

Speech Topic: Garnaut Climate Change
Review Update 2011

Compere:

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Speakers: Ross Garnaut, Climate Change
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Robert Oakeshott MP, Federal
Member for Lyne

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Transcript:

ROB OAKESHOTT: So thank you all for coming out on what is a beautiful Sunday Port Macquarie afternoon. We should be doing this outdoors somewhere. I know on this topic it is dangerous to talk about the weather. But hopefully most people can separate weather from climate and we can talk quite sensibly about issues, and complex issues, facing all economies in the world at the moment around the climate science and how every economy is trying to grapple with a response.

And that is where it is a great honour to have Professor Ross Garnaut visiting the mid-north coast, visiting us this afternoon in Port Macquarie and then at breakfast in Taree in the morning.

Professor Garnaut over the last five or six years has had the brief of trying to turn the science into the economic response. And it is almost as challenging, if not more challenging, than the complexities around the climate science itself.

Personally, I think he's had a pretty good crack, but I'd imagine in the room today we've got a whole range of different views on that. And that is why it's really important that everyone has come out to listen to Ross and either reaffirm existing views or challenge Ross's, mine and plenty of other people's views here today.

I hope we can do that in a civilised way. This is an incredibly emotional topic and a sensitive one at the moment with the politics the way it is. But no-one is in this business to try and do public harm. Everyone is trying to do the right thing by communities such as ours and the community of Australia. And Ross Garnaut is certainly no different in that regard, despite accusations of, as late as two days ago, being called I think a Nazi was the latest accusation in regards to Ross's work.

So hopefully this can be civilised and we can all be ambassadors for the mid-north coast and we can have a really good discussion throughout the afternoon. Ross initially was going to speak for about half an hour and then have questions and answers. I thought in discussions that we've had we shorten that front end speech up a bit, so we can have more of a question and answer time. So hopefully plenty of people have got questions, statements, and we can have a really engaged conversation about one of the key policy issues of our time.

So ladies and gentlemen, if you could please welcome to Port Macquarie and to the lectern Professor Ross Garnaut, thank you.

ROSS GARNAUT: Thanks Rob and thanks all of you for coming out on such a great sunny day, although maybe every day's like that here in Port

Macquarie so this is no sacrifice. But certainly for us down in Melbourne it would be a big sacrifice to come indoors on a day like this. And thanks to St Paul's School for providing the venue where we can all get together.

As Rob said, and thanks Rob for organising the occasion, he suggested that people in Port Macquarie would be interested in a good open discussion about the issues. As Rob said, this has become an unnecessarily contentious issue. For some reason it's become a bit hard just to discuss it in rational, careful words but we'll do that today and show the rest of Australia that that can be done.

The issue begins with the climate science and we need to understand what the climate science is saying about climate change. For quite a long time the science of physics has been aware that if you put more carbon dioxide, and methane into the atmosphere, then that will trap more of the sun's heat, and the planet will gradually get warmer.

In fact it's been understood for a long time that life on earth or life of our kind on earth is only possible because of that greenhouse gas effect, otherwise so much heat would escape every time the sun's not shining and it would be too cold for life to live.

For about 10,000 years there's been an equable balance between the sun's energy coming out and the amount going back out into the atmosphere and it's kept temperature at levels that's made it possible for human civilisation to develop.

Well we've upset that balance, especially in the last half century of rapid economic growth, mainly by burning fossil fuels. All the coal, the oil, the natural gas that's there in the ground used to be carbon dioxide in the atmosphere at a time when the earth was much warmer than it is now and then plants absorbed the carbon dioxide. Some of that got buried, got transformed into fossil fuels and that took carbon dioxide out of the atmosphere. It led to the climate that we've got now. We're putting a bit of that back and that's upsetting the balance.

And three things are quite clear to the climate science. First, the earth is warming. In my final report which is on the web, on the internet - www.garnautreview.org.au, and also in the bookshops - in my final report I've got a chart showing average temperatures in Australia decade by decade.

And you see from that that until the '40s, some decades were warmer and some cooler than the one that went before. But since the '40s every decade's been significantly warmer than the one before and that's true of the last decade as well. And that's the pattern that's repeated all over the world. And that's despite the fact that we're in the relatively early stages of increasing the carbon dioxide in the atmosphere.

If we continue exactly the way that we've been going before, increasing the burning of coal and fossil fuels, increasing the cutting down of natural forests, especially in developing countries. In the developed countries we did that a fairly long time ago, but the developing countries are doing it now. If we continue with all of that without any adjustment, then that warming would continue and continue and continue and later on this century would be deeply disruptive to human civilisation.

That's a view on the science that's accepted by the academies of science of all of the countries which have accomplishments in science where we've got real science communities. There's no exception to that. It's true of the Academy of Science of Australia, the equivalent - the Royal Academy in the United Kingdom, the United States, Canada,

Japan, China, India, France, Germany, Italy, Russia. There's no exception. That's the view of the mainstream science. You get some dissentient views, but very little from amongst the people who've spent their lives studying this question.

So the three central propositions from the science are that the earth's warming. No-one can, with credibility, object to that. It's there in all the data and if you don't believe the temperature measurements, you can see the shrinkage of the icecaps. Secondly, there's lots of evidence that humans are making a big contribution to that warming. And the third thing, if it's allowed to continue without breaking the connection between economic growth and greenhouse gas emissions, then that will build up to a position that's deeply disruptive to life in many ways.

Well in the work that I was asked to do that Rob mentioned, I was asked to do it back in 2007, by all the states and territory governments of Australia initially and then, when Kevin Rudd became prime minister, the Federal Government joined as well. I was asked to provide an independent assessment of the effects of climate change on Australia and to provide independent advice on policies that we should adopt to deal with it.

And the first thing I did was try to understand the basic messages from the science. I had top scientists, Australia's top scientists, working with me and I was in communication with leading scientists in other countries. I tried to keep lines of communication open to people who held different views. And then I had studies done of what would be the effects of what the science was telling us would happen to Australia. What would be the effects of that on economic activities and other aspects of Australian life?

And the end point of all of those studies showed that while all countries in the world will be seriously damaged by climate change, of all the developed countries Australia would be damaged more than any others and there's a few reasons for that. One is that we're already a hot and dry country with a lot of our agriculture and a lot of our other activities operating at the margins where modern agriculture is possible so that if you get change there's more risk here than in other places of being tipped over the edge into circumstances where agriculture's not possible.

Of all the developed countries Australia's the one that is most closely connected with developing countries. We're the only developed country that lives in a region of developing countries. And we're the only developed country whose trading partners, especially whose export markets, are mainly developing countries - Indonesia, China, other parts of South East Asia, India. And developing countries are going to find it especially difficult to deal with climate change. They don't have the capital resources, the incomes that will be necessary for adaptation.

So while climate change will be disruptive for the whole world, it will be especially disruptive in developing countries and we're the developed country that will experience more of the effects than any others. Our neighbouring countries' problems will become our problems.

So if any developed country's got a reason for taking this issue very seriously and making sure the world deals with it, then that's us. But while we've got the strongest interest in dealing with the problem, we've also got the natural and the human resources that put us in a pretty good position to deal with it. And there's no other developed country that's got the natural conditions and the human capacities that

are necessary to reduce greenhouse gas emissions to make the transition to a low carbon economy.

Of all of the sources of energy that don't have high emissions, we're better placed than any other country, especially when you look at it on a per capita basis. Natural gas has far fewer emissions than coal and of all the developed countries we've got the richest endowments of natural gas in the world.

Solar energy is a zero emissions energy source and, as is clear from the sunshine out there today and I'm sure even clearer if you go a few hundred kilometres to the west, we've got richer solar resources than any other country.

I had the leader of the German program of solar energy in my office a few years ago and Germany makes much more use of solar energy than we do. And he was lamenting the fact that everywhere he went in Australia was, to his eyes, looking perfect for solar energy. And even the west coast of Tasmania – where you get lots of rain and clouds - he'd been there and he said "they were telling me this is the worst place in Australia for solar energy, but it's better than the best place in Germany for solar energy", so we've got that advantage.

Similarly wind power. There are parts of Australia with wind resources that are as good as anywhere on earth. On average through the year - fortunately Port Macquarie's not one of those places - but right along the south coast of Australia where you're in the path of the strong westerly winds, that's exceptionally good country for wind energy; also the west coast of Tasmania.

We've got extraordinary geothermal resources. A lot of technical work is required to make the most of it, but there's no country with the hot rocks deep underground that we've got that provide another possible source of energy.

We've got exceptional wave and tidal power and we've got by far the world's largest resources of uranium oxide per person. And uranium oxide's obviously the source of nuclear fuel, and nuclear is a zero emissions source of energy.

So we've got lots of options. We've also got very rich opportunities for what's called biosequestration. The natural processes that took carbon out of the air and made animal life and human life possible on earth depended on plants and algae converting the sunlight and carbon dioxide into hydrocarbons which later became coal and oil.

And we've got more opportunities per person - opportunities divided by population - for getting more value out of biosequestration for capturing carbon in plants, in woodland, soils, pastures and the use of algae than any other country so that's another great opportunity.

The transition to a low carbon economy here and in the rest of the world depends on professional skills and capacities and good management, especially in the engineering area, project management, in the sciences of energy and geophysical processes. And we've got very strong resources of all of those. A lot of those are the human skills and capacities you need for the resources industries. And the same skills are very valuable for the transition to the low carbon economy.

So while we're currently a high carbon economy - carbon emissions higher per person than any other developed country on earth and we've done well out of the high carbon economy using a lot of coal and gas - we've got the resources where we can also do extremely

well out of a low carbon economy. So we shouldn't be worried about that transition.

It's in the nature of this problem that there's no solution unless there's a global solution. Some people say Australia only accounts for one a half per cent of the world's emissions so why worry about what Australia does?

Well the first part of the story's right. We do only account for one and a half per cent of the world's emissions and we can't solve this problem on our own, but nor can other countries solve it on their own. Britain has three times the population that we do, the United Kingdom, but its emissions are just a little bit bigger than ours, about the same as ours, one point seven per cent of the world. And the British Government has never said, "oh well we're only one point seven per cent of the world emissions, it doesn't matter what we do".

And even for the very big countries - the two big emitters, big sources of greenhouse gases are China and the United States - but even there they couldn't solve the problem on their own. Each of them accounts for nearly twenty per cent of world emissions. Given the current growth of global emissions, even if one of them said, okay we're going to cut our emissions nearly to zero, that wouldn't solve the problem. The growth in the other eighty per cent would still cause a very serious problem.

So there's no solution to this problem that's not a global solution. And then the question becomes, what are other countries doing and what's our fair share? Now there are lots of problems that are like this, our collective problems that you don't solve them unless a number of countries cooperate. You get the same problems in any society. There's lots of problems that only have collective solutions. It's only if we cooperate that we can solve the problem. Lots of those problems locally, lots of those problems internationally.

When we come across a problem like that, the only solutions to which require cooperation, we're used to finding ways of working together and they have to be based on everyone doing their fair share. It is a reasonable point to make that if the rest of the world was doing nothing there'd be no point in us doing something. So one has to ask, are other countries doing something?

I've got a couple of chapters of my final report addressing that question. When you look at it closely, other countries are doing quite a lot. Recently the Productivity Commission did a detailed report on this for the Multi-Party Committee on Climate Change that Rob's a member of. So there are other sources, you don't have to rely on mine. But I look closely at what's happening in Europe, what's happening in China, what's happening in the United States.

Europe's been taking this issue seriously for quite a long time. Margaret Thatcher made this a big issue when she was Prime Minister. Every British Prime Minister since then has made it a big issue. The European Union has had carbon pricing since 2005. The Scandinavian countries - not members of the European Union - they've had carbon pricing since the early '90s.

In Europe, the debate that we're having just looks strange. They've got a carbon price, they're just getting on with it. Their emissions are much lower than ours. Typically around ten tonnes of carbon dioxide equivalent per person per year, compared with our twenty-seven. Britain, already only one third of the emissions that we have per person has just announced that it will be reducing its emissions by half by 2025. That will be legislated, it will become part of British law, the requirement to do that.

It's common in Australia for people who don't want to do anything about this problem to point to China and the US saying they're not doing anything. Well that's just not looking at reality. I spent a lot of time in the United States talking to people working on this question, including the most senior officials working on this question reporting directly to President Obama.

The United States Government has committed itself to reducing emissions by seventeen per cent by 2020. They would have liked to have had carbon pricing through an emissions trading scheme. President Obama proposed that to the US Congress, the US Parliament. It was passed by the Senate but not by the House of Representatives.

When that was blocked, they decided they would still reach their targets but do it by other means. Mainly regulatory action, with some states having emissions trading schemes - carbon pricing. And the leading officials in America who talked to me about this question said "we're taking our targets seriously". They're more ambitious targets than Government and Opposition are aiming for here.

"We know that it would have been better to have carbon pricing, but we were blocked in that. So we're going to do it in another way. It would have been cheaper to do it through carbon pricing. If we can't do it in the cheap way we'll do it in an expensive way. That will mean our people - our small businesses, our households - will pay a lot more than they would if we did it through carbon pricing. But we have to do it, so we're doing it anyway."

China too has embarked on rather ambitious approaches to reducing emissions and China too is doing it in regulatory ways. Ways that economists in China recognise are more expensive than doing it through carbon pricing.

Some people say "well China and the US don't have carbon pricing so why should we?" I say that carbon pricing is the cheap way of doing it. It means less burdens on households and on business. Why do it the expensive way if there's a cheaper way? If others are shooting themselves in the foot that's up to them. But why should we say we'll keep shooting ourselves in the foot, unless you stop shooting yourself in the foot?

Both sides of politics in Australia - Government and Opposition - are committed to reducing emissions by five per cent from 2000 levels by 2020. That's harder than it sounds because with all the policies that are currently in place - the Renewable Energy Target, the solar programs - the most recent estimate is we're heading for a twenty-four per cent increase on the basis of all those policies.

So really we've got to get from plus twenty-four to minus five to reach the targets of Government and Opposition. The Government's said that once it's clear the rest of the world is doing more then we will tighten our targets. But even the minimum one will be very hard to meet, and if you try to meet it by regulatory ways it's still a lot of costs, but they'll be bigger costs than if you do it through carbon pricing.

So there's no easy way of dealing with this, it's going to cost something. It'll cost more if you do it through regulation or direct action than if you do it through carbon pricing.

The other thing with carbon pricing is the Government is selling permits to large polluters. It will only be very large companies accounting for twenty-five-thousand tonnes per annum or more of carbon emissions that will have to buy a permit.

The Government will, through an independent regulatory agency will get about - well if the Government accepts, and the Multi-Party Committee, my recommendation on the price, will get over eleven billion dollars a year. And that's available to pay back to households in tax cuts or other household payments, in support for trade exposed industries and support for innovation in new technologies. And to support for carbon farming, for farms to sell credits.

If you reach the same goals through regulation it will cost more and there'll be no money to get - to pay for tax cuts or support for innovation. So it seems to me a pretty simple choice that carbon pricing is better than regulation.

At the moment there's a fair bit of anxiety about carbon pricing. It will add to the cost of living. But on my recommendations of a starting price of carbon around twenty-five dollars a tonne, the cost - the increased cost of living will be less than one per cent. Treasury is doing some very detailed modelling work on that now.

Now that less than one per cent is a small fraction of the increase in the cost of living that was introduced with the GST - if you recall there was a lot of anxiety with the GST when it was introduced. But after it was introduced it was not such a big deal. As with the GST, there will be accompanying tax cuts and adjustments to social security benefits with carbon pricing.

The increases in the pricing of products are averaging out at less than one per cent over everything. They will be highest for those goods and services that contain a lot of carbon emissions. Most importantly electricity. And on my recommendations, the increase in electricity price associated with that, would over a five year period be around twenty per cent. Now that's not small, but it happens to be much smaller than the increases that are coming through anyway from other sources.

And in my report I talk about how the biggest source of increase in electricity is the way we regulate the transmission systems and I think that involves a lot of unnecessary expenditure. So I've made some suggestions on how that can be produced.

Well once we've got carbon pricing in place, we will begin the transition to a low carbon economy. That will be a story of innovation in which many Australians - millions of Australian households and small businesses will begin to think of ways in which they can reduce their carbon emissions, reduce their use of energy. So we'll find that the reduction in emissions comes from many, many different places. And it will be those bits here and bits there that add up to Australia meeting its target.

The end point of that is that Australia will be doing its fair share of the global effort. I'm not suggesting Australia should lead the world. I'm saying we're a long way behind now. We should try to do about the average of developed countries. I think that's a fair thing to aim for. We've got to do a lot more than we're doing now to do that average. Do it by carbon pricing, it will be the least costly way of doing it with the tax cuts and adjustments to family payments and social security that I'm suggesting.

Then for low and middle-income Australians, there'll be no overall economic burden. And I think that acceptance of this structural adjustment is a reasonable price for our generation to pay to keep the climate one in which future generations of Australians can live in the sorts of amenity that we've been able to live in - although not all Australians in the wonderful amenity of Port Macquarie on a day like this. Thanks.

[Applause]

ROB OAKESHOTT: Thank you Ross and hopefully from that and from the coming Q and A, you'll see that Professor Garnaut is certainly a voice of reason in what has been a pretty divisive conversation in Australia. So thank you in front of Port Macquarie and the electorate of Lyne for the continued work that you have done. And hopefully this time the political process can be a bit more successful than in the past. But thank you very much for your work.

As well, for those that are interested so I don't forget, the Garnaut Report 2011, the updated version from the first round is available at all good book shops is that right? And online. And certainly for anyone who's interested in what is driving a lot of the policy conversation, both through the Multi-Party Climate Change Committee and in the Australian Parliament generally, it is worth a read.

It is much smaller than the first version and so - what is it, twenty - what's the price?

ROSS GARNAUT: Twenty-four something.

ROB OAKESHOTT: Twenty-four something dollars. And so it is certainly worth a read for anyone who hasn't yet had a read.

ROSS GARNAUT: It's on the web, you don't have to buy it.

ROB OAKESHOTT: Oh you don't have to buy it, it's also on the web for those that are online. So thanks for that, that can save you twenty-four dollars. We've got a - have we got one roaming mic? Two roaming mics. So the way we might do this, we might give one of them to Ross so that he can - rather than us doing this double act with the microphone. And then you can sit down and relax informally.

I'll have to play, you know, Red Symons and gong you if you go off patch. Please don't take that personally, but Ross has certain boundaries of his own. Please also be aware that this Climate Change Committee process is somewhat uniquely in Australian policy history, a cabinet subcommittee. So you know, we're off to gaol if we speak outside that committee process. Please again, also don't take that as an offence. That is just a reality that I don't think either Ross or I want to go in the clink.

So there is a roving mic. We can do it on a - just a hands basis. And I will just point to you and Pete will come and give you the microphone and away we go. There is one up the back on the inside. Fourth from the back.

QUESTION: Professor there was an announcement yesterday on ABC Radio that there is an investigation into the damage of wind farms to health. And it's not just the noise, there's more to it than that. And people overseas have been looking into this and they're grateful that something is being done about this. Could you give me your response to that?

ROSS GARNAUT: I saw those reports and to be honest I'm not an expert on wind farms. I am aware that some people living close to the wind farms - I'm aware that in Victoria some people living close to wind farms say that the noise and other effects are damaging their health and it's a very good thing that that's being investigated. But as I say I'm not an expert in those things and I'll await with interest the results of the investigation.

ROB OAKESHOTT: And the gentleman on the side in the jacket. Pete's right behind you.

QUESTION: I don't really need a microphone I don't think.

ROB OAKESHOTT:

But maybe some others who might not be able to hear you.

QUESTION:

Given that human activity generates CO2 and the world population is just on seven billion, we don't hear very much about a conversation regarding population growth and the problem we've got with CO2. And I just wonder if any of the discussions that you have anywhere addresses the issue of this huge population issue.

[Applause]

ROSS GARNAUT:

Yeah population is an important part of the story. One can think of the total amount of carbon dioxide we put into the atmosphere as depending first off all on population. And then how much energy each person uses and then where people get that energy from, it's those three things together that govern how much goes into the atmosphere.

I touched on that fairly briefly in my report, but on the web, on the website garnautreview.org.au, there's ten detailed background available that contains all the information than final report itself. And you'll find in update paper number three a very detailed assessment of each of these factors and how they're influencing total emissions. And one of these is population.

But the difficulty with population is that it's rather difficult as a matter of policy to do something about it. China's done quite a lot about it. There would be three-hundred million more Chinese today than there are if China hadn't adopted a one child policy. That's been very effective, but it's also very tough, and most people think pretty nasty. And not many countries would want to do what China's done or would be able to do it.

You might remember, it's now about 25 years ago, Indira Ghandi the Prime Minister of India tried to introduce some policies for greatly reducing the numbers of births per family. And she was strongly criticised for that. And there was such an eruption that she suspended democracy and declared martial law, but still the community was so antipathetic to that, that she abandoned that policy.

So it worked in China but it doesn't work in many places. It's only other countries with authoritarian governments like China that have had success. But the good news is that as countries are successful with development and as living standards rise then it seems to be always the case that births per woman fall. We've seen that in the countries that are now rich. All of the countries that are now rich have numbers of children per woman of child bearing age less than two-point-one. Two-point-one per woman is the zero population growth level. Why two-point-one? Because not every woman reaches child bearing age.

Australia has fluctuated a bit but its commonly about one point seven. In some European countries, it's way down, one-point three. It's below that in Japan, it's below that in Russia. So everywhere successful economic development has been leading to lower productivity.

In the developing countries, in the countries that have been successful in rising living standards, with development you get a fall in population growth. In India, when I first started looking at the Indian economy back in about 1970, from memory the number of average number of children per woman was about six. And then it's been falling every decade since then. The most recent data is just over two, about two-point-three and still going down.

But the countries where the population growth is still out of control are those who haven't been successful with economic development.

In Africa, the Middle East, Pakistan, parts of but not all of Latin America. So the good news is that successful economic development, rising incomes, better education, women feeling in more control over their lives, which comes with economic development and better education, leads to declines in fertility. For that reason the latest projections say that the world population will reach a maximum in about the 2060s and then start to fall. Of course it will be much better for dealing this problem and for a number of other problems if we were able to bring forward in time the time when population starts to fall.

ROB OAKESHOTT: Thanks for that. I might go Harry next up the front and then - I can only see a red arm - is that you, Jeremy? So followed by Jeremy - you can bring your arm down - and then Ross, we might - I've had some feedback that we might swap microphones, as well, because this one's a little bit clearer. So you might answer the next one from here.

HARRY CREAMER: Professor Garnaut I'm Harry Creamer from Climate Change Australia Hastings Branch. Can I ask you please to explain how this proposed scheme would work? Who would actually pay, how is the permit system calculated, and is compensation that you talk about to affected industries just them not having to pay, or does the Governmental have to find money and actually pay the affected industries? Can you explain what is proposed?

ROSS GARNAUT: Well I've made some detailed recommendations and it will actually be up to Rob and the political leaders on the multi-party committee who'll decide in detail what actually happens. And I know that they're still talking about that, but I can tell you what I've recommended.

And under my recommendations, any business - it would only be businesses that are liable and any business that wants to emit more than twenty five thousand tonnes per annum of carbon dioxide will have to buy a permit from the Government. So it won't affect small businesses. I would be amazed if there's any business in Port Macquarie that is up to twenty five thousand tonnes.

But it will include all the big power generators in Australia, the steel mills, the coal mines, but it'll be big businesses that pay. Then the Government will - the scheme will work differently in the first three years. In the first three years, the Government will issue as many permits as people want to buy at a fixed price and I've suggested the starting price should be twenty to thirty dollars, somewhere in that range.

I've suggested in the absence of a reason for something different, about twenty five dollars - twenty five, twenty six dollars, but somewhere in that range so that if you are a company that's emitting one million tonnes per annum of carbon dioxide, just to give you an idea of what that means, one million tonnes, the very big, dirty coal fired power stations in Victoria - and they're the dirtiest in Australia - have got about 16 million tonnes per annum.

But if you want to - if you are a company that wants to burn coal or oil and emit about a million tonnes per annum, you'll have to buy a million permits and you'll have to pay twenty five dollars for each permit. So that - you'd have to pay 25 million to buy your permits. And so there will be a system of administration.

I've suggested there should be an independent body, which I suggest be called the Independent Bank of Carbon, that administers the scheme, that sells the permits, that makes sure there's compliance, that it has rules to check that people who are paying - who are emitting more than twenty five thousand tonnes are actually paying. And in the first three years, it will hand out as many emission permits as people are prepared to pay for.

So in that first three years, you're introducing a financial disincentive but you're not actually putting an absolute limit on the number of emissions. But I've recommended that after three years, we go to a floating price in which the Government calculates what our fair share of global reduction in emissions is and that allows you to calculate how many emissions we're allowed to have while doing our fair share. And it will issue that number of permits.

Actually a bit less because it will have to take into account that there are some people emitting less than twenty five thousand tonnes, but it'll pick up most of them with the big ones. It will calculate how many permits and then we'll auction them and the price will depend on what people will pay for them and there can be trade between different companies.

And so any business that wants to have big emissions like a coal fired power station wanting to have big emissions will have to buy a permit for every tonne of emissions. Now, an electricity company will then pass on most of the cost. In some cases, maybe all of the cost. That's the way business works.

So you can't say that there's no effect on everyone else because the big businesses will try to recoup their permit prices by passing on the price. That will lead to an increase in electricity prices. As I've said before, a much smaller increase in electricity prices than has been happening for other reasons, I think not very good reasons in Australia in recent years and is likely to happen in the next few years. But there will be an increase in electricity prices.

But the Government will be getting all of this revenue. Under my recommendations in the first year over eleven billion dollars of revenue - a lot of money. I've suggested that a bit over half of that should be given back to households basically as tax cuts and as adjustments to family payments and social security payments for people on low and medium incomes and then phasing out above that. So by the time you get to high incomes, not having much effect.

And I've suggested that initially about thirty per cent of the income used to provide assistance to trade exposed industries like the steel industry and the way I've suggested it would lead to the amount of money being - or the number of permits being handed to the trade exposed industries falling over time. But to start with, so as not to be disruptive to those industries, about thirty per cent.

And then the rest can be given to farmers who take action to reduce their carbon emissions or increase the carbon in their soils, in their pastures and their woodlands. There's a lot of opportunity for doing that in Australia. This could be a big farm industry. And then some of the revenue would go to support innovation in new technologies that reduce emissions.

For example, the first people that try out a new solar technology should get some support for that because if they're successful, everyone will learn from their experience. So there's a case for giving some assistance for the first people. Now, some say that if you give assistance to households, give tax cuts or adjustments to social security, then that removes the incentive to reduce emissions.

Well, it doesn't because the electricity price will rise more than other prices because electricity's got a lot of coal in it. So if you get a tax cut or a social security adjustment that's equal in quantity to the increase in electricity prices, you'll still have an incentive to reduce electricity because the price of electricity is more.

And I've heard that you can reduce your electricity bills by ten per cent just by making sure that appliances are always turned off at the plug rather than left on remote control which leads to some - the facility stays warm and that means energy is being lost. But if we turn it off at the plug, it doesn't. I've heard that you can save about ten per cent of your energy bill from that.

If you start taking saving electricity more seriously because the price of electricity has gone up more than other things, then you'll be able to reduce your total expenditure and you will actually make a profit because you'll be getting a tax cut or a social security adjustment based on the increase in electricity prices if you succeed in reducing electricity use.

And lots of studies have shown that if the price of electricity rises about ten per cent compared with other prices, people will very quickly reduce their electricity consumption by about three per cent and then over time as they learn new ways of reducing emissions - maybe adjust their appliances, make sure the next fridge they get uses less energy - then over time they'll reduce their electricity about seven per cent.

So although you've compensated people for the increase in electricity prices, you've kept the incentive for them to reduce emissions. And for the trade exposed industries, it's very important that you do that in a way that maintains incentives to reduce emissions. So the way you'll do that - I'm suggesting that in my recommendations, whether Rob takes them or not is up to the multi-party committee - but we shouldn't be compensating generators of electricity because they're going to pass on most of it to others anyway.

But for the trade exposed industries, they can't pass it on. There's a certain world price of steel and the imports from Korea or Japan or wherever it's coming from will be at that price and if our producers in Wollongong or Whyalla have to pay for permits they won't be able to pass it on. The electricity company will pass it on, but they won't be able to pass it on in the same way.

But if you base the free permits you give them as assistance on some objective number based on their past performance, and they get that even if they reduce emissions, then they're in the same position as the household with electricity. So you give them a certain number of permits and if they succeed in reducing their carbon emissions, they don't get less permits so they'll still have an incentive to reduce their emissions.

And as I said before, I've recommended arrangements in which the number of permits going to the trade exposed industries falls over time. But the most important thing is that the amount of assistance you give them doesn't diminish if they are successful, if they make a big effort to reduce their emissions. And in that way, they're a bit like the household that gets tax cuts and social security compensation but retains an incentive to reduce emissions.

ROB OAKESHOTT: Thanks, Ross. Following Jeremy's question, I wouldn't mind just coming back to that one point about electricity prices and the electricity sector and some of the recommendations you've made in regards to the regulatory failure of the electricity sector.

Because I think it certainly surprised me the number of failures in that market and also some gems in there as well, such as New South Wales already had an emissions trading scheme in place and some of the considerations that we'll have to make if we go down the path of having a national emissions trading scheme including potentially

transitioning out. But first, to Jeremy, his question and then we might come back to that if that's okay.

QUESTION:

Thank you for coming here, Mr Garnaut. Two very important questions from the agricultural sector, you touched on there. One is reduction of emissions and the other is biosequestration. Now given that biosequestration, especially in soils, is not a Kyoto acceptable area and that it would cost a fair bit for each farmer to adopt the technologies for biosequestration, in labour costs especially, what price do you consider would be fair for soil carbon credits per tonne? Amongst the farming community, it's suggested up to forty five dollars per tonne.

And the second part of it is, reduction in emissions from chemical fertilisers. The leakage from nitrogen fertiliser is nitrous oxide. As someone said, that's no laughing matter. And the - being three hundred CO₂-e and a very persistent gas and phosphates which acidify the soil and need calcium carbonate which releases calcium - which releases carbon dioxide. These things are very, very difficult to remediate. Given the fact that most of our agriculture is very dependent on nitrogen and phosphorous, has much thought gone into that?

ROSS GARNAUT:

Yeah, a very comprehensive question. That shows you've been thinking about this a lot. But a lot of thought has gone into that and in the update papers on the web, there's one paper just on the land sector that discusses quite a few of those issues in a lot of detail. Paul Ryan from the Department of Climate Change is with me here today, has done a lot of work with me on those questions and maybe Paul can give you some more references relevant to that.

Not all of you will have understood - it's Jeremy, is it - Jeremy's reference to Kyoto rules. Well, the international community - all the countries of the world - in a meeting in Kyoto in 1997 took some decisions on what would be counted in each country's targets for reducing emissions. And Jeremy's quite right, they thought that initially they would not include soil carbon and some other forms of sequestration of capturing carbon on farms that's not included.

And under those rules, you wouldn't include all the capture of carbon in woodlands in Australia. But what I've suggested is that for capturing carbon on farms in soils, in pastures, woodlands, in ways that's not counted under the international rules. But where the capture of carbon is genuine - you really are taking carbon from the atmosphere and we don't want fraudulent arrangements, we want genuine sequestration - where it can be shown that it's genuine, the farmers should get compensated - should get rewarded at the same price as the carbon price.

And if the carbon price is twenty five dollars, they should get twenty five dollars. Now the price - the cost of different forms of sequestration will vary a lot from place to place. I've heard that some soil based carbon costs might be as low as eight dollars, but there won't be that much of that. There'll be more at fifteen, there'll be more at thirty, there'll be more at forty five and at twenty five it no doubt will encourage some, perhaps quite a lot, but will not encourage some that would be encouraged at forty five dollars.

That's the way the market will work. But there'll be quite a strong incentive for genuine capture of carbon in soils, pastures, woodlands through the proposals I've made and I've recommended that part of the carbon revenue be kept for making payments for that purpose. Could potentially be quite a large industry in Australia.

Now, I know that the Australian Government has been engaged in discussions with other countries to try to get the rules changed. One problem is that these rules were made up at a time when Australia and the United States were the two developed countries that weren't active in the discussions. We were mainly thinking about how we could avoid responsibilities rather than getting stuck in and helping to shape the international rules.

So at that early stage, European perspectives were much more influential than ours and I think that's a mistake of our diplomacy. We missed out because we were not influential enough. We were not participating strongly enough when a lot of the rules were discovered. And these issues are nowhere near as important in Europe as here because we've got much more potential for biosequestration than Europe.

Nevertheless, we are now in the game and thankfully America's in the game and America shares some of these interests with us. And some of our big developing country neighbours also have a big interest in these questions. Indonesia does, so we're not on our own, so there's a reasonable prospect of changing the international rules so that we will get full credit for that once the rules are changed. But even before then, I'm saying we should use some of the carbon revenue for that purpose.

Now, there is an issue of the compliance costs of measuring the carbon in soils, in woodlands. Those costs have been coming down and they are developing techniques for measuring a lot of those things indirectly through remote sensing, from satellites and so on which would greatly reduce the cost.

We need to keep the research going, to improve ways of measurement and reduce the costs of measurement and that's happening. And I've recommended that a fair bit of the carbon revenue be used for research in this area and so costs can keep coming down - that's a very important activity. It's an area where we've got lots of skills in Australia that can help teach things to the world. So if we work the things out for ourselves, we can take that technology to Indonesia, to Europe and other places.

On your question about fertiliser, yes, they are complex issues. The issues related to nitrogenous fertilisers. The various nitrogen oxides are covered by the international rules and so they will just become part of the scheme, although the farm sector itself under my recommendations would not be - would not pay for the costs of these things. It would just receive benefits through credits if it succeeds in demonstrating that it was capturing carbon.

ROB OAKESHOTT: Thanks Ross. Do you want to now come back to the question about the regulatory environment, because I know that you said that that whole cost of living question is largely driven by what makes pretty sharp electricity price rises locally. And I think some people know that you're interested as to what is going on in that regulatory environment and what can be done to improve it.

ROSS GARNAUT: Yes, thanks, Rob. I must say, I was surprised when I started digging into this. Everyone knows that for the last five years electricity prices have been rising a lot and this is a complication for carbon pricing because - well, one thing that I was worried about is we'd introduce carbon pricing, there'd be some increase in electricity prices because of carbon pricing but carbon pricing would be blamed for the other increases that have been going on for the last five years and which we're told will continue to go on if current policies continue.

And if you look at the data - and I've got charts in the final report and more charts in update paper number eight on the web, on electricity - if you look at those charts, for most of history Australian electricity prices rose more or less in line with other countries and more or less in line with other prices. Electricity wasn't out of line but the last five years, our electricity prices have just taken off, rising much faster than other prices and much faster than prices in other countries.

There's no other country in which this has happened and it's never happened like this before in our history. So that to me as an economist set me a bit of a challenge to understand why this was happening and so I started to dig into it. And when you look at electricity prices, there's three main components and up to a couple of years ago, about forty per cent was the cost of producing the electricity. That's the generators. Here, they're mostly generators using coal in the Hunter Valley.

And then about fifty per cent is the poles and wires getting the electricity to your home or your business and about ten per cent is the margin for the retailers who send you all those letters or ring you up or knock on the door saying you should shift from someone else to them. It costs about ten per cent of your electricity bill to pay for that. And the biggest bit isn't actually the generation of the electricity in the Hunter Valley. It's the poles and wires.

And this is naturally a monopoly because it will never make sense for five different companies to run wires down your street and into your home. It will make sense in each suburb or region to have one supplier. You'll be able - different sources of electricity, different retail companies can use that so you can switch between Country Energy and AGL and then they will just use the poles and wires that are already there.

But the poles and wires which are most - the biggest single bit of the price of electricity are a natural monopoly. And with natural monopoly, the people who provide the service are in a position to charge whatever they like because you have to have that service. So it's common when you have a monopoly like that for the government to regulate the price. And the way we've done that since 2006 - it was done differently earlier on - is to regulate the rate of return.

But we've done that in a way that creates opportunities for the companies, the distribution companies, to raise the rate of return. If they're not happy with the rate of return the regulator gives them, then they can appeal that. But the regulator can never appeal or the consumer, if you're not happy about your electricity bill, you can't appeal that and say that's too big a rate of return, so it's a one way street.

And the whole system of appeals is biased in favour of the distribution companies. And so we've had the regulators saying this rate of return is fair and then appeal and that puts up the rate of return to that level. So if the rate of return used to be five per cent - if that's set by the regulator - five per cent a return on capital and then there's an appeal and the appeal court says no, no, we'll change that to six per cent - and things like that have happened in New South Wales - then that part of your electricity bill, that half of your electricity bill that's poles and wires, will go up by twenty per cent just through that mechanism.

But there's another problem. If the rate of return that's allowed is higher than the cost of capital of debt and equity to the company, then it has an incentive to make more investments in poles and wires and then it gets a rate of return, the high rate of return, on that bigger investment. And so they add that on to the electricity bill as well. And

so we've been going through a boom in investment in transmission and distribution, especially distribution, with billions and billions being spent on investment in transmission.

Now, this is a zero risk investment because it just gets added on to your electricity bill. It's not like - I've been chairman of a mining company, well, you take a risk on the price of gold and copper and other things. Well, there's no risk in this. The price is set for you and it just gets added to your electricity bill. So if you don't pay your electricity bill, the electricity gets cut off. So you're going to get it.

And so if you've got a riskless investment and the rate of return that's allowed by the regulator after the appeals is higher than the cost of capital, then you'll get excessive investment and this is actually well known in economics as a problem, that if you've got a monopoly and you regulate it by rate of return, you set the rate of return too high, you'll get what the economics books call wasteful over-investment. So we've had that here and there's no limit to it until we get rational regulatory things in place.

My own view, after looking at all that, is that if we made this a high priority, reduce the rate of return to a rational level that would stop the excessive transmission, those two things together would actually - would stop this big increase in transmission costs which has just got out of hand. I would like to see that done because apart from the fact that there's no good reason for it, we're just further bettering the distribution companies for no good reason. But the other cost, of course, is it'll become confused with the effect of carbon pricing. People will blame carbon pricing for it and the electricity companies will try to blame carbon pricing too. So I think it's very important to solve this problem and I think we can solve it.

ROB OAKESHOTT: Thanks.

[Applause]

ROB OAKESHOTT: I think ... my eyes are starting to fail at my age. Brian? We might start to work this side of the room because I don't think there's been one single question. So we might start here at the front and start working that way.

QUESTION: Professor Garnaut, the thing that puzzles me is with the - you've given us an explanation but that's going to happen with the distribution of the carbon tax and where the polluters going to pay. But what's the real incentive for the polluters to try to reduce their polluting because why don't they just keep paying and just keep handing on that cost? That's where I can't see how the whole system ultimately benefits the environment by reducing pollution.

ROSS GARNAUT: Yes. Okay. Well, that's a good question. It'll work a bit differently in different industries but I'll just give one example of electricity because that's just about our biggest source of emissions. That's where most of the coal is burnt in Australia.

The electricity generators, if they're burning coal, more than twenty-five thousand tonnes a year, will have to buy permits. It will cost them a fair bit of money. They will try to pass it on. The extent that they pass it on - the government gets money, gives tax cuts or adjustments in social security - there's an incentive for households and businesses to use less electricity to save money.

So that's one of the things that will happen: there'll be a bit less electricity used; that will reduce emissions. But for the generator, there's a number of different ways that you can generate electricity. You can use dirty brown coal in Victoria and say there's a hundred

tonnes of emissions per unit of electricity from dirty brown coal. Or you can use black coal, now - the sort of coal you've got in Queensland and New South Wales. That might be about eighty tonnes.

I'm just using these numbers as examples. Or you can use natural gas which is about forty tonnes of carbon per unit of electricity. Or you could use wind or solar, or for that matter nuclear and that's zero. So when you put the price on carbon, if you're using brown coal, you'll have to buy a lot more permits per unit of electricity than if you're using black coal. If you're using black coal you'll have to buy a lot more permits than if you're using gas. If you're using gas, you'll have to buy a lot more permits than if you're using wind.

So every generator - and most of these big companies who are generating electricity have got some coal, some gas, some renewables - they will try to use less of the brown coal and more of the others, less of the black coal and more of gas. And they'll be making careful calculations of all the things affecting their costs and you'll find that no-one will build a new power station in Victoria using dirty coal because they would have to buy so many permits.

Almost certainly the new investments under my recommendations would be in gas or to some extent in renewables but you won't get more investments probably even in black coal for generating electricity because the cost is so high. The incentive comes from it costing much more in permits to use those forms of energy that have very high emissions per unit of electricity. And these incentives will be quite strong.

Take that brown coal power station in Victoria that I mentioned that emits about sixteen million tonnes of coal. If the price of emissions per - altogether, sixteen million tonnes, if the price of permits was twenty-five dollars a tonne, then it would have to spend - quick arithmetic in my head - roughly four-hundred million dollars on permits. Now, if its competitor's using black coal, high quality black coal, would just generate about - would only have to spend say three-twenty million dollars instead of four hundred.

And if they were using gas, they'd only have to use about one-hundred-and-sixty million so there'd be quite a strong incentive to adjust. And as soon as this is in place, all those electricity generators - well, you're thinking about how can I use more gas and less dirty coal? We'll probably find that the power generators in Victoria don't run their plants all the time, and the gas plants which currently are only used part of the time will be run for more hours. That's the very first adjustment.

And when it's time to put in new plants, they'll be gas or renewables and not coal and so over time, that will reduce emissions. I modelled all of that fairly carefully and went through and presented a lot of the details on how that adjustment would take place in my first report which, as Rob said, is quite a thick report that came out in 2008.

ROB OAKESHOTT: Thank you. I wasn't that critical, by the way. It was just a few more late nights reading. Its fantastic to have some young people here so can I assume you're from the Youth Climate Coalition as well, based on the t-shirt? And then we might jump back to Brian Parsonage and the gentleman down in front and then we'll work our way down the side.

QUESTION: My question is a long run kind of perspective. I don't see how, if in the long run we still export coal overseas, how we can legitimately call ourselves doing something about climate change. So in the long run, if we're a zero carbon economy at home, but we're still digging up the

stuff and sending it overseas, how are we really a zero carbon economy?

[Applause]

ROSS GARNAUT:

Yes. That's another very good question and you're dead right that if we were still exporting as much coal in ten years' time as we are now, especially if that was growing and if they were just burning that coal and letting the emissions go into the atmosphere, then we wouldn't have solved the problem. I've mentioned that other countries are doing quite a lot. Now, Australia is by far the world's biggest coal exporter and the biggest markets are the countries of Northeast Asia - Japan, China, Korea, Taiwan. So the crucial thing is, what are they going to be doing to their use of coal?

Now, all those countries are taking emissions seriously and for all these reasons, I think there's not a future for the export of coal in Australia, a long term future, unless the world develops ways of capturing the waste from burning coal and storing it so it stays out of the atmosphere. Now, there's several ways in which that could happen. One is called carbon capture and storage where you burn the coal, you capture the carbon waste and you take it underground by pipeline or you compress it, put it underground and store it in geological structures that are stable and will hold it.

Now, we do know that some geological structures under the ground can hold that for a very long time. For example, the natural gas that we use has been caught in those sort of structures, sometimes for millions and millions of years and we know that those structures are impermeable because the gas hasn't escaped. And so if we put carbon dioxide down that could hold it.

And over time the carbon dioxide interacts with other rocks and turns into rocks so there's some very good work being done, a pilot project at Cape Otway in Victoria where they're studying this and they can see all of that happening. So that's a possibility and if that happens, that's one way in which coal could have a future. Another way is through biological processes and the most exciting research work that's going on, in my mind, relates to the use of algae.

Now, algae has got a track record. For billions of years, or certainly hundreds of millions, it got to work capturing sunlight and carbon dioxide and converting it into hydrocarbons, into chemicals. It then dropped down and became the coal and the oil and so on. So it's shown that it can do it but we've got to get it working to do it more quickly.

And if you put the wastes of a power plant or a steel mill through water a lot of it will - the carbon dioxide will dissolve in the right conditions and you get a weak carbonic acid. That's dissolved carbon dioxide - H_2CO_3 from my high school chemistry but you'd be better at that than me and that's the perfect environment for algae to grow. It will grow very fast.

Now you get an extra bonus if you can then extract the algae and that's got hydrocarbons in it, the same chemicals that make oil. So you could then use that as a base for biofuel and there's a lot of research going into that. It's not yet commercial mainly because we need cheaper ways of actually collecting the algae and putting it into the processing plant.

I think there's quite a good chance of that being done. Another way is through turning the carbon dioxide through a chemical process into solids that you might be able to use for building material and into carbonates. I think it was Jeremy who mentioned that when you put

lime - well, carbonates on to your soil to offset - or put lime on to your soil you usually have to burn a carbonate.

Well it may be that you can form a carbonate out of carbon dioxide, so a reaction with other chemicals. So one way or another it may prove to be commercially viable to capture the waste carbon dioxide after burning coal and if that happens our coal exports and our coal use within Australia have a future.

But in my opinion it doesn't have a future unless those sorts of technologies can be developed at reasonable cost. Now if they're not developed at reasonable costs we will find that other countries who take reducing emissions seriously will be looking for alternatives to coal.

I spent a week in China in January just catching up with the work going on, on technologies to reduce carbon emissions. I was told then that in coastal China, where most of the new industrial activity is - and they're the places that buy our iron ore, our coal and for that matter our wool; about seventy per cent of Australia's wool goes in there these days - turn it into industrial products for use in China or for export.

And China is trying to reduce use of coal in those coastal areas - well, right over the country but especially those coastal areas. It's doing that through the world's biggest wind power program, the world's biggest solar program, the world's biggest biomass program but most dramatically the world's biggest nuclear program. And they are hopeful that costs of nuclear will come down so much and they have been falling a lot, that with new research and better manufacturing techniques they can get nuclear plants down at lower costs in about five years' time I was told, that's their hope; lower costs than coal so that they can avoid coal.

Now since Fukushima, the disaster in Japan in February, the Chinese, like all of us, are thinking hard about the risks, the safety risks, of nuclear. And so they've suspended new projects in China.

The minister who is responsible for this area in China told me in March that after the Japanese disasters they had decided to continue with all the projects that were already being built for nuclear but to suspend approval of new ones until they'd investigated the safety implications of what had happened in Japan.

And I think the most likely is that they will have more demanding safety requirements and use later versions of nuclear technologies that carry less risks but they will go on to the program.

So there's a commercial risk for coal that our exports of coal will have to compete with lower cost zero emissions sources of energy and there's an environmental risk. We will lose those markets unless the world succeeds in finding some way to capture the waste.

I should mention one other thing. China has been engaged in the last couple of years in a very big program to close small, economically and environmentally inefficient coal mines of their own and power plants. And we've had quite a boom in coal, in exports in the last couple of years and the coal price, the price we get selling our coal to China and the world, has gone up a lot.

And one of the reasons for that is that they've been very tough on their own dirty coal mines and closed a lot of them down and that increased demand for Australian coal and the price went right up. So our coal mining companies have done very well because China is being very serious about environmental questions.

So that's a temporary gain. The short term benefit is when they do more about the environment they've used more of our cleaner coal, less of their dirty coal. But the long term story is that unless we can help China and other countries find ways of capturing emissions from burning coal, coal exports, like coal burning in Australia, won't have a future.

[Applause]

QUESTION:

Firstly I'd just like to say thanks again for coming Professor Garnaut. As you can probably tell by Cameron's question we as members of the Australian youth and the Australian Youth Climate Coalition have a particularly high stake in the future of Australia and the long term effects of this policy and we've been watching this debate with a great deal of frustration and the youth of this country have almost been quite alienated from the process, considering we are going to be the ones who are going to have to deal with the issues in the future. The youth are going to university and learning about photovoltaic technology, going into economics and development studies and everything that we can possibly think of to try and learn as much as we can about the science.

Yes, I was just going to ask yourself and Rob, if you could have one statement that you'd like to say to Australia to prove to us that you're actually considering our future in this discussion that you're having at the moment, what would you say to the Australian Youth Climate Coalition and young Australians?

[Applause]

ROSS GARNAUT:

Well, I think that's a really important point because if we don't deal with this problem it will be our children and our grandchildren and later generations of Australians who will pay the price and so the question is, are we prepared to accept a little bit of cost now, but not much, to avoid leaving for those Australians who come after us a world in which they can't live as good lives as we've lived? That's the real question.

Do we care enough about future generations of Australians to make some effort now to leave them a world that's comfortable for them to live in?

Now on this question young people have got a few advantages. One is that they know they'll be around to live with the consequences, but I think that a lot of people my age actually still care about the consequences of the future. I think I care as much about the welfare of my children as I do about my own and I think I care more about my grandchildren than my children...

[Laughter]

[Applause]

...so there's not such a generational divide on motives.

But whenever you get a new and complicated issue young people have got the advantage that they're familiar with it from an early stage. I hadn't heard about this problem until about twenty years ago and by then I was already more than halfway through my career. And the first time I ever wrote about it being a serious issue was in 1997 and it's really only when all of the state premiers and the Prime Minister asked me to do this work in 2007 that I started recognising what a big problem it was.

Now, that's not because I didn't care about it in the 1990s and 1980s but because I hadn't grown up with that just being part of the

knowledge that you absorbed. Young people have got the big advantage that they're growing up with this knowledge, just as people of your generation are much more clever with information technology than I am, you've also got the advantage that a new complicated issue like climate change is something you're growing up with.

So this is a problem that we wouldn't care about - people my age wouldn't care about if we were only thinking of our own future because the main problems will come later, but one that we have to give very high importance to if we worry about our grandchildren's welfare. But it will be people of your generation that find the best solutions. I hope that we will leave a base from which you can build.

[Applause]

ROB OAKESHOTT: I'm conscious this is Ross' day but I will give a very short answer, that is actions speak louder than words. I am not bleeding politically all over for no reason. It is because I do want to see this forty-third parliament deliver on what the forty-second one couldn't, and I hope all that political blood tells my story.

[Applause]

I'm conscious it's 4:30 now so if anyone does have to leave feel free to leave. I'm happy if we keep going for a few more questions because I know there are hands still going up and we may go through until a quarter to, about ten to, so we could have about four or five more questions. So Brian?

QUESTION: Yes. Thanks, Ross and thanks Rob for organising this important debate. I think one of the things that concerns a lot of people is the difficulties in getting coordinated international action. I wonder if you'd like to comment on any lessons that we have learned from history about how that can be achieved and perhaps comment on the current success of the reduction in CFCs when the concern was about the hole in the ozone layer.

ROSS GARNAUT: I think that is a successful example of - CFCs, just for other people in the audience, the CFCs are chemicals that damage the ozone layer, which is a very small part of the atmosphere but is crucial in keeping out some of the damaging rays of the sun that damage - well, the ozone layer is crucial to keeping out some damaging rays of the sun that once you've got holes in the ozone layer become much more vulnerable to various skin cancers and so on.

And once scientists discovered the link between these chemical CFCs - which come from pressure packs or the old kinds of pressure packs and various other things, you get them used in refrigerators and so on - then the international community agreed to ban a lot of the technologies that use these chemicals and it worked.

Now that's a successful example of cooperation. I'm afraid it was much easier than the carbon dioxide one because there were other technologies that could be used. They were a little bit more expensive but it wasn't such a big deal whereas when we're trying to deal with carbon we're dealing with something that affects so many businesses, so much of our lives.

We're just dealing with a much more difficult problem. I've spent a lot of my life dealing with international trade policy questions and one thing I've noticed is that it's always very difficult to get a solution once you send negotiators from each country in and they start negotiating on how much each will do because they each feel that their success depends on getting other countries to do more than them.

No it's funny the psychology of this but the end product of it is that no one does much and we don't make much progress, we don't get the reductions in trade barriers that would make us all better off. And we've actually had more success with trade policy where we don't have tit for tat negotiations, where we don't send a whole lot of diplomats in to say okay, we will reduce our protection on textiles if you will reduce your protection on beef.

We've actually had more progress when each country is showing that it's committed to reduce protection and doing its own bit and other countries notice that each country is doing its own bit and so you really get voluntary rather than negotiated outcomes. And it's for that reason - I talk about this in the report, in chapters three and four - it's for this reason that I don't think the outcome of the Copenhagen negotiations and the Cancun negotiations is a bad one.

Because what we were trying to do before Copenhagen, the United Nations' Conference at the end of 2009, was to get an agreement where every country agreed to do a certain amount if other countries did a certain amount and it was just too complex for every country to agree in that one meeting.

Largely through the initiative - well the idea of an alternative approach actually came from the Australian delegation but it was taken up by President Obama who had detailed discussions with the prime ministers of - mainly of four big developing countries - of China, of India, of Brazil and South Africa - and they came up with a different approach called pledge and review where you weren't trying to get a binding agreement all at once.

Each country was putting on the table what it was prepared to do and they agreed on procedures where they would measure progress towards the pledges in a similar way with verification from outside, so it wasn't just one country saying I'm doing so much and then they agreed to review the pledges periodically. And the hope is that that will lead to a ratcheting up of ambition over time.

I think that's definitely worth a try because I think it's a lesson of trade policy that that sort of pledge and review process has been more successful than negotiations to reach binding agreements.

[Applause]

ROB OAKESHOTT: Okay. So we might have time for three more questions from the red jumper up the front and, Tom. Sorry we haven't been able to get to everyone else; I hope you understand the time commitments.

QUESTION: I have two questions, the first on the science of climate change and the second on the policy we've got on renewable energy. You've already said today that the science of climate change is more or less settled, which is a statement which is not agreed by many thousands of scientists and just one example which happens to be current. Professor Landscheidt in 2003 published a paper which summarised his hypothesis that...

ROSS GARNAUT: Professor - who is that?

QUESTION: Landscheidt, from Germany, summarised his views, or his hypothesis that solar activities have a direct effect on the planet. He cited forty-three other papers, published between 1873 and 2002 on the same subject; all came to the same conclusion. Now just this month at a conference in Mexico the United States National Solar Observatory which is not some small organisation, it is the American National Solar Observatory, they published three separate papers, which confirm

Professor Landscheidt's hypothesis that there is a clear correlation between solar activity and climate.

But that's not all because...

[Over speaking]

QUESTION: All right ... The fact is that what the scientists are proposing or what they said is that, in fact, the current solar activities - and this has been in the papers recently - the current solar activity is decreasing ... resulting in a cool climate similar to ... little ice age.

Now, my first question is based on this, just as one example of ongoing research into the climate science is how can anyone say that the science is settled?

ROB OAKESHOTT: Do you want to ask them both and then Ross can wrap them together?

QUESTION: On renewables, just to take the wind farm, wind energy, and I'd like to point out that on 30 December 2010 when the UK was going through a very strong spell, there was no wind, and instead of producing twenty per cent of the electricity power from wind farms, it, in fact, produced on nought point four per cent [inaudible].

In south east Australia on 29 and 30 January this year, there was a very strong heatwave, but there was no wind generation. The peak demand for energy is in the afternoon, the peak wind farm energy could only be delivered from three to six am when it was not needed.

So, yes, my point is this. My point is this, is that we are now embarked upon a policy which is going to increase taxes for coal generation. In both those examples, the base load had to be provided by coal fired power stations. When we are going to make coal fired generation so excluded, so expensive, so expensive, are we not risking the security of energy upon which this country relies by transforming the costs before we have a reliable renewable source?

ROSS GARNAUT: Thank you. Two separate questions really. First on the science, I've had to rely on other peoples' science. I have never pretended I'm a climate scientist, but I've had very good scientists working with me, including the best in Australia. And I've made it my responsibility to read deeply into the science.

The climate science, the genuine climate science that's supported by all the academies of science in the world and by the specialists in climate science, on which I've relied most heavily, recognises, always has recognised, that variations in solar activity are one source of variations in temperature; they go up and down over time. Changes in the orbit of the earth around the sun, and it varies a bit from different periods, that has an effect on temperature.

And these are both taken very carefully into account in the climate models that seek to work out what is the effect of human induced increases in temperature. They're all important, but the science models that try to measure all of these effects say that by far the largest part of the recent increases in temperature since the 1940s that I've referred, with each decade being warmer than the one before, by far the largest part of that is a result of human induced activity.

If it is true that right at the moment, that we're going through a weak period of solar activity, then that will be followed sometime by stronger solar activity because it does fluctuate. Despite the fact that the solar contribution, if your sources are correct, is weaker at the moment, the

average temperature of the last decade has been higher than any decade previously in history.

That's just an observable fact and there's less glacial ice, there's less polar ice than there was thirty or forty years ago and so that means that the human contribution is having to overcome the contrary effect of reduced, temporally reduced solar activity.

So that's all carefully taken into account in the climate science. As I read into the literature I saw that those solar variations and changes in the orbit around the earth had been taken into account, they're recognised. No climate scientists say that the only thing affecting temperature is human induced, but the human induced sources are the largest cause of the increases in temperature over the past half-decade.

And the other factors that lead to fluctuations might move for some years in a positive direction, some years in a negative direction and if they're moving in a negative direction for a number of years, then they'll be moving in an opposite direction at a later stage. So the long term trends, looking forward fifty, a hundred years, are dominated by the human induced causes.

And all of this is very carefully studied and I actually make reference to some of that literature in my paper on the science, update paper number two I think it was, and more briefly in the final report, and papers that have been published by leading climate scientists like Will Steffen at the ANU, David Karoly at the University of Melbourne addressed those questions.

The second question is quite separate from the first. If we have to reduce emissions, how reliable are various low emission sources of electricity, and it is true that both solar and wind are highly intermittent. Some renewable sources of energy, hydro-electricity, is the opposite of intermittent; you can run it more intensively exactly when you want more power, and that can become one of the ways of balancing out the intermittency of solar and wind power.

If the wind is blowing in the - strongly in the middle of the night when there's not much demand for power, you can use the surplus power to pump water up from lower storage areas up into higher dams. In Australia we've got two very large hydro-electric facilities, Snowy Hydro in the Snowy Mountains, Tas Hydro in Tasmania. They can be used to balance the intermittency of other forms of power.

Quite a lot of research is going on into various chemical ways of storing surplus heat arising from the concentration of solar energy in the day time. That's incorporated into some of the very large new plants in Spain. But all of these things have a cost and one has to take those costs into account. The costs will fall with more research, but they're significant and the points you referred to have to be considered when we are looking at the mix of energy that will give us energy security.

That's one of the reasons why in the transition period we will probably be wise to use a fair bit of gas and less coal and during this time we will be developing cheaper ways of dealing with intermittency, and that's all an important part of the transition to a low carbon economy.

ROB OAKESHOTT: Thank you.

[Applause]

ROB OAKESHOTT: Thanks, Ross. Final two questions. Here and then Tom and then we'll have to leave it at that.

QUESTION: Our Independent member here for Port Macquarie is going to play a very key role in determining what sort of legislative response and actions we should take in response to your recommendations. Mr Oakeshott wrote to me personally this year and said that he did not personally believe in a carbon tax. Now unless he falls to some affliction of truthfulness like Julia Gillard and Wayne Swan and supports such legislation, heaven forbid, will that process or legislation and actions result in any significant reductions in global warming within five to ten years?

ROSS GARNAUT: Sorry, would what I have proposed lead to a reduction in global warming in five to ten years?

QUESTION: Carbon tax.

ROSS GARNAUT: Carbon tax.

ROB OAKESHOTT: You might want to clarify what you mean by a carbon tax. The current model that is being discussed or an actual tax.

QUESTION: The carbon tax, which will be the mainstay of the legislation.

ROB OAKESHOTT: Well no it won't be, but I'll leave that to you Ross.

ROSS GARNAUT: I've described my proposals which are to legislate an emissions trading scheme with a fixed price for the first three years and then the same arrangements with a market price after that.

I, myself, would not call that a carbon tax; I would call it an emissions trading scheme with a fixed price in the first three years. It has been called in some of the discussion a carbon tax; I myself would not use that description of it. I never have. In fact, I first proposed such an arrangement, a form of that, in my first report in 2008 exactly as I've proposed it now; a fixed price for a while with an emissions trading scheme with a fixed price for a while and then a market price after a while.

It did not occur to me to call that a carbon tax. To be honest, I think the Prime Minister might have made a blue in letting other people call it a carbon tax and in accepting that, because I don't think it was necessary. I don't think it's the natural word to use for that type of arrangement.

But, for myself, I prefer what we've got to a carbon tax where you would simply charge a certain amount for each carbon emissions and keep it like that forever. I think there are some advantages for Australia, not for every country, in an emissions trading scheme over a carbon tax, but both have some similarities in the way they work.

Whichever way you approach things, what we're trying to do is have Australia do its fair share of a global effort. This problem can only have a global solution. You can be pretty sure that it will be hard to get a good global outcome if all of the rich countries don't do their bit, don't do their fair share. So we can have quite an effect on what the world does by doing nothing, because that would help undermine the world effort.

So what I'm suggesting is that we try to do our fair share and the whole world doing its fair share won't lead to a dramatic cooling in five or ten years because the warming that's already going on has some momentum. And that, from the carbon emissions we've already put in the atmosphere, which have increased temperature on average by almost getting on towards one degree, is likely to lead, in the next few decades, to getting on towards two degrees.

Now if we take strong action now, we can hold it there and the science tends to say that that will probably be manageable for human civilisation. Go much beyond that and you start to take risks and the further you go beyond that the more risks you take. So we have to take effective action now, not to stop temperature increases in the next five or ten years; we're too late for that. What we've already done puts into the system some momentum, but if we take action from now on we can stop it getting much worse than that two degrees.

If we do nothing, the mainstream science, the vast majority of scientists who spent their whole lives working on this question, not with any business motive or any other motive, but dedicated scientists just trying to find out the truth, like science does, and supported by the main academies of science in all the countries that I've mentioned, all of the countries that take science seriously.

These scientists say, the great majority of them, that if we just keep on going, don't make any big efforts, keep on going the way we are then we run serious risk of temperature increases going through four degrees later in the century, six degrees at the end of the century, and that's not the end of it, it just keeps on going after that.

Well, once you get up into those sorts of temperatures everyone expects you would melt the Greenland icecap, that would raise sea level by seven metres, pretty damaging for parts of Port Macquarie, but it's worse than that. You get more intense extreme events and more intense storm surges and so on. So it's not just sea level up seven metres, but much more energy in the surges in times of inclement weather.

QUESTION: So we are going to get wet as well as poor? Thank you.

ROSS GARNAUT: Yes, but then at that sort of temperature increase, very few scientists would dispute, you'd also get a melting of the West Antarctic ice cap, which would add another six metres. You would start to run risks of melting a much larger part of Antarctica, the main East Antarctic which has much, much more ice than Greenland and the West Antarctic put together. The science says we would get more extreme weather events.

In those horrible conditions that gave rise to the Victorian bushfires a couple of years ago, the temperature on the hottest day of the worst fires was the hottest, I think it was the hottest ever recorded in Victoria and certainly the spell of days that included that was the hottest spell they'd ever had. And on the very hot day it was over forty-seven degrees, and people ever since the terrible fires of the late thirties in Victoria they've tried to develop an index of the conditions that are dangerous for fires.

The conditions, not the fires themselves, the conditions for bad bushfires on that day in Victoria a couple of years ago were twice as bad as the very serious conditions of the late thirties. And if the average temperatures on earth rise by another six degrees then on those rare occasions when we would get forty-seven degrees now, we'll have fifty-three degrees. There'll be warmer and cooler days, but forty-seven degrees after a number of days of forty-two, forty-three was just horrific in Victoria, will make it much hotter and it's that much more horrific.

There's no way to be safe from fire in those sorts of environments, so the reason we need to do our fair share in a global effort now is not because we can turn back the clock on what's happened in the last - in the - what we've put in the atmosphere up till now. We will actually get further warming for a while no matter what happens, but if we start acting now and other countries do with us - and we've got to

encourage everyone to do their fair share - then we can place some limit on how bad it gets.

But just let things run and we are taking huge risks with the lives of future generations.

[Applause]

ROB OAKESHOTT: Thank you. Certainly if you want to speak to Ross, why don't we talk afterwards about clarifying any confusion about [inaudible] carbon tax for an emissions trading scheme. So over to Tom.

QUESTION: Thanks, Tom Klein from *Port News*. Two questions ... The first one is, we've heard a lot about the positive of introducing a price on carbon. What disadvantages are there, either economically or in terms of everyday quality of life with introducing such a carbon price ... And, secondly, what do you think will happen if the legislation doesn't pass or the price that is set is lower than the twenty to thirty dollars currently recommended?

ROSS GARNAUT: Well there will be some price increases for goods and services that embody a lot of carbon dioxide and the most important of these is electricity. I think we should put that in perspective. On average, the price of goods and services will rise by less than one per cent.

The tax cuts and social security adjustments should fully compensate people on low and middle incomes, but not everyone, from that price increase.

The increase in price itself, although it's compensated for a lot of people, does have some, obviously some disadvantage. I think it's a manageable one. I don't think it's the sort of disruption that has been associated with a lot of other economic changes that we've had, but there will be some.

There will be some regions where people rely for employment and income on things that use a lot of carbon. If there is one region in Australia that is more vulnerable than any other it's the Latrobe Valley in Victoria where they produce nearly all of Victoria's power there and it's very high emissions power. I visited that community twice in the last six weeks. Once to meet people from the local council and community groups. The second time I was asked by those people who appreciated very much the meeting I had and said, will you come down and talk to a community meeting?

So I did that at - there's a campus of Monash University down in Latrobe Valley and their biggest hall was the Student's Union cafeteria. So it was probably about this big as this whole room and it was full of people. These are the people in Australia who have most to lose from this.

We had a really good discussion. The dominant thing that was said by people were saying, "we know that Australia has to do this and we have to do our fair share. But what can we as a community do if the consequences are the worst of what could be expected?" I said to them what I said in answer to the question here. The future of that sort of coal or any coal, but that sort of coal will depend on progress with technologies on capturing the carbon waste and storing them.

So the Latrobe Valley in Victoria has a very big interest in the success of these technologies. But we don't know for sure that they will succeed. Now probably that region could also be a good region for gas based generation. So that would be some jobs. That region is a very rich agricultural region. Already there are plantation areas with quite a substantial timber processing industry. While the

biosequestration opportunities are very big and that's not just jobs on farms that's jobs in timber processing as well.

So we had a very good discussion about those things. But it could be disruptive and those people are naturally very anxious, but they were able to engage in a very constructive discussion about the future. I've talked for so long on that I've forgotten the second bit of the question?

QUESTION: The price [inaudible].

ROSS GARNAUT: Well I'm relying on Rob and his colleagues to come up with something in that twenty to thirty dollar range. I hope I have been persuasive enough for them to do that. I think that somewhere in that range will be a good start to the transition that we have to make and we build on that later. But if it was much lower than that - well sometime we would have to go through another disruption of increasing our effort much more later.

We'll have to gradually increase our effort over time anyway, but if we start too low we'll have to go through another more disruptive process of raising ambition. It's better I think to start at a reasonable point and gradually increase the effort rather than to start too low and then having another big debate about this, about getting up to a reasonable effort.

But if nothing passed the Parliament that wouldn't be the end of this matter. Two years ago - well earlier in last year I think it was, early 2010 the major political parties of Australia decided to drop this matter off the agenda for a while. Well it came back on the agenda because a lot of Australians care about it.

I think if Rob's Committee dropped the ball and said, "okay this is too hard; it might be essential for future generations but we'll lose some votes so we're not going to do anything. We care more about votes than future generations of Australians." If they took that attitude then I think the issue would come back on the agenda and we would find ourselves debating it again in three years' time.

But every time you put it off it means, like any big problem you've got to deal with in your life, it becomes - by putting it off it becomes a bigger task when you finally get around to it. You've dropped a bit further behind and it becomes - you've got more to catch up with. So I think that the next time we'll probably be - not be debating an emissions trading scheme or carbon pricing.

People who want to do something, who actually understand the issues, understand the risk will be saying, "we dropped the ball last time, this is getting too urgent. We can't have that same debate over and over again. We've already had that a few times. We need a lot more direct action. We've got to suddenly close down our coal mines and our coal exports." It will be a much more divisive and damaging debate.

So I think that putting off dealing with the question will make dealing with the problem harder. It will make dealing with the problem more divisive and dealing with the problem more costly. If we don't deal with this problem now the problem of climate change will still be here tomorrow, but our chance of dealing with it at reasonable cost may not.

[Applause]

ROB OAKESHOTT: It's a good note to end on. So thank you everyone, first of all, for coming and going a bit over time. Hopefully everyone will have learned at least one thing or have some food for thought to reflect on. So thank you very much for coming out on a Sunday.

Secondly, I noticed that for people who are sitting on there - if you can pass on the message that - thank the High School in letting us use the hall. He's probably come in do some quiet work on a Sunday, setting up the school for the week, but hopefully you've enjoyed it as well.

Thirdly, and probably most importantly today, Ross, thank you very much for your time coming to Port Macquarie. Ross hasn't taken any... out of lunchtime. He's going to be going down to Taree at six am tomorrow morning. Then he's on a lunchtime flight of Taree going to back to Melbourne... by Ross to come and spread the message of why this is so important to our nation. Thank you very much for your work today and also over the life of this project. Hopefully we can get it across the line this time. Thank you.

[Applause]

- ENDS -

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