



Australia's Pre-eminent
Leadership Organisation

BUSINESS LEADERS FORUM ON CLIMATE CHANGE

REPORT

28 March 2007
Hyatt, Canberra

Principal Partners



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Partners



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His Excellency Major General Michael Jeffery AC CVO MC (Retd), Governor-General of the Commonwealth of Australia and Michael J Roux, Chairman, ADC.



Michael J Roux, Chairman, ADC and Sir Nicholas Stern, author of the Stern Review on the Economics of Climate Change.



Michael J Roux, Chairman, ADC, Her Excellency The Rt Hon Mrs Helen Liddell, High Commissioner, British High Commission and His Excellency Major General Michael Jeffery AC CVO MC (Retd), Governor-General of the Commonwealth of Australia.

It was with great pleasure that I welcomed leaders to the Business Leaders Forum on Climate Change. In the last six months we have all witnessed a dramatic shift in consumer and business sentiment towards climate change. While the community is anxious, and there is a strong appetite for more action, the magnitude of the challenge presented by climate change requires a considered response.

Following the ADC Australian Leadership Retreat in August 2006 which highlighted the need for new government and business leadership in action on global warming and climate change, ADC (Australian Davos Connection) initiated the first Australian Business Leaders Forum on Climate Change (BLFCC) for senior Australian business leaders, public officials and experts on climate change.

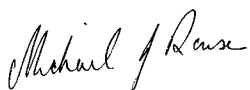
BLFCC received the strong support of His Excellency Major General Michael Jeffery AC CVO MC (Retd), Governor-General of the Commonwealth of Australia who attended the forum and also hosted a dinner for all participants on the evening of March 28 at Government House in Canberra.

The forum provided a unique opportunity for business leaders to be exposed to the very best Australian and international experts on the science and economics of climate change. The forum provided the opportunity to actively debate the priorities for action by Australian governments and business.

I am delighted that Sir Nicholas Stern travelled to Australia to deliver the keynote presentation on the economics of climate change and the need for business leadership to tackle the problem. Senior climate change experts also presented on the science of climate change, and the current and likely future international and national policy responses. This assisted leaders to develop a greater understanding of the complex and multi-disciplinary nature of the problem and the level of risk associated with it.

There was a strong focus on the positive Government and business actions that could move Australia towards a lower carbon economy and the need for action. BLFCC provided an event where senior business leaders could work towards a consensus on what can and should be done to tackle climate change, including what domestic and international policies will be effective in reducing carbon emissions and promoting investment in low carbon growth.

Thank you to those who participated in this important national initiative. At this critical time all leaders, and particularly business leaders, will continue to play an influential role in choosing the right national path.



Michael J Roux
Chairman

Acknowledgements

I would like to acknowledge the support of the Principal Partners for the Business Leaders Forum on Climate Change, Insurance Australia Group and L.E.K. Consulting. I would also like to acknowledge the assistance of HE The Rt Hon Mrs Helen Liddell, High Commissioner, British High Commission in facilitating the visit to Australia by Sir Nicholas Stern to provide the keynote address at BLFCC, and the personal contribution of Simon Barrett, Managing Director, L.E.K. Consulting Pty Ltd and Nick Rowley, Director, Kinesis in assisting ADC in developing the BLFCC program and preparing background material.

The Business Leaders Forum on Climate Change was held in Canberra on 28 March 2007.

Leaders at the forum called for greater domestic action on climate change. They agreed that Australia should ratify a new global treaty on climate change and also implement an emissions trading scheme.

“Business leaders have significant faith in the potential for market forces and technological innovation to tackle climate change, but getting the national policy settings right is a critical step. This will require strong, ongoing collaboration between government and business.”

Michael Roux
ADC Chairman

Leading Australians and eminent scientists attended Australia’s 2007 Business Leaders Forum on Climate Change (BLFCC) in Canberra on 28 May 2007.

These leaders represented a broad spectrum of industry sectors including financial services, resources, energy, manufacturing and construction.

Organised by ADC (Australian Davos Connection), the forum was opened by Australia’s Governor General, Major General Michael Jeffery AC CVO MC (Retd) with the keynote address by the author of the Stern Review into the Economics of Climate Change, Sir Nicholas Stern.

Other speakers included Australian National University’s Executive Director, Centre for Applied Macroeconomic Analysis-Economics, Professor Warwick McKibbin and the Director, The Fenner School of the Environment and Society, Professor Will Steffen, the CSIRO’s Group Executive, CSIRO Sustainable Energy and Environment Group, Dr Steve Morton, and the Director of International Strategies at the Pew Center on Global Climate Change in the US, Elliott Diringer.

The forum sought to encourage agreement about the priority of the actions that should be taken by business and government to slow the rate of climate change. It also sought to examine how Australia could demonstrate leadership in moving to a low carbon economy.

A key outcome was consensus that the science of climate change was sufficiently compelling to warrant aggressive action to reduce greenhouse gas emissions.

In the forum’s final session, participants called for urgent national action led by the Australian Government (the Government). This included ratifying a global treaty on climate change and implementing a fair, efficient and effective Emissions Trading Scheme.

There was broad agreement among forum participants that:

- Australia needs to take much greater action on climate change
- Economic as well as moral and ethical imperatives demand greater action on climate change
- Australian businesses are experiencing increasing pressure from their stakeholders to tackle climate change
- Australia’s relatively small contribution to global emissions is no reason for complacency
- The Government should ratify a new global climate change treaty even if this involved some economic costs
- Australia should adopt a binding, medium term target for emissions reduction (2020) and a longer term aspirational target (2050)
- A carbon price signal should be the central tool to achieve cost effective abatement
- An Emissions Trading Scheme is likely to be the best mechanism for introducing a domestic carbon price.
- The Government should review its current Research, Development and Deployment (R, D&D) policies to facilitate more urgent climate change action, including accelerating clean coal technology
- Regulatory intervention is a justifiable tool against barriers to change, particularly in relation to buildings, transportation and energy efficiency
- The Government should better prepare Australians for the challenges likely to flow from climate instability

At the close of the forum the ADC Chairman, Michael Roux, said participants acknowledged that climate change was a global problem requiring global solutions. Nevertheless, Australian leaders at the forum had agreed that the Government needed to take urgent domestic action on multiple fronts.

OPENING STATEMENT

Mr Michael J Roux , Chairman, ADC



Your Excellency Major General Michael Jeffrey, Mrs Jeffrey, Your Excellency Helen Liddell, British High Commissioner, our overseas guests Sir Nicholas Stern and Elliot Diring, Dr Peter Shergold and his colleagues, business leaders of Australia and fellow participants all.

A very warm welcome to today's roundtable on climate change. The Forum today, for me, is a landmark day, a historic day. It's historic because I think we have senior business people and senior government officials coming together to spend the day, a very valuable day in their time, to talk about an issue that confronts all of us. To talk about the science, to talk about the economics, to talk about the social implications and to talk about some of the things that we might or could do about what has become compelling science.

The history of this day goes back a couple of years to the Australian Leadership Retreat at Hayman Island in 2005, which coincided with a number of events: the World Economic Forum Roundtable on Climate Change with major business leaders from around the world, with Tony Blair talking about climate change as one of the key two issues of his presidency of the G8, and of course the event that took place at that time Hurricane Katrina in New Orleans. The Governor General's opening address at that Retreat talked about some of the major issues facing our nation and in particular the responses that we needed to make to climate change and positive things we needed to start talking about to do something about it. And out of that, and the discussions that followed that weekend across the broad spread of topics merged into quite a focus on climate change, came the idea that there should be an event such as this.

The following year at Hayman Island at the Australian Leadership Retreat the focus was predominately on climate change and we saw out of that a great shift in conversations amongst business. We'd had many business leaders like Michael Hawker, John Schubert and others talking about this issue for some years but I think we saw in the latter part of last year, demonstrated at Hayman Island, a big shift in corporate Australia in terms of the focus on this issue.

And then we saw Al Gore's film and the launch of Sir Nicholas Stern's review. So the world was exposed in a readable way to both the science and to the economic implications of what was becoming one of the most significant issues of our time. And I suppose that even in our own country we have seen a major shift in the last six months with the Government setting up its Emissions Trading Taskforce and we've seen increasing numbers of initiatives coming from business. We've seen certainly a growing number of CEOs in this country responding to both their stakeholders, to their clients, to their employees and increasingly to their investor community to address this issue.

I mentioned that the science had become compelling and I think that's true. I think it has been accepted broadly now around the world that the science is very compelling. That doesn't mean it's absolute and I think it's important that we recognise that even though the science is very compelling we do have to continue to live, as with science in any time, with continued uncertainty but that doesn't mean we shouldn't act.



We know that public policy responses come from the need to deal with risk, to deal with problems, to deal with things that affect our communities more broadly, and in having a policy response, one needs to take into account the probability that the science is sufficiently compelling, and that the gravity of the consequences is also compelling. And in this case I think that's inarguable.

At an economic level we will hear from Sir Nicholas Stern about the arguments that acting earlier rather than later makes good economic sense. We also have to deal with the question that it's not an either/or issue, it's not a government issue nor is it a business issue alone. It is a community issue and that markets alone won't solve this problem although we increasingly hear "set the price for carbon emissions and the problem will solve itself". I think that's a far too narrow a view to take to an issue as wide and as broad as this. And I think there's a broader issue that we are faced here. That is, the health of our planet as we go forward. That we came into this century in reasonably good shape, or a little worse for wear, but in reasonably good shape, and we owe it to our children and our children's children to put them into the next century in at least as good a shape if not better. And that's an enormous challenge for this generation.

Even if some of the science that we are talking about is even a small proportion right, that challenge is going to be momentous. I think there is no more important issue facing policy makers and business than climate change. At the World Economic Forum in Davos earlier this year, the major issue that CEOs of the global community indicated was, to their businesses, climate change. And the major issue to which they were least prepared to deal was climate change. So I think that it's important that these conversations take place and that we start to look at solutions not to rush into quick fixes because I think this problem's far too complex to have quick fixes, but with an open, organic, evolving, flexible mind to reach the goal of having a healthier planet and a world which is fit to live in for ourselves, our children and their children.

So I applaud you for giving up your time to participate in this. I hope that you will find it beneficial to you, to your organisations and I'm sure it will be beneficial if that's the case to this nation.

KEYNOTE ADDRESS

THE ECONOMICS OF CLIMATE CHANGE AND THE NEED FOR BUSINESS LEADERSHIP TO TACKLE THE PROBLEM **Sir Nicholas Stern**



Your Excellency the Governor General, and Michael Roux, thank you both very much for that very kind introduction and the very thoughtful and indeed inspiring speech your Excellency, after which it's difficult for me add very much but I will try to do my bit. Thank you also to HE The Rt Hon Mrs Helen Liddell, High Commissioner, British High Commission and Nick Rowley for their part in putting all this together. I'm not a very simple person at the moment to deal with. I try not to be complicated but thank you very much for all the preparations that go into this morning. And thank you all very much for coming. It's a privilege to be asked to speak to such a distinguished group.

Now I'm not a scientist. I did do a mathematics degree 40 years ago with a lot of physics in it, but I'm not a scientist, I'm an economist. What we tried to do was to use the science as it came to us and then to ask what sort of economic questions would follow from that. What could we say about economic policy based on the science. Now that science shapes the economic story in a very direct way. If I could just sum that up, not going into the details of the science, but sum it up in a way that leads us very sharply into the economics.

Flow stock problem

This is flow stock problem. The flow of emissions each year builds up to a stock of greenhouse gases in the atmosphere. It's the stock of the greenhouse gases in the atmosphere that traps the heat and causes the warming which causes climate change. I prefer to emphasise the climate change part of the story. Global warming doesn't sound necessarily, particularly if you were in Moscow in February, to be such a big problem. It's climate change that is the problem and I'll emphasise the way in which this operates. The Governor-General has already given important examples.

So it's a flow stock problem. That means it's a problem that takes time to build up and it means that it is actions now that affects what happens with some lag. There's a lag too because after the stock builds up, there's a lag for that to feed into the climate change and global warming. It's a problem with a lot of uncertainty. We can't be sure what emissions will flow from a given level of economic activity. We can't be sure that the stocks which occur in the atmosphere as they build up will affect temperature in a very definite way. Again we are dealing with a probability distribution. As the temperatures build up, we can't be sure about all the aspects of their effect on the climate. There will be different possibilities in relation to the rainfall, the floods, the droughts and the storms. There will again be a relationship which is only a probabilistic one between the physical effects and the economic and social effects. So the probability distributions are intervening at each stage here.

"We can't be sure what emissions will flow from a given level of economic activity"

Economics of Risk

That means that we have to and we are dealing with the economics of risk. Well a great deal of economics is about, and should be about, the economics of risk. So this is about the economics of risk and that drives what we are doing. But there is one very simple statement about the economics of risk



at the beginning which I think is useful to note. Suppose that we assume that the science is right and we follow policies of the kind I'll describe and the kind that Michael Roux and the Governor-General described. So suppose the science is right, and we follow these policies, I can argue that it costs us about 1% of GDP to do that and we will get, along with we hope the benefits of avoiding climate change, a lot of clean technologies, technologies which will probably do quite a bit on energy efficiency. The world will be a cleaner place and we will have more choices to make. So we might have spent a bit of money, but in any case we are going to get something along the way in terms of the new technologies.

Suppose we bet the other way. Suppose we bet the science is wrong and we say we are just going to carry on as usual. What happens then? Well, we'll build up the stock of greenhouse gases in the atmosphere and if the science turns out to be right, we'll be in an extremely difficult position because you can't reverse out of there because of the flow stock problem and these greenhouse gases stay around for a very long time. So if we go the former route and assume the science is right, and the science turns out to be wrong, then there will be quite a bit of technologies and new ideas along the way. If we go the other way and bet that the science is wrong, we'll be in an extremely difficult position because we can't reverse out. But in any case the probability that the science is right seems to be very high, at least to a non scientist.

So I think if you look at it from the point of view of the economics of risk, taking action now is actually a sensible policy, even taking into account that the science might be wrong. But I'm going to go through with this on the assumption that the science is right. I think it's an overwhelming majority of scientists now who made their statements in the 4th Assessment report of the Intergovernmental Panel on Climate Change published in February this year, that the Governor-General referred to, is very clear and strong and indeed that is the kind of material which we used in working through our analysis.

Key report messages

So let me give you first the key messages of the report, 700 pages but you can actually do it in one slide so you can save yourself a bit of time. First that the cost of action is a lot less than the cost of inaction which is a case which I will be developing in the course of what I have to say. The cost of inaction is the climate damages that build up in the process of going on with business as usual.

Adaptation is absolutely crucial, we've seen 0.7°C relative to pre-industrial times, and because of what we've done already, we are going to see more. We'll see, even if we are sensible and serious about this issue, 1.5 to 2°C more in addition to what we've seen in the past. We're already seeing quite severe effects with 0.7°C, another 1.5, twice as much as we've seen already, will give us in all probability a lot more than twice the effects we've seen already, you pass certain thresholds and things kick in in strong ways, like the collapse of the Greenland ice sheets. So we're going to have to adapt in ways which cut right across the whole economy. Floods, droughts, storms affect infrastructure right across the board, affect housing right across the board, affect agriculture, affect cities, and so on. This is something that has to be at the level of a whole cabinet, at the level of Prime Ministers and Presidents.

If we are going to do mitigation as well, as I will argue we should, that again is something that occurs in every sector of our economy and again is something that requires whole cabinets. This can't simply be left to environment ministers. Environment ministers are admirable people doing a good job, but this is something that goes way beyond simply an environmental remit.

Lastly on policy, the policy story is one that is about what we call in economics externalities. That means you do not pay for the damage you inflict on others. You might pay when you buy goods or services, you do indeed pay for the raw materials and the capital equipment that goes in, but you do not pay for the damages you inflict on other people in producing or consuming. That's an externality, that's a market failure. It's the biggest market failure the world has seen. Why? Because everybody is involved in causing the problem, everybody is involved in living with the problem and the problem is indeed a very large one. So this is a challenge of correcting market failure and those of us who think the world is better driven by market economics than the alternative structures, will try to think this through in terms of how to correct the market failure.

Correcting market failures

Just as in Rod Eddington's report on infrastructure, a lot of the market failures around infrastructure have to do with congestion, pricing for congestion is a natural way to correct a market failure, as we've started to feel our way towards for e.g. in London. So pricing for greenhouse gases can be done in a number of ways. It can be done in terms of taxation, it can be done in terms of trading schemes, it can be done implicitly in some forms of regulation where you push people to buy something that's a bit more expensive, by a regulatory measure for example the low energy light bulbs, which are coming in here I understand and in Europe for the next couple of years. That is something where you take a regulatory measure. You push for a different standard, it costs a little more, at least initially, and you save on the emissions and that's an implicit price. But one way or the other you are going to need a correction of this market failure. I'll argue you need more than that. That you're going to have to push ahead with getting behind technologies in the public sector and reversing the decline in energy research and development (R&D) that has taken place over the last 25 years or so.

Deforestation

I've just come here from Indonesia, where the problems of deforestation are of course intense. Indonesia is the third largest emitter now after the United States and China, as a result of deforestation, peat fires and so on. Deforestation and energy efficiency are the two cheapest ways to get action quickly and fighting deforestation is a very important part of the story. I was very struck by the way in which the whole Indonesian discussion is moving ahead very strongly. I was asked by President Yudhoyono to address the entire cabinet, the vice-presidents, the coordinating minister, the entire cabinet, the rectors of the main universities – and it takes a long time to collect them as it's a big country – the heads of the armed forces and police, and the major civil servants. We all got together the day before yesterday for two hours, and I was very impressed by the seriousness of their commitment. They are chairing the Bali conference of the United Nations Framework Convention on Climate Change taking place at the end of this year. I would suggest your neighbour is really grappling with the problem in a way that has changed greatly in the last year or so, and is of course a country which is vulnerable to climate change itself with 17,000 islands, and is very vulnerable to storms and so on.

Mitigation

Now that is the story of the review very briefly. So let me try to spend the rest of my time developing it and going through some of the details. I'll focus mostly on the policy for mitigation. By that I don't mean to put adaptation aside, I've already emphasised it very strongly as did the Governor-General. We shouldn't think of this as the minor part of the story. It's at the centre stage just as is mitigation, but I'm going to focus my attention on mitigation policy.

This is a quick illustration of the kinds of things that can happen. One to two to three to four to five degrees centigrade relative to pre-industrial times – those are now the kind of temperature ranges we have to consider and indeed we have to consider possibilities on upwards from 5 degrees. What we are illustrating here is that the intensity of the effects move up strongly as you move up the temperature range (and that's moving along the columns and down the rows). You can see we have to take into account that the climate change impacts occur on a whole range of dimensions of the economy and most of them operate through water in some shape or form – storms, floods, droughts, sea level rise. The heat itself of course is a factor. Many thousands of people died in Europe in the heat wave of 2003 from heat stress. That kind of thing will become normal by the middle of the century given what we've already done. Those of you who have lived through North India in April, May and June will recognise heat stress, and if those temperatures move up considerably, as they are likely to do, you can have many millions of people at risk. So whilst the story is mostly through water, in some shape or form, we shouldn't lose track of the heat side of the story as well, including of course what will happen to agricultural growing seasons and so on.

“We do now risk 5°C sometime next century if we go on with business as usual.”

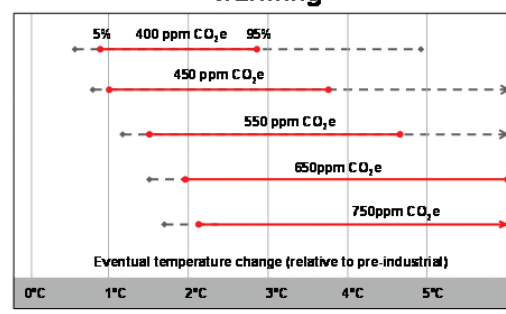
Now 5°C is absolutely enormous. We do now risk 5°C sometime next century if we go on with business as usual. Indeed serious risks of well above that. That is absolutely planet transforming. At the last ice age about 10–12,000 years ago, we were at 5°C less than we are now. Most of northern Europe and Canada was under a mile of ice. I'm not sure how far the ice stretched up in Australia, but what you saw was large areas we now occupy that would be impossible for human habitation. People would have been pushed towards the equator. Five degrees more and you will transform the planet in other ways, probably people will be pushed away from the equator. That involves very large movements of populations. One thing the human species, adaptable though it is, is not very good at is coping with very big movements of population and indeed there is some evidence that we are getting worse at that than we were before. So this kind of change is enormous. Even at 3°C, you see the risks of the loss of 20–50% of the species and the collapse of the Greenland icesheet with very striking and important effects on sea level across the board. Those of course occur with rather long lags but still they would be inevitable if the Greenland icesheet were to collapse. So these are the kinds of effects that we have to think about when we are think about the economics of climate change.

This is a stock flow problem as I emphasised and this is an illustration of the types of temperature increases associated with different stocks. Suppose we were to stabilise greenhouse gases at 550 parts per million (ppm) of CO₂ equivalent. That would give us a roughly 50–50 chance of being above or below 3°C. These red lines are 90% confidence intervals, 5% probability being off the top end, 5% probability being off the bottom end. The dotted lines illustrate that we have chosen a fairly modest probability distribution. There are other distributions that spread the risk out further than we have assumed. We've taken the Hadley Centre for Climate Change research in the UK, fairly central estimate in terms of probability distribution, and that's what we worked on. 550ppm is a very risky place to be given many people's definition of dangerous climate change is 2 degree change. So 550ppm would be a very risky place to be, 450ppm would give you a roughly 50–50 chance of being above or below 2°C. Now the problem is that we are already at 430ppm and we are adding 2.5 a year. In 8 yrs roughly speaking, certainly within 10 years, we'll be at 450ppm.

Stabilisation

So what we argued in the Review, is that we should aim to stabilise somewhere between 450ppm and 500ppm. We're virtually there and it's a risky place to be. We do various quantitative estimates, from rather simplistic aggregative models, that show that the damages from business as usual, relative to stabilising at 550ppm, would be very large indeed and we argue that you can get there below 550ppm for roughly 1% of GDP. That's like a one off 1% increase in your cost index. Significant, important, but certainly bearable given the kinds of cost increases we cope with fairly often through for e.g. exchange rate changes. For a cost of around 1% GDP we can bring down our emissions to stabilise somewhere below 550 ppm and save much more than 1% of GDP in terms of costs, averaged over time, averaged over space, averaged over possible outcomes. If we go on as business as usual we are going to drop off by the end of this century, somewhere below the bottom of this story. We are at 430 ppm

Stabilisation and commitment to warming



now and adding 2.5 a year and that is growing. If we went on with business as usual we'd probably average 4ppm increase per annum over a century. That would start to take us over 800ppm with probabilities well above 50% at being above 5°C. That surely would be irresponsible by anybody's calculations.

Flow path

So let's suppose that argument goes through. That you stabilise somewhere between 450ppm to 550ppm that's the stock. What's the flow path? The flow path is demonstrated by the yellow curve here. The blue line is business as usual. Stabilising below 550ppm is the yellow path and the lower paths correspond to stabilising at 500ppm and 450ppm. This should really be seen as a corridor of paths, because stabilising a stock you can do a little more earlier and little less later on. But that's roughly speaking what a path which stabilises at 550ppm would look like that yellow path there. It means peaking within 15–20 years and it means being by 2050, as a world, 30% below where we are now.

Now many people would argue that 550 is actually far too high a target and I get jumped on by quite a lot of environmentalist friends for even suggesting that 550ppm is tolerable. I get jumped on by other people who think it's all too difficult and we should let it go way beyond 550ppm. Roughly speaking I think the attacks from either side are more or less symmetrical, so it makes you think you got it about right. But 550ppm is actually a rather dangerous place to be, as already described, and there should be a discussion how far below you would want it to be and that kind of discussion would be important. The world has to talk through itself, that's a complicated idea the world talking through itself, but you need to get international agreement that stabilisation below some level is what we should be aiming for. And I believe that level should not be higher than 550ppm.

Equity

If you think about equity now, then I think it's very clear that rich countries should be taking on ambitions much stronger than 30% by 2050. It's the rich countries, through their past growth, through their past use, of energy that's responsible for at least 75% of the emissions that are up there now. They've essentially brought us to the difficult position where we start. Developing countries are fighting their battle against poverty. Happily many of them are starting to grow quite strongly and I think any equitable policy has to take into account that differential in responsibility and the differential in the ability to cope with the cost of moving to the new technologies.

And indeed it's just practical politics, because unless the rich countries take more of the responsibilities, you're not going to bring the poor countries along with you. So it's both equitable and practical politics to think in terms of the rich countries doing much more. How much more? Well we tried to answer that question in the Review by saying somewhere between 60% and 90% of the reductions should be financed by the rich countries. Some of it they do themselves. I'll come to trading schemes internationally in just a moment. I believe they've got an important role to play in bringing developing countries into the story. California has answered the question with 80% target reductions. France with 75% target reductions. UK at least 60% target reductions. We're starting to see discussions in the right ball park. The Spring Council of the European Union committed itself to at least 20% reductions by 2020, 30% if other countries come along. I think it had one particular country in mind when it made that statement but it wasn't explicit. So 20% in the European Union by 2020 and 30% if others comply. That would start to put us on a sensible road and well along the way to 60% by 2050 for that group of rich countries.

So I think we're starting to see that kind of recognition. Now that is a big change in the way we do energy because we hope the economies will be 2 or 3 times larger by 2050. So a cut absolutely in 60% to 90% is really going more or less carbon free for electricity, and very big movements forward in transport so those are quite radical changes. So it's very important to have a clear target set out so that business, which is going to take the decisions which drives all this, has a clear framework in which those investment decisions can take place.

So I've already argued this will cost about 1% of GDP and I'm more than happy to go into the discussion and into some of the details of that. We did it by putting together many estimates that others have made and done some bottom up estimates ourselves taking into account possible new technologies and the way in which those costs will change. About a month after we published our report, the International Energy Agency published its Global Energy Outlook and came in with actually a number rather similar to ours, in some respects slightly lower. I think that 1% is a reasonable estimate though with lots of uncertainty here. We say +/- 2% or 3% depending on how technologies move but a central estimate of 1% for the cost of all of this.

Growth

Now that is an important statement because it tells us that we can be green and grow. A 1% increase in costs, by shifting over to somewhat more expensive forms of energy, is a one off shift, a one off cost, a one off increase of 1% which of course stays up so it's a one off 1% increase in the price index. That doesn't stop you growing. This is not a story of anti-growth economics. You can make these kinds of adjustments and you can continue growing. Now that's a crucial part of the story. If this becomes a competition between growth and the environment then we're going to lose traction and indeed it would be quite likely that the growth story would win out. But what we are arguing here is that good policies can put the two together and indeed good policies can bring energy security along with it. Renewables for example, is good for the environment and good for energy security. If you can bring those costs down you are bringing all those things together. So policy can bring into harmony growth, climate responsibility

and energy security. That argument by the way, was very important in the European debate and the shift you saw in Europe over this last year reflected in that Spring meeting of the heads of gov't of the EU of just over 2 weeks ago.

“...we can be green and grow”

Counterbalancing growth

Now I've emphasised the costs and have emphasised that we can take it on, but actually there could be a growth story here too. Those of you who like your Schumpeterian views of economic history, I do actually, quite likely will see great surges in growth coming from technological change and I think this could well happen. I actually think you know more about Australia than I will ever know, but to an outsider it looks as though Australia is singularly well placed to lead that kind of charge which could power a whole new growth story in the world. Simply because you have a fine tradition in science, technology and engineering, and you have particular experience with the kinds of technologies that are likely to be relevant. As the Governor-General emphasised you are well endowed with the kinds of resources that are associated with the kinds of technologies that might be relevant.

Incentives policy

So what should policy look like? I've already emphasised the carbon pricing story and the externality. Unless we do have the incentives to cut back, people won't cut back. That's what incentives are about. Prices, taxes, regulations can come in different ways in different parts of the economy, different combinations in different countries. The United States don't like taxing very much. The European Union seems to be more kindly disposed towards taxation. You can use different techniques in different countries and we will see different techniques in different countries and that's all OK provided you get these incentives to cut back on carbon somewhere.

Now if you were a pure Chicago economist you'd say just correct that particular market failure, identify where the market has failed and then the wonderful entrepreneurship and competitive spirits of the different players in the economy will sort everything else out. Now that's not a bad argument actually but I don't think it's a full argument because there won't be total confidence from the industry in policies going forward. Try as we must as policy makers, and those who argue about policy, to get as much certainty as you can there will never be the complete certainty that would be associated with getting the full incentives in place. Also we are in a hurry for the reasons I described. This flow stock problem has told us that the later we leave it the more costly it's going to be to make any adjustment. We're going to have to peak in 15 or 20 years so we are in a hurry and should push forward with the technologies. So let me describe what the arguments look like on that front.

“...unless we do have the incentives people won't cut back”

Carbon pricing I've already described and what I want to emphasise here is that the carbon pricing that I'm talking about comes from first setting a path and setting a set of objectives. It's the economics of risk that tell us that's the right way to go, because it's too risky for the quantities to go above that. So get a quantity path and then use the prices to decentralise that quantity path. So I'm not going at it through a social cost of carbon which many other people have adopted and I think that's an interesting way to go forward but I'm going at it another way that it is the economics of risk that identifies that path for you. Then the economics of cost will say let's use the price mechanism to move forward as cheaply as possible within to get to that kind of path that we're looking for. So that's a very important step in the way we see the structure of the price story. It's the economics of cost that's going to give us the flexibility that's associated with using prices.

As we go forward, in putting those policies together, clarity and predicability are extremely important. That's why it's so important to set long term targets so that people can plan properly. Some people in the UK and industry talk about 'loud long and legal' so that your signals are really clear. It's about credibility, predicability and enforceability. That's the kind of story that we have to put together when we are putting together policy here so that people can take investment decisions not with complete certainty, you're never going to get that, but reducing policy risk as far as you possibly can.

Technology

You're going to recognise that technology has its externalities too. People who come up with ideas, people who show what's possible give benefits to other people and in this area and as these graphs show, along the horizontal axis you've got cumulative experience in terms of electricity production, and on the vertical axis you've got unit cost. So with these different technologies experience brings down unit cost and you learn from other people's experience as well as your own. You probably learn more from your own experience, but you learn from other people's experience as well. So it does seem as if there's great potential in this area for pushing ahead with new ideas, implementing them, learning from the R&D as well as the deployment. That's why we've argued in the Review not only a doubling of public sector R&D in energy. It's fallen by a half in the last 25 years around the world. It's gone in exactly in the wrong direction from the point of view of this challenge. We can argue and discuss why that's happened and there are good reasons that we can understand why it's happened and we've got reverse it. It is not simply public R&D. Public and private R&D are strongly correlated, but also deployment incentives. If we can see if we can bring some of these technologies like solar on to market quickly we're all going to gain from the experience involved.

"You probably learn more from your own experience, but you learn from other people's experience as well"



International action

Now I've started at the global level and I've talked about the kinds of policies at country level. Now how do we put it back together at the international level? Well first we need a common understanding of the problem and we need transparency and understanding about what everyone else is doing. Let me just emphasise the transparency and mutual understanding for a moment. In the middle of February I gave evidence at Senator Bingamin's Energy Committee on Capitol Hill. The tone on Capitol Hill has changed dramatically in the last year particularly after the November elections. On Senator Bingamin's committee, I was asked question by four Republicans and 4 Democrats nearly all about cap and trade schemes and how they might work. One thing they took strong interest in was that I'd recently been in China, a country I've worked in for 20 years in one way or another, and describing to them what China is doing. Because in the United States you so often hear 'why should we do anything the Chinese are doing nothing and they are building a coal fired power station every week'. I'm sure you've heard that argument closer to home as well.

China is actually doing quite a lot and China like Australia is reforesting it's not deforesting. China has a 20% energy to output cut as part of its ambitions for this current five year plan which started last year. Only two targets in the Chinese 5 year plan at the very high level, growth rate of 9% or so I'm sure they'll get there, and this energy efficiency target the 20% energy to output cut within 5 years. Europe has got 15 years for such a program. They are moving very quickly on that. You can't sell an American car in China as it doesn't satisfy the emissions requirement. \$8,000 tax on an SUV in Beijing. In November/December last year they introduced a tax on energy intensive exports – cement, aluminium and so on. China is moving very strongly on this, but they are still opening a coal fired power station every week. So when you look at what China is doing, you have to recognise the strong moves they are making but also the problems associated with their development path.

Similarly I spent a lot of time in China trying to explain to them the US is not doing nothing. You hear very quickly in China 'why should we act, the US isn't doing anything and they didn't sign up to the Kyoto protocol'. So you try to explain that the US has got California with it's 80% reduction targets, ten Northern Eastern states embarking on emissions trading schemes, and it's got many cities with very strong targets to

reduce carbon emissions and so on. So mutual understanding is of great importance. The approach that does the finger wagging and says 'I'm not going to do anything until everyone else has done everything' is a prescription for everybody doing nothing. So mutual understanding here is of crucial importance and I think an exchange of information or indeed having an international body to provide that information in a systematic way, not simply on the emissions but on the kinds of policies that are being adopted and initiatives that are being taken. So internationally then understanding what everyone else is doing is crucial to the collaboration that should be a part this. We should be developing policy measures that bring people together.

International trading is a very important part of that. India and China are not going to move quickly. I've been working in India for well over 30 years now. India and China are not going to move quickly unless two things happen – unless some form of external carbon finance starts to flow and until they see proven technologies and those technologies shared. My Indian friends tell me "Nick, you keep going on about carbon capture and storage for coal, it is important, just give me a call you've got my number as soon as you've got those carbon capture and storage plants working the UK – I'll come over and have a look" and you can see where they are coming from. So we have to prove these technologies and share them. If we do that and couple it with flows of carbon finance, through strong targets in rich countries, then I think you'll see India and China willing to come in. They are saying these kinds of things in private now, they are not saying it in public. But saying in private is big move forward from a couple of years ago. And so I think if you look at the US it's moving, and India and China are moving. But what we need now is a build up of the understanding, the trading schemes and the sharing of the R&D that's likely to bring people together. We have to treat this as a problem of how to bring people together and I think those are the kinds of ways we can work. Deforestation is of great importance here and I think the whole world gains from combating deforestation and I think that is a challenge the world should pick up directly and quickly. For around \$10 billion a year you could probably halve the flows of deforestation. That would be giving you carbon savings of around \$5 a tonne of CO₂. That and energy efficiency are the cheapest ways to move forward.

Carbon markets

I want to move quickly to the discussion so let me not dwell on the building the international carbon markets. What I have here is a graph that shows how those carbon markets could increase if more and more people came in. On the bottom-left hand side is the European Union emissions trading scheme, the yellow block is what is covered there. So there's around 2 billion tonnes of carbon covered under the EU trading scheme at the moment in overall emissions in the world of about 42 billion tonnes. Roughly half of the EU emissions are covered under the emissions trading scheme. I hope that half will be increased by for example including trading from air transport in the emissions trading scheme – that's something that's under discussion. So we could increase the margins in Europe, push up the yellow into the brown but of course you get the big increases as you bring in more and more countries into the system.

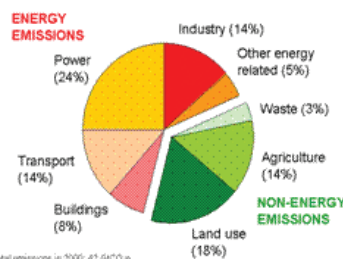
How will those markets be driven? The demand side I've already referred to. That will be driven by strong targets 60 – 75 – 80% and upwards in the rich countries. That's what's going to give us the demand side. What we need now is a really well developed supply side. The current clean development mechanism that operates with counterfactual, restricted technologies, at project by project level is a much too heavy mechanism to build this market up on the scale that's required. Half a billion or a billion flow a year in CDM projects. We need this market to be flowing from rich countries to poor countries at the rate of \$20 to 30 billion a year as soon as we can. That means we are going to have to have new methods of recognising an emissions reduction and I think that technology benchmarks and sectoral benchmarks are the right way forward. I think we could put those into place rather quickly and that should be an objective I think for the Bali conference in December. And of course markets need demand sides and supply sides and institutional sides to support them. If you've got the simplest possible standards for recognising emissions, as I said through technology of sectoral benchmarks, then I think the institutional structure could be simplified and be made much easier than the current clean development mechanisms. But I do believe that there is enormous scope for building up those markets, and these markets, like trade in general, will bind nations together as a policy mechanism that can produce coherence and mutual action rather than the kind of stand offs that you sometimes see at the moment such as why should I do something if those other people aren't doing anything.

Emissions reductions

Let me emphasise here two things. One that emissions come from everywhere. Transport and power take up something close to 40% but that's only 40%. It's a very important 40%. People in discussions usually focus on power and transport. One big lesson from this diagram of where emissions actually come from – everywhere. You must look at power, you must look at transport but you must look at building, industry, deforestation and agriculture and so on. There's no one of these that could possibly carry the burden of cutting world emissions by 30% absolutely by 2050 or in rich countries by 60 to 90%. And of course deforestation at the moment is more important than transport.

That's why quick wins are important and I why I think there should be public funds initially to combat deforestation and we should move as fast as we can to bring deforestation into the trading schemes so it's private funds that support the change there.

Strategies for emission reduction



Four ways to cut emissions:

- patterns of demand;
- improving efficiency;
- using lower-carbon technologies;
- tackling non-energy emissions.

Adaptation

Adaptation I've already noted right at the beginning. Let me not develop it at length but make one point. It's the poor countries that are going to be hit earliest and hardest. When we made the arguments for Monterey in 2002, at the UN special conference at Glen Eagles in 2005, for doubling aid between 2050 and 2010 and the reaffirmation by much of Europe of overseas aid to 0.7% by 2015, we then were using arguments which didn't really factor climate change in to quite the extent that we now realise we should have done. We could come in and say the aid requirements are bigger than we thought they were. We decided not to go that route because if the rich countries deliver on the commitments they've made that will be increases in aid in the order of \$150 – \$200 billion a year and that would be enough to promote both adaptation to climate change and development. But I think the arguments were very powerful for the increases in aid as they were made in the first half of this decade I think they become compelling as you bring in the problems of climate change.

Business

The role of business, well that's something you know much more about than I do. I've already referred to the expansions in the EU emissions trading schemes, the expansions in the US, changing the clean development mechanisms and so on. I think business is going to lead this charge and it's for government to provide the kinds of frameworks that are going to give the right kind of incentives. But in building those frameworks, the strong commitment and involvement of the business community will be absolutely fundamental. It's the business community that makes the transactions, that makes the investments and I think close involvement in the design of policies here is of great importance. That's starting to happen around the world. It's groups like this that are fundamental to taking that forward. I think the whole technological cooperation story will involve joint ventures by business in rich and poor countries and so on which will be fundamental in driving that whole action in developing countries which will be all the more important as they start to grow still more strongly. I'm very happy to discuss the kind of risk adjustments that firms will have to make in adapting to climate change, the kinds of investment opportunities that will be there that I've already referred to, but business is going to be at the heart of this whole story.

There's one particular thing I'd like to raise and I'd be very interested to hear your views is that there will be a few energy intensive areas which will be most vulnerable to the increase in prices associated with charging for emissions. I've argued that across the board, on average, it's only about 1% increase in costs and that's the kind of thing we can deal with. But there will be some industries of course where the cost increases are higher than that. In those industries, cement, aluminium and so on, I think international sectoral arrangements where we try move together as a world strongly on policies in particular industries in meetings we've had with business communities and government in both Japan and China for example.

Those kinds of questions were raised at Gleneagles last year so I think it would be a major step forward and remove an obstacle to change if we could move strongly with those kind of sectoral arrangements.

Conclusion

So that's where I should conclude. The arguments for action are very powerful and it will cost around 1% GDP and it will save us much more than that over time and space and possible outcomes. It is possible provided we act in the next 10–15 years and act strongly. The later we leave it the more the stock of greenhouse gases will move up inexorably from 430ppm. 30 years of doing nothing will take us pretty close to 550 part per million. If we then realise that it's time to stabilise at 550ppm the cost of action then, stopping the whole thing in its tracks, will be very high indeed. So that's why there is a very strong economic case for urgency. But I actually am really quite optimistic. I'm not sure quite how much. Optimistic is a fairly ambiguous adjective. I'm a lot more optimistic than I was a year ago. Change in the US, commitment in the EU, intense discussions in Canada and Australia, the very deep involvement of Indonesia which I've just seen, the movement in India and China there is a chance now to build an international coalition. It will involve a strongly collaborative spirit and it will involve strong leadership from the rich countries. Thank you very much.

“I'm a lot more optimistic than I was a year ago”

Discussion

The discussion following Sir Nicholas Stern's presentation covered the status of global action, the prospects for hydrogen, key arguments of critics of the Review and the European ETS experience.

In terms of status and concerns about global action, the level and timing of US action, but also China and India's responses were key themes. If the US does not move rapidly in addressing climate change, the EU and other countries might equally not move as fast. India and China are “difficult problems”, and leadership from developed countries will be essential.

Hydrogen has a particular role in transport. In this sector it is important to push ahead on all key technologies including hydrogen, electric cars and biofuels. The creation of hydrogen in a zero emission way points to a very optimistic picture.

Critics of the Stern Review often comment on the social discount factor and the use of science in the report. The authors of the report are merely consumers of science, but the IPCC 4th assessment is very close to assumptions from the Hadley Centre, which formed the basis for the report. Social discounting is an important issue. The key concept is that an extra unit of income for future generations is less important than an incremental unit of income today. Some of this discounting is ethically unattractive.

When introducing the European trading scheme, a number of mistakes have been made. Too many permits have been allocated for free. Whilst starting with a free allocation is feasible, moving to (some) auctioning quickly is important. Overall, good predictability of emission prices is essential.

A summary of the presentations on the science of climate change.

Professor Will Steffen

Director, The Fenner School for the Environment and Society, The Australian National University

The evidence is now overwhelming that the Earth is warming and that human activities, primarily the emission of greenhouse gases to the atmosphere, are the primary cause of the observed warming. The global mean temperature has risen since the early 20th century above the long-term average, and has risen more sharply since in the mid-1970s. Temperature now stands at 0.7°C above the pre-industrial value. Evidence for global-scale warming can also be found from temperature increases in the surface waters of all ocean basins, in the melting of the Arctic sea ice and the retreat of land-based glaciers, and in the rising of sea level. The strong warming of the past century is clearly beyond the patterns of natural variability observed for the past two millennia and probably over the whole of the Holocene.

The summary for policymakers of the Fourth Assessment Report (Working Group 1) of the Intergovernmental Panel on Climate Change (IPCC) concludes that: “(i) with very high confidence that the globally averaged net effect of human activities since 1750 has been one of warming; (ii) that warming of the climate system is unequivocal, as is now evident from increases in global average air and ocean temperatures, melting of snow and ice, and rising sea level; (iii) that numerous changes in climate have been observed at the scales of continents or ocean basins – wind patterns, precipitation, ocean salinity, sea ice, ice sheets, and aspects of extreme weather; and (iv) that it is *very likely* that anthropogenic greenhouse gas increases caused most of the observed increase in globally averaged temperatures since the mid-20th century”.

Impacts that can reliably be associated with climate change are now observable. Severe heat waves, such as the August 2003 heat wave in central Europe, have become more probable because of the underlying rise in mean temperature. Sea level has risen about 20 cm since the 1880s and is projected to rise a further 50 to 140 cm by 2100. There is some evidence that tropical cyclones have become more destructive as a result of the rise in sea surface temperatures. A critical question for Australia is whether the 50-year drying trend in the eastern part of the country is related to climate change. There is not yet conclusive proof that such a relationship exists, but there is a significant (and growing) risk that it does.

In terms of impacts, the IPCC’s summary for policymakers has concluded that (i) it is *very likely* that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent; (ii) the number of tropical cyclones per year is projected to decrease but their intensity is expected to increase, with larger peak wind speeds and more intense precipitation; (iii) storm tracks are projected to move poleward, with consequent changes in wind, precipitation, and temperature patterns outside the tropics; and (iv) dynamical (ice sheet) processes not included in current models but suggested by recent observations could increase the vulnerability of the ice sheets to warming, increasing future sea level rise.

Dr Steve Morton

Group Executive, CSIRO Sustainable Energy and Environment Group, CSIRO

There are three major issues in the climate change arena – recognising its reality; working out how to mitigate the effects by reducing greenhouse gas emissions; and adapting to inevitable degrees of climate change. My remarks focus on the latter two, as Will Steffen has addressed the first.

With mitigation and adaptation to climate change it is important to think not just about danger but also about opportunity – new businesses and new ways of thinking will emerge rapidly. Nevertheless, big reductions in emissions will be needed if the global community is to limit the risks of dangerous levels of climate change (i.e. 40% cuts by 2050 and 70% by 2100). There are many options by which this could be achieved, broadly including energy efficiency in homes and offices, efficiency in coal-fired electricity plants, and replacement by gas, carbon capture and storage, expansion of nuclear, solar, wind and biofuels, and conservation tillage and reforestation for soil carbon storage.

Technological development is essential to allow these options to be assessed for cost-competitiveness, and thereby for effective combinations of energy generation to emerge and evolve through the coming decades. There are grounds for cautious optimism about such technologies because, among other advances, there is a revolution taking place in materials science.

The adaptation challenge is obvious in just four examples. Water supplies are certain to be a major pressure point requiring effort in recycling, improved catchment management, techniques for groundwater storage, desalination, water trading and increased efficiency. Sea-level changes will force adaptation in coastal infrastructure and planning. Human health will be affected by changes in the distributions of disease vectors such as mosquitoes. Finally, agricultural producers will experience shifting productivity patterns that will require different cropping and animal production systems.

Australia’s scientists have a special role to play in each of the three fields of climate modelling, mitigation and adaptation, and the country stands to gain more opportunity by responding proactively to the pressure of climate change.



Professor Will Steffen



Dr Steve Morton

Discussion

Discussion on the science of climate change covered areas such as the key issues impacting on life in the major capital cities in 20–30 years, research and development funding mechanisms, the extent of skepticism in the scientific community, and collaboration in the region.

Life in Melbourne, Sydney, Canberra will be somewhat different in 20–30 years. Whilst the temperature increase will be between 1–2°C, the availability of water will be a major concern. In addition, agriculture is expected to be substantially transformed, or non-viable.

Research and development investment must target a broad range of technologies. Whilst clean coal is important, a much wider technology portfolio is required. One single technology is not going to deliver the full emissions reduction technologies. Transitional technologies are also needed. The right funding model to support R&D activity is already in place. It ensures that duplication in research activity is largely avoided, in particular between research institutions in Australia. In the international context, the focus on key technologies for Australia's circumstances is important (eg Clean Coal, Solar etc).

There are climate change skeptics. However, it is important to recognise that the group of critics is very small. An analogy would be a soccer score of 99:1. Collaboration in the region provides grounds for optimism. For instance, delegations from China are visiting on a weekly basis. Very powerful links have been established. The AP6 is a good platform. It comprises of all major players including India.



A summary of the presentations on the national and international policy responses.

Professor Warwick McKibbin

Executive Director, Centre for Appl. Macroeconomic Analysis-Economics, College of Business & Economics, The Australian National University

Professor McKibbin provided an overview on climate change policy from an Australian perspective. Uncertainty is the key issue in climate change policy design. Uncertainties cascade from the timing and magnitude of potential climate change to the distribution of costs and benefits across time and geographical location. We don't know how much or how quickly to cut emissions despite the desire by many to specify precise targets and timetables. However, clear long run goals are needed.

The benefits of taking actions should be weighed against the costs. The Kyoto Protocol approach of fixed targets and timetables no matter what the costs leaves the Australian economy (and most countries) in a vulnerable position. It also makes the policy regime vulnerable. Australia needs to convince the world to take sensible action on climate change policy.

It is unlikely that a global system will emerge from the top down because countries don't have the institutions or government credibility to trade in a global market of government promises (i.e. a global carbon permit). It is more likely that a patchwork of national systems with some degree of coordination will emerge; just like national currency markets.

A portfolio of policies is needed ranging from R&D in alternative carbon abatement and adaptation technologies, to market based incentives. The key is the introduction of a long term and short term carbon price through a clearly designed market. The long term price (the guide for investment) should be flexible given long term targets (and based on a distribution of long term carbon rights) and reflect all available information about the future. The short term price (the economic cost) should be low and fixed for some time as policies in the rest of the world become clear and as information on the climate builds. This can be done following the McKibbin Wilcoxon Blueprint policy in which climate policy is operated in a similar way to monetary policy – the market determines the long term price of carbon (the bond rate) and the central bank of carbon determines the short term price of permits (money market interest rates).



Professor Warwick McKibbin



Mr Elliot Diringer

Mr Elliot Diringer

Director of International Strategies, Pew Center on Global Climate Change

Mr Elliot Diringer's presentation focused on activities on the international level and discussion of a global post 2012 framework. The UNFCCC and Kyoto Protocol were established in 1992 and 1997 respectively. Whilst they established binding targets, scope was limited and so was the overall effect. However, the frameworks include a number of good mechanisms, in particular the Clean Development Mechanisms (CDM). They facilitate international investment in developing countries.

The next agreement is likely to be based on the UNFCCC and Kyoto frameworks. A key risk for the success of the post 2012 scheme is lack of commitment, which could eventuate should the US not sign the agreement. However, recent signs are positive as the momentum in the US Congress has significantly increased. Climate change has become the top priority for Democrats.

The Pocantico dialogue resulted in a proposal for a more inclusive international approach that aims at engaging all major countries post 2012 in a flexible framework. Key elements to this framework are: 1) targets & trading, 2) policy based commitments, and 3) an overlay of sectoral agreements, including standards etc, which is in particular important in heavy emitting sectors.

From an Australian perspective it is important to recognise that it appears that a US commitment to action is only a matter of time. This commitment would very much encourage a global system. By engaging early, Australia could benefit through the opportunity to be part of shaping the new system.

Discussion

Discussion beyond the clarification of details included the role of the APEC meeting in the climate debate, the practical steps of introducing a carbon market, distributional impacts of carbon pricing, and the role of regulation.

The APEC meeting offers a great opportunity to progress the discussion, however, it is important to recognise the differences between countries and agendas. The implementation of a carbon price can move quite quickly as, in Australia, the expertise and institutions required already exist. Key steps are: 1) Legislate upstream, 2) allocate the rights and 3) establish the market. The distributional impact of a carbon price is an important consideration. One possible approach is the compensation of households for instance through allocating a proportion of the permits to private households. A portfolio of methodologies is needed, and they can interlink trading and regulation. For instance, an automotive manufacturer can be required to buy permits in case its fleet does not meet emission standards.

The final BLFCC session identified broad agreement among business leaders about the action Australia needed to take to effectively counter climate change. This consensus was determined by participants discussing and voting on a range of options.

The most extensive debate was around three issues:

- a) stakeholder pressure to act – in some cases there was little pressure; in others, pressure was spearheaded by senior management or by other employees
- b) design of Emissions Trading Systems – issues included permit allocation, the range of industries, sectors and companies covered and special consideration for trade-exposed industries
- c) the Australian Government’s (the Government’s) role in research, development and deployment (R,D&D) – issues included whether, and how, the Government should allocate funds, set incentives for private sector research, underwrite private sector risk, and fill the gap where a technology lacked private sector appeal

Case for action

There was broad agreement among business leaders that:

1. The science of climate change was credible enough to warrant aggressive action to reduce greenhouse gas emissions
2. Australia’s relatively small contribution to global emissions (around 1.4%) was no reason for complacency.
3. Australia needed to take greater domestic action on climate change because developed countries must lead if they expect developing countries to follow.
4. Greater action was justified on economic as well as ethical grounds i.e. action would:
 - help Australia capture opportunities in new low carbon technologies
 - help to maintain the social structure of the Australian economy
 - better position Australia to influence global treaties

- avert the risk of inaction leading to Australia’s exclusion from international trade

Business action

5. Many businesses, particularly those with significant greenhouse gas emissions, already understood their carbon footprint and had actively worked to reduce it, but more action was needed due to:
 - growing pressure on business from customers, employees and shareholders
 - the need for multiple abatement strategies including efficient energy use, low carbon energy sources and carbon management (capture, sinks and storage) in the absence of one “silver bullet” technology which would reverse emissions growth

Policy settings

6. Participants agreed that the Government needed considered, coherent policy settings to facilitate the nation’s transition to a low carbon economy. Such settings required that the Government and business would:
 - drive a national policy response to climate change, rather than a plethora of state-based schemes
 - produce clearer policies on adaptation to climate change
 - better prepare Australians for the challenges likely to flow from climate instability
 - adopt a binding medium term emissions reduction target (Year 2020) and a longer term aspirational target (Year 2050)
 - recognise that carbon pricing signals should be a central tool for achieving cost effective abatement
 - implement an Emissions Trading Scheme (ETS) as it is considered the most appropriate carbon pricing mechanism to help deliver abatement at the lowest cost
 - complement an ETS with funding for R,D&D
 - use regulation to reduce the barriers to behavioural changes required to reduce emissions

Emissions Trading

7. The establishment of the Prime Minister's Task Group on Emissions Trading was welcomed, with agreement that designing a fair, efficient and effective ETS was a critical step which should determine:
- the process for allocating emission permits
 - overall level of emissions caps
 - duration of commitment periods
 - extent of credit for prior emissions reduction
 - appropriate sector coverage
 - mechanisms to protect trade-exposed industries that compete with countries without emissions trading
 - mechanisms to link to other international schemes
 - a domestic and international approach to accessing carbon offsets

Research, Development and Deployment

8. In order to rapidly identify low emission technologies and bring them to market, participants agreed that the Government should:
- allow the market to “pick the winners” among cost-effective climate change abatement technologies
 - support the development of relevant new technologies from early research to demonstration and scale up stages
 - comprehensively review its current R,D&D policies, including tax breaks, to facilitate more aggressive action on climate change
 - maximise efforts to co-ordinate its research with that of its global peers
 - review current governance of, and funding for, clean coal technology to ensure an optimal outcome

Regulatory intervention

9. Participants agreed that regulatory intervention was a justifiable tool against barriers to behavioural change and suggested that:
- stronger regulation was required, particularly in relation to buildings, transportation and energy efficiency
 - existing regulation be comprehensively reviewed in the light of the need for more aggressive action to abate greenhouse gas emissions.

International treaties

10. Participants agreed that the Government should continue to pursue an international agreement including all major emission-producing countries including the US, China and India even if this involves some economic costs.

However, given that such an agreement was unlikely to take effect before 2012, participants recommended that – in the interim – Australia needs to take strong domestic action.

Summary

While acknowledging that climate change was a global problem requiring global solutions, participants at the 2007 BLFCC called for the Australian Government to lead urgent, much stronger national action.

Despite the participants' faith in the potential for market forces and technological innovation to tackle climate change, they agreed that success depended on appropriate Government policy settings.

Creating optimal policy settings was a critical step which would require strong, ongoing collaboration between the public and private sectors.

Session	Session Time	Description
	8:30am – 8:45am Atrium	MORNING TEA ON ARRIVAL
1	8:50am – 9:00am The Canberra Room	Opening statement by Chair: Michael Roux, Chairman, ADC
	9:00am – 9:10am The Canberra Room	Opening address: His Excellency Major General Michael Jeffery AC CVO MC (Retd), Governor-General of the Commonwealth of Australia
	9:10am – 9:45am The Canberra Room	Keynote address: Sir Nicholas Stern The economics of climate change and the need for business leadership to tackle the problem <i>Questions and discussion following keynote address</i>
	10:30am – 11:00am	MORNING TEA
2	11:00am – 12.30pm The Canberra Room	The science of global warming and climate change What is likely to happen to the world’s natural systems given the current and future level of global greenhouse gas concentrations and emissions? Two presentations on the latest scientific understanding of global warming and climate change: <ul style="list-style-type: none"> • Professor Will Steffen, Director, The Fenner School for the Environment and Society, The Australian National University • Dr Steve Morton, Group Executive, CSIRO Sustainable Energy and Environment Group, CSIRO <i>Questions and discussion following presentations</i>
	12:30pm – 1:30pm	LUNCH
3	1:30pm – 2:45pm The Canberra Room	Future international and national policy responses How individual states (and other levels of government) and the international community have responded thus far and the likely future responses (for eg. regulation, taxation, offset markets, technology transfer, cap and trade). <ul style="list-style-type: none"> • Professor Warwick McKibbin, Executive Director, Centre for Appl. Macroeconomic Analysis-Economics, College of Business & Economics, The Australian National University • Mr Elliot Diringer, Director of International Strategies, Pew Center on Global Climate Change <i>Questions and discussion following presentations</i>
	2:45m – 3:15pm	AFTERNOON TEA
4	3:15pm – 5:30pm The Canberra Room	Action for Australia Structured discussion around what business actions and new Government policies are needed to transition to a lower carbon economy including carbon pricing, investment in low carbon technologies, regulation and improvements in energy efficiency. In working towards a consensus, opportunities and constraints will be considered including: <ul style="list-style-type: none"> • Harnessing the power of the market to drive sustainable growth • New policies from government • Learning from international experience • Implications for the competitiveness of Australian business Facilitator: Nick Holder , Director, L.E.K. Consulting Pty Ltd

EVENING PROGRAM



Time	Description
6.00pm – 7.00pm Private Lounge, Hyatt Hotel	Drinks
7.30pm	Dinner at Government House



A Background Briefing was prepared by L.E.K. Consulting as pre-reading material for the attendees of the ADC Business Leaders Forum on Climate Change. The purpose of the paper was to equip participants with a basic understanding about the topic, pertinent information and terminology. The document summarises the science, potential impacts of global warming and climate change, Australia's greenhouse gas emissions, the national and international policy environment, as well as responses to climate change.

The vast majority of scientists believe that emissions of greenhouse gases from human activities are leading to increased atmospheric CO₂ concentrations, global warming and climate change. The increases in carbon dioxide emissions during the last 150 years have been very significant and resulted in rising concentrations of atmospheric CO₂, that now exceed pre-industrial levels by more than 30%. This has already led to a significant increase of global surface temperatures, which is illustrated by the fact that nine of the ten hottest years on record (1890–2006) have occurred since 1997. The best estimates of temperature increases until 2100 range from 1.8–4.0°C.

These temperature increases are expected to result in complex environmental, economic, social and possibly security effects. For instance, increased temperatures could lead to the melting of the ice caps, increased sea levels, coastal flooding, the dislocation of affected population and possibly to political instability. For most parts of Australia, warmer and drier weather is projected, and has already been observed. These environmental changes are expected to adversely impact the economy, for instance as a result of declining crop and fishing yields. Many experts argue for action and highlight that the cost for acting now is lower than the cost of acting later.

Australia's greenhouse gas (GHG) emissions have increased by 3% since 1990. During this period, a significant decrease in deforestation has offset strong emission growth in all other areas (25% from 1990–2004). Stationary energy accounts for the majority of greenhouse gas emissions (53%), followed by agriculture (18%) and transport (14%). Similarly, growth has been strongest in stationary energy (+43% from 1990–2004). Whilst Australian emissions only account for 1.4% of global emissions, Australia's per capita emissions are among the highest in the world. This might be, among other factors, a reflection of low energy costs and efficiency standards (eg in terms of building practices and vehicle fuel economy). Current projections expect Australia to almost meet its Kyoto target of 108% of 1990 emissions. However, significant further growth post the Kyoto period until 2020 is expected.

The United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and Intergovernmental Panel of Climate Change (IPCC) are key elements to the international system for climate change action. The UNFCCC is an intergovernmental treaty aimed at reducing emissions of greenhouse gases in order to combat global warming. The Kyoto Protocol is an agreement under the UNFCCC between member nations to reduce or stabilise emissions over time. The overall target for the first commitment period (2008–2012) is a reduction of greenhouse gas emissions of 5.2% relative to 1990 levels. Australia, who has signed, but not ratified the protocol has a target of 8% above 1990 levels. Discussions about an international post-2012 agreement have commenced and are expected to lead to some form of agreement by 2009. The IPCC facilitates action against climate change through providing assessments of the knowledge on climate change in regular intervals.

The discussion around responses to climate change can be summarized along four themes: Public opinion, abatement strategies, targets and policy mechanisms. The public sees climate change as a major concern. Business leaders at the 2007 World Economic Forum in Davos voted climate change to be the highest impact issue in the coming years and according to a recent survey, Australians now rate climate change as their number one concern. Consequently, products such as "GreenPower" are accelerating and businesses are reacting to changes in consumer attitudes as illustrated by the recently introduced carbon label in the UK.

Experts agree that a wide range of abatement strategies are required in order to address climate change. Key strategies are increasing energy efficiency and the decarbonisation of the energy supply. The abatement costs differ significantly between abatement approaches and technologies, and include consumer behavioural changes and building efficiency improvements, which, if implemented, often resulted in incremental cost savings (per ton of carbon dioxide emitted less). One area of Australia's R&D focus in the context of CO₂ abatement are clean coal technologies, reflecting the importance of coal for Australia.

Targets in the context of climate change are important for a number of reasons, which include the provision of a concrete goal for current and future climate efforts, and the promotion of global participation. A wide range of medium and long-term targets have been discussed and include the EU's emission reduction target of 20% by 2020.

There is widespread agreement that a broad range of policy mechanisms will be required to combat climate change. Carbon pricing, R,D&D and regulation are key elements of climate policy. Emission trading and carbon taxes are two mechanisms of implementing a price for carbon. Most experts prefer emission trading over a tax for a number of reasons, in particular because emission trading provides industry with an incentive to reduce emissions in the most cost effective way and it directly facilitates the implementation of an emission target. Significant R,D&D funding is often seen as an important complement to carbon pricing, as the price signal might not always be sufficient.

Additional Material

The Governor General's speech at the Business Leaders Forum on Climate Change on 28 March is available at <http://www.gg.gov.au/governorgeneral/speech.php?id=215>

The following material is available on www.ausdavos.org

Presentation Slides

- Sir Nicholas Stern
- Professor Will Steffen
- Dr Steve Morton
- Professor Warwick McKibbin
- Mr Elliot Diring

Background Briefing

Prepared by L.E.K. Consulting

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