know you can identify source of emissions and mandate that individuals or businesses either eliminate or reduce whatever emissions those may be.

There are certainly many drawbacks to using regulation infinitely more so if regulation is the only tool that is being used.

First, it represents potentially a significant competitive disadvantage for domestic firms in the sense that they now might face new compliance costs that the foreign competitors may not.

2nd, it's an imperfect tool, since if we reference the the that kind of complex pie chart back on slide 5, the sheer number of emission sources would require an unwieldy number of regulations to address them, and they also have to be constantly updated as the sector evolves, and likely wouldn't even be successful in addressing all emission sources.

Anyway, however, there are a number of instances in which regulation can play an important role in addressing certain kinds of missions, notably those that aren't really part of any market based activities that other policies like carbon pricing can address.

A good example here are orphan wells in the oil and gas sector.

There can be significant.

Greenhouse gas emissions from orphaned wells in the form of methane emissions from tailing ponds or improperly capped wells in addition to the habitat and biodiversity or habitat loss and biodiversity impacts of sites that aren't rehabilitated regulation can be helpful in adjusting those types of situations because you know it, since those so those things tend to fall outside kind of market based activities.

It's difficult for other tools to address them.

However, the far more effective tool in addressing emissions is carbon pricing, which as we all know by now, simply puts a price on emissions at every stage of the value chain of how goods and services are produced.

As each participant faces that carbon cost, it can then be evenly passed on to consumers, which in turn forces all of us to come to terms with the end costs that the pollution embedded in our everyday activities.

The goal, of course, is not just to disincentivize demand for emissions intensive goods, but also to change the relative price of things that emit carbon relative to their alternatives that do not.

Now, relative to regulation, carbon pricing has several advantages.

Since carbon pricing targets fuel usage and emissions over activities, emission coverage tends to be a lot wider, and policymakers need not worry that an emission source might fall outside regulatory boundaries if you use fuel, then you're going to pay the price and all of those things are going to end up getting captured.

In addition, it actually doesn't force any individual or business to actually decarbonize or importantly push governments to pick winners and losers.

The agency lies with the individual.

If they choose to decarbonize or simply to pay the cost.

Lastly, it gives policymakers a lever that they can change over time.

To continue incentivizing the shift towards lower emitting activities, which should permit a smoother transition, an example here might be.

A $40 carbon price might be sufficient in pushing individuals to choose an electric passenger vehicle over an internal combustion engine car, but at $40 still might not be the kind of incentive needed to push.

Airlines to invest significantly in electrofuels or some sort of clean fuel alternative to aviation fuel. But as that carbon price starts to increase when it reaches $140.00, certainly airlines looking down the barrel of such a significant increase in compliance costs will say I better get my act together beforehand, so I don't have to pay that cost down the line, so that lever that's that kind of slow moving lever is actually a feature of carbon pricing.

Now, briefly, there are two types of carbon prices.

Mainly there are a few others, but the two main ones that are in use today there, there's the straight carbon price that we have here in Canada that we're familiar with here in Canada, where you simply pay for a ton of emissions and the 2nd is our emissions trading schemes.

Here in Canada we also have them we call cap and trade.

But but emissions trading schemes are incredibly popular in Europe, which essentially what happens is you put a cap on the level of emissions on a sector by sector basis, and then you force firms within that sector to pay for the emissions beyond that cap.

And just like there are benefits to a carbon price, there are also drawbacks to similar to regulation.

Generally speaking, there are few that I've listed here.

Firstly, carbon prices tend to hit lower income households disproportionately given a higher level of emissions content for core, core household spending, things like home heating, transportation, food

tend to be a little bit more emissions intensive than the other kinds of spending that we see in the economy.

So lower income households tend to get hit harder.

Where carbon pricing tends not to work. In addition, where carbon pricing tends not to work very well is when the technology or way to decarbonize simply doesn't exist.

So again, let's go back to our example of aviation where there really isn't viable or scalable solution to aviation fuel.

Forcing airlines to pay $140.00 carbon price, which forced them to figure it out, but until it is, it could be a significant competitiveness.

Barrier to those firms relative to international carriers that are not going to face that cost.

Importantly, and for this discussion, countries that unilaterally apply carbon prices tend to put domestic industries at a competitive disadvantage overall relative to their international counterparts who don't face such costs, and that puts the country at risk of losing those firms who might simply shift emissions intensive production overseas.

Where again they don't have to face those costs.

That's what we call carbon leakage.

You might be familiar with this concept when we talk about, for example, tax leakage where a you know firms might move activities overseas and to lower tax jurisdictions to avoid the same kind of costs.

The third tool that that governments have available to them are these direct investments or Co investments, where essentially governments help derisk or risk share and new technologies that will be needed as part of the clean energy and clean energy transition.

We're seeing quite a lot of announcements recently on the part of the Canadian government the, the US government, and in Europe, but we're going to discuss.

That more a little later in the presentation, going back to carbon pricing, these drawbacks are a key focus as they lead to discussion about Canada's implementation of carbon pricing and our framework, later discussion about carbon border adjustments. So let's talk a little bit about Canada simply.

Mutation, one of the one of the biggest misconceptions that we have that that often get cited is that Internet in fact does not have a single cargo price.

Our framework is actually made up of a series of provincial carbon prices with the federal backstop that kicks in if the provincial policy isn't deemed sufficiently stringent by the federal government.

It's actually the federal backstop that is often what its most talked about, bBut it actually only currently applies in four provinces.

The backstop itself covers 79% of Canada's emissions and is generally applied as a fuel charge, so you'll often hear Canada's carbon price also being referred to as a federal fuel charge. Those things are actually interchangeable in those terms.

In addition, Canada has several ancillary programs aimed at addressing those drawbacks we just discussed first to offset the disproportionate impact of the carbon price on low income households.

There's actually what's called a household rebate program, which you might be familiar with if you live in one of those four provinces, because we get basically we get a standard rebate back at the tax return time.

Essentially what that rebate does is it gives every family in those provinces back the amount paid by the average household. Built in this way, carbon pricing is actually progressive since lower income households generally get more back than they paid in carbon costs.

Just given a lower level of spending totally speaking and higher income, households generally get less.

And importantly, here Canada has something called an output based pricing system, which, like the household rebate, aims to minimize the punishment aspect on industries that would be highly impacted by the carbon price from a competitiveness perspective we call these sectors emissions intensive or trade exposed sectors.

A few are listed on this next chart here, which as you could see, is dominated by oil and gas, but basically the obps only forces firms in these industries to pay for emissions beyond an industry standard right now that standard is set at 90% of the average emissions intensity for each sector.

So essentially, if I fall below that that 90% of the average emissions intensity threshold, then I'm not paying any costs whatsoever.

If anything, I'm actually generating emissions credits, which I can then sell to other people that participate in the obps.

If my emissions intensity falls above that I'm only paying their current $40 per ton price per ton on my emissions above that level of emissions intensity.

In this way, I'm still if I if I fall above, I'm still incentivized to lower my emissions intensity, but essentially I don't pay a significant amount if I don't.

Now, what both of these ancillary programs do is actually lower the quote unquote effective carbon price since notionally.

If you look at the household rebate program, the average household is actually no better or worse off.

After getting back a rebate, I pay a certain amount over the course of the year.

I notionally get that same amount back at tax return time.

Similarly for the obps, the actual amount that I'm paying, even if I fall above the the average level emissions intensity, is still not overly significant.

Uh, you know, given the given the how the obps works.

But this is in many ways preferable since what you're doing is you're essentially eliminating or removing the punishment aspect of the carbon price, but policymakers will still have been successful in changing the relative price of activities that emit greenhouse gases relative to those that don't.

So again, let's go back to our example of the average household.

If I'm right on the margin.

Of of trying to decide whether I want a a battery electric vehicle or electric vehicle.

Uh, you know it might not be fully there yet.

Uh, so you know, given no carbon price at all, I still might buy an internal combustion engine, but with the carbon price, you know the price of gasoline has is now significantly higher, and that might be sufficient to just push me over the edge to say, OK, well, you know, given my annual cost of fuel.

I might now consider an electric vehicle, even though my financial situation hasn't really changed like I'm still paying, I'm going to pay a certain amount of carbon prices, but I'm getting that that exact amount back so that that in in the way is kind of the key feature of how Canada has implemented the carbon price, at least on the household side.

Now we're often asked to compare how canada's carbon price stacks up against our international counterparts, so I thought I would provide some perspective here.

Now what this chart shows you is the price per ton of CO2 that each of these systems that you can see on the left applies the Canada federal fuel charge. As you can see below, is right now it's $30.

It's actually $40.

Even though this data is as of 2021 and the reason for that is that this data was collected at the beginning of the year and our our carbon price didn't reach $40 until April.

So this is, you know, basically just before we raised our carbon price to $40, but even then you can kind of see that Canada's federal fuel charge doesn't really stack up all that well, at least on a price basis relative to some of these other systems. You know, if we compare ourselves to Sweden.

Or Switzerland, or even if the European Union emissions trading scheme, we don't.

Seem to stack up that well, but.

Comparison is often hard in this regard because price level is simply one metric.

It's actually an apples to oranges comparison.

If you start to look at the the the you know the the underlying details of how our different systems are designed, the differences in sectoral and emissions coverage, and even differences in how our energy systems are structured, how we produce fuel, how we consume fuel, all of those factors are important in how we consider how quote unquote stringent a carbon.

Pricing framework is as an example.

Uh, take a look at the third bottom bar here in the EU ETS that system you know despite appearing to be more stringent in Canada on a price level basis, it actually only only covers 40% of the greenhouse gas emissions in the region, mainly from power generation, heavy industry and oil and gas production, including a few others. And that also includes.

Free allocation of emissions credits. So what that means is that a certain level of emissions are given a free pass just like the obps that tries to kind of mitigate some of the punishment aspect.

What the ETS does is for sectors that have very hard to abate carbon emissions. Again, going back to the aviation sector, which is actually included, they've given quite a lot of free allocation of emissions credits, which essentially, you know, eliminates the burden of having to to to pay for their carbon costs. So despite appearing to be more stringent than Canada's carbon price on a level basis.

The reality is far more complicated. Our federal backstop covers 79% of emissions and again, of course, it doesn't include the fact that our carbon price is now at $40.

Individual Member States which everyone in Europe pretty much, uh, participates in the EU ETS.

Even non EU members like.

Norway for example.

Individual Member States can actually supplement the EU ETS with their own carbon pricing frameworks.

So you'll note.

That there's an ETS and also a German ETS.

An example here where basically there's an additional carbon tax being applied in Germany on sectors that are not covered by the EU ETS.

For example, buildings and road transport.

In other countries like Sweden, which is largely considered to have one of the most stringent carbon prices in the world, they similarly apply, uh, an additional carbon price to emissions not covered by the ETS, but they actually also overlap with some others that do, and what they what they intend on doing is basically apply a higher carbon price.

On those sectors than the EU ETS does, so you know, let's take power generation. Sweden essentially hopes to apply $135 carbon price on power generation as opposed to the the 45 or $50 that EU ETS does.

So despite canada's implementation appearing to be complex with the different provincial and territorial frameworks, the federal backstop, the Obps, household rebate, on top of regulations, it's actually in line with systems elsewhere in the world.

And quite frankly, it's actually quite highly regarded internationally, so you know, it's difficult to compare, but broadly speaking, you know the system that we have in place is actually a very stringent and very good.

Now the one drawback of carbon pricing that has yet to be addressed through all of this is this issue of carbon leakage.

You know firms leaving domestic borders to jurisdictions that don't price carbon to avoid those costs.

Now the chart I'm showing you here doesn't represent carbon leakage.

Carbon pricing is still too new to really for us to have any solid evidence to suggest that carbon leakage is actually happening.

You know, we only implemented our carbon pricing framework in 2016, so it's only been a few years there so it's difficult for us to say that that this thing is actually happening.

However, the data shown here is the net exports and imports of emissions of carbon emissions from China, the USA and Canada, meaning in a given year, one giga ton of carbon emissions produced in China.

Are actually for the purpose of producing goods that are subsequently exported and consumed in other countries while in the US. 350 megatons and emissions are.

Notionally, quote unquote.

Outsourced to other countries now, but I think this data underscores underscores a few important points for our discussions.

One, it seems obvious, but worth noting that the high level of integration of the global economy, particularly through trade channels, basically means that in individual countries, reported emissions, particularly that importers like the US, are not truly indicative of their actual emissions and climate policies that only consider what we call.

Territorial emissions or emissions that are produced within national borders are notionally incomplete.

2nd, we already see a tremendous amount of on and off shoring as a result of discrepancies across international tax systems.

Differences in unit labor costs and other economic factors.

So the risk that carbon pricing adds through carbon leakage is in fact incremental on top of already an a large system of movement of firms.

Incidentally, going back to how the US is able to address their emissions better than Canada, this is actually part of the story.

Another part of the story is the disproportionate share that oil and gas production tends to play in our economy.

But the point is, is that the US has simply done a better job of offshoring their emissions than Canada has, which you know, as you can see, we're neither at net exporter or net importer.

Net emissions sort just move along that zero line.

This of course leads to our discussion about carbon border adjustments, which may be a key policy tool that governments use to address carbon leakage.

In theory, the way these carbon border adjustments would work is that they would impose a carbon levy that would notionally be equal to the carbon cost that domestic producers would pay on the emissions of those firms importing into a country while simultaneously rebating the carbon costs paid by exporting firms in order to equilibrate.

The cost basis that domestic firms face relative to their international competitors. So the example I've shown here is basically, you know, Canada has carbon price relative to the US that doesn't. Essentially what would happen is. Let's say I'm a producer of widgets in Canada and I pay a certain amount of carbon costs in producing those widgets. What a carbon border adjustment would do is that any US firm that's trying to compete with me in producing those widgets and export into Canada.

They would faced a border adjustment import levy on their emissions intensity that would be on a level basis to what I face. That would basically mean that if we're competing in the domestic market, we're competing for domestic consumers.

We would be competing on an even basis in the same way, if I were trying to.

If I were producing the same widgets and now we're competing with that same US firm and producing widgets, if I were trying to export into the US.

In theory, a border adjustment would rebate my carbon costs that I would pay here in Canada so that again I'm playing on a level basis with my US competitors so that there's no disadvantage that I would face.

That's at least from a theoretical perspective how it would work when we get to the implementation, there are obviously some complicating factors, but before we get to that carbon border adjustments have essentially three goals.

The first is obviously to address the potential for carbon leakage.

The second is to further address the competitiveness concerns raised by carbon pricing.

Let's go back to our discussion.

About the output based pricing system, which, as we discussed is a way for governments to alleviate, particularly the Canadian government, to alleviate the competitiveness concerns that you might have about carbon pricing in the 1st place.

But what that system does is it beats the costs that firms that participate in the OBPS might face you might consider a carbon border adjustment to be the next level of that in the sense that if implemented on this theoretical basis, that competitiveness barrier is completely eliminated.

Since essentially domestic firms would be competing on the level cost basis with all international.

All their international competitors so notionally, if we implemented the CBA, we might not need the obps at all.

The final goal of a carbon border adjustment is it's a way for advanced economies to hopefully influence global climate policy by leveraging their position as the largest consumers in the world.

By leveraging their purchasing power in order to influence global climate policy, the way that that hopefully CBA's will interact with other climate policies is that domestic firms will eventually lower their emissions intensities by adopting clean technologies electrifying or switching to clean.

Fuels in doing so they will.

Lower their carbon costs.

If foreign producers don't do the same, then that level cost basis that a border adjustment force may turn into an actual cost advantage for domestic firms, and that essentially we're lowering our emissions intensity, and they're not.

Which basically means that they're paying a higher level of carbon costs than we might be in that way.

We hope to leverage our position.

As they both dominant consumers to shift the emissions intensity of global production because in the absence of CBA's, it is a serious open question about whether emerging markets would seriously.

pursue emissions reductions at all.

Recall that almost all of the emissions growth over the last 20 years, as I mentioned earlier, have come from places like China and India.

The world essentially has no shot of reaching net 0 by 2050 without them, and this may be one of the few ways in which we in the advanced world have.

Of making a serious impact globally.

Now the challenge with CBA's is that they face a significant number of implementation hurdles.

I've listed the four main ones here, which we'll go over briefly.

I don't want to get too deep into the details here, but the first is, well, what do you plan on covering with a CBA? You know I mentioned earlier that on a theoretical basis, it should impose a levy on imports and rebate carbon carbon costs on exports.

But if the goal is to actually reduce emissions, then what's actually the the point of the latter?

What's the point of rebating carbon costs for exports?

If I'm an exporting firm, you rebate by carbon costs. There's actually no real incentive for me to ever reduce my emissions. So in practice, CBA's will likely only apply to imports.

But at that point, other countries might actually claim favoritism for domestic industry, if the carbon levy that's being applied to imports isn't precisely calculated to equilibrate, what domestic firms are facing and that brings us to the the second issue of which is actually being able to estimate the emissions content of all foreign producers.

In the first place, now we know better than most how difficult it is to establish even our own emissions.

If we, as you know large advanced firms here in Canada have difficulty figuring that out, then one can only imagine how accurate the data would be for a cement manufacturer in China, or a steel producer in Nigeria, which actually brings us to the third implementation hurdle, which is the more countries that you include, the more sectors you include, the harder it is for you to actually keep track of everyone's different emissions, and ensuring that we are treating domestic and foreign producers on an equal basis.

And that equal treatment is critical as the legality of CBA's and consistency with WTO trade rules is dependent on countries not favoring domestic industry over foreign producers. There are explicit rules that prohibit essentially that kind of that kind of favorable treatment.

The softwood lumber debate dating back decades between Canada and the US is a master class in trade nuances and complexities and the interaction between domestic policies and how that and how those things might get interpreted as favoritism for domestic industry and the lawsuits that that come from there. So those are some of the the implementation hurdles and why it's so complex.

The next question is, well where are we today?

You know what are some of the recent developments in it?

More importantly, what are the implications of this of this policy tool?

Well, unfortunately, since having done this presentation a little bit earlier, this slide has actually already become out of date.

The first little point is still solid in the sense that carbon border adjustments are being considered by the EU, Canada, the US and the UK with the UK and Canada suggesting a joint collective.

Carbon border adjustment that covers the entire advanced block of economies.

However, the second bullet is actually out of date in the sense that they are.

The EU is no longer currently designing a pilot project.

They have actually launched a detailed proposal for what they're calling it their carbon border adjustment mechanism, or C bam their pilot project.

As of a few weeks ago.

To start, it is only expected to cover 5 sectors, electricity generation, fertilizers, iron and steel, aluminum and cement.

What they did reveal was a tremendous amount of detail in terms of how they're going to address the emissions intensity of foreign producers, how they're going to estimate it, what they'll fall back on if they don't, if they can't estimate that, and all the details of how they're actually going to implement this thing.

And policymakers all around the advanced world, including here in Canada, are going to be looking to this, both in terms of how it functions, its economic impact, and also how the EU defends this policy on the world stage as a potential model for how we might implement it back home.

Now the important thing here is that the strategic value for Canada of doing so of being part of this advanced bloc of countries that might simultaneously impose stringent climate policies and border adjustments could be very significant.

Consider going back to the beginning of this presentation, discussing how much of the world energy system needs to evolve and change.

Shift to cleaner alternatives.

Essentially all of our everyday activities need that this needs to happen in all of our everyday activities.

The combination of carbon pricing, border adjustments and direct government investment that will help de-risk and scale nascent technologies could result in a first mover advantage in which all of the new industry supply chains and energy systems that will emerge as part of this energy transition are up for grabs.

And if we're able to to get that first mover advantage.

And do things in a better way than our international competitors while still imposing carbon costs on them.

Through these import levies.

Well, then, essentially what we've done is we formally what we're talking about as a competitive disadvantage, this carbon pricing being a disadvantage, and we turn that into an advantage by rewriting and redesigning all of these supply chains.

These firms and industries that will emerge as part of the community.

So in the next slide you know I've listed a few at the bottom.

Here, but you could use your imagination as to as to all of the things that that that we might benefit from as a result of this.

So in a nutshell, those are the some of the key findings of our recent report, and I look forward to some of the questions that you might have as a result of this.