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THE NEW AUSTRALIAN APPROACH

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P R O C E E D I N G S

MS. BRAINARD: Welcome. It is my pleasure to have here with us today two of Brookings' farthest-flung or at least the most farthest-flung Nonresident Senior Fellows Warwick McKibbin and Peter Wilcoxen, who have recently had a lot of impact, in the sense that a proposal that they have put enormous energy and analytical work into over several years has now been adopted really as the policy in Australia in a really remarkable shift of, I think, political positioning. So I think this news came out a few days ago, so Warwick is here to tell us exactly how it happened and what does it mean. Warwick is going to first talk through the specifics of the proposal and then he and Peter together will take questions from all of you.

Just for those who do not know him, Warwick is currently the Director of the Center for Applied Macroeconomic Analysis at the Australian National University. He has been affiliated with Brookings for many years, he was a Resident here years ago, and has a doctorate from Harvard. And Peter Wilcoxen, also I think a Harvard doctorate, is a Nonresident here at a professor at the Maxwell School at Syracuse University, and that have been collaborating for many years now. Warwick, over to you.

MR. MCKIBBIN: Thanks very much, Lael, and thank you all for coming. Thank you also to the Brookings Institution for supporting this research on climate change since 1991 well before it was fashionable or a hot topic. And

also I would like to thank Jan and Patrick Davies who have also supported this research financially.

Several weeks ago the Prime Ministerial Task Group on Emissions Trading presented a report to the Prime Minister of Australia and the Prime Minister announced in early June several weeks ago that many of the proposals that were outlined in this report would be adopted by the Australian government. Although the text of the document sounds a little bit like the Kyoto Protocol language, this really is quite a fundamental shift certainly in the climate policy debate in Australia and could be the beginning of a shift in the debate internationally.

I should mention, by the way, that my role is to present, my colleague Peter Wilcoxen's role is to translate it into American English for you.

What I want to do in this presentation is first to lay the context, how can it be that a country that was even more fossil fuel dependent than the United States, that did not ratify the Kyoto Protocol, that had some policies in place but really did not look like taking serious action, has all of a sudden moved forward in a fairly dramatic way in a very short period of time. I want to outline the context and I want to talk about the approach taken by the task group and again to point out that it is a philosophical shift away from the Kyoto Protocol.

In comparing it, the best thing to compare it to is the DNA from which it comes and that is to compare the actual policy to the philosophical

approach of the McKibbin-Wilcoxen blueprint, or as I like to call it, the Brookings- McKibbin-Wilcoxen plan or the BMW of climate change policy. The critical point is the difference between our approach in theory and the actual policy relates to the credibility of the long-term goal and how the permit allocation mechanism might work, I will talk a little bit about what remains to be done, and then offer a conclusion.

The context here is very, very similar to the United States. Indeed, you could scratch out the word Australia and insert the word United States. Australia was very vulnerable to the Kyoto approach of targets and timetables primarily because of our reliance on fossil fuels, but also because the Kyoto approach ignored fundamentally the costs of taking action. The government in Australia as in the United States rejected Kyoto but did not have a comprehensive approach. There were subsidies for R&D in specific types of renewable energy, but it was realized by quickly that this piecemeal approach, the patchwork approach, the industry handout approach, really was not what was required for the sort of deep cuts that we were facing potentially in the future.

The debate in Australia was muffled as it has been everywhere because of the mantra that Kyoto was the only game in town and the idea that you would propose an alternative was really pushed aside by people who really cared about climate change issues. But in the last several years, countries who have ratified Kyoto have realized that they are not going to reach the Kyoto targets.

Industry in Australia was becoming increasingly concerned because they had very large investment decisions to undertake and really did not know what the price of carbon would be, what the policy context would be, so the lack of action or the lack of clarity actually was having increasingly large economic consequences, so industry started to push for a clear policy. Developing countries had announced at several meetings of the COP (?) that they were not going to take binding targets and timetables again largely because of the unknown costs involved in this strategy. Meanwhile, the science of climate change was becoming more and more compelling. We had the RPCC reports, the Stern Review, and an increasing awareness that deep cuts may be required.

Last year the Prime Minister convened a review on nuclear energy on which I was one of the six panelists, and we managed to put to the forefront of that discussion on technology the need to have a carbon price before you could even consider the technological solutions. Political pressure began to mount on the government primarily I would argue because of the drought, the worst drought in 100 years, perhaps not related to climate change, but nonetheless brought home to everybody, particularly the voters, that climate change of some description was happening. And there was a need for an alternative, and after 10 years since the original publication of the Brookings paper we wrote, and 5 years after our Brookings book, there was a policy sitting there to be debated as a possible response.

Now onto some details. Just to make it clear that the task group approach is not Kyoto. Kyoto is about targets and timetables, very precise targets, very precise dates at which these targets will be hit, and very little concern about the costs of reaching them. Secondly, Kyoto is all about a centralized approach; agree at the top and force it down across countries, and so it is very much a top-down strategy.

The task group approach is setting goals for emission reductions without specifying exactly what the timetable would be, but outlining what a timetable might look like, but applying policy to steer emission reductions toward that goal at minimum economic cost. The second aspect of the strategy is to bill it as a set of national systems that are eventually joined together in a globally cooperative framework. So it very much a national based set of actions coordinated together to create a global system.

This is directly from the report and it looks very much if you read it like many of the papers that were published through Brookings, and very much like President Bush's recent statements on what policy should look like. Firstly, you need to engage the top emitters, you need to provide flexibility to deal with the national circumstances, and you need to address competitiveness within your own economy. This policy will change your competitiveness. The need to couple short-term actions with a long-term focus. The need to integrate climate change with energy security and sustainable development policies. That debate possibly

is not being had as strongly as it should be inside the Beltway. Addressing the need for adaptation to the impact of climate change. And finally, to deliver something which is politically acceptable from an equity point of view.

So what are the details of the task group's approach? Firstly, as the long-term aspirational emissions abatement goal specified in series of gateways at every 5 years to monitor how you are approaching the target you have set; to maximize the coverage across all sources -- and all greenhouse gases; to create a system of permit allocation and a method for issuing these permits initially and over time; the implementation of a safety valve emissions fee designed to minimize the economic cost during the transition; and the need to recognize that you -- to a global system at some point in the future.

So how does the TGA work relative to the McKibbin-Wilcoxen blueprint, because again they are extremely similar but there are some important differences? The task group approach requires emitters to have an annual emission permit. It creates a package of date-stamped permits perhaps out as far as 40 years. So instead of just issuing an annual permit, you issue permits along a profile related to the target you are trying to achieve. You allocate these permits to industries, in particular those that are most affected. And you auction some and you keep some aside for future allocation depending on how much flexibility you want to have at a time.

Allow those initial permits that are allocated to be traded in the market. Let futures markets emerge. Have a safety valve in place just in case in any given year there are not enough permits and the costs are too high. And every 5 years reassess whether to auction more permits to loosen the long-term targets. This is summarized in Figure 7 from the task group report. The blue line at the top is the base business as usual. This is actually an exaggeration. In just any country, business as usual would be exponentially rising as distinct from flat and rising. The red dotted line is the aspirational goal. This is where we are trying to get to. As you can see, deep cuts relative to today. And the circles are the gateways where every 5 years you assess what we know about the science, what we have seen in terms of abatement costs, and to reallocate some long-term permits if required along the pathway. You can see those two pink lines above the red line. They are cases where you may actually either tighten the constraint or loosen the constraint as time evolves.

In terms of the pricing, the idea is to get, and this is a graph of the price of carbon into the future where time is on the bottom axis and the price is on the vertical axis, the red line is the expected price as you look out into the future along what is effectively a yield curve for carbon. So what is critical in this approach is not what the price of carbon is today, but what the price of carbon is expected to be 5, 10, 50 years into the future, because that is what is going to stimulate the investments in new technologies, not the price of carbon today

which is the cost to the economy. To prevent excessive price fluctuations or to prevent excessive costs, the safety value emissions fee is overlaid above the price profile so you know for sure that there will not be any excessive costs over time.

What is the McKibbin-Wilcoxen blueprint? It looks very similar. We require emitters to have an annual emission permit. We create long-term permits out as far as 100 years with a declining profile over the next 100 years in an allocation. We allocate these long-term permits completely. We do not hold any in reserve. We make the targets credible, we issue these into the market, and then we move forward. We allow these long-term permits to be traded in the market, and that is essentially the futures market for carbon. We allow the annual permits to be traded in the annual market. We also have a safety valve, except instead of paying a fee to the government, you pay a fee to the government for a permit that you trade on the annual market. It is almost identical. This is only used if you do not have enough permits in a particular year given the costs involved. And then every 5 or 10 years we assess where we are at, we reset the price cap, and we move forward.

This is a graphical presentation of our approach, again, slightly different to the previous graph. In this case we have emissions in the vertical axis through the future on the horizontal axis, and the blue line is the abatement path we wish to follow, where this has been normalized to be 100 in the base here. So you have this long-term path. Every red triangle, every 10 years in this example,

we reassess what the costs are we are willing to pay and we set the annual price for the next 10 years at those points.

What that implies is in this particular scenario, this is a case where it turned out that the cuts we proposed were too expensive for the economy relative to what we were willing to pay and we allow the safety valve to kick in, and these pink lines show you the actual emissions achieved through the period through time.

What that looks like in terms of the permit market is assuming that we did not allocate enough permits initially, we are bouncing along the safety valve price and every 10 years because we were not getting abatement, we raised the safety valve price until by 2050 the price is roughly $140 per ton. This is a market that is actually existing through time so you can pick out the price point at any point from now for the next 100 years on what the price of carbon is expected to be in the future.

These are the annual permit sales to go with that scenario. As you recall, we exceeded our target for quite a few decades and so the permits over time were issued in the annual market that then evaporated, but eventually we managed to move the price high enough that eventually we smoothly transitioned onto the target we were trying to achieve. This is just one of many scenarios that would be possible.

What is important here is that the value of the long-term permits, this is the bundle that is initially allocated, can be quite high. Here is an example for the particular scenario we have presented. In 2007 when the system begins, the value of a long-term permit which is the right for a permit every year for 100 years decaying exponentially is $1,000 under that scenario. So these are very valuable assets because what we have done is we have taken the carbon emission rights of all future generations, putting them into a market, and giving them away to the existing generation. That is how we can compensate all the political constituencies today for taking climate policy action because it is in their own financial self-interest.

What are the key differences between these two approaches? Firstly, in the task group approach, the long-term aspirational goal in my view is less credible because you do not actually precommit absolutely at the beginning, you allow the government every 5 years to issue more and more longer-term permits, so the goal is less precise. There are also three steps in that approach, the initial target, the reissuing of permits, and the safety valve, whereas you only need two if you are trying to minimize economic costs as we are.

The third point which I think is important is our goal for developing this system was not just that it would work in Australia or in the United States, but in fact you could take the same philosophy and implement it in a developing country. If we are going to take effective climate action, it cannot

be that we just deal with emissions in Australia with 1-1/4 percent of world emissions, it really does not matter. What we need to do is to get our approach into China, India, Brazil, Indonesia, and the United States so that we begin to take some sensible action.

The credibility of the future price is the key of this entire approach. It is the current carbon costs that drive the economic costs, but it is the future price of carbon that drives technology. So the argument you hear people make is that $20 per ton of carbon will not do anything is not the right way to think about it. Yes, $20 per ton of carbon today may not do very much except for conservation purposes, but a rising price into the future that starts at $20 per ton is going to do a lot for technology relative to zero carbon prices in the future. So it is this rising future price that matters, and again, the Australian government approach of reissuing these medium-term permits I find is a political compromise that you really do not need to make.

There is also an issue about allocation. In the TGA approach, this initial bundle of permits of different durations are basically concentrated in industry's hands, whereas we would argue that these long-term permits actually should be given to consumers who ultimately will be paying higher energy prices and so we would have an allocation mechanism which is fair because consumers will have to pay, but secondly, we want consumers to be aware that the price of carbon is something very important. So they can own these long-term rights and

their superannuation and retirement funds, the daily news will have the price of carbon and the futures price of carbon just like it has the price of coal, oil, and gold, and this would increase the amount of awareness in the economy as well as incentives to abate across the board.

How do you apply this system to developing countries? This is really quite important. Here is an example I will present where we implement the system in China and China decides to allocate more than their current emissions in their system, either twice or three times. Remember, in the system we have devised you are actually allocating far less than you need so that you are always bumping up against the price cap and that is how we get a price-based system rather than a target-based system. Here is the same graph where Australia again is following that scenario of learning by doing and raising the price every 10 years because abatement was not achieved quickly enough. You can see in China if there is double their current emission allocation, the short-term price of carbon in China is zero. Why is that? Because the annual permits that you require to emit, there are more available in the economy than the current emissions. So the short-term cost to the Chinese economy is zero.

But you can see that in this scenario as China grows, as emissions grow, they bump against their cap, the price starts to rise, and by 2030 in this scenario the Chinese price of carbon is equal to the Australian price of carbon not because we are trading carbon rights, but because we have the safety valve cap set

to the same level in both countries. You can see that if you give China triple the emissions or China sets in place triple their emissions, it take a lot longer to hit the cap but they are part of the system and they are part of the global approach.

What do you value of long-term permits look like? This is what is critical in China. If you give China a double allocation of the present value of this carbon constraint is actually quite large today. In Australia it was $1,000 per ton, in China it is $750 per ton. So even though provider is not paying the price in the short term, they certainly have got very strong incentives for putting in place alternative technologies because they will make a profit from it; not because it is the right thing to do, but because they actually find it financially a very good idea.

The more you allocate, the longer it takes, but the point is you can see that China is moving in the same direction as everybody else and this is very important when you are dealing with migration of industries across borders because of relative carbon prices.

What is left to do? What is critical both in this country and in all countries is to have bipartisan support for the policy. There is no point in having carbon policy with one party arguing one approach and another promising to abolish that and implement another approach in an electoral cycle when the story we are talking about is commitments over decades, not over years.

In the Australian context, the Australian Labor Party, the opposition has a medium-term target and timetable. It is very much in the Kyoto

frame of we will cut emissions by 60 percent by 2050 without saying how much it will cost, without knowing how much it will cost, and this is a real problem. The government's approach only has an aspirational goal but too much flexibility. So you have these two contrasting approaches, a Kyoto, rigid approach, and an approach which philosophically is very clever, but still I think has too much flexibility. What you should do is put the Labor opposition approach to target into the long-term aspirational goal, issue the permits as we argue in the McKibbin-Wilcoxen blueprint, and you have a bipartisan approach, you have taken the best parts of the two positions and formed a uniform policy.

What is the conclusion? In summing up, I think the task group approach of report is a very important document because although much of the language sounds like Kyoto, it actually moves a long way from the Kyoto targets and timetables and philosophy, focuses on the need to price carbon in the context of minimizing short-term economic costs, but focusing on long-term climate policy credibility. My view is there is now a new approach on the table and it is actually available for those countries who have rejected the targets and timetable strategy like Australia and the United States, those countries that have signed Kyoto but do not have targets and timetables like most of the developing world, and those countries that have ratified Kyoto but actually have no chance of hitting their targets in this commitment period like Canada, New Zealand, Japan, and

parts of Europe. And so now we can actually have a sensible debate on climate policy which we have -- to have for the last decade. Thank you very much.

MS. BRAINARD: Thank you. Peter, did you want to add anything?

MR. WILCOXEN: Questions, I think.

MS. BRAINARD: Let me ask maybe the first one while the audience gets ready to, and I think there is a microphone somewhere in the room, and just please identify yourself before you take the microphone.

Warrick, you talked about the potential migration of industries when you have different climate policies in different countries, and this is a country-by-country approach. What would the trading system need to do to be able to support differential national policies?

MR. MCKIBBIN: What is critical here is that each country is running their own permit trading system. In our system you would either start as each country individually joining them together, or you could do it as a global system, but critically, there is no trading of permits across countries. So the Chinese permit is not traded in the Australian market. There is no need to do that because if you need permits, you can buy them from the government for this year. That is what the safety valve's purpose is. So it actually delinks economies in terms of the trading system and that is absolutely critical because the institutions in developing countries who would support the value of these permits because

after all they are promises of governments, those institutions cannot possibly equate the values of those promises and so you would end up with a system that would fall to pieces under its own weight because never could you verify whether or not a Chinese permit unless it said made in China was of any value and this is the problem we have seen in the European trading system. The overallocation of permits because governments had incentives to actually protect their own domestic industry, these permits were overallocated, so therefore the value of everyone's permits fell very sharply because there seemed to be of equal value in the market and if you do not design the market properly the market will not work, and that ETS has demonstrated that.

MS. BRAINARD: What about the trading of goods when you have very different carbon prices in different economies?

MR. MCKIBBIN: Firstly, there is differential pricing, so if you are a very fossil fuel intensive exporter and you have a carbon price in your input, it will raise the price of your goods. But if you have a price system like we have, a carbon system where the value of capital is protected because you have a risk-management strategy in the market itself, the cost of capital in those energy intensive industries will go down. So if you've got a low enough carbon price, you will find that the gain in competitiveness from lower capital costs could actually offset the higher carbon prices.

The most fossil fuel intensive industry is aluminum and the biggest input in aluminum is not electricity which is what most people think, it is actually capital. So what we would hope is a system like ours which would give you a capacity to manage the risk of these big investments, because you know what the carbon policy is, you can use the long-term market to hedge your investments in carbon intensive activities, that you will not want to migrate from that economy because why would you? You can hedge, you can see what is happening in the market, and you know the policies, whereas in many other countries you have no idea.

MS. BRAINARD: There is a microphone in the back here. Yes?

QUESTION: If I could, a small two-part. I like your analysis like markets, and in terms of permits and trading across countries it reminds me a lot of maybe a future currency market in which permits are obviously valued at different levels varying across countries. I was wondering do you think that as a part of national foreign policy for countries like Australia or the U.S. if it is adopted in the future, countries like the U.S. or Australia would consider tariffs or things of that nature on permits like, I know it's very general, maybe just commenting on that.

Then another quick question if I could, in the U.S. right now, the trading emissions program we have or at least the little bit I understand of it, in terms of corporations there is a lot of cheating in the current emissions trading

market. How does Australia in the government's new policy plan on cracking down on corporations just cheating the system as a whole and emitting as much pollution as they want, and how would you recommend other countries especially China that cheats all the time in a lot of different manners of its economic policy, how would you get -- I know those are two broad themes, but thank you both.

MS. BRAINARD: Peter?

MR. WILCOXEN: I'll take a stab at that and then, Warrick, you can chime in if I miss anything.

The first thing to emphasize is that under our system the permit markets are all national markets rather than international markets so there is no trading of permits across borders. So there would not be any need for worrying about tariffs on imports of permits because they would not be flowing across borders. There has been a lot of talk about applying something that is kind of like a tariff called a border adjustment that would adjust for differences in carbon content of different products. We have done some analytical research on that, some numerical simulations, and that turns out not to usually be a very desirable policy for the countries that are thinking of adopting it, but that it is something that you would likely to see in the debate if there were differences.

MS. BRAINARD: Can you elaborate the reasons?

MR. WILCOXEN: The reasons that it does not look so great are the usual reasons that tariffs do not look great to the country which imposes them,

it raises domestic prices a lot, and it turns out in this case that it does not benefit domestic industry very much. I actually have a paper on that probably on the website.

The question that you asked about cheating, and monitoring and enforcement, I think is very, very important. We do not have a civil board solution for enforcement, but having permit systems that at the national level means that national institutions and fraud statutes can be applied, the existing legal system is there. Whereas under the Kyoto approach which is an international system, basically entire new international organizations have to be developed to do the monitoring and enforcement. So the national-level system at least has an advantage that it can use existing institutions.

MR. MCKIBBIN: Can I just follow-up with two points? One is on the point about institutions and domestic focus, the property rights that we are allocating are only tradable within the country, so all the transfers are within the country. So if one company cheats, they are not hurting a foreign corporation or a foreign citizen, they are hurting someone else within this country which means that the national government has an incentive to monitor and enforce those property rights much more than they would if actually the net beneficiary is offshore, because why would you bother.

The second point is your comment on currency markets is absolutely critical. The reason we do not have a single world currency is because

we do not have a single world government of equal credibility across the board, so you get pockets of national currency. In Europe you have the Euro which is a group of countries that maintain equal credibility. You could do that under our system. You could have a European-wide system. You could have a system with Australia, Papua New Guinea, and New Zealand, small groups of players, but you would not have a global system for the same reason you do not have global money.

MS. BRAINARD: There is one right here.

MR. SMITH: Bruce Smith, former Brookings, George Mason. Two questions, Warrick, for your very ingenious system. How would this differ from say a direct taxation such as the British BTU tax, and I am not quite sure how that works, in terms of a cascading effect like a VAT? But there is a tax presumably that goes into effect that is mandatory and some end user has to pay it. I am not quite sure how your plan would work. But related to that I am just trying to grasp in my homespun way, let's say I am an airline and I want to go into business. How do I know how much carbon I use? I have gasoline for my airplane; I have planes that have to be manufactured. Do I pay that in some cascading effect? Where do I go to reach this carbon permit? Do I need that before I can fly my airplanes? Just a little bit if you could explicate how the practicalities and modalities of such a system would actually work.

MR. MCKIBBIN: That is a very good question. Firstly, our system is what is called a hybrid. It is a combination of taxes and permits. We are putting a price on carbon which is what a tax does. The existing allocation that we give out at the beginning, the revenue from that price goes to the people who own those permits rather than the government. When you have new permits coming in for the safety valve, the government is selling those and that is a pure tax. So you have a combination of a permit system and a tax.

The second issue is who actually has to have a permit. Under our system we would start at the very top end of energy generation, or if you want to go one step further, the miners of the primary energy are the ones who have to have the permits, not the aircraft manufacturer, not the aircraft company. But the price of those permits will be reflected in the price of fuel, the price of electricity, the price of gas. So those energy sources which are very fossil fuel intensive will become more expensive and that is how the price effect filters through the demand side of the economic, and that is critical.

You can move down as much as you wish in terms of who has to have a permit, but the deeper you go the more expensive it becomes, and we do not think it makes sense to have people at the gas tank filling up their cars and pulling out their carbon permits. It is better if the oil refinery or the oil importer actually has the permits. The second issue is that we would have permit

requirements on importers of primary energy to offset that aspect of the competitiveness issue.

MR. WILCOXEN: I would just like to add a little bit to this on the question about how is this different from a tax. The politics I think are strikingly different from a tax in the following way. With a tax, energy users have to pay the tax into the indefinite future and they are likely to be unhappy about doing that and there may be calls for the tax to be repealed. Remember that we are trying to put into place a policy that will last indefinitely, decades and decades through different political administrations with different priorities. Under our system where a large block of the long-term permits are given out, we create a constituency of people who have a vested financial interest in the policy being perpetuated. They own an asset whose value is entirely dependent on the policy being enforced and carried out. So one of the big differences from a tax is that we essentially divide the electorate into two groups one of which is the energy users who may be expected to lobby against the policy, but the other is the owners of these long-term permits who have under the system very deep pockets and a big financial stake in making sure that the policy continues. So that is the second point I wanted to make.

MS. BRAINARD: John?

MR. WILLIAMS: John Williams from the -- Institute. I would like to follow-up a little with the contrast between the carbon tax and the three

versions that you have discussed today of a cap and trade system. The big difference is indeed as has just been said in giving the property rights, giving the rents, to existing carbon emitters which presumably gives an incentive -- that such a system is about to be imposed to emit more carbons as you get more carbon rights which they can then enjoy for the next 100 years. Whereas with a tax, it all goes to the government and it is wrong to suggest that there is no political constituency because if you increase taxes on carbon users, you can decrease taxes elsewhere in the economy and so you can get there a political constituency which will be opposed to reducing the taxes in the same way.

MR. MCKIBBIN: Just on the constituency question, that is true, but what we are doing is putting the property rights directly in the hands of that constituency that would most likely oppose it and so we are cancelling it out directly.

The second point is that although we are giving out a proportion of these permits to existing activities, they would be based on a benchmark year which is not in the next 5 years, but probably the last 5 years, or even going back to the Kyoto targets and benching it to the Kyoto targets. That way we could take the politics of Kyoto and merge it into the politics of the new system.

Secondly, once you receive these permits, the reason that you are giving them to existing industry is because they have capital-intensive investments which are very expensive to change and so the value of their capital

would drop. The way we would compensate them would be to actually give them enough permits to offset that loss in the value of capital. Then at that point, new industry and existing industry have exactly the same incentive as to how they behave in terms of their energy decisions, because a unit of carbon whether you buy it or whether you do not sell it is going to have exactly the same impact on the bottom line of your corporation.

We are talking here about the difference between transfers which is the allocation mechanism, and the actual incentives at the margin which is independent of how you allocated the initial property rights after the system gets going.

MS. BRAINARD: Right over here.

MR. PATTERSON: Andy Patterson with Econergy. I am betting that you are going to have to adopt some kind of commodities board as we do with agricultural commodities because in a sense that is what you are creating especially as you stress test your regime with the volatility in let's just take the oil market where if we get a disruption in the Gulf it does above 100 and there is tremendous pressure to have relief regardless of where you set the cap. On the other hand, if we have turmoil like we had in 1998 in Asia where the oil price collapses down to 12, you get a complete collapse of technology and investment to curb carbon usage.

Are you going to have some kind of commodities board that gets more involved in addressing this kind of turmoil in the market like we see in agricultural commodities?

MR. WILCOXEN: On one side, the upward price spikes would be handled in this system by this safety valve mechanism which allows people -- if it turns out that there is a year where there is very high energy demand, a cold winter or something like that, under a rigid permit trading approach, that would cause a spike in the price of permits that might be very high. Under our system, that would end up translating into a bunch of additional annual permit sales, but a cap on the price, so we do not have the same problems with upward price volatility that you would have with the oil market.

As far as the other side, the temporary drops in the demand for markets, those would be annual phenomena, but because we are handing out long-term permits and most people expected the demand to be low indefinitely, the long-term permits would still retain most of their value because people would see it was only a temporary drop. The commodities examples you are thinking of now are purely spot market prices year to year, and ours has both the spot market and it has this long-term component because the long-term permits last for long periods of time.

There probably would need to be some kind of regulatory agency or organization to oversee things, but we should be more robust with those kinds of price volatilities under this system.

MR. MCKIBBIN: The way to think about this if I can just add is we would run this system like we run monetary policy where the long-term permit market is like the long-term government bond market. That is what is driving the investment. But the spot price is actually controlled by the Fed, so we would have a Central Bank of Carbon. The Central Bank of Carbon in Australia would always be the governor, but the Central Bank of Carbon's whole role is to set the short-term price or to prevent it from rising above a certain amount. Why do we that in monetary policy? Because there is no value from volatility in short-term interest rates, as there is no value in volatility in short-term carbon prices, and because we are dealing with promises rather than physical commodities, we can control the price in the short run. So we move from the short run to the long run, we go from a fixed price flexible emission world in the spot market, to a fixed quantity flexible price world in the long term moving and smoothing all the way through the time profile, and that is exactly the analogy, exactly like the money supply.

Why did we stop targeting money in the United States and every other country in the world? Because there is no point in having a certain amount of money at a point in time if the interest rate was highly volatile. The second is

the same argument for carbon. There is no reason we should have a certain amount of carbon in a particular year because it is not the carbon flow that matters, it is the stock of carbon in the atmosphere and if that comes quickly and then slowly or evenly over 3 years, it does not matter, and that is the logic behind this approach.

MS. BRAINARD: Right back there?

QUESTION: I an Kaitlin and I am with RCA Network. My question concerns the initial allocation of permits, and particularly, you said that half of it will go to households. I am wondering how this will affect the low- to middle-income households who will be most affected by a carbon price and how --

MR. WILCOXEN: I think the short answer to that is that the government that adopts our proposal could allocate that particular block of permits in whatever way it wanted to and it could allocate them specifically to relieve regressivity of the tax if it wanted to do that. We do not actually specify how that premise would be handed out.

MR. MCKIBBIN: We do in Australia because I feel I have a right to say how Australians should receive permits because I am Australian. I have no right to tell the Americans or the Chinese how to allocate within their own economies. The distribution is a national issue. In New Zealand, for example, they would auction them most likely. So it just depends on the allocation you

want to have as a national body. That does not affect the global system in any way whatsoever, but it does under a Kyoto style system, it affects it a lot.

MS. BRAINARD: In the back?

QUESTION: Given the decentralization as opposed to an international approach, how can you prevent industries from simply transferring to countries with lower carbon prices thereby counteracting your financial incentive to have a lower carbon price?

MR. MCKIBBIN: The first point is that the reason that they would relocate is presumably an economic reason. So if you are in Australia, let's take that example, we have our system where you've got a capital investment, you've got a futures market that you can hedge your heavy investment in capital against future carbon price changes so you've minimized the risk. Where would you move that to? Would you move it to Indonesia? Would you move it to Indonesia? Because you've got a gain in lower carbon prices today but you have no idea what the carbon price in Indonesia will be in 20 years' time. You've got the national risk that we currently face so we don't get mass migration of industries to these countries already. But really it is the idea that you can lock in a hedge to the investment that you are undertaking.

And if the other countries take it on board which is the goal here, then there is no incentive to migrate once everybody has got the same system, but

there is a problem in the transition from the beginning to where we would end up in a global system.

MR. WILCOXEN: Just to add a little bit to that, for most industries, energy costs are a very small part of their total costs. There are some exceptions like aluminum, but for those industries, the change in their costs due to a policy like this where there is a cap on compliance costs introduced by the safety valve means that there is not really very much incentive to move. As Warrick mentioned earlier, most of the industries find their costs drive mostly by access to a skilled work force, capital, reliable legal systems, and there is a very large of empirical literature in the environmental economics field that shows that firms do not relocate very easily just to take advantage of more lax environmental rules.

QUESTION: John -- International Monetary Fund. I have found the work for McKibbin and Wilcoxen very useful, but I think it is a little bit surprising to me that what you are proposing now here I know some work earlier of yours particularly the article in -- Perspectives a few years ago where you were arguing very strongly in favor of taxes. Now it looks like you are changing your mind a bit. But to me it seems like a problem here is that you might have very different prices in different countries of these emission rights which of course essentially would be a sign of inefficiency across countries. You may not see that as a first approach problem because you are getting something started and maybe

over time things are going to sort of converge into something more efficient over time. That might be the case.

But I see some other problems here. One problem of course is the issue of start-ups of new major firms. You see that just like in the European Union system now that that might be a bit difficult with these initial allocations to existing firms. The other issue is of course that the loss of tax revenue was also mentioned here by somebody else. Giving these handouts to households of course partially deals with that, but it does not deal with the issue of major efficiencies on the general tax system which might be rectified to some degree by lowering general taxes.

Another problem here is you are saying that these emission rights as they are sold become a more secure asset for firms than maybe what will happen under a tax system where taxes might fluctuate by the whim of governments over time. But I think you might have the same problem here if you have a government in the future that is going to be very lax, going to be very permissive, it might increase the total quota for emissions and that is going to reduce the value of these emission rights. If firms look ahead to that possibility, that is going to make things less uncertain for firms in the future. So there are some problems at least with the proposal here.

MS. BRAINARD: If you were a candidate, the first part of that question would be the flip-flopping question.

MR. WILCOXEN: So let's start there. The article that you mentioned, what we emphasized in that article, there was an advantage of taxes is that from a strictly economic efficiency point of view, taxes would be an ideal way to address climate change. We are worried about carbon emissions. We want to reduce carbon emissions. So if we impose a big tax on carbon emission and a tax remained in place indefinitely, that would reduce the problem. But in the article I think if you go back and check it, you will find that we actually went a step further than that to say that a problem with taxes potentially is their political sustainability, that a tax may be an ideal economic instrument, but because of the huge distributional effects that it has, the amount of money that is collected over the long period of time that it is probably not a sustainable political option. So we went a step further in that article and proposed a hybrid scheme like the one that we were talking about today that involves long-term permits and at the margin a mechanism that operates like a tax which is the safety valve.

So I think the overall emphasis of the article was to go beyond taxes to arguing for a hybrid policy on the grounds that it is both economically efficient and politically more sustainable. Do you want to add to that?

MR. MCKIBBIN: No, keep going. I'll wait.

MR. WILCOXEN: Another point that you mentioned is that under our system of decentralized national policies, there would be different prices of carbon in different countries and that that might be from an economic point of

view not perfectly efficient. We recognize that, and basically we accept that as the cost of getting an operating policy off the ground, that the inefficiencies of carbon abatement between different countries are small compared to the problems that arise if we do not have the policy at all or have a policy that has really no effect which is the case with Kyoto.

You also mentioned a concern that we have heard before which is about the potential for anticompetitive behavior by permit owners after the permits are distributed. If they end up essentially being monopolized, there could be one conglomerate or a coalition of firms might drive the price of permits up and reduce the possibility for other firms to enter the market. But remember the market we are talking entering here is a market that involves burning fossil fuels and so from an environmental point of view, if there were a group that got together and restricted trade in these things and drove the price up, it would mean good news for climate change, it would mean lower emissions, and whether that is an acceptable outcome within any given country would be up to that country's equivalent of the SEC and the FTC to decide.

Then the last point is that you mentioned what about permissive governments in the future flooding the market with additional permits. That is certainly a risk. The problem in a democratic society is that governments can essentially not do anything to bind their successors. So the advantage that we see in our policy is that at least we can create a financial stake in the private sector in

maintenance of the existing regime. So if you imagine in the future that a permissive government is floating the idea of relaxing the target by issuing more permits, the existing permit holders lose a lot of money because their asset is debased and so we think it is a feature of our system that those people will be motivated to send their K Street folks down to the Capitol to prevent that from happening. We have no guarantees, but at least we have a constituency in favor of the policy.

MR. MCKIBBIN: What matters too is always when you are comparing policies is to compare it to some illusionary optimal policy because there is not one in the climate change area. But in our approach, we try to focus as much incentive as we can within the domestic constituency because there will be winners and losers if you change the policy, but at least there are localized. Whereas it is quite obvious if a government needs lots of permits as currently under Kyoto, they are not going to stick to the system because why would that transfer tens of billions of national wealth to another country to abide by a national agreement that was made in 1997? So you keep the politics local, but it is not foolproof. If the government decides to renege, they can tear up the property rights as they do in some countries; we have just put incentives in place to minimize the chance of that.

The second point that you make is, and John made it as well, what about all this wonderful revenue that you can take and do wonderful things with?

The problem I have with that is I would like to know how many governments in this world have actually done that. What happens is the revenue goes into the coffers of the government, the government then gets lobbied by all sorts of groups, that money gets redistributed and has nothing whatsoever to do with the problem you are trying to solve and you lose yet another opportunity. What we are saying is let's put the revenue flows directly back in the hands of those who obeyed. So we are lining up not only the tax incentive to abate, but the revenue goes to those companies or those individuals who come up with ideas that lead to abatement. So we take the government out as much as possible except at the margin where there is a tax.

So we have the government in there, they have an incentive, they are getting revenue, but most of the action is in the economy which is where it should be. It is the economy that is going to generate the technological innovations, not the government. It is the economy. It is the businesses in the economy, and that is where the revenue should be.

MS. BRAINARD: I think we need to wrap up at 2:00, so why don't I take these last two questions and then we'll just give Warrick and Peter the last minute or two to sum up or answer the questions. There is one in the back, and there is one right up here.

QUESTION: I wanted to tie your analysis down to nature on the ground, so to speak. This is Michael -- from George Washington University. In

the Stern Review there is a chart that shows that above 450 parts per mission CO2 concentration there is great stress on coral reefs and the Amazon, but they recommend a target of 550 which was suggested (inaudible) coral reefs and the Amazon. Is your model completely agnostic or indifferent to the survival of natural assets, the Great Barrier Reef in particular, or do you set your targets or do you see particular pathways as more important to follow and precisely to preserve the unique natural assets?

MS. BRAINARD: Actually there is one more back there behind you. Then there is one more up here.

MR. LENIN: My name is Alex Lenin from CSIS. This is a geopolitical question for your folks. One way to read the G-8 Summit is that the United States weathered the storm from the Europeans for emissions restrictions and we're looking to the September APEC Summit in Australia to build momentum for an investment-based approach toward the Bali Summit in December since the Chinese and the Indians would be at the APEC Summit in September and were not of course a member of the G-8.

The cap and trade approach that the Australians recommend is arguably a midway ground between emissions-based restrictions and the investment approach of the United States, China, and India have advocated, but it also potentially sets up a fissure within Asia between the Australians and the Japanese for one approach, the Americans, Chinese, and Indians on another.

Which outcome do you expect is more likely at the September APEC Summit? Is it one that will seek agreement among all of them or do you sense a fissure coming through the APEC Summit around the cap and trade system since Australia is hosting APEC?

MR. MCKIBBIN: If I can answer the second, and then let Peter answer the first --

MS. BRAINARD: Let me take one more quick question in the interests of time. There is one up here, and then just do them all at once if you can handle that.

QUESTION: (inaudible) Economic Strategy Institute. Again my question touches yet again on the issue of volatility of the permit price. More specifically, how does your safety valve differ from for instance the ETS system or the government approach, the TGA, in that to me it seems that because the permits you suggest are on a long-term basis, potentially 100 years of potential emissions, once they are produced into the market and allocated again and bought by corporations, they would actually create an indefinite inflation in the price of permits? It's a safety valve in the sense that it might not destruct completely the economics of the market but it might just completely deflate the price of permits, and how would you prevent that?

MS. BRAINARD: Warrick? Peter?

MR. MCKIBBIN: On the last question, remember what we are putting into the market are long-term permits that are decreasing in number so that constraint is getting tighter year by year. The safety valve is only in there to stop the price in the short term from spiking through some threshold. But the long-term price is set in the market, so the long-term price can be whatever the markets set. The short-term price is likely to be up against the cap because we are not giving out all of the emissions that currently exist so we have a mechanism to always be bumping against the ceiling unless there is some miraculous discovery that reduces carbon out of the economy at low cost, and that is actually what we want to happen. So we want the long-term market to fail ultimately because you do not need it anymore because there is not any more carbon.

On the political issues with APEC, I do not think there is a fissure at all. The AP-6 which is the Asia Pacific Partnership for Clean Development, has the key players in it, China, India, Japan, U.S., Australia, and Korea. That unfortunately has only focused on technology. What you need in AP-6 is a carbon price. The nuclear review has demonstrated how the technology argument can be swung dramatically by looking at what you actually need, so we can get I think carbon pricing into the AP-6 process. There is already a move for the Australians to push this system into APEC. There is absolutely no doubt. I have presented my work at various pre-APEC meetings to get it very much on the table. I think it is in the Japanese interests. Minister Takenaka had me Japan at

the end of 2005 three times to present our approach because the Japanese are 16 percent above their target. They cannot hit their Kyoto targets. No amount of technology in the next 5 years is going to bail out the Japanese, and they will not put hundreds of billions of dollars into China to get clean development mechanism credits, so they need something. I agree that there is some debate, but I think deep down those coalition of countries you were talking about are all of one mind of how we might move forward.

MR. WILCOXEN: I guess the hardest question here is about the coral reefs. I am going dodge that a little bit by saying that what we have focused on is mechanisms for achieving different trajectories, but we have not done a cost-benefit analysis on what the specific trajectories should be. So personally I do not think it is really going to be feasible for the world to hit a 450 part per mission target. I just do not see that that is technologically going to be possible. But our view is that we need to get a policy that is going to be long-lived and effective in place to start moving in the right direction to keep that concentration from going even higher. So I guess that is where we stand on that.

MS. BRAINARD: Please join me in thanking them for a really very interesting presentation today.

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