THE BROOKINGS INSTITUTION

CLIMATE CHANGE AND THE G8 HOKKAIDO TOYAKO SUMMIT

Washington, D.C.

Monday, March 3, 2008

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P R O C E E D I N G S

MR. PASCUAL: Good afternoon. I am Vice President of Brookings and Director of the Foreign Policy Studies Program here, and also one of the initiators of the Energy Security Initiative that we have at Brookings. It is a great pleasure to welcome you today to the session that we are going to have on global climate change, how to look at an international framework that goes beyond the Kyoto Protocol, and the role that the Hokkaido Summit can play in the process of getting there.

In working on this issue, it is probably one of the most difficult challenges of international policy that we face today, where we have scientific realities that are linked to technological challenges, those technological challenges affect our economies, the economic implications have direct impacts on labor groups, those have implications for different geographic areas and our politics, those feed into our national policy debates, and where we stand on the national policy debates affects our ability to negotiate international agreements, and the cumulative total of those international agreements brings us back to the overall scientific impact all over again, which means that we have a loop here which is inescapable and phenomenally complicated at each step of the way. Some of the individuals who we will be listening today have been at the center of working through that terribly difficult conundrum.

This is an issue which needs all governments to have participated and all countries to have participated, or at least the major emitters, because we do not simply have a luxury of allowing some to drop out. That additional ounce of carbon that is emitted makes no difference whether it comes from Detroit or Newcastle or Beijing or Hokkaido, so it is absolutely critical that we bring countries into this equation.

Yet at the same time we have differing geopolitical camps. We have for example the European Union which has focused very strongly on creating mandatory targets and caps within those targets. The United States has generally focused on nationally binding commitments, although we will look forward to Jim Connaughton's talk and some of the messages that he has been carrying across Europe on whether the United States might be willing to look more broadly at some form of an internationally binding agreement.

There are countries such as China and India who argue that the problem of carbon concentrations was created by the industrialized world and they should not be expected to pay the increased or incremental costs or carbon mitigation and so therefore they are looking for means to in fact pay for the differential between business-as-usual technologies and clean technologies.

There is a whole part of the world that is going to be affected by climate change. They are concerned by adaptation, or for many they are simply saying there are 1.6 billion people who simply do not have access to electricity, where does our change come and where do we get the resources.

Finally there is yet another geopolitical group who has not been adequately explored or looked at which is the energy-producing countries that have accumulated massive wealth and could be part of the solution in investing in technology. The reason I mention that is that it is part of the challenge of figuring out how all of these geopolitical groups can be brought together into one form of an agreement that matches our interests globally and being able to mitigate carbon emissions and at the same time be able to sustain the growth of our economies and look at the differential interests that a number of countries have, and that is really the fundamental problem that we are trying to deal with today.

We have the benefit of two experts who are at the middle of the climate change debate. Starting first in the discussion will be James Connaughton. Jim Connaughton is the Chairman of the Council on Environmental Quality. In that capacity he is the Senior Environmental Energy and Natural Resource Adviser to the President and to the Director of the White House Council on Environmental Quality. That means in

practical terms that he gets the job of negotiating the policy debate across agencies, how that interrelates with the U.S. Congress, how they integrate their views with the U.S. states, how to take into account views from the business sector and civil society, again, a daunting task, and now you get to bring it to the international arena as well.

Jim Connaughton before heading the Council on Environmental Quality was a lawyer in practice where he focused on environmental issues, and one of the things that I noticed from your background, Jim, was from 1993 until 2001, that you were one of the lead negotiators on ISO 14,000 which may seem like one of those terms that you really do not want to know what it actually means, but it is a fascinating concept because the International Standards Organization plays the role from the bottom up generating out of the business community the standards that are created for a whole range of areas such as international accounting standards, and in this case it is on environmental standards that are adopted by the business community on how they report their carbon footprints which is a phenomenally important tool to be able to create the capacity to understand how companies to relate to one another, and I would be interested in maybe if we might even have a chance to get into some of those questions in the Q and A.

You will also hear as well from Ambassador Yoshi Nishimura. Ambassador Nishimura is the Adviser to the Cabinet and to the Prime Minister on Climate Change which means that it is his central job to be able to plan the most difficult and complicated part of the Hokkaido Summit which is how it will deal with issues on climate as well as to prepare for and run the counterpart environmental summit that will take place alongside of the G8 Summit.

Ambassador Nishimura is no stranger to this issue. He has worked as an ambassador-at-large on global environmental issues out of Japan. He has also had assignments in Afghanistan and Mexico at the OECD, and even here as Consul General in Chicago which I was very pleased to see.

Finally, after the two of them give their presentations we will take a bit of Q and A because they will focus more on the broader international framework. Then we will delve further into some of the analytics behind this issue and that discussion will be led by Warwick McKibbin. Warwick is a Nonresident Senior Fellow here at the Brookings Institution. He is also Professor and Director of the Center for Applied Macroeconomic Analysis in the Australian National University. He is someone who has taught me a phenomenal amount about the use of modeling as a practical tool in understanding international policy. And I

think that when you get a chance to hear from Warwick, he is one of these individuals who has the capacity to see the world in numbers and patterns and yet translate that into English so I think it will be a great pleasure to be able to hear from him.

With all that said, let me turn to Jim Connaughton and ask Him to lead us in this discussion.

MR. CONNAUGHTON: Assuming the slides are not coming up, I am going to give you the visualization with words. Let me just start at the top. First, it is great to be here with Ambassador Nishimura. We had the great pleasure of forming the Asia-Pacific Partnership on Clean Development and Climate together which is a seven-country partnership that set some very planks for how to do an approach based on sectors and we found a way to move forward on sectoral approaches in that context, and that is a plank that we will be talking about in the context of a new international agreement. So you've got someone very good here with me and I am pleased to be here with him. And of course, Australian English is the best form of English when it comes to technical matters, so Warwick, it is great to see you, especially when it is accompanied by a big jar of Foster's.

Let me just quickly skim across what we are trying to achieve in the major economies process. These are the 16 largest

countries, largest energy users, largest greenhouse gas emitters, plus the E.U., however you choose to reflect upon them as a political entity, so there are 17 entities in this discussion. We initiated this really at the strong advice of groups like Brookings and Pew, and I could give you countless others, who have recognized now over time that in order to try to advance to the next stage of this dialogue we really need to bring the big economies, the big emitters, together into one conversation because we have to find a way to go forward. You cannot succeed if you are building a dam halfway across the river. You need everybody together on this for it to work. So we have to find a constructive, proactive way forward that involves engagement by all the major economies, and so that is really what the philosophy behind the approach is.

But like any practical approach, we have tried to break it down into some component parts building on what we learned on implementation of the Kyoto Protocol as well as building on what we have learned from the countless technology partnerships and other mitigation partnerships that have unfolded over the course of the last 6 to 10 years.

So we are trying to achieve the following in the major economies process and that will be supported by the work of the G8. One, we want to see if we can come up with a shared vision for the future that includes a long-term global goal for reducing emissions. In the Bali

Action Plan the expression is used that we need deep cuts and so we want to see if we can define collectively what deep cuts means. Two, similar to the past, we think it is important that each of the major economies set national goals over the midterm, so you are talking about the 2020 to 2030 timeframe, that are backed up by national plans. We would like to see those national goals reflected in an international agreement. The United States and many of our counterpart major economies believe that those goals should be internationally binding. And as the president made clear in his State of the Union address, we are prepared to turn our goals into internationally binding commitments as long as everybody else is too, so it does require us all doing this together. The U.S. view on this is the nature of the commitment needs to be the same, so it needs to take the same form, the nature of it. The content of it of course will by necessity need to be differentiated and in this respect we fully adhere to the principle of common buy differentiated responsibilities, respective capabilities, and the new term in the Bali Action Plan, nationally appropriate action. These are all expressions of the same sentiment that each nation has a different portfolio, has a different energy profile, has a different economic profile, and so differentiation is required. However, the form of our commitment to the world needs to be common, so that is what

we are seeking to achieve. There are different views on that, and so we are working through those.

The third component, and this is the additional feature, if you will, this is a supporting feature, and it is pursuing a sectoral approach which is cooperative action in key sectors. As complicated as the climate issue is, it is actually in substance in one respect quite simple. Most of the future emissions have to do with using coal to generate power which is a very important sector, and the countervailing sectors of efficiency, nuclear, and renewables, are the way you mitigate against that. So we need to advance carbon capture and storage in the coal context and then work on bringing forward these other technologies and making them more available and more affordable.

Personal transportation, people cars. Forget all the discussions on aviation and maritime and all of that, it is people in cars, personal mobility, and then you can add in roadway transportation for trucks and the like. That is most of the transportation profile going forward and that requires its own set of solutions and is very challenging if you think of the scale. Then 20 percent of the remainder is deforestation. The solution is simple. We need to stop it. The mechanisms of that solution are quite complex in the cultural, social, and other economic mechanisms of that. Those three sectors account for up to 90 percent of future

emissions. After that you've got aluminum, steel, cement, chemicals, buildings and the built infrastructure, but that is the basket. If you compare this to the Montreal Protocol, the Montreal Protocol deals with 26 substances and about 250 sectors. Here we are talking about six substances and really about 10 to 12 sectors. It is just they are big ones.

The fourth component of what we would like to see in a leader's declaration when the leaders get together later this year is a focus on finance and financing. So we working together with other G8 countries to pull together a clean energy technology fund. Countries such as Japan, the U.K., and even the U.S., have other funding streams as well, but we would like to see if we can come up with a shared fund that is linked to very important pieces. One, it is linked to support for commitments. The U.N. Framework Convention recognizes that the extent to which developing countries meet commitments turns on the availability of financing and we would like to make more financing available, but that needs to be linked to commitment.

A second thing that it needs to be linked to is the systematic elimination of the tariffs and nontariff barriers on the clean energy technologies that we would be financing. It does not make a lot of sense to have the U.S. taxpayer or the Japanese taxpayer provide low-cost financing only to see the cost of that financing go up because of

prohibitive tariffs. So the idea is we can make these clean-energy technologies a lot cheaper with low-cost financing and the elimination of tariffs. The World Bank has estimated that among 43 major categories of climate-friendly technologies, with the voluntary elimination of tariffs, we could increase global trade by up to 14 percent per year compounded. That is many, many billions of dollars of investment that could be happening that currently is not happening in lower-carbon energy technologies.

The fifth element then is measurement. We have all committed to taking actions that are measurable, verifiable, and reportable. We have very good national inventory systems given to us by the IPPC largely developed by USEPA. We still have a fair amount of difference, a lot of commonality, but a fair amount of difference, I how we measure emission reductions at the facility level or the project level. If we are going to use whatever tools we are using whether it is mandates or incentives, whether it is emissions trading or other forms of public policy, we should have a common currency and common units of accounting and measurement. We can accelerate that. We can do a lot better on that especially to take what we do well in America and Europe and translate that into the key developing countries. So that is what we are trying to achieve.

You can imagine in the G8 context there are a few G8-specific items. The fund is a G8-specific item. Our work together on energy efficiency is something where we can continue to lead and to translate that and to hopefully find some sectoral outcomes with the developing countries. And we have some other deliverables that comes from the Gleneagles dialogue that was initiated a few years ago. So I think you will see a wrap-up of that at the G8 this year. But the real deliverable of the G8 this year will be the leadership it showed in initiating the major economies process and producing a strong leader's declaration from the leaders of the major economies. So I think that will be the most important deliverable to look forward to.

Let me just quickly mention there has been a talk about the U.S. only supports voluntary approaches. At this point I hope everyone understands that that is nonsense, but we can now sum it up. We have eight mandates in every major carbon-emitting sector or non-CO2 emitting sector. The energy bill just gave us five and it took many years to get it, but gave is five in vehicle fuel economy, lighting efficiency, appliance efficiency, in federal government operations. We just agreed with the developing countries to accelerate the phase-out of HCFCs. There is a sector agreement that is internationally binding that has China and India on it. So we do know how to do it with them but can we do it in the climate

context? Then 26 of our states have renewable-power mandates and we are working with the states on new mandatory building codes of 30-percent efficiency. I would observe that the renewable fuel piece, the vehicle fuel economy piece, and the renewable power piece, use a cap-and-trade mechanism. In fact, the renewable fuels piece has carbon weighting in it. It is just we are using different metrics depending on the system. Market-based regulatory mechanisms are alive and well thank goodness, it is just that we do not need to be dogmatic about the particular approach by which we achieve it, and we have it in every major category. So even as we talk about this domestic legislation on economy-wide cap and trade, understand a bipartisan Congress, and at the state level bipartisan legislatures have defined the specific terms of what we can achieve between now and 2020 and now and 2030, so we are going to have to take this into account as we work on new programs.

Secondly, I want to emphasize on the incentive side we have gone from a technology budget of about $1.7 billion, to the $4.3 billion that the president has requested in the 2009 budget. That is a very steep rise in direct public spending on technology. But as important is the new authority on loan guarantees. Our Congress has just appropriated $38.5 billion and is dedicated specifically to technologies that will avoid, reduce, or capture carbon dioxide and it is on a competitive basis. So this will

allow us to build the new nuclear plants, the large-scale renewable plants, and the advanced coal plants that will make carbon capture and storage possible. We now have not just the authority but the budget line to accomplish this. This is a huge shift in public-backed financing and in fact we are hoping that other countries will do the same.

One thing in conclusion, let me just note the scale of the future problem. This is under a business-as-usual scenario. This shows you the rise of emissions between the OECD countries and the non-OECD countries, a simpler chart is this one, the IPCC has already informed us that most of the future increase in greenhouse gasses is going to come in the big developing countries even as ours at level off. If you look at the policies that Europe is putting in place, if you look at the policies that the Congress has enacted and that we are moving forward with on incentives, you are going to see the developing country emissions come down. For us it is the trajectory of coming down, it is the developing countries that are the big challenge, and I will just note that if we talk about perhaps a 50-percent reduction from current levels, you are talking about a massive reduction of CO2 and we are just beginning to get our arms around the scale of that. Emissions are going up to 50.6 gigatons if you use today's profile and if 50-percent reduction gets us down to 12, we

need to find 48 gigatons of reduction. This is not easy. The hard part is the change in energy and transformation that we need to achieve that.

I will give you that as a summary. I think I can take about 5 minutes of questions. And Yoshi, I am sorry that I cannot stay for your part, but we will be spending a lot of time together as we have already.

MR. PASCUAL: Jim, thank you. Let me ask you to introduce yourselves and as you ask your questions, please keep your questions relatively brief.

MS. ITO: Thank you. I am Kaori Ito (ph) with NHK Japanese Public Television. Jim, I have a question on the major economies leader's meeting. Would it be correct to understand that this would take place prior to the G8 summit at Hokkaido, and how would this declaration fit into the G8 process?

MR. CONNAUGHTON: We are still sorting out exactly when the leaders are going to meet so I do not want to get ahead of our Japanese hosts as this may relate to the G8, or if we will need to schedule it at another time. So you will just have to stay tuned. We hope that it will be this summer, and that is what we are working on. There is some suggestion that it will occur before or after the G8 and we are talking to that as well.

MS. ITO: (inaudible)

MR. CONNAUGHTON: Actually, I would prefer if you don't mind since I talk to you all the time, maybe I could get some questions from nonreporters who don't get the chance to call me up all the time, because I do talk to reporters all the time. I am happy to talk to media later, nonreporters now.

MR. PASCUAL: Let me go back to over there.

MS. LEWIS: My name is Courtney Lewis (ph) and I am from the League of Conservation Voters. I wrote down something that you said. You said that people in different countries have common but differentiated responsibilities. It reminded me of another quote from before the civil rights movement that people could be separate but equal. As Mr. Pascual already mentioned, there are 1.6 people in the world who do not even have electricity. How can you suggest that the actual responsibilities are exactly the same as people driving around in sports cars wanting to reduce their emissions in the United States with people in small villages in China who are just trying to get electricity?

MR. CONNAUGHTON: One, I would not equate them. Two, I would not go along with your analogy of separate but equal. I do not see where that has any relevance here. But leaving that aside, there are lots of people with energy poverty so one of our great challenges is providing the poor more access to more affordable and cleaner energy,

and that is critical. Some of that is going to be fossil energy so it needs to be highly efficient, natural gas is useful, but more people should be getting access to more energy. It allows us to clean our water. It allows for more productive agriculture. It prevents diseases, so that is critical. As we go forward, we have to go forward in a way that sustains economic growth and enables the investment in more affordable energy technologies.

The flip side of that is if you look at for example the large industrialization of China, the rich part of China, the piece of China that is sitting on $1.5 trillion of foreign reserves, that is a lot of money to be able to buy first-rate clean energy systems, just like China and India are investing in first-rate telecommunications systems. So in that respect we should be moving forward together recognizing that we are starting at different places, but there is no reason why we should not be taking those steps toward better clean energy investments together.

However, efficiency will be different in China than it is in America, and we still have some catching up to do with Japan and with parts of Europe. So the U.S. is kind of in the middle of the pack on an issue like that. When it comes to steel production, however, the brand-new steel plants in China should be first in class not middle or last in class, and we have producers here who are trying to retool their factories and their steel mills to make them first in class. So that is where we can

go forward together. We just have to be thoughtful about the differentiation and respectful of the need of the key developing countries especially to lift their people out of poverty.

MR. MIYAZAWA: Mike Miyazawa. On limiting the CO2 emissions, you have several times used the expression aspirational goals. My question is do you mean that the United States is for or against binding mandatory numerical targets?

MR. CONNAUGHTON: The phrase aspirational goals has been attributed in many different contexts. We need to be quite precise about what we are talking about, and I tried to do that here. The long-term global goal that has been suggested by Japan and others is a goal that all the countries would share. No one has suggested that that long-term global goal be binding in the sense that you do not collectively bind yourself to that kind of an expression. Where we are focusing on what is legally binding is on the national commitments, the national goals and the plans that back them up, and the United States has indicated clearly and we have been reemphasizing it even more specifically because of some mischaracterization of our position that we are prepared to take on internationally binding commitments with respect to midterm goals but we are prepared to do so in the context of the other major economies also doing the same thing. We need mutuality in the form of our commitments.

In terms of sectoral approaches, one could imagine a hybrid approach. There are several sectors that are already now well positioned to make sectoral commitments. Exactly what the form of those commitments might be in an international arrangement is something that we have to discuss. It could be as simple as just they are a voluntary agreement to doing it in a public way with their governments or to doing it in a way that finds itself reflected in an international document much in the way that the Montreal Protocol includes sector-based commitments. So that is an open question.

MR. PASCUAL: If I can interject, as you look at the nationally binding commitments and comparability with others, are you doing it in the context of the policies and measures that you showed us here on the screen which is the context of current policy? Or are you looking to the future dynamic of legislation which is on the Hill such as Warner-Lieberman which will obviously create very different expectations of what comparability might be? As you think about comparability is there willingness there then to take from a country like China reciprocity and policies and measures that may not necessarily put an explicit price on carbon?

MR. CONNAUGHTON: A very complex question. Let me start from the back end of that question. One, in terms of national goals

and the plans that back them up, it is our view that among the major economies, and our view obviously it is the U.S. view, it should include most or all emissions, so obviously only covering 10 percent of your emissions does not constitute a real national plan to take action, so most or all emissions. We are not stuck on the fact that it has to include 100 percent of all emitting activities but it needs to do most.

Second, when you talk about the comparability of action, that has many facets to it. One is where you are on the development curve, two is where you are with your energy profile. For example, Japan and France use a heck of a lot of nuclear energy and they are in a different place in terms of the profile of their energy mix. So when we talk about pushing for more greenhouse gas intensity, for example, Japan and France already had the lowest GDP greenhouse gas intensity of anyone else and there would be an example of we are working toward their benchmark.

In steel, however, the aluminum sectors come together and they have identified the fact that they should be able to achieve an 80-percent absolute reduction in PFC emissions at a profit. So they have set a collective goal to do that by 2010. There is an example where the goals are not just comparable, they are identical, they could be identical. So we

have to be a lot more thoughtful here about a variety of different approaches by which we are assessing comparability.

The U.S. has just legislated a goal of 36 billion gallons of renewable fuel to displace oil by 2022. Europe has just announced a goal of a 10-percent displacement, not a 15-percent displacement, off a lower benchmark. The question is are those comparable? Or we will make the case that, no, Europe's is not adequate to the task and they should be pushing for 15 percent? The answer to that is probably not. They have a different set of issues they have to deal with in doing biofuels in Europe than we do in America. So as we are doing comparability we have to think of that.

Finally, on your question on Warner-Lieberman and the other economy-wide proposals, one, most of these proposals were developed and released before the Congress did something no one thought possible which is to get bipartisan agreement signed by President Bush on five major new energy mandates in specific sectors. One, is we are going to have to figure out the relationship between the agreement on how far and how fast we can go on fuel and cars and lights and these other things and how that relates to a carbon cap-and-trade proposal that is seeking to achieve the exact same outcome over a roughly similar period of time. We just have to reconcile that in some way.

I would observe that Europe has already pre-declared their goals. Canada has pre-declared its goals. Japan is working in its cabinet on a new national program and they have to decide to what extent do they pre-declare their goals or what extent do they hold them back for negotiation. I am tending to favor these days getting countries to be clear up and up front about what they think they can achieve and then working together to tweak levels where that may be appropriate. This idea of holding back your program for the sake of a massive negotiation may not be the constructive way forward, but that is something we will have to see sorted out this year.

I am getting the buzz. I am sorry my time with you is short and I am really sorry, Yoshi, that I will miss your remarks, but we will be spending many hours together. Thank you all very much.

MR. NISHIMURA: Thank you very much indeed for this invitation. My name is Yoshi Nishimura. I am a special adviser to the cabinet of the Japanese government on issues related to climate change. My task is daunting, as you have said, Carlos, now that we have to prepare our G8 summit this summer. That is going to be a really messy process. Messy is not the proper word, but complicated process now that we have to deal with all sorts of avenues as put forward by Jim. The MEM (?) may be around there the same time maybe or similar timing of the G8

summit. The G8 summit alone is a huge challenge and we have to deal with other things as well.

This year's Hokkaido summit is unique I think on three accounts at least. This is going to be the first G8 summit to be held right after the IPPC's repeated warnings. The congregation must respond positively. Second, the G8 this year as a political institution is in cross-roads as East Europe (inaudible) requires involvement and commitment of a far wider group of countries and stakeholders. Thirdly, this is this U.S.-led MEM coming to fruition almost at the same time as the G8 summit in Japan and obviously there is an issue of sorting things out so that each one of the G8 and the MEM can yield enough impetus and contribution to the United Nations negotiations. So the G8 this year must be one of the most difficult (inaudible) ever in recent history. The government of Japan of course is making in earnest every possible effort to put together to produce tangible and positive results.

Let me run down some of the possible deliverables of the G8 summit this year. First, there are long-term reduction goals. That is to go globally at least for a 50 percent reduction by 2050. Heiligendamm said as you may know we will consider seriously, and that's the Heiligendamm communiqué, we will consider seriously the decisions made by the European Union, Canada, Japan, which includes at least a halving of

global emissions by 2050. Therefore the G8 this year mush seek consolidation of Heiligendamm. The consolidation would enhance the G8's position as leaders in the climate change battle. It will enhance our moral standing to call upon actions from the part of developing countries. The MEM also holds long-term reduction goals high on the agenda.

The second possible deliverable will be a shared vision on technology roadmap. As we all know, a 50 percent reduction by 2050 alone does not solve the problem. Those numbers alone do not usher us to a global low-carbon economy. We need a shared vision about what a low-carbon economy is and how it looks. We need also to share the possible technology roadmap that will bring us there. Commitment is needed to ramp up technology investment and accelerate R&D of breakthrough technologies. We have to transfer those technologies expeditiously to developing countries and we need to compare notes amongst us about how well we are faring.

Thirdly, short-term peak and decline issues must be yet another candidate for the G8 discussions. Madam Merkel in Heiligendamm did long-term, so it makes sense for Mr. Fukuda to focus on the peak-and-decline issue. As you all know, the midterm peak-and-decline issue is just as important as long-term emission reductions if we are to achieve climate stability. Mister Pachauri said, "What we will do in

the next 2 to 3 years will determine our future. This is a defining challenge. Humanity's very survival is at stake. She also said, "We also know that mitigation efforts over the next 2 to 3 decades will have a major impact on opportunities to achieve lower stabilization levels over a period of time."

Energy efficiency is yet another issue to be certainly discussed at the G8. The task was given to the IEA by Gleneagles 2 years ago to look into how energy efficiency can be enhanced sector-wide. On the basis of their findings, the G8 can build a useful program for spearheading a global drive on energy efficiency and energy conservation. Prime Minister Fukuda proposed at Davos back in January that the world start a new drive to attain a 30-percent improvement on energy efficiency by 2020. This can be a basis for the discussion.

The financial mechanism is yet another important item for the leaders' deliberations. Japan will establish a new financial mechanism on the scale of $10 billion. This is to assist developing countries to mitigate as well as to cope with adverse impacts of climate change. In addition, we aim to create a new multilateral fund together with the United States and the U.K. The Hokkaido summit this year is going to be an occasion to call upon others to join.

On top of all these issues, there are some very strong overarching themes commonly held by all G8 leaders like their strong commitment to ramp up and scale up further mitigation actions and other adaptation actions to boost the Bali Action Plan and to work together to seek all major emitters to come on board this time around and to produce a deal at Copenhagen which is effective, all-inclusive, and fair. In fact, all major emitters must come on board and reduce their emissions substantially. It is imperative to ensure a fair burden-sharing based upon scientific data such as sector-wide energy efficiency. A global task of this magnitude cannot be sustained for decades with unfair contributions.

Now let me turn to another issue which is just as important for you and for me, and that is the issue of how to get major developing countries on board this time around. First let me say that as far as the rich countries' actions are concerned, I do not think there are problems, by this I mean including the United States. Although there are some differences and occasional quarrels, we are largely aligned about the credibility and value of science, about long-term vision, and about magnitude of actions which are called for to stabilize the climate at an acceptable level. The problem really lies with developing countries, and the challenge is how to get them engaged in all this. To make a long story short, I should say I believe they are ready this time around to join the battle but under certain

conditions. First, there must be a common but differentiated principle hoisted high in all of our climate dealings. This comes obviously from their historical-responsibility argument. The second condition is that the rich countries including the United States must keep taking the leadership and reducing their own emissions substantially. United States participation is particularly important, almost crucial and indispensable in this regard. No positive participation of this countries is possible without a substantial power taking of this country. Third is that rich countries come and assist them on technology and finance. These are their basic attitudes and if we attempt to force them to change, we get easily into an infinite debate which soon proves to be futile. From my perspective, any discussion which puts United States action contingent to the prior disposition of those countries to act anew would hardly convince anybody. So the better idea is to respect their basic positions and get them engaged on real actions and real programs. We would better have an intimate and more cohesive consultation of technology cooperation for example with those developing countries on the basis of their real reform projects. For example, let us say that there is a 7-year plan to clean up all coal-firing power plants in country X. It is better to go and assist them of course without posturing, as patronizing, instead of demanding to take on numerical targets which we will do anyway, we will certainly continue asking them and demanding

them to take on numerical targets, better to compare notes with them, offer what we have of technologies, discuss with them on issues like IPR, intellectual property rights, in the light of real cases and projects and not in the light of theory.

In short, the key thing is that we go and work together with them. Yet another key thing is to try to create a space where us and them can work as real indispensable partners of the general headquarters for the battle on climate change. No matter what pressure we apply and you apply to have them take on good numerical targets, that will take time, and that will take a lot of time. In the mean time, things can easily get worse climate-wise. To go and help them reduce emissions from coal-firing power plants which are the mother of all evils will not take a lot of time. To put things in the most simplistic way and simplistic terms, old coal-firing power plants are the real crux of the issue and whether we succeed in replacing them with real good ones will define whether we can peak and ebb, peak and bend in time to avoid catastrophe and save the planet. So the real question for me is this, whether we are keen on having them take on numerical targets or keen on saving our planet Earth. Thank you.

MR. PASCUAL: Ambassador Nishimura, thank you. If you want to stand, that would be great, and if you would like to take a couple of questions now while people have your presentation fresh in their minds,

we will go ahead and provide the opportunity to do that and then we will turn to Warwick McKibbin. Questions from the audience? I will take the liberty then of beginning. One of the things, Yoshi, that you mentioned was the importance of reaching some kind of understanding among not only the major emitters, but as part of that, the developing countries. Then you also referenced the target or goal of Copenhagen at the end of 2009 which will obviously be a challenge. But we have right now a G8 process as Jim Connaughton described, a major emitters' process. You have a slight variation on the grouping of countries that you are going to have at the summit in Hokkaido. How do you see this relating back to the U.N. Framework Convention on Climate Change? I recently had an opportunity to discuss this a little bit with Mr. Pachauri who you cited in your talk and that is one of the issues where there still does not seem to be enough clarity of how the interlinkages work, so that this dialogue among the major emitters is seen as supportive of the wider process as opposed to a competition.

MR. NISHIMURA: Thanks for that question which is really my question as well and my program as well. As a matter of fact, we have thought about that and we are still pondering how to sort out and how to create any possible positive result out of those multiple processes. Each one of those processes have got membership and membership are

different, constituencies are different, so therefore there is a possibility for the G8 to produce certain positive results and there is also the possibility for MEM to produce its own product. We strive actually to do the best so that each one of them would produce as I said positive impacts. After all, we all aim at the United Nations negotiation which have been started at Bali. Therefore, that is the ultimate goal and there is absolutely a consensus amongst all related to this preparation about that. So there will not be any difficulty as a matter of fact, structural difficulty, in achieving that, there is just a complication which is a challenge, but let us do our job to the best of our ability, and that is what we are doing.

I think, yes indeed, there are problem areas where as Jim as alluded. MEM is a product of the G8. As a matter of fact, the Heilingendamm summit has given rise to the MEM process. There is a consideration which we have to take about that so there are some certain nuances in ownership of those two avenues, but as I have said, I am terribly sorry, I cannot say in any concrete way how we are going to sort out all these problems, but I am pretty sure we will do our best.

MR. PASCUAL: I will leave you with one though that Pachauri left with me, that under the framework of the UNFCCC that there is a possibility of what is called the Subgroups on Science and Technology agreements and within that context there are subgroups that can become

accredited. He said one possibility would be to in fact actually have the major market economies seen as a subgroup within the UNFCCC and have an official relationship back which could provide a mechanism of actually pursuing both of these in parallel and one idea from a Nobel Laureate that might be worth thinking about.

MR. NISHIMURA: Great.

MR. PASCUAL: Let's come over here.

MR. HOPKINS: Mark Hopkins from the United Nations Foundation. There have been a number of mentions of the importance of burden-sharing of the major emitters which sort of implies that negative kinds of things and is going to be difficult economically, et cetera. At the same time, it has been pointed out that in many ways, many major countries are striving to be where Japan is now as one of the most energy-efficient countries in the world. I am wondering, was becoming a highly efficient country a burden over the past 20 or 30 years? Is your economy injured by being one of the most efficient economies in the world?

MR. NISHIMURA: Thanks indeed for that question which is so important. As a matter of fact, no, there is no data as far as I know which tells us that all our efforts over the two or three decades in the past to economize and to save our energy and to improve our energy efficiency

has resulted in any negative way for our growth. As a matter of fact, I think the inverse may be the case. We have profited from our energy independence, although we have yet to do a lot more in terms of energy independence and energy security and we really have to do more on energy efficiency. Therefore, we are now deciding that we must go further in terms of energy efficiency. In our present projection, we are going to go further down that road by improving 30 percent by 2030 in terms of global, national energy efficiency. Therefore, yes indeed, to make those efforts are beneficial for any country I am pretty sure for that country to gain from that energy conservation and energy efficiency. But at the same time, the real moment of truth to negotiate our numbers with the rest of the international community there is a challenge of course because our marginal abatement course is higher and more expensive than other countries although that margin is narrowing down each passing year. In my country people are really striving so hard to invest further on breakthrough technologies so that is the reason why we are argue for fairness of burden-sharing which is so important for all of us because, as I said, this is a huge global action which must last for decades and decades to come and unfair burden-sharing will not support those long-lasting efforts.

MR. PASCUAL: Let me take one last question all the way in the back standing up in the back corner.

MR. MACLAURY: Bruce MacLaury, former Brookings. Mister Ambassador, I thought you earned your title of diplomat in your remarks because if I heard you correctly, you said that Japan and the United States were aligned in most if not all of the respects, and then you ended your remarks with what I thought was a very sharp challenge. Jim Connaughton said that the United States would adopt enforceable numerical targets only if everyone else did and I thought I heard you say that would be a mistake and we would not get where we want to go. Is that a disagreement or are my ears deceiving me?

MR. NISHIMURA: Thanks again for that pertinent question.

MR. PASCUAL: Bruce is the former President of Brookings and you can see the acuteness of his --

MR. NISHIMURA: By all means. Definitely. I noticed that. And thanks for that precise question. As a matter of fact, I did not say I was opposed to Jim Connaughton's idea. I said we of course will seek and continue seeking developing countries and most particularly major developing countries to take on numerical commitments. We will certainly do that and continuing doing it. We will never pull our punches on that. But at the same time, I think if we take time, then there is a wiser way for

us to engage those countries to start actions. Actually, they are doing all sorts of actions on mitigation, on adaptation, on technology transfers, on technology development, and they are actually transferring their indigenous technologies to other developing countries and maybe tomorrow they will be exporting their technologies to countries like Japan and the U.S. So such is the tremendous development which is taking place in those countries. Take for example in the case of China. China as a nation did not buy, but one of the top billionaires of China has just bought last year I think a state-of-the-art Japanese company with high-tech solar technologies. They have bought that Japanese company and through that acquisition they have bought whole technologies that this private-sector company of Japan has been developing so far. So there has been a huge discussion about technology transfer. It is almost like the discussion turned out that rich countries must give technologies and assistance to developing countries so that it is top to down. It is a kind of patronizing thing, but the new reality is that they are doing all sorts of things and they will do more.

Therefore, of course China and other major developing countries must take on eventually numerical targets just as Jim Connaughton was suggesting. There is no disagreement amongst us as far as that proposition is concerned. But at the same time I really think

that as long as they do not take those numerical binding targets, I think there is yet another way for us to engage those developing countries in actual emission-reduction actions.

MR. PASCUAL: Yoshi, thank you. Yoshi will stay with us. We are going to have Warwick McKibbin now and give him an opportunity to walk us through some of the analytics of this issue and some of the insights that we are getting from the modeling process. Then we will have an opportunity to address questions to both Ambassador Nishimura and to Warwick.

MR. MCKIBBIN: Thanks very much, Carlos. I must say that the life of a climate negotiator is a very complex existence. One of the problems that you face in this long process is that people move down at a particular sequence of steps determined by where the negotiations were the last time. One of the advantages of being at the Brookings Institution is that you can stand back from that sequencing of decision making and ask the big questions, are we going in the right direction, what direction should we be going, and how do we end up where we want to be.

It seems to me one of the dangers of climate change is that it started off by not being such a serious issue and not it is a serious issue, I think the world needs a plan, and I am not convinced that the current

stage of negotiations is really being undertaken in a framework which is really what you would call a consistent plan.

This is structure by presentation. I do want to preface it by saying that there are many, many complex issues and what I will talk about today is a very narrow part of the research we are doing. What I will not talk about which I think is a critical issue is deforestation is tropical rainforests and we are working on a project of how to bring that into the framework we are talking about today, and so this is actually really a very, very simple representation of how I think we should proceed on climate change policy.

What I want to do is talk about what the Hokkaido project is here at Brookings and just point out what I think are the key issues that we need to take into account in designing a global climate policy, talk very, very briefly about the models that I will be using for giving some numerical insight, talk about some of the key issues of how hard it is actually to project long-run emissions of carbon dioxide, and how difficult it is but necessary to evaluate the implications of alternative policies and policy interventions, and then draw some lessons for the G8 process.

The goal of this project at Brookings is very wide-ranging and there are a number of people involved in it, but from my point of view, our contribution is to evaluate a range of alternative climate policies not

just focusing on how well they deal with reducing CO2 emissions, but also to focus on how well they deal with the uncertainty that will inevitably unfold over the next 50 or 100 years. The idea that you can pick the optimal policy to reach a particular goal in 2050 and actually be anywhere near the world in 2050 that you thought would be there is rather naïve. So our structure of our research here is really to do the least bad rather than actually to do the most good because a lot of the alternatives are very, very dangerous alternatives to dealing with climate change.

There are a couple of philosophical issues about how you would go about this. One approach is to start from the top down and to have all countries agree on a particular strategy and then to self-impose it on all countries. The alternative strategy is to start from the bottom up and have a series of national approaches which evolve into a global system where international cooperation across nations sustains the system. My view is that we are trying the first and not succeeding because we are not taking into account national self-interest, certainly not the national self-interest that will determine the behavior of future governments in each of these economies, and I think it is much more productive to start at the national level and build up in a cooperative framework taking into account national characteristics, institutional developments that are very, very different in different countries, different social systems, different customs,

et cetera. So I think philosophically I would argue starting from the nation and going to the global.

But there are some important lessons from history that we need to take into account and in thinking about climate change I always am drawn to one of the major issues of the last 100 years and that is the evolution of the international monetary system. We have learned a lot in designing the international monetary system and we know that since Bretton Woods we have tried a number of systems based on either gold or the U.S. dollar or a single currency. Yet now we have evolved to a system where we have a whole series of national markets, national strategies, all based around pricing money rather than targeting the money supply. I think the analogy there for climate change is very, very, very important. We will never have a single carbon asset in the world economy in my view in the same way that we will never have a common money because this carbon asset we are talking about is nothing real. It is actually the promises of a government to a commitment to achieve a particular level of carbon in their economies, and that is really crux. We are dealing with a situation of enormous uncertainty and we are trying to create a system of a common currency when it will never happen. That is very dangerous because as we saw with the numerous financial crises, the collapse of the Bretton Woods system, these collapses of international systems can be

extremely expensive in financial terms, and here we are talking about something that could be very, very expensive in environmental and ecological terms. So I think it is a very strategy to do what most economists would like to do and that is to go to a global market.

So what are the questions we are addressing in this project? There are many. Some that stand out are questions like how important is it to get the participation of the developing countries into the system? What is the magnitude of the contribution to costs and mitigation of these actions? In terms of stability, it is very important to understand how countries that have signed up to a climate change regime at the sub global level affected by shocks occurring outside those countries. For example, suppose we take a group of Annex B countries who create a system and all of a sudden growth in China accelerates and in India accelerates and the developing world accelerates, how does that shock impact on the commitments that these countries have made? A similar set of issues involve countries that are in the system. What if a group of countries agree on a climate regime and there is a massive shock to one of the economies within that group of countries? What would we expect to occur?

The model that we have been developing here since 1991 has a range of industrial and developing countries. This model is unusual

in that it includes China and India as well as other developing countries, and of course Australia is in there as one of the future potential leaders of the world economy. It is actually quite an interesting country to have in there because we are a very, very, very fossil-fuel-intensive economy and the sort of policies that you may want to implement in the U.S. or in Japan, you need to have a country like Australia that can represent some of the fossil-fuel-dependent economies just to see how sensitive some of the outcomes are to the policy. This model is quite unusual in the sense that we model a global macroeconomy, exchange rates and capital flows and trade flows, but we also model the flows of resources within countries across sectors. This is very important for understanding the political economy of some positions that different countries are taking because of their dependence on different types of industrial structures.

The first stage of the project is to understand how to project carbon emissions into the future. As I mentioned, this is enormously complex because the world is a very, very uncertain place. Emissions depend on a range of thing, and particularly human behavior. How will people buy energy? What will they use it for? How will they transport themselves? What sort of energy systems do we expect to see in 2050 or 2100? If you had asked this question, what energy systems would you see at the end of the 20th century, most of the people in this room would

have got it completely wrong. We would not have known about the internet, we would not have known about a whole range of different technological innovations, so it is very hard to know how you project into the future. The second that is very important is technology and what drives economic growths. Economists do not understand this very well at all, and part of this project is to work with colleagues who understand technology and build the technology work into the economics.

What is important when you are projecting when you are projecting into the future, what we have found so far is that what really is critical are the sources of economic growth as well as the location of that growth. Growth in China under existing technologies leads to enormously higher carbon emissions than growth in Japan under existing technology. Where the growth is occurring is very important. Is it in manufacturing, is it in services, is it in energy-efficient technologies, what is the nature of technical change? These all matter a lot.

Once you have a baseline, once you have a projection of the world, you can then start evaluating different policy options, and there are many, many different policy options. The ones we are focusing on are carbon taxes, cap-and-trade permit trading, a hybrid approach we have developed here at Brookings which combines the idea of cap and trading with carbon taxes to deal with some of the fundamental flaws that I see

are in the cap-and-trade permit system, particularly the sorts of systems that are being developed around the world at the moment. And finally, the issue of technological innovation through financing.

Again there is not much time but I will mention that the aim of this blueprint approach that we have developed at Brookings is not to focus on what carbon emissions will be over the next 5 years or 10 years, but actually to impose very long-term numerical targets, a goal for the global economy at some future point, to use that commitment to price carbon emissions not over 5 years or 10 years, but over a very long period of time, 100 years into the future. These long-term prices are critical for driving technological innovation and critical for driving the uptake of technology through the economy. It is not the price of carbon today that matters, it is the price of carbon people expect in 10 years' or 20 years' or 30 years' time.

But while focusing on that as long-term drivers of technology, to line up the short-term economic costs with what we think are the environmental benefits of taking action in the short-term. And also very importantly, and this comes to the crux of why a lot of the cap-and-trade permit systems are not very effective is that you need a way for corporations and households to manage climate risk. You need to have a long-term incentive to invest in different technologies but have a way of

hedging that risk in case the world is different than what we imagine today when you make the decisions. And finally, to coordinate these national-based hybrids to create a global system rather than from the starting from the top and working down. We do that very simply by, and again this will be somewhat difficult to absorb even after a can or two of Foster's, but I just want to make the point and people can look at our work and see what we are talking about, basically what we would do is we would create these long-term carbon permits, that is, the right to emit carbon at a diminishing rate for 100 years into the future and distribute those rights into a market and that is the commitment the country has made and the commitment is being priced on a daily basis just like long-term government bonds are being priced and the commitment of the U.S. Treasury is being assessed on a second-by-second basis. This allocation, this recommitment, is put into the marketplace and there is a price that emerges at every point along the U curve.

But in addition to that, we need to worry about fluctuations in the short-term costs to the economy. So what we do is we would issue annual permits which would be issued at a trigger price. If a price in any year went above a threshold, the government would be selling these annual permits. This is what has become known as the safety valve in the U.S. debate but actually draws back on the original work we did here in

the early 1990s. The idea would be that these capped prices would be reset every 5 years either as a national system by the president or in a global system by negotiation. The goal here then is to have very clear long-term prices but to deal with short-term volatility. The third point of the approach is you require companies to have a permit, either a long-term permit or a short-term permit, to be allowed to emit carbon.

This may sound like a very complex system, but it is exactly the same way that you run monetary policy in this economy. The long-term bond market determines the long-term price of money. The short-term interest rate is set by the Fed and the amount of liquidity in the economy at any point in time is determined by the market. So it is a hybrid between short-term fixed prices and long-term flexible prices and it is a very effective way of encouraging investment at the same time as making government decisions very, very transparent.

I am about to present some results and then I will wind up just by drawing out a few insights from this modeling approach. Again, this is just a model. The world is highly complex, and what we are trying to do is incredibly simple. What we have done in this particular example is suppose that the world or that the Annex B agrees that they are going to reduce emissions not by 50 percent by 2050, but by 40 percent by 2100. This is not a recommendation. This is not a proposal. This is just an

analytical benchmark that new can compare the various approaches. This target can be reached either through a cap-and-trading system within Annex B, a uniform carbon tax across Annex B, or a hybrid system in Annex B where the long-term allocation of property rights is exactly equal to the target that was specified. To show you just how complicated this problem can be, and Jim Connaughton pointed this out, the pink line here is the business-as-usual emissions for Annex B and you can see quite a dramatic between now and 2100. The blue line which is only a 40-percent reduction in emissions by 2100 relative to 2002 is a very substantial deviation from business as usual. In fact, if you looked at 2100, the reduction in emissions which is determining the cost is close to 90 percent. So even though this is only 40 percent relative to 2002, relative to what it is going to cost the world economy, this is a very substantial policy and this is nothing compared to what the world is currently debating. You see that in 2050 we have allowed emissions to actually arise marginally in Annex B economies rather than be cut by 40 percent.

If you stick this into the modeling framework and you ask the question suppose every country takes exactly the same profile of emission reduction, so every country has to have a 40-percent reduction by 2100, they gradually smooth it and according to this profile each country has a binding commitment, what do the carbon prices that come out of the

modeling suggest? This is highly uncertain and we have done a lot of sensitivity analysis and this chart is a spaghetti diagram, but it does show you are some interesting things. Firstly, the carbon price is rising over time. Secondly, in countries like the U.S. which is the blue line, the cost of taking carbon out of the economy is significantly less than for example in Japan which is the pink line. For exactly the reason that Ambassador Nishimura has already mentioned, Japan is already very energy efficient and very carbon efficient. So to take an additional unit of carbon out of Japan is a very expensive proposition. If you allocated this country-by-country target and said that is the commitment, it would be a very economically costly approach because there are substantial gains not to take the carbon out of Japan, but to take it out of the United States and that unit of carbon is still having exactly the same climate impact but at much lower economic cost. So this wide dispersion across economies shows you that there is a very, very dangerous economic cost for no environmental gain because the Annex B outcome is exactly the same, or in this case the world outcome is exactly the same where you share that or whether you did not share that. So the first point is that there are very, very large differences in costs across countries.

The second set of issues is suppose instead of doing that we just take the Annex economies and we let them have a common carbon

price. So you have a target for Annex B which is the sum of the individual country targets and you achieve that target but you achieve it through a common price, and that is what this chart shows you is what the price profile might look like in Annex B economies. What is happening here is that in a permit-trading system this is achieved by countries transferring permits by the Japanese buying permits from the Americans. In fact, in this set of results, everybody buys permits from the Americans because it is so cheap to reduce emissions in this economy not to much because of the technology choices that have been made abstractly, but because the price of energy in this economy is so much price of energy in Europe and Japan where people have made this decisions to have smaller cars, different energy structures, and that means it is very cost-effective to take the carbon out of the inefficient economy. In a carbon-trading system this comes about through carbon trading. In an Annex B carbon-tax world it comes about by countries announcing a carbon tax common across countries but no international transfers of assets of borders. And in the hybrid, it comes about by the authorities issuing exactly the right number of emission permits to give you this sort of profile.

Then the question is let's look at the sensitivity because all of those systems of economic instruments have achieved exactly the same environmental outcome because we've got the same emissions

underlying. What happens now if we impose this system and all of a sudden in Annex B economies there is extra growth of only 1 percent a year for 3 years? This is not a major shock. This is the U.S. economy has slowed down more than 1 percent a year in the last several year. So this is a very small (inaudible) the second set of issues to look at is what happens in non-Annex B, China and India, where they are growing at 1 percent per year for 6 years? Again, reasonably small shocks, reasonably plausible shocks that might hit a system like this. You can see that it is quite an important set of results here. Again the blue line is the baseline carbon price. That is also the carbon price with the shock that comes out of the common carbon tax and the hybrid. So under a hybrid there is no change in the tax, there is no change in the price, because the safety-valve mechanism has kicked in. But you can see that when non-Annex B countries grow more quickly, the carbon price inside Annex B countries rises, and when Annex B countries grow more quickly, the carbon price in the early period more than doubles because energy demand is rising because of economic growth, that pushes up the demand for permits, that pushes up the carbon price, that acts as a break on economic growth. So you can see that the volatility in the market when you have a cap and trade is very, very different to the volatility in a market based on the hybrid or based on a carbon tax.

Does this matter? It does matter because this graph shows you one example for the U.S. GDP. In the blue line we have the baseline cap. We then have in the pink line suppose non-Annex B countries grow more quickly. Then you can see that U.S. GDP rises by roughly have a percent relative to what it would have been. When Annex B countries grow more quickly, that is the U.S. itself has more economic growth, you can see that GDP rises very sharply because that is the experiment. Underlying that is that is under a cap-and-trade system. Under a hybrid system the lines look very similar in the sense that we are taking about faster economic growth. The difference between the two is in this chart and it is a lot clearer to see. This is the cap minus the hybrid so the cap minus the baseline is zero. But you can see that the green line shows you that if Annex B countries grow more quickly, there is a loss in GDP from having the cap and trade relative to the hybrid. In other words, the cap and trade is not a very good idea because it retards economic growth with very little environmental benefit. Whereas the faster non-Annex growth does the same thing but nowhere near as large. These numbers are not trivial, and if you think about China growing 10 percent to 12 percent per year now, when you were developing the Kyoto protocol because was growing at 5 to 6 percent. So China's growth has so dramatically changed just in 10 years that the designers of the Kyoto protocol had no idea that

that would happen and in fact designed a set of targets which in fact were a drain on the rest of the world economy if in fact we had a global cap-and-trade system today.

What are the lessons? Again, I do not expect you to absorb that, but the idea is to have a framework where you can think through these issues. The first lesson is that it is very difficult to project the world economy over any timeframe that we are talking about for developing climate policy and if the costs to the world economy depends on the accuracy of your projections, you have a serious problem, and that is the fundamental problem with targets and timetables. You have to have binding commitments to reduce emissions but maybe not with a precise date. You need the flexibility to adjust. If you do not, if you have a target and a timetable, you face the danger of you just do not know what the economic costs will be and that is why developing countries find it very difficult to take a binding commitment in the form that we are currently proposing within the negotiations.

The third point to note, cap and trade is becoming quite a popular device and I know I have a lot of problems with cap and trade. Mostly it is because of the instability that are the causes to short-run economic activity for no gain whatsoever in environmental outcome. So the short-term volatility in price buys you nothing except economic cost.

Therefore, for no other reason than it is a free lunch, you should move to a hybrid approach if you are going to have a targeting system.

What does this all mean for the policy design post-2012? What it does mean from modeling work is that a decentralized system of national carbon prices is a way of reducing the costs of greenhouse gas emissions. Costs are lower when you have a wider participation of countries. That is, if you can get the developing countries in, there are enormous cost advantages in solving the climate problem at lower economic cost. But in the process of we know where we want to end up approximately, but we have to worry about the tradeoff between the environmental outcome at any point in time and the economic costs of achieving the long-run goal. And after all, it is not the emissions that matter, it is the concentrations, and whether you get there in 3 or 4 years or 7 years, you should not be binding year by year.

Finally, and Ambassador Nishimura made this point, you have to fundamentally take into account the differences between and across countries because each of these major economies are at very different stages of economic development, have very different institutional capacity, and I think the idea that we would have one-size-fits-all dictated by a global negotiation would delay effective climate action for decades into the future. Thank you.

MR. PASCUAL: Warwick, thank you. Working through all the dimensions of that is tough. We had promised to end at 3:30, we are at 3:40, and so what I am going to propose is that I take three questions and let the two panelists address those questions. And if they have a couple of minutes, maybe they might be able to stay a few minutes for individual questions afterwards. So I am going to take three questions all together. I'll start right here.

MR. PEARLMAN: I'm Lou Pearlman with the Institute for Regulatory Science. Our colleague here who is from the United Nations Foundation did not mention that his organization sponsored a very important report last fall of a panel of scientists led by Professor John Holton (ph) of Harvard which emphasized that too much effort is being put into preventing climate change which in fact science shows cannot be prevented and not nearly enough effort is being put into adapting human infrastructure and societies and economies to the consequences of not only climate change but other potential environmental hazards. Mr. Nishimura mentioned adaptation in passing, but I was not sure if that is what you had in mind or if any of the panelists see that the G8 meeting is going to give serious attention to the needs of adapting as opposed to simply preventing.

MR. PASCUAL: Let me take one question from somewhere in the back over there.

MR. : Mr. McKibbin, you mentioned in your opening about bringing in issues of preventing deforestation in the tropics into plans for international negotiations. Have you included this in the modeling at all? What policies seem to be the best in that light? And what does it look like as far as the roadmap going on into negotiations for producing some sort of consensus on this?

MR. PASCUAL: And one final question?

MR. : My question is about the economic efficiency of cap and trade with banking and borrowing versus your hybrid approach. You said that it is hard to accurately predict the price at a future time and target it and that if you try to do so there are extra economic costs. If you include banking and borrowing in the cap-and-trade system, do you get some of that economic efficiency back, or if you would just compare the two. Thank you.

MR. PASCUAL: Warwick, why don't we let you start. And Yoshi, if you want to pick up on any piece including the adaptation issue and then any final comments.

MR. MCKIBBIN: That was a good question about the banking and borrowing. You can actually take a cap-and-trade system

and back out the appropriate banking and borrowing arrangements to give you the same results as the blueprint. The difference I would argue is in the credibility of the system because with the banking and borrowing it has to be actually be something you believe especially if you are doing a lot of borrowing up front. Whereas under our system because the property rights are distributed, what sustains it at the national level is a whole constituency of individual corporations and households whose value of their assets depends on the credibility of the government's decision-making process. So what we want to do is actually build political constituencies based on property rights within these economies and there will be different in different countries. You have different cultural settings and you have different degrees of credibility. But the point is that, yes, technically you could map the two, but when it comes to uncertainties, the two systems become very different.

On the tropical forests, that is a really important set of issues. I do not see how you can deal with the deforestation that is going on in economies like Brazil, Congo, and Indonesia, until you establish some form of property rights over the forests themselves. The basis for that has to be that there is some alternative value in preserving those forests rather than be a cattle rancher. If you have a carbon market in place where in fact you have the capacity to sell those embodied carbon

rights into that market, you have real economic incentives to preserve the forests only if of course the gain from the carbon rights is greater than the gain you get from ranching cattle, for example. What is critical though, and that is why the approach we are pushing is so important, is with forestry even if you have a carbon price today of maybe $15 a ton, that will not do very much to encourage people to preserve trees in tropical rainforests especially with the price of food because of certain biofuels policies of certain countries going through the roof, that will not be enough. But the key point here is a tree is not just an emission flow, it is a stock, and if you are looking at along this yield curve of carbon prices and you can see that the value of carbon in the market 10 years from now and 20 years from now is really very high, then the value of the forest becomes an equivalent value in terms of the stock. Therefore, you can design systems, and it will not work in all societies, but it could possibly work in the main economies where this is occurring, but it all has to come down to an economic value for carbon and I think this is a great opportunity that you can preserve tropical forests and have all the ancillary benefits, the ecological benefits and all the other benefits, what you do not want to do is create a system where you are destroying old-growth forests to have harvest forests because you get exactly the same value from the two. They have to very carefully design it. There are good markets and there

are badly designed markets and good markets work well, badly designed markets work very, very badly. Just look at the U.S. housing market at the moment.

MR. PASCUAL: Yes, Yoshi, on adaptation and any other topics that you wanted to touch on.

MR. NISHIMURA: Thank you for that. As far as adaptation is concerned, yes indeed it is a huge problem and as a matter of fact, at Bali we have made some progress which was tangible and something which we have not had. Therefore, I think it is incumbent for the G8 and other mechanisms to carry on that impetus and produce something more positive. Of course there is a huge interest on the part of G8 leaders on adaptation, but adaptation is a kind of difficult thing. As a matter of fact, borders are almost to the official development assistance and in development assistance we do all sorts of assistance. Therefore, we really do not think we need to draw a defining line between adaptation and development assistance. It is really futile.

One proposal, a very, very personal proposal, is for the entire international community to get together on adaptation, not as a broad discussion in the big theater. I think we should come closer to the reality and that means that let's say for example that sub-Sahara has got a totally different situation, their own situations and difficulties and plights

and so on which are different from other areas. So why not we get together to assist and to look into what is needed in adaptation in area A, B, C? This way, on a regional basis, we can focus our attention and our resources most efficiently. So that is something which I always think about as a possible way for us to go forward with adaptation. Because after all we need a huge sum of money as things go from bad to worse.

MR. PASCUAL: Yoshi, and Warwick, let me thank the two of you. Just a couple of things in closing: one of the things I would underscore -- for those of you who have a regular relationship with Brookings, you already know this – there is no "Brookings view" on any given issue and so Warwick and Pete Wilcoxen have been leaders on doing this work and taking a very creative approach to dealing with this question of how do you price carbon in a way that can make sense and produces economic benefits. This reflects the outcome of their research. It's not a Brookings position but we're very pleased to be sponsoring that research together with them.

Particular thanks to some colleagues from Hitachi, one of whom is here with us. Hitachi has taken a special interest in the inter-relationship between technology and climate change and has helped us be able to undertake some of this analysis, including some technical

contributions to understanding the impacts of the different technologies, and so we're very thankful to Hitachi for doing that.

And then to the Government of Japan, who made it possible for us to have this session today, in particular with Yoshi Nishimura, and in particular to Yoshi who has just flown from Tokyo to have this dialogue with us among with a few other things. We're especially appreciative of your willingness to take the time and share insights about how Japan is handling your approach to the Hokkaido summit, and we hope that we can continue to be helpful to you as you proceed along that track.

Thank you very much all of you for your patience and your interest in staying with us this afternoon.

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