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Compere:	Peter Coaldrake	**Speakers:**	Professor Ross Garnaut
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Transcript:

PETER COALDRAKE: Good evening everybody. I'd like to welcome you to this climate change review update at the South Bank in the library. Peter Coaldrake is my name; I'm the Vice-Chancellor of QUT.

Before I commence the formalities with Professor Ross Garnaut, who's of course our guest, I would like to acknowledge the traditional owners, the Jug-a-rah people and pay respects to them and their elders.

If you should need a toilet: outside and to the right. If we have to evacuate - I'm required to say all this - if we're required to evacuate Tim, wherever Tim is, will tell us where to go very quickly indeed.

We will have a presentation from Professor Garnaut for a period of time, there will be plenty of time for questions and when we come to questions it would be nice if people identified themselves by at least their first name to enable the conversation to proceed.

I think everyone in this room will be aware that Professor Ross Garnaut was commissioned by the state and territories in 2007 to look at the economic impact of climate change on Australia and he provided his report in 2008.

A lot of things happened in the world between 2008 and 2010 and in 2010 he was asked to review the work that he had previously done and to update that work, taking into account events as they had of course occurred in the world in terms of the international financial system. And of course taking into account new evidence that was available scientifically, much of which have been promulgated through international conferences.

And Professor Garnaut reported earlier this year and many of you I'm sure will have a copy of the review report which is now in bookstores. Professor Ross Garnaut of course is known to us all as a very distinguished - exceedingly distinguished - public intellectual future thinker and most distinguished economist. Like most days of his life he spends much of the day on his feet as he has today and we're greatly appreciative that he's here to address this forum this evening. Please welcome Professor Garnaut.

[Applause]

ROSS GARNAUT: Thanks Peter; thanks for QUT for hosting the event and to the Office of Climate Change and the Queensland Government for assisting in that.

I'm glad that I got to Brisbane; Chilean volcanic activity in this globalised world held me up in Sydney for a while and I missed what would have been an interesting day yesterday; a series of meetings in the Rockhampton area. But planes were flying anyway yesterday afternoon and so I got to the Brisbane part of the event in time to start at breakfast this morning.

I remember a very enjoyable event in the Brisbane Town Hall in 2008 when I presented the findings of my original review, a very large interest in Queensland. I know there was particular interest in the land sector; very strong research based in Queensland for research related to carbon issues with biological sciences in general. And I kept in touch with people here in the CSIRO and the universities, in the state government agencies related to research and agriculture on those biosequestration issues after I completed my work and that led me to make this the place where I released my update paper on the land sector on biosequestration in February of this year. And good to be back again now.

I must say that when I gave my original report a thick six hundred and fifty pages, thousands of working paper pages on the web and I gave all that to the prime minister at the end of September. I wouldn't have expected to be back here now - back in the saddle. But our leaders have tried to take the issue off the agenda for a while and the community interest in this matter and insistence that it not disappear from the agenda set us all to work again and that's why I'm here again today.

Climate change policy is an issue that won't go away. If we don't deal with it effectively this time it will be back again but it won't be me doing it again.

[Laughter]

Well right now we are in the midst of a great struggle - I hope in the later stages of a great struggle about whether Australia should encourage and do its fair share in an effective global effort to reduce the dangers of climate change.

It's a struggle over policy between special interest and the national interest. This conflict is not new. Indeed, it has always been with us and it will always be with us. But there have been periods when the special interests have dominated the policy process and other periods when an independent centre of the Australian political community seeking to implement policy in the national interest has been relatively more important.

And the difference in the quality of policy and in Australian performance between those two periods - periods when special interests have dominated periods when the community interests - the public interest has been more influential really shows.

For a long period in our history special interest - both business and union special interest dominated economic policy. You could say that about most of the first eight decades of our Federation. That was our time of protectionism and pervasive interventionism with governments handing out favours to particular interests and in those eight decades we had the lowest productivity performance of all of the countries that are now developed.

We managed to get ahead of that. We managed to create an environment in which the public interest was more influential through the '80s and '90s and the consequence of that was in the '90s average productivity growth was right at the top of the developed countries.

Well I'm afraid there's been another turning of the wheel in the past decade and we're back in a period where special interests are particularly influential. And this is a big test of whether we stay in that position or whether there can be a reassertion of the public interest - the reassertion of a role of an independent centre of our political community in the policy process.

This debate is being conducted at a time when Australians are enjoying the highest material living standards in our history. It's a time when our relative living standards - those relative to people in other developed countries - are higher than they've been at any time for the past hundred years.

In the first decade of our Federation we were the richest country in the world in average incomes. We gradually fell down the list through the rest of the twentieth century. We started climbing back late last century mainly through our own efforts through effective economic reform. In the early twenty-first century we've gone much further as a result of the resources boom and the effect of that on incomes and the exchange rate.

Good times like these are a good time for structural reform. It should be the best of times for structural reform. The best of times to accept some structural adjustment costs for the present because they are important for the future. If past Australians hadn't have done that from time to time we wouldn't be in the position that we are now. The question is whether at these best of times are we prepared to make the same sort of efforts for future generations of Australians.

In these best of times it's the best of times economically for structural change - for structural reform, but the resources boom has another side to it which makes it to some extent a difficult time politically for structural change and one consequence of the resources boom is that our real exchange rate - the nominal exchange rate adjusted for differentials in inflation is at its highest level since our Federation. The nominal exchange rate the highest level since the dollar was floated at the end of '83. But the real exchange rate the highest since the early years of our Federation.

And we're living through the largest reallocation of resources outside the two World Wars in our national history. The Governor of the Reserve Bank Glenn Stevens has put it all very simply and clearly. He has said that the resources boom means that interest rates and the exchange rate have to go up to the extent that's necessary to free resources from other sectors to reduce employment and investment in other sectors below what they otherwise would be to make room for the resources boom to allow the resources boom access to labour and capital without putting inflationary pressures on the economy.

The high - by international standards - the high interest rates and the very high real exchange rate that results from that is putting a lot of pressure on other tradeable goods and service industries. I've just been discussing with the vice chancellor the pressure on the universities which are export industries. In fact two of our top four export industries these days are service industries. So universities - well, education and tourism. They're under a lot of pressure because of the high exchange rate. Manufacturing and parts of farming are under a lot of pressure for the same reason. We should understand that this is the other side of the coin to our currently high incomes from the resources boom.

There's a tendency for interests that want to block action on climate change to oppose carbon pricing to point to the stress in the other industries as a reason for not using this time as a time for introducing carbon pricing. And what I say to that is let's not let a genuine issue of pressure on all export and import competing industries outside the resources sector become a reason for avoiding long term structural change that's necessary in the interests of the whole community.

The structural change we're talking about has generated a loud and, at times, hysterical reaction, but we should keep a few things in

context. This is not a small change, but neither is it overwhelmingly large. Carbon pricing along the lines that I've suggested - the recommendations in my review - would lead to the overall cost effect raising costs and prices by less than one per cent across the economy as a whole.

In this respect it's a much smaller change than the introduction of the GST. And like the GST all the money will be given back to households and businesses. I recommended that of the over eleven billion dollars that will be collected from carbon pricing by the Government selling permits to emit, then over half should be given back to households as tax cuts and adjustments to family payments, social security; that, initially, thirty per cent, but tightening up over time, should be given back to businesses as assistance to trade exposed industries, and the balance be given back as fiscal support for innovation for enterprises introducing new techniques in low emission production and also research and development - the research end of innovation - and also in support for carbon sequestration in our land, on farms and, more generally, in the rural sector.

Over time the proportion going to trade exposed industries can be scaled back and the proportion going as tax cuts and other payments to households, to innovation and to support for sequestration in the land sector can increase.

It is a bitter and distorted debate that we're having in Australia. And to the rest of the world it looks a pretty strange debate; strange to have the mainstream science disputed and sometimes demonised in the way that it is in Australia. I don't think there's any close analogue to that anywhere else. And it bears some effort to explain it.

Strange also because here there has been a Conservative - Social Democratic political divide that's not present in most of the world. There's no reason why carbon pricing should be a matter of partisan political division in Australia. In much of the world - perhaps everywhere except Australia and the United States - concern for global warming is a conservative as much as a social democratic issue. The Conservative Governments of Germany, the United Kingdom, France, Republic of Korea, are playing important global leadership roles.

Even in the United States the most effective political leadership on climate change has come from the Republican governor of California and a Republican mayor of New York.

A concern to avoid dangerous climate change fits naturally within the Conservative tradition. It may be rational for the radical to risk the institutions of human civilisation in a throw of the climate change dice, just as Lenin saw merit in inflation in the capitalist economies. The radical may hope that the outcome will open the social and political order to new shapes. It is strange for the conservative to embrace such risk.

We don't yet know the outcome of this struggle. I think that there will be important progress over the next couple of weeks. I'll be attending as an independent advisor a meeting of the multi-party committee on climate change in Canberra on Tuesday. It will be very nice if that was the last of the meetings, but we'll see. And if all of that is going well, then the Government will make an announcement not very long after that.

I think the landscape will change and the nature of the debate will change when we've got details settled on a policy program. They'll change again when legislation is passed and when the law starts to be

implemented. And the Prime Minister has said that she hopes that the implementation will occur from the middle of next year.

So one way it might all go is that we get policy announcements soon; legislation this year; action in the middle of next year. There may or may not be a continued debate about withdrawal of the measures, but if there is a continuing debate; if the matter isn't settled in the next couple of years, that won't end the debate on climate change policy. It might however end the possibility of action at relatively low cost. What's at stake is doing things at reasonable cost, effectively and at low cost.

I think if we don't do it now it will keep coming back onto the agenda. It will keep coming back onto the national agenda because the increasing impact of climate change and the increasing impact of overseas policy developments where others are taking, at this stage, much more firm actions than we are. These things will promote continued pressure for new policy in Australia. Inaction by Australia would invite retaliation in trade and other areas of international cooperation. Debate will continue over how much Australia should do and how we should do it.

This will raise the supply price of investment and any activities and the political system will respond to continued community interest in climate change action through myriad costly interventions, as we've been doing up till now; things that reduce emissions very little but which impose quite large costs.

I'm pretty sure that in those circumstances one of the things that would come onto the agenda would be a clamour for direct action to impose controls on our emissions intensive fossil fuel use and production, which wouldn't be an efficient way of dealing with it. But it would not be possible for economic rationalists like me to find argument against that if we've rejected the efficient way of reducing emissions.

The Vice-Chancellor mentioned the context of my current work. I was asked to update my review, taking into account developments over the last couple of years. And I did that in relation to the debate about the framework for decision making, about the science - update on the science, update on the international action, update for the effects of the global financial crisis on emissions growth and in developed and developing countries and in many other areas.

The developments in science since I did the earlier work have strengthened the evidence that climate change is a substantial threat to the wellbeing of Australians living in the future. In 2008 I pointed out that Australia would be affected more by climate change than other developed countries. The other side of that coin is that we've got more than any other developed country to gain from effective mitigation.

We've also got exceptionally good human and natural resources for the transition to a low carbon economy. We have in exceptional degree all of the natural resources that are important for low emissions energy production. We've done very well in a high carbon world economy, we have the natural resources to do extremely well in a low carbon world economy. We've - per person amongst developed countries we've got the world's richest solar resources.

When the head of the German solar energy program - it must have been 2008 and that's a very big and effective program in Germany with far reaching implications, very costly but doing well - he lamented that while the west coast of Tasmania was pretty cloudy and the worst place in Australia for solar energy, it was better than the best place in Germany. He still had to make this program work, and was making it

work in Germany. Our wind resources are as good as any in the world, especially across the southern coast in the path of the strong westerlies, southern coast and the west coast of Tasmania.

Per capita we've got by far the world's richest opportunities for biosequestration and capturing carbon in land, in soils, pastures, woodlands, plantations, we've got very rich wind resources. We've got by far the world's largest resources for production of nuclear energy. We've got the richest per capita endowment except perhaps for Norway amongst the developed countries of natural gas, now supplemented by coal seam gas which will be a very important transitional fuel in the world as a whole.

Our proximity to the island of New Guinea gives us opportunities for access to some of the world's richest hydroelectric resources. And above all we've got through the strength - the historical strength of our resources industries, we've got all of the human skills that are very important to making the transition work. The engineering skills, the skills in the geophysical sciences, the project management skills and so on.

I should mention that we've also got some exceptionally good opportunities for geosequestration of combustion loss and the richest of them, not very far from very high emissions from the Victorian power generation. So we've got a stronger interest than anyone else in global mitigation working and we've got the resources to make a successful transition to a low carbon economy. It's strong mitigation in the world as a whole in terms of global mitigation that could be effective, then it's important that we do our fair share to improve the chances of affective global mitigation.

Quite a few [indistinct] who say that yes, climate change is real, we should do something - the world should do something about it but why should we, we're only one and a half per cent of global emissions. Well if any developed country doesn't do its fair share, then that will help to undermine the global effort and there's nothing special about climate change, that's the way most international cooperation works.

It's the way our security alliances work, whether or not we sent troops to Afghanistan or Iraq it's hardly decisive to the outcome of the war, but it's important that if we feel that we share a strategic objective with other countries, so we feel that we should do our fair share about it. And that's really the natural way for us to look at international cooperation in many spheres, including this one; cooperation to combat climate change.

Somehow those who back opposing climate change action want to look at this issue differently from the question of collective action for a collective purpose on other international issues. If - it is true that we're only one and a half per cent of global emissions and even if we reduce those to negligible levels that alone won't cure global warming, but you could say the same about most countries. Most of the world's emissions are in countries with two per cent or less of global emissions.

Britain has about the same emissions as us, about one point seven per cent, although it's got three times as many people as us. Margaret Thatcher played a very large role in putting this issue - action on climate change - on the European and global agenda and every Prime Minister in Britain since then, including the current Conservative Prime Minister, David Cameron, has seen it appropriate to put a major effort into Britain's reduction of emissions.

Even the big countries, the United States and China, can't stop global warming through their own actions alone, even if either of those

countries decided to reduce its emissions to negligible levels, the momentum of emissions growth in other countries would bring on dangerous climate change. So it's only through effective cooperation across - certainly across all developed countries and more substantial developing countries that we're going to get a result.

At this stage and prior to the passage of measures that are currently under debate, we're certainly not doing our fair share. We have put a target on the table in the international agreement - and there is an international agreement which I discussed at length in the final report - and there is an international agreement finalised at Cancun in Mexico at the end of last year. We've pledged to reduce our emissions by five per cent from 2000 levels by 2020 and to raise the level of our reductions to twenty-five per cent if others are doing what we consider to be enough.

Well that five per cent reduction will be a very big change in trajectory. The Department of Climate Change has calculated, late last year, that we're headed towards a twenty-four per cent increase in emissions under current policies. That includes the renewable energy target, it includes all the solar subsidies, it includes all the other measures, more than two-hundred of them that we're taking and they are emissions growing by twenty-four per cent, so to get from there to the minus five per cent is a big step.

There's no other developed country that has put on the table a target that's as modest as our five per cent. More importantly there's no other developed country whose current trajectory is so far above the target as Australia's and so what we need to do is first of all correct the gap between our pledged target, serious international commitment, that has the support of both Opposition and Government and then raise our level of ambition in line with other countries.

I suggested that it's an appropriate ambition for us to seek to be in about the middle of the developed countries, not to lead the world, that's not a realistic aspiration for us given that we're so far behind. But just to aim to get somewhere in the middle.

The rest of the world is doing quite a lot and it's only by putting our heads in the sand that Australians can say that we need somehow to get ahead of the world if we took action. The Scandinavian countries have had carbon pricing since the early nineties and all the countries of the European Union since the Emissions Trading Scheme in 2005. All of those countries have carbon emissions far below us. We are the highest in the developed world, over twenty-seven tons per person per year. Some people say, well that's inevitable given our rich endowments of fossil fuels, of coal and more latterly gas.

If we made the structure of our economy a fossil fuel intensive structure, that sounds pretty plausible until you look at other countries and you see that the one other developed country with even richer endowments of fossil fuels than us, that's Norway with its huge gas and oil reserves, as per capita annual emissions a bit above ten tonnes per person compared with our twenty-seven tonnes.

The larger European countries, countries like Britain, Germany, France, have gone way beyond the emissions targets of the European Union, of the Emissions Trading Scheme. They're doing additional things, like David Cameron in the United Kingdom two weeks ago, announced a further tightening of the British target. The United Kingdom will legislate, he said, to require a reduction of emissions by fifteen per cent by 2025.

In the Australian discussion there's often a search to find countries that we should compare ourselves with. I even heard today from the

coal sector that - in discussions with one of the representatives that we should compare ourselves with Mozambique. They found us...

[Laughter]

...Mozambique might not be doing as much as us, although they are a bit affected by the South African carbon tax. But it's more common to highlight the situation of China and the United States. Well I put quite a lot of effort into the final report and to the update paper on the international situation which is on the web; update paper number two. I put quite a lot of effort into setting out what's going on in China and the United States.

And you could have said four years ago, certainly, five years ago that China wasn't doing much, wasn't taking this issue seriously. Well that has changed dramatically and the transition to a low emissions economy is a central objective of the twelfth five year plan of Premier Wen Jiabao, presented to the Chinese National People's Congress meeting in March this year.

Chinese economic growth is so strong and the growth in living standards is so rapid that at this stage of history major action to reduce the emissions intensity of production and the number of emissions per unit of economic output is consistent with growth in absolute emissions; that's for the time being. They are looking at the time the total emissions will peak and come down. I think in the meantime China has a huge program of closing high emissions intensive smaller and less efficient coal based power generators and replacing it with large, offering lower emissions rates.

It has got by far the world's biggest nuclear program, the world's biggest solar program, the world's biggest wind energy program, the world's biggest hydro-electric program, the world's biggest biomass program. And it's seeing getting ahead of the rest of the world on all these technological developments as being important to its long term growth strategies.

In the United States it's common for people who want Australia to do little or nothing to say, well President Obama failed in his attempts to introduce an Emissions Trading Scheme. Well he did, it was passed - his program was passed by the Senate and not by the House of Representatives.

For those who know their history, that's the same position that President Obama's hero, a former President from the State of Illinois was in at the beginning of 1965 when he introduced his bill to abolish slavery. It got through the Senate, not through the House of Representatives. He was very persistent and got it all the way before he was assassinated.

[Laughter]

The administration of the United States committed itself to reduce emissions by seventeen per cent on 2005 levels by 2020. He wanted to do that at low cost efficiently through carbon pricing, through an Emissions Trading Scheme. When that got blocked in the House of Representatives on that they didn't withdraw their commitment to the emissions reduction. They said they would do it in other ways. And I have interacted with the leading officials, reporting directly to the President on this matter to Secretary for Energy, Steven Chu who happens to be a Nobel Laureate in Physics, so actually understands climate change.

[Laughter]

He's taken me through in some detail the programs of regulation that they're introducing to reduce emissions through the role of the Environmental Protection Agency. Some states in the United States are introducing Emissions Trading Schemes of their own. The State of California will introduce one by the beginning of next year. Californians are not a trivial economy if they were a separate country they would be about the tenth biggest in the world. We've already got less ambitious - but still, Emissions Trading Schemes in the North Eastern States.

The United States is going through something of a gas revolution, like we, I expect, will go through replacing a lot of coal based generators with gas generators. Through these mechanisms people that I have been talking to think that there is a reasonable prospect of them meeting their minus seventeen per cent target.

Certainly Australians are looking at our trajectory of emissions against our five per cent target and the basis for assuming their faith for the American President when he says that they're seeking to reduce emissions by seventeen per cent. At this stage you have to say they're on a path that gets them closer to that than we are.

Once we have decided we will do our fair share in a global effort and have accepted the qualitative targets, the question becomes what's the low cost way of doing that? And we won't get out of the [indistinct] of economy wide pricing is the lowest cost means. That's a market approach. Whether you're doing it through a fixed price which can be described as carbon tax, or whether you're doing it through a market price, an Emissions Trading Scheme.

Both of them set a price and then households and firms respond by reducing emissions, to reduce them at their own cost. Then you use revenue from that to reduce taxes to support innovation, to support sequestration and the land sector, to support trading exposed industries. It will be more costly to do it through regulation, sometimes called direct action.

So the costs will be higher with regulation than with carbon pricing, but one additional difference is that with carbon pricing you'll have that eleven billion dollars of revenue that can be used to offset the cost through tax cuts, through support for innovation, through support for trading exposed industries and other ways.

I know it is sometimes said that why should we have a carbon price when the United States and China, the world's two big emitters don't have one? My response to that is to say they are doing things in an expensive way, as American officials say to me. They would rather do things in a cheap way through carbon pricing; they're blocked in that. So they are going to do things in an expensive way. They are shooting themselves in the foot. I don't see the logic of us saying we will keep shooting ourselves in the foot for as long as you keep shooting yourselves in the foot.

[Laughter]

You're probably familiar by now with the main elements of the scheme in my recommendations. I'm suggesting that the Government introduce a framework, they introduce an arrangement for an Emissions Trading Scheme. That would set the number of emissions in the economy. A regulatory authority would sell permits. The number that would sell by auction, would be equivalent to the target of emissions. That target would tighten over the time, then the buyers of those permits could trade them and the price would be set for the market.

But I'm saying for the first three years the regulatory authorities should issue the permits for a fixed price. So you'd have three years of a fixed, but rising fix each year, rising for the first three years before we have the floating of the price. Why the fixed price in the first three years? It will allow people to get used to the scheme, to get used to compliance on our businesses to contain to the system, to get the regulatory things working before you've got the additional Australian challenge or way of trading.

And in addition it's quite possible - well I could say locally that we will continue to have political contention for a little while after the introduction of the scheme. I think that that will settle down and I wholly expect that not very long after the introduction of the scheme people will be wondering what the fuss was about. But there will be contentions for a while. And political contention if one party is promising to rebuild the system that would give rise to volatility in the price. So there is some advantage in having a fixed price for a few years while that all settles down.

Good governance will be critical to the scheme to provide that stability and credibility and to ensure that the environmental objectives are met. As soon as the parameters of the scheme have settled business will focus on the money within the new rules, rather than on securing rules that make money. And this makes it important that the rules really are settled as soon as possible. And to help things settle down I've recommended the establishment of three independent bodies.

An independent bank of carbon which would the regulatory system which would hand out the permits, would ensure compliance. An independent climate committee that would recommend on targets. It would recommend targets to the Government and recommend tightening in line with progress in the international situation. That would be advisory, but I've suggested that the recommendations should go to the Government. If the Government hasn't rejected it within sixty days then it becomes a regulation.

That's modelled on the role of the UK Climate Committee. It would be influential if it was able to establish a high reputation, just as the Government can overrule the decisions on interest rates of the Reserve Bank. But it's never been done because the reputation of the Reserve Bank has established.

And I've recommended the establishment of an independent agency to advise on assistance to trade exposed industries to avoid what would otherwise be extreme politicisation of this matter of handing out permits to particular businesses. And the target institution we need there is an institution like the Productivity Commission and that could be the Productivity Commission. I have laid out the details for these governance arrangements briefly in the final report and I've got two supplementary notes on the website with a lot more details.

Once we've got a carbon price working - and I hope that we'll have that by the middle of next year - the story of Australia's transition to a low carbon economy will begin. That will be a story of innovation and will find that with the incentives in place for households, for businesses to reduce emissions, to reduce emissions in ways that generate less emissions, to invent new technologies for reducing emissions. So we will find that our contributions to the reduction of emissions comes from everywhere.

You'll find the consumers will use less energy and other goods and services that embody high levels of emissions. We've got studies from many countries of how consumers respond to an increase in electricity prices, for example. The typical response is if electricity

prices go up by ten per cent, there is a very early production of three per cent in consumption. And over time that becomes a seven per cent reduction in consumption as everyone adjusts their patterns of electricity use.

Each household will have an incentive to reduce electricity demand when the price of electricity relative to other prices rises, even if they're being fully compensated with tax cuts or social security adjustments, because they're responding to the price changes. You'll still save money if you literally can keep your savings or spend it on other things if you reduce emissions in response to the higher electricity price. Even if you're being fully compensated with a tax cut for that.

Once the incentives are in place the natural gas exporters will try harder to find opportunities for sequestration of fugitive emissions and the waste from liquefaction. The fugitive emissions from coal mining - the methane that comes out of coal mining when you open it up and the fugitive emissions from gas projects and from the energy that you use in liquefaction of gas, both in coal seam gas and in natural gas. A very large - and it's actually the biggest single source of that very big growth in Australian emissions in recent years.

It's the source of a great challenge. In some projects at some cost you cut the fugitive emissions and reinject them in Western Australia, the Gorgon project which is a very dynamic project currently under construction. If it had just ignored its carbon dioxide emissions, by-products of mining natural gas, it would been releasing to the atmosphere three or four million tonnes of carbon dioxide a year.

Just like the North West Shelf project does, like other natural gas producers do, they're required by regulation to capture those fugitive emissions and to reinject them. In doing that it will cost them a couple of billion dollars - they would not do it if they hadn't been required by legislation. Or if there hadn't been a price incentive or with carbon pricing not only them, but every project will have a reason to make a bit of an effort to do that.

We'll find land owners thinking hard about the parts of their properties that would have more value as carbon sinks than they do carrying sheep, especially with my recommendations on linking carbon farming to the carbon pricing scheme. We'll find lots of people with clever ideas for innovation, finding it easier to fund them.

Every producer will think about whether it's more profitable to spend a bit to reduce emissions or to buy more permits. And millions of Australians will set to work finding cheaper ways of meeting their requirements and servicing their markets in conditions in which they have to pay for their emissions.

We don't know in advance what the most successful or most important technological innovations will be, but we know from lots of experience of market incentives, that once you've got the incentive structure in place there will be extraordinary developments in technology and that a change will happen faster than we expect.

Well to wind up this is the fourth time that we've moved towards an economy wide carbon pricing. This time the rejection of an economy wide action does not mean the end of climate change mitigation policies, an array of regulatory interventions took their place. Neither will it be the end of discussion of climate change mitigation if this current episode [inaudible] doesn't lead to carbon pricing.

Again we get governments responding through myriad, fairly arbitrary interventions to reduce emissions to what will be continued community

concerns. If we reject carbon pricing today the climate change - the policy debate will still be here tomorrow, but our opportunity to deal with it at low cost may not. Thanks.

[Applause]

PETER COALDRAKE: I don't know whether you want to sit down Ross. It's open to the floor. Just to kick things off, there has been a certain calmness to the discussion in New Zealand about climate - about carbon price and I wondered whether you could just provide a sort of an assessment of why you think it has been so relatively calm. It's a small country, but it's our closest neighbour. Do you think it's related to the political clarity, or economic structure, or what?

ROSS GARNAUT: That is a bit of a puzzle. Can you hear that alright at the top?

[Audience response]

ROSS GARNAUT: There is something to explain in why it's gone so smoothly in New Zealand with so little fuss. On this issue Kiwis have been a bit more sophisticated in their understanding of the international situation. You don't have the same denial there of what other countries are doing. New Zealand has just accepted that it has to do its share fair, because it is an international issue in which it's got an interest in the outcome.

But maybe the decisive thing is the different structure of the economy. That twenty-seven tonnes per person per annum of carbon emissions in Australia is significantly higher than in any other developed country, higher than the other - there are three very high emitting countries; Canada, United States and Australia and we're significantly ahead of the United States and Canada. I've got a chart on that in the report.

That leads to business interests supplying those emissions intensive goods having a bigger role in our political process than equivalent industries in other countries, even than in the United States. So that must be an important part of the story. And sadly I think there has been a more general deterioration of the quality of our political culture in the early twenty-first century.

I began talking about this in 2005, where - at a big annual conference run by *The Australian* newspaper and Melbourne University and I gave a lecture there in 2005 called the Great Australian Complacency of the Early Twenty-First Century. And since then the complacency has worsened. The role of particular interests, special interests in the policy process has increased. The difficulty of having a voice from the independent centre of the Australian political community heard has increased.

And I said in the final report - I talk a fair bit there about the political culture. I fear that we are reverting to type, that was the old Australian political culture that gave us high protection and interventionism and the world's poorest productivity performance amongst developed countries for the first eight years of our Federation. We got out of that and did much better for a couple of decades. And I think since the beginning of the twenty-first century we're reverting to type.

If that's the case the consequences are very severe. If that's the case then we in the independent centre of our political community have to make sure we win this one. Or that will not only mean failure on this policy issue, but it will confirm those negative aspects of our political culture which have become important again over the past decade.

PETER COALDRAKE: Thanks. I'm just going to throw it open. As I said at the outset, if you would be courteous enough to just give your first name that would be handy. Please? I think we've got some roving mikes.

MARK ENGLAND: Ross, thanks very much for the presentation. It's a wonderful opportunity to come and hear you speak and to actually ask a question. My name is Mark England and my question is this. I think Australia is very, very good at sharing wealth and we've come at - positively speaking over the last however many years in the Federation, perhaps more so than many other countries.

When we talk about a tax, a carbon tax, Australians tend to shy away from that. But being a little cynical about where the money will go. But perhaps if we talked about a carbon reduction bonus where some percentage of the eleven billion dollars went directly back to the citizens of Australia, perhaps a Christmas cheque.

[Laughter]

And that money could be used for the purpose of purchasing solar power or another alternative technology that then becomes more reduced in price as the electricity bills go up. Just a suggestion.

ROSS GARNAUT: Well there's no doubt that names matter in politics and the leader of the opponents of action on climate change won a great victory when he succeeded in calling a carbon pricing a great big new tax. You could call it an emissions reduction scheme with a tax cut, but that's not going to make sure they're going to dominate the airwaves. Of course in my recommendations I do have the majority of the eleven billion dollars going back to the community.

I've suggested as much as possible of that in tax cuts and for low and middle income earners and if you structure them right you get quite a big economic dividend from that. We've got an issue in Australia of disincentives for labour force participation, because of the interaction of our tax and social security system. We could do something about that in reducing those disincentives for labour force participation by reducing taxes.

So that's what I've suggested. A variation on your theme. But it actually would - I recommended on my first report that we start with an Emissions Trading Scheme with a fixed price and then move to a floating price after a period. It didn't occur to me to call the fixed price period a tax. But that's what's happened in our political discourse.

PETER COALDRAKE: Thank you. Perhaps you - we'll just work up, Sir.

UNIDENTIFIED MALE SPEAKER: Professor Garnaut thank you for a very informative presentation today. It seems that the conversation still needs to be a growth [indistinct] view of the economy. And I just wondered what your thoughts were - are about perhaps a different perspective around steady state systems?

ROSS GARNAUT: Well the famous American economist, Paul A Samuelson, who is now in his nineties, said famously at the funeral at one of his elderly colleagues, economic theory advances through funerals.

[Laughter]

And an old economist like me will find it very hard to abandon the idea that economic growth is a good thing. So you probably won't get that out of me.

[Laughter]

UNIDENTIFIED MALE SPEAKER: We can try.

ROSS GARNAUT: You'll get silence at my death. [Laughter] "…" But there's still so much that humanity needs from growth. Most of my life's work has been in

developing countries or working on the development problems. That's why I went into economics in the sixties and done lots of work in Indonesia and Papua New Guinea and China. China, before it became a successful economy, quite a lot in India, other parts of South East Asia and Korea before it was rich.

And economic growth isn't just money, its education and its health services, its empowerment of women, it's a growth in self-confidence of individuals because their labour is valued and I'd hate to lose all of those things. But not only would I hate to lose them, I think you would be pushing it uphill if you said to people in poor developing countries, okay, they've good health services and education in Australia and labour has self-confidence and rights, but you can't have it. Bad luck, climate change is too important, you stay where you are. I don't think that would succeed.

So where I come back to, is we've got to break the nexus between economic growth and pressure on the environment and we can do it and we can do it at reasonable cost, some cost in terms of economic growth. And in my first report I laid all that out in great detail. However, we would shave a bit over point one percentage point per annum from our growth rate over the period up to about - up to the 2050s, if we set about through carbon pricing and related measures to reduce our emissions by ninety per cent by 2015.

It would mean that the income levels that we otherwise would have reached in 2048, we wouldn't reach until 2051. I don't think that would be an unacceptable sacrifice, but some people do. But whether or not it's a sacrifice for us much more importantly there is a part that poor developing countries can apply to break the nexus between economic growth and growth in emissions and so I think that's the realistic path to emissions reductions.

Now, when - especially when non-economists talk about a steady state, they usually don't say that they're against technological improvements, which can lead to rising living standards, without greater pressure on the environment. And that's really what we're talking about in breaking the nexus, but you could have technological improvement to give you better communications, health, education, without using more resources.

You can even have larger manufacturing production without increasing pressure on resources. Japan is a wonderful example of this. When I first started work - visiting Japan doing work on the Japanese economy in the late sixties, the atmosphere of Tokyo was sulphuric. Tokyo Bay was dead, you couldn't see to the next corner for the dirt in the air, let alone Mount Fuji a hundred kilometres away. Well, now there are lots of those days when this - from the suburb of Kunitachi where I used to stay, you can see Mount Fuji and fish in Tokyo Bay - you can breathe the air.

And Japan went through a great transition of deliberately setting out to reduce the environmental impact of its growth, to change the structure of industry the way that - in which it did things. Technological innovation to reduce use of resources, to reduce environmental impact became a major feature of economic development.

And the main period for this was late seventies through the eighties, while economic growth was going, they since have got themselves into a steady state in which they weren't there. But if - with a period of continued growth but strong emphasis on reducing the environmental damage from growth that gave them the big reductions in emissions.

So until I'm dead, I'll be putting the emphasis on breaking the links between economic growth and environmental damage.

TRISH: Good morning, sir. My name's Trish I'm studying at Griffith University, I have a question regarding stationary energy and transport fuel.

ROSS GARNAUT: A question re energy and?

TRISH: Transport fuel.

ROSS GARNAUT: Yes.

TRISH: So it seems the planned energy security is gas, gas, gas and then PNG hydro and I heard you today mention nuclear power is still on the agenda. Is - I understand with your outline today about thirty per cent and then altered in the future, reimbursement to - in a, so to speak, the households of funds collected from the tax. Is there a part of the plan that includes changing the energy technology that we have gradually and responsibly and enabling the current special interests that don't - do dominate energy production in Australia, enabling them first dibs so to speak at clean - completely clean, no carbon power generation and power supply? For example, as outlined in the Beyond Zero Emissions Report, which I'm sure you've looked at, is there any part of the plan that actually says, right, gas great, let's export it. Let's sell it, but let's not actually use it?

ROSS GARNAUT: Well, first on nuclear, because of our rich grounds of gas, nuclear won't make any sense in Australia in the foreseeable future. If the world as a whole is adopting low cost means of reducing emissions, we will be the world's main source - or export source of both natural gas and - or gas, liquefied gas and for uranium oxide nuclear facilities.

And it just makes no economic sense for us to export natural gas and use uranium at home in nuclear plants - because you lose so much energy in liquefaction and it costs so much to transport the natural gas. It will always be much cheaper to use gas here than to use it in Japan or China, whereas if you export uranium oxide the transport costs are trivial. So you'd - so the economics would drive you to use nuclear first in North-East Asia - sorry, natural gas first - nuclear first in North-East Asia and gas first in Australia.

You'd only get early development of nuclear in Australia if for some political reason the political decision overrode the economics. The nuclear does have some real problems, of course. There's a serious problem - a serious risk of weapons proliferation. Our - the world's put together some reasonable arrangements and we certainly take those seriously on nuclear proliferation. It's the reason we're not exporting - going into India, because India hasn't become part of our arrangements. There will be a debate whether nuclear - whether India can give other assurances on use of nuclear materials.

There's a real problem of risks to local communities. We've seen that laid out in Japan rather dramatically this year. There are risks too with securing nuclear waste. In some environments these things can be handled, but they are serious issues that have to be thought through. And there's no doubt that nuclear is - will be very helpful to the big developing countries, first of all China and then India, in reducing emissions, if they can satisfy themselves that the safety issues can be managed. Now, the safety issues are being taken more seriously everywhere since Fukushima earlier this year. So that's a dilemma that China and India will have to work through.

Gas will only ever be a transitional fuel, unless we succeed in sequestering the waste from gas combustion. There are lots of opportunities for technological developments that would sequester the waste, the carbon dioxide waste. One is geological, carbon capture and storage, but I've already mentioned that that's effectively what's been done from the Gorgon Natural Gas Plant, three to four million

tonnes per annum, that's about a quarter of the emissions from Australia's highest-emitting coal-based power station, the Hazelwood Plant in Victoria. So it's not a trivial contribution and it could be done in other places, to cost [unclear] and whether it's done on a large scale will depend on costs.

There is important inventory work being done on biological sequestration rates, including use of algae, putting the carbon dioxide waste into water, carbonic acid to create a greater environment for growth of algae in the algae for stock food, or for bio-fuels, very clever work on research is running on that. Like I said, at James Cook University one of the power stations in Queensland is experimenting with it, a bit further along the track in some commercial applications in the United States. There are some uses of carbon dioxide waste from power stations in - through chemical transformation into carbonates that we use for building materials.

So there may be a future for coal and natural gas, but whether or not there's a future will depend on finding ways of reasonable cost to sequester the wastes, to permanently keep them out of the atmosphere. It's going to be much easier to do that with gas than with coal for various reasons, so that's important.

But my package includes an amount rising to two-and-a-half billion a year on innovation in low emissions technologies and I'd like a big hunk of that to be spent on supporting demonstration and commercialisation plants for other lower emissions technologies and that combined with the carbon price will be quite a boost to the range of low emissions technologies. Costs are coming down for some of those quite rapidly, even for wind which is a standard technology, but new methods of manufacture of the wind plants bring costs down, dramatic reductions in the cost of solar, both photovoltaic and solar thermal and that's not mainly driven by us, although a lot of the clever technology of the photovoltaics was developed in Australia at the University of New South Wales. But the main technology, which is the basis for four of the world's six biggest photovoltaic plants, is a result of research in University of New South Wales, but the cost reductions are occurring through new manufacturing techniques mainly in China.

So all of these things will be part of the transition, they'll start very quickly. Gas isn't the whole story, but we can get some large early gains by increasing the proportion of gas and reducing the proportion of coal.

PETER COALDRAKE: I'm going to draw the proceedings to a close at about half-past seven, just time - the gentlemen at the back; we'll just give you a mike, just hold a tick.

UNIDENTFIED FEMALE SPEAKER: Mr Garnaut, you've got this in the context of the global financial crisis, but since the gaoling of Dominique Strauss Kahn there's been no bail out for the bankrupt banks. And what's to stop the banks from speculating and profiting from the carbon credits and carbon training? Do you support Lyndon La Rouche's call for a global [inaudible] bankruptcy reorganisation of the financial system to heavily regulate the banks?

ROSS GARNAUT: My views on that question are in my book *The Great Crash of 2008,* which you might enjoy reading.

PETER COALDRAKE: Mike down the front, please.

SPEAKER ROLF: Thank you. My name is Rolf. Just in terms of the, the concept of peak oil, it seems our whole economy is driven around the idea of the, the cheap oil, whether it's the, the roads we actually drive on, our local

food system. How do you envisage that how we are in Australia on imported oil breaking ourselves from that situation?

ROSS GARNAUT: Well, peak oil seems to be a reality. We're not getting big increases in supplies of oil. Prices rise and so the prices are rising higher and higher. Ten years ago very few of the forecasters expected today's prices of oil at this time. And, high oil prices like we've got now help the climate change effort.

If the problem - if, if we had similar scarcity of natural gas and coal to the scarcity of oil, if we were facing imminent peak gas, imminent peak coal, we would adjust to it. The price would rise very high. The price would rise much more than the carbon prices are going to rise. There'd be huge incentives quickly to develop solar or another technology. We would reduce our consumption of electricity.

And we, we would bitch about it but probably get on with it because it, it wouldn't be the government forcing us to do it. Somehow it's much harder when, when policy is driving the, higher prices. But peak oil is nigh. But it won't get us there alone. There's so much coal reserves. And natural gas reserves are so large and are still expanding that, if we use them all, all those will be economic to mine, we'd have a climate catastrophe, unless we can find ways of sequestering the waste.

So we've got to put in place the policies, carbon pricing and other policies, that will leave a lot of gas, and especially coal in the ground, unless we find ways of sequestering the combustion waste. So I think we would make the transition much more easily if it was driven by genuine scarcity than if it's driven by policy.

That's perverse. We, should feel that dealing with the threat of climate change is a very good reason to make the adjustment. But somehow we find that harder than a shortage of - than responding to a shortage of natural resources.

PETER COALDRAKE: Two more questions. Yours - this gentleman over here, please.

UNIDENTIFIED MALE SPEAKER: Clearly here's a man who thinks about world better off. I'm looking for your opinion - the - one of two big steel industry CEOs in Australia has said, there's no technology for a material reduction in the carbon emissions. And that won't be around for ten years. How do you respond to something like that?

ROSS GARNAUT: Well, for a start, it's not strictly true. There, are two main steel-making technologies. One is through reduction of iron oxide, iron ore, through combining carbon with, with steel - with this carbon with iron oxide.

The other is through electric arc processes which depend on scrap. So through a much more efficient use of scrap you can get a fair bit of steel. It's not trivial in the global scene. So there's always competition between blast furnace steel and others.

But, but even with the steel-making technologies that depend on reduction through carbon of iron oxide there are different technologies. So there's direct reduction using gas, which has lower emissions than the coke-based - coal-based reduction technology. But, they're qualifications of, of a story that's, that's broadly right.

To me, all of the world's steel needs, especially with a very rapid growth in big developing countries, we're going to need more steel than we can get from scrap. And that will always require some carbon for reduction. Not all, not all the reduction is as emissions-intensive as the traditional blast furnace. But you can't do it without carbon, carbon dioxide waste.

So the question becomes, how can you capture those wastes? You, you could run the waste through water and use the biological processes to absorb the waste. So you could do that just as easily for the waste from a blast furnace as from a coal-based generator.

In fact, I hear - I don't know why this is the case, but I hear that algae actually loves all the other rubbish that comes out with, with a blast furnace, the, the other gases. So it might even be an advantage. And there are other things you can do. In the effluent from blast furnace the gas that would come out with a lot of heat. You can use that to generate power.

And I - from memory, there have been four different occasions when Bluescope Steel has said that, as a result of carbon pricing, they've abandoned their program of using the blast furnace waste for generating electricity. Well, it's all part of the political to'ing and fro'ing saying, because you've done this awful thing, you know, or you're going to do this awful thing, we won't do this good thing.

But there are some - quite a number of ways in which you can reduce emissions in steel making. All of them involve some cost. When there's incentives in place to reduce emissions the steel industry, like all others, will find that necessity is the mother of invention.

PETER COALDRAKE: Just one more question, please. Sorry.

BRAD: Yeah, I'd just like to ask about the price mechanisms. I was wondering, as you've said, the carbon tax is going to lock in a lot of gas production for decades in Australia.

And reports such as the recent Productivity Commission report showing that a better - a very effective price on mechanism for current and renewable abating carbon is a feed-in tariff of small and large scale renewables. And that's been a lot more effective in Europe for [inaudible] carbon emissions.

I was just wondering why you haven't included that as part of the current plan?

ROSS GARNAUT: Well, I don't think the Productivity Commission does come to that particular conclusion. In fact, they're very critical of the alternative policies and have come down strongly in favour of carbon pricing. So you won't get support for that in the Productivity Commission report.

Just on the merit of the case, I, don't think that carbon pricing locks in gas. There is a danger of it locking in gas. It's very important that, that when we introduce carbon pricing everyone understands that carbon pricing is going to rise over time, both in internationally and in Australia - will be targeting targets. And that will lead to higher prices.

Our price [inaudible] link to international markets and, as the world becomes more ambitious, the carbon price will rise. We have to accept - well, businesses now investing in gas generation should be under no illusions that they will face a higher carbon price later on. And that will - although gas emissions are only forty per cent of emissions in some of our coal-based plants.

And so initially you save quite a lot of money by shifting from coal to gas, the rising carbon price will make gas too expensive at some time. And we - it's very important that we don't then go through another episode of defence of industries that are becoming redundant - very important that there's no implied commitments to [inaudible] new, new investments that are taking place.

If we have that sort of approach, accept that there will be continued structural change, that gas will be profitable for a while but then will be rendered unprofitable by a carbon price, then there is a useful role for gas, as additional fuel.

The successful, rapidly growing countries of the world have been able to inculcate an attitude to [inaudible] technology that, that each new layer of technology is introduced knowing that it will become redundant at some time.

In my modelling for the 2008 review developments over time in the energy sector - but the market led, on the presumption of [inaudible] a rise in carbon price rising enough for our emissions to fall by ninety per cent by 2050. That's one of the cases that I model that it would - profitable for gas to play a significant role for a while but then to be overtaken by other technologies. It was profitable to invest in gas even though it was only transitional.

So we would rule out cheaper ways of getting to our emissions objectives if we ruled out gas. And if you make it more expensive it makes it less likely that we'll take the decisions to get there. I don't think we have to deliberately choose an expensive way but it's crucial that we recognise that each new technology will have to take its chances with a rising carbon price.

PETER COALDRAKE: I think we will close it. I thank everybody for being here. We thank the office of climate change for organising the forums. But, most particularly of course, we, we thank very much Ross Garnaut for being here tonight. His journey is a remarkable journey. The contribution he's making to the public debate is a remarkable one.

We wish you, and perhaps all of us, good luck next Tuesday and beyond. And, with regard to never coming back and doing another one, never say never. Thanks, Ross.

[applause]

- ENDS -

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