

Speech Topic: Garnaut Review - Launch of Update Paper 8: Transforming the Electricity Sector
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Speakers: Professor Ross Garnaut

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Transcript:

COMPERE: Good evening, ladies and gentlemen. Let me welcome you to this public talk and discussion afterwards by Professor Ross Garnaut. The topic that we've got tonight is in some ways extraordinarily simple and I suppose it's appropriate that I introduce it. I'm Robin Batterham and I'm a professor at Melbourne University involved in the Energy Institute and also basically the Academy of Technological Sciences and Engineering [inaudible] chief scientist [inaudible].

So in some ways [inaudible] is dealing with simple things and complex things and that's what the whole climate question is. Really, it's so simple; all we've got to do is reduce emissions. It sounds easy, but it's so complex, because how we go about it and the interactions that can occur [inaudible] other leaders simply will follow the best brains in the country that can solve the problem, such that we all understand what direction that will be. I'm delighted therefore that tonight Professor Garnaut will in fact launch and speak to the latest offering in his series; it's number eight of a series. It's all done with incredible energy, I might add, with a team of very competent people.

Professor Garnaut, as most of you know, is one of Australia's - if not Australia's most distinguished economist. I'm not going to even attempt to read out some of his achievements; that's what Google and Wikipedia are for quite frankly and you're all capable of doing that. But I will say this, that who better to address both the simplicity of the end result required and the complexity, than who we have here tonight? Folks, Professor Ross Garnaut.

[Applause]

ROSS GARNAUT; Thanks Robin and thanks to the Academy that you're president of, and for their help in our work on innovation and energy over the last couple of weeks. But it's good to be back in Melbourne. This is the eighth of the releases of update papers. It's been a pretty fast run; one a week through February and March. We began in Melbourne early in February with a discussion of the decision making framework for looking at policy issues and it's appropriate that we come back here to round it off, to launch the final paper on the electricity sector.

The nature of the exercise changes now. The last couple of months have been a very public process. We've had a lot of interaction with Australians interested in these issues, so we're grateful for the feedback and look forward to more from this evening's meeting. And my excellent team and I will be drawing together all that we've learnt from the interaction over the last couple of months in April and May and we're due on May the thirty-first to give the final report of the updated climate change review to the Prime Minister, so we change gear a little bit, but it's still going to be a very busy time until the end of May.

We're in Melbourne for other reasons as well. Victoria is the place in Australia with the most emissions' intensive electricity sector and Australia

leads the world - leads the developed world, as the most emissions' intensive electricity sector. So here we're right in the centre of things, but Melbourne is also the hive of Australian innovation and a lot of the ideas, a lot of the work that's necessary to find us an economic path into lower emissions will come out of Victoria and Melbourne.

How we manage the transition to a low emissions' economy is going to have a very big influence on the living standards of Australians over the next generation. The good news - and I'll be talking about it a bit tonight - is that Australia is very well placed to do well in the energy sector, the electricity sector in a lower emissions world, just as it has done very well in a world that didn't know there were lots of external costs in burning fossil fuels.

I thought I'd begin this evening with the last of the eight releases and update papers by running through the issues briefly, before I get deeply into the electricity sector, the issues that have arisen in the earlier papers. In the first paper on the decision making framework, I tried to put a bit of rigour back into the way we looked at this question. In some ways, as Robin said, it's a very simple question, a very simple matter.

Climate change is a problem because humans have been returning to the atmosphere, in one way or another, a lot of the carbon dioxide that has been absorbed through biological processes and sequestered naturally over a very long period of time, and that returning of carbon dioxide to the atmosphere has changed the balance of heat on the earth and the atmosphere on land and the oceans, and that's giving rise already to some problems and threats. A simple thing is that all we have to do is to change the practices that have led to that emerging imbalance and this warming the planet. But it's also an immensely complicated question and when you dig into it as a policy question, it doesn't get much harder than this. I've called it a diabolical policy problem because it has dimensions that policy issues don't have. There's going to be no solution to the global warming problem unless all significant countries make a significant contribution to it and that will inspire economic cooperation; cooperation on the economic issues of a dimension that we haven't seen before on this earth.

It's a pretty good reason to do it; a strong incentive to do it, but when you're doing something that's more complex than has ever been achieved before, you're trying to do something hard. So that's one of the complexities of the issue and it actually is the decision is really a long-term one. Not quite as long-term as Tim Flannery seemed to have made it on Friday night, but while I think it's absolutely essential that we start moving downwards the trajectory of carbon dioxide emissions from now, if we're going to have any hope of moderating warming and climate change in the middle of this century it will be some time.

It will be a couple of decades at least before what we do now is manifest in moderating effects on climate. We're not used to thinking in these sorts of timeframes. Once we think in these sorts of timeframes we have to find a way of valuing cost now against benefits in the future and ask some rather hard questions, like do we value the welfare of our grandchildren as much as we value the welfare of ourselves? And I would like to bring all of the complexities of this decision within a framework in that first paper.

It's very hard to get a disciplined and logical approach to this question. People feel strongly about it because almost any policy that's going to be useful in really holding back conditions and contributing to a solution is going to affect some particular interests severely. And the easy thing is to object to a conclusion or a policy recommendation because you don't like it, like you don't like a carbon price. That's not helpful to the discussion.

The framework that I laid out was meant to make transparent the premises, the information, the logic that led me to the recommendations. I'd invite Australians to help me find anything that was wrong with my premises, information or logic and I would be delighted if a major flaw was found so that I could get back to the things that I've spent my life enjoying indirectly. But the feedback that I've had so far has been a lot of constructive feedback within the framework of the decision making structures that I set out in the first paper [inaudible] confirmative of the approach that I was adopting and I've had some good exchanges on the detail and in the context.

We have to have rigour in looking at this question if we're going to end up with good outcomes, to insist on good information, logical consistency and we should be debating these things; we should be debating the premises; the logic; the information and not debating slogans.

The second paper was about the international context I presented back in Sydney at the Lowy Institute and this was critically important because there'll be no solution to the climate change problem without all significant countries making major contributions and Australia has to do its proportionate part. This is an issue on which every developed country has a veto.

None of us alone can make sure that this whole problem is solved. But any one of us can pretty well decide that it won't be solved because all countries are having discussions like ours, in which it's a great comfort to those who don't want to do anything much to be able to point to the failure of some other country to take much action and that becomes a reason for inaction in that country. We've seen plenty of that in Australia and we might be a little bit surprised at how the name comes up - Australia's - in discussion of these things in other places.

As the United States ambassador on several occasions - and I'm sure he wouldn't mind me saying this - has said to me, don't underestimate the importance of the debate that's going on in Australia, for what turned out to be possible for President Obama and his administration if he wants to take strong action on climate change.

And yesterday I had lunch with the deputy chairman of China's National Development Reform Commission, Xie Zhenhua, who is the official with the prime responsibility for material for energy and climate change in China and he made the same point to me. He said, if Australia continues to drag the rest of the world, don't underestimate how much harder that makes my job. And he's saying that as an official who has led China into the largest and most decisive reduction in emissions, although business as usual has occurred in the country.

So in that paper I went through what's actually happening in the rest of the world and it's quite clear that we're in no danger whatsoever of doing what some people fear; that is getting ahead of the world, getting ahead of the game. There's absolutely no risk of Australia getting ahead of the game. That's obviously true if you look at the half of the people of the developed world who live in Europe. Half-a-billion high income people, people with lifestyles mostly fairly similar to ourselves; an emissions' trading scheme and price on carbon for most of the past decade.

They've learnt a bit as they've gone along, they've made some mistakes, but there's no doubt that they've put emissions onto a downward trajectory in a way that we're nowhere near doing at this stage. It's also clear when you look at those countries that don't have an economy-wide price on carbon and two countries keep coming up in the Australian discussion; China and the United States. I've already mentioned China. I'm still amazed to hear people talking about China not doing anything. Well it takes an extraordinary insulation from information to live with that opinion.

[Laughter]

But the United States story is important too. It's well known in Australia that President Obama would have liked to have introduced an emissions' trading scheme. His Cabinet took strong action to reduce emissions. But critical developments there meant that he doesn't have the numbers in the House of Representatives to get that.

Well, the United States hasn't changed its targets. President Obama put on the table at Copenhagen a commitment to reduce United States emissions from 2000 levels by - sorry from 2005 levels by seventeen per cent by 2020. Arithmetically that converts into a sixteen per cent reduction on 2000 levels. Well, the defeat of the idea of an emissions' trading scheme in the House of Representatives is not the end of the commitment.

The United States remains strongly committed to that policy in the United States with the head of my secretariat, Steven Kennedy. In January we met senior people in the administration who report to the President on these issues. The commitment's a strong one. They're getting there in other ways. They're introducing systematically a lot of regulatory restrictions.

They're trying to introduce some policy consistency into that by putting a shadow price on carbon and then deciding on emissions that are allowed in cars or energy efficiency in appliances or building standards by applying that shadow price of carbon. The officials who are doing this know it's not as economically efficient. It's more costly than putting an economy-wide price on carbon. But the fact that they're blocked in doing things in the cheapest way has not stopped them moving forward.

But one hears, in Australia, the comment that because the United States is not introducing an economy-wide carbon price that we shouldn't either. I see what the House of Representatives has done in the United States. It's stopping an economy-wide price and forcing it to go on these indirect routes that are much more costly, as the American Congress shooting America in the foot. And so what we have is Australians saying, I'm going to keep shooting myself in the foot for as long as you keep shooting yourself in the foot.

[Laughter]

It's a strange sort of reciprocity.

The third paper was on my global emissions' trends. This was a background paper and the main lesson from it is to underline what a difficult task we have. If the objective is - as the international community is now agreeing it is - to seek to hold [it] to increases from pre-industrial times to two degrees centigrade or Celsius, we have a reasonable chance of doing that. That roughly corresponds to holding concentrations of greenhouse gases in the atmosphere for fifty-thousand [millimetres]. We haven't got long to go. We've absorbed a lot of our capacity for the atmosphere to take in greenhouse gases without running risks of dangerous climate change.

We're reaching those limits at a time in world history that, from other points of view, is a wonderful time. I've described the period in world economic history from early in this millennia from pretty well the turn of the century as the Platinum Age because this is the period in world history when the populace countries of Asia, the vast hinterlands of China and India, of Indonesia, have had their people joining for the first time in modern economic growth. We've seen wonderful improvements in living standards.

The other side of that coin is a growth in emissions in countries that once had very low per capital emissions. It's still very low compared with ours, but increasing rapidly.

But one of the wonderful and awful things that's happening is that the Platinum Age is not only a story of big successful developing countries. We've had an acceleration in economic growth through almost all of the

developing world - in Africa, in all of the countries that are not being subject to political disorder, civil disorder, if there's political stability and a reasonable continuity of policy in the last decade. And we've had economic growth on a scale that we haven't seen since the first few hundred generations after the Garden of Eden.

So the African development story, the Latin American development story, the story in Asia outside the Big Three is one of accelerating growth, but also accelerating growth in emissions. That increases the complexity of the challenge.

The fourth update paper was on the land sector. And the Academy's done a lot of work on this. This is really where Australia does lead the world and has the capacity to lead the world a lot further because we've got strength in the biological sciences, the sciences that are going to be very important [via] sequestration. There're enormous opportunities in this country for sequestering carbon in soils, in pastures, in woodlands, in forests.

A lot of uncertainty, both about capacities, about some of the other implications of restoring much more of the woodland that we once had; a lot of issues requiring research of the best ways of going about things but the potential is very large. I suggested that we should link the incentives for doing this through our carbon pricing system. And I suggested that if, as a result of these incentives, just ten per cent of the technical potential that had been identified by the CSIRO was utilised, then the industry of carbon sequestration in rural Australia would be contributing as much to value as the Australian wool industry by 2020. The wool industry is not what it was, but it's by no means trivial in rural Australia.

The fifth paper was on the science of climate change. And here I was at great pains to say when I released the paper at a meeting in Hobart [inaudible] a lot of the world's leading scientists who work on sea-level issues because of Australia's leading role in the study of Antarctica, I was at pains to regard that I didn't ever pretend to have direct, scientific authority. I put quite a lot of effort into understanding what others were saying.

I do have the background that allows me to form the view on what is scholarly authority and what's not. And on the central propositions about the physics of global warming, about the human contribution to that, there's a very clear reason in the authoritative science. And there are still some Australians, rather more Australians proportionately than in other countries, except possibly the United States, who can test the basic science. And in that paper released in Hobart I characterised the debate as one between the academies of science in Australia, in the United Kingdom, in the United States, in France, in Germany, in Russia, in China, in India - in all of the countries of scientific achievement on the one hand and the shock jocks of Australia on the other.

[Laughter]

This is a contest between knowledge and ignorance. The issues are so important that I think that the people who are not climate scientists, like myself, really need to put a little bit of effort into familiarising themselves with what is authoritative and what is not.

Well, in our country and other high income countries, the judge in this contest between ignorance and knowledge will be the democratic polity. And this is a test of their democracy.

The sixth paper, two weeks ago, was on carbon pricing. I won't go into a lot of the detail of that year. But I went through, again, the arguments why an economy-wide price on carbon provides the best economic starting point for reduction in emissions in a cost-effective way, in a low cost way, in a way that will do the minimum of damage to our standard of living.

I made the point that when we put a price on carbon, whether it's through a carbon tax or emissions' trading scheme, the money doesn't disappear. The Government has the potential to collect it and then can give it away. Of course, it's not its own money to give away. It puts it back into the community from whence it came. And it can do this through efficiency raising, reforms to the income tax and social security system.

And I suggested this should be the central way, it can do it for support for research, development and commercialisation of low emissions' technologies. And I suggested that this should be an important use of it. Or it can give it away through the vested interests that make the biggest noise. And we'll find out later this year how the Government decided to allocate this very substantial quantum of resources.

Then finally last week, I released our paper on low emissions' technologies and the innovation challenge. How costly it is for Australia and for the world to make the transition to a low emission economy's going to depend a great deal on technological change. We do know that there is immense opportunity for technological change to reduce the cost of emissions' reductions.

We never get enough investment in innovation simply from the alteration of markets, for the very simple economic reason that no individual firm or person can capture all the benefit of innovation for herself. If, say a pioneering firm developing a new technology, if it's successful it will be able to be patent it and may get first use, but lots of other people learn about the technology along the way through.

And so you'll only get enough innovation if the public finances support research, development and commercialisation of new technologies. And I suggested that we needed about two to three-billion dollars per annum in support for innovation which is a lift of about a factor of about two on current forward commitments.

Well, now, the electricity sector - Australia's disproportionately large and unusually the emissions' intensive electricity sector is the single main reason why our emissions per person are exceptionally large. And that's the central reason why the transformation of the electricity sector has to be central to our reduction in emissions.

It's not the only reason. Because it looks like the cheapest path to reductions in emissions in a number of other sectors it's going to be through the use of electricity; a lot of progress around the world with the electric car, for example, in the last few years. But - and that is potentially a very important path to reducing tangible emissions, but only if you reduced emissions in your electricity sector. Similarly, in a lot of industrial processes if you substitute electricity for fossil fuel combustion in other sectors as well. So the decarbonisation of the electricity sector is crucial.

It's to our great good fortune that Australia has absolute abundance of high quality resources of virtually all of the low emissions alternative sources of energy. Gas from natural sources, including coal seams and shale. Wind, the quality of the wind resource in Southern Australia is as good as it gets. Solar amongst the developing countries has incomparable insolation in parts of Australia.

High grade uranium oxide for nuclear energy; we're emerging as the world's most important source of uranium oxide and we will be for other radioactive materials. Land with low value for food, which is a prospective for biomass and biofuels, and the special opportunities for using algae and saline marine on land environments. Wave and tidal energy and opportunities for geo-sequestration of carbon dioxide.

So if we play our cards right, if we're clever, if we make the right investments in technology, if we're guided by a carbon price and into doing

what makes most sense economically, then there's no reason why Australia can't be relatively as rich in energy in the new world - in which the external costs of carbon are recognised - as it is in the old world, where energy is based on fossil fuels.

The change will come at a difficult time in electricity pricing. Since 2006, prices of electricity have risen at an extraordinary rate in Australia; much higher than in earlier periods of Australian history and much higher than in other countries. And carbon pricing will increase the price of electricity and the modelling that I did with Treasury for the original review and which Treasury will update in the coming months as part of the current work on carbon pricing.

For the sort of carbon price I was talking about, twenty dollars, you're looking at electricity prices in the next five years being an average of about twenty per cent higher in real terms than at present. But in real terms, in the last three years, or 2007 to 2010, the electricity prices increased by thirty-two per cent.

There's no doubt that the ongoing very rapid increase in the price of electricity complicates the introduction of a carbon price, which will raise electricity prices, but we're talking about a smaller increment in prices that's already been going on for a few years - and then can be expected from other sources in the next few years. That may include digging deeper into the causes of an increase in electricity prices of Australia and I've got a fair bit of this in the paper.

Most of the increases in recent years and most of the increases expected in the next few years come from huge investment in network infrastructure in poles and wires. And I've suggested in the paper that a lot of that might be a wasteful overinvestment. We've hit upon a regulatory system that gives huge rewards for expansion - investment in expansion and network infrastructure and all of that's passed straight through to the consumers. So maybe by more efficient approaches to regulation of pricing of network infrastructure, we'll be able to lower the basic inflation upon which we earn some increase from electricity prices and perhaps from carbon pricing.

What's different about the electricity pricing that comes from carbon pricing is that I think we will have revenue from a carbon tax, or sale of permits, to compensate lower-level income households with tax cuts and adjustments to the social security system. Electricity prices have also been pushed up a bit by other mitigation policies; the renewable energy target feeding tariffs for a federal tax on rooftops. These are small compared with the big increases that have come from overinvestment in network infrastructure. But they're increases in some cases that it's hard to justify once we've got a carbon price that's high enough to carry the lifting of reduction in emissions.

Within the electricity generation sector, the carbon price will drive a lot of change and change the level of costs of different sources of generation according to the emissions intensity of each. One of the early things that will happen is that we'll get adjustments of the use of gas and use of coal. Gas is about forty per cent of the emissions of brown coal, about fifty per cent of the emissions of black coal. Even from existing plants you will begin to get some adjustment in the way the plant is used, increased gas, less coal, and you won't get your investments in base-load coal. That will be in gas and meanwhile we will be getting increasing levels of investment in lower levels, lower emissions' technologies.

The carbon price will need to rise over time. I suggest that the economically efficient way to increase is the interest rate, and so over time they will gradually be improving essentials for even lower emissions' sources of energy. There will come a time when gas and coal becomes uncompetitive in Australia, but that time will be further in the future in Australia than in other countries, because we will be - or we're emerging as

the world's biggest exporter of natural gas, just as we're the world's biggest exporter of coal, and emerging as the world's biggest exporter of high grade uranium oxide.

With all these inputs of energy, the one in which you lose most energy and which costs the most in the national transport is natural gas and so natural gas is always going to be much cheaper here than in the countries we're selling it to. And whereas, for example, uranium oxide will be similarly priced elsewhere because they see very low volume net material, so they'll hold onto more gas for longer than others, but eventually the rise in carbon price will force down the use of gas and then there'll be a competition between the various near-zero emissions' technologies.

I want to leave time for discussion, so I'll just comment briefly on what draws a lot of attention in this discussion, is the role of coal-fired generation and the transition. We've - Australia has built its economy on very intensive use of coal in regions of the country, including the Latrobe Valley, not far from here, where communities have earned their livings from coal; the future coal is very important to Australia.

Well, the simple reality is the future; the long-term future of coal depends on successful geo-sequestration, so it's sensible for us to be able to be at the forefront of research in geo-sequestration. It happens that if large-scale geo-sequestration is going to work anywhere in the world, it will work in the Latrobe Valley, with the nearby excellent sites in Bass Strait being available. A lot of work, a lot of research lies ahead. The testing on commercial scale facilities lies ahead, but the future of coal depends on the success of that technology.

In the meantime, there will not be a sudden overnight pricing-down of coal and one of the outcomes of the research we did in my - for this paper was to demonstrate how with the rise of carbon pricing, it's not very likely we will suddenly get foreclosure of brown coal generators. It's much more likely that you will get them moving to intermittent production at times of the year when electricity demand is higher and prices are higher with hot days in summer and winter, and the phasing-out will occur gradually.

The locations that are good for the brown coal generation will turn out to be pretty good for some other energy technologies as well, in view of the growth of use of natural gas. And so one of the challenges for Australia will be to have a process some structural adjustment that looks after likelihoods of people in those communities.

Through this transition fears have been raised about energy security and the paper goes to some length to explain how the dynamics of the market - the electricity market - leave little room for fears that there will be a loss of physical capacity; an energy insecurity associated with the breakdown of plants. The electricity market has a lot of strengths that will allow it to manage the structural change that we'll be going through, but because there are anxieties and also because there's a small risk of financial disruption causing problems, I suggested two mechanisms for enhancing energy security during the transition.

One of these mechanisms is to have a national Energy Security Council, which will have at its disposal capacities with the sorts of intervention that the Reserve Bank and its companion regulatory authorities have in the financial sector, so that you avoid contagion if you do have financial weakness in a single generator through the transition.

I've also suggested making available the most emissions' intensive coal-fired generators, a Commonwealth guaranteed facility. I've explained that this is a much more cost-effective way of dealing with anxieties about energy security than the means that are favoured by the industry itself, which is fairly indiscriminately handing out free permits, which is really handing out money that could otherwise come to the Budget for other

purposes. Or the Government buying some of the transmission assets of closing down, which might turn out to be particularly expensive when you take into account the effects on electricity prices and the loss of opportunity for flexible operation of the generators.

Well, just to sum-up, Australia is well-endowed with alternative energy sources, exceptionally well-endowed. In relation to our population no-one is anywhere near as well-endowed. For a long time the leading country in the world for solar power was Germany and one of the leaders of the German solar industry visited when we were doing the old review and commented that he'd been over all the solar insolation maps of Australia and the worst place in Australia for solar power was the west coast of Tasmania and that was better than the best place in Germany. Yet Germany was making a lot of use of solar power. Well, that may or may not make sense in Germany, but we have a great opportunity.

But as I mentioned at the beginning, those opportunities extend across a very wide range of low emissions' fuels and we'll have to be a bit clever to make good early use of the immense resources in low emissions' technologies that we have. We've got a great opportunity. Australia is likely to be a country of abundant and relatively cheap energy in the low carbon world, just as it is in the fossil fuel world. And it's important that we start lowering the carbon exposure of our energy sector now, so that we can play a full part in the global effort which is necessary to combat climate change, but also to make sure that we're well placed in the competitive - in the very different global energy economy of the future. Thank you.

[Applause]

COMPERE;

Folks, I'm sure you'll all agree that the vision resplendent we have on the screen as a low emissions' superpower is one which Professor Garnaut certainly ascribes to. How we get there, the discussions that are necessary and the wisdom that's needed to make choices, Ross is, of course - and his team - are making a massive contribution to that effort. But I have no doubt that we will arrive there.

We now have fifteen minutes maximum for questions. So I have - and there are microphones at each end, so if you'd like to come to the microphone to ask a question, there is just two rules. I've already mentioned one of them; that is that we have to finish in no more than fifteen minutes time. The second is, for everyone's benefit please, questions, not lectures or statements which will deprive others of the opportunity of asking questions.

So who is first? The system is, perhaps come to the microphone and then you are ready for the next one. Thank you.

QUESTION;

Professor Garnaut, are you aware of the thermal solar power plant in Spain that has fifteen hours' storage and are you aware of the zero-carbon Australia plan, which is for Australia to have sixty per cent of its power from solar thermal and forty per cent from wind in ten years and if you are aware of it, what is your opinion on it?

ROSS GARNAUT;

I am aware of the Spanish solar thermal, which is very important. What's happening in southern Europe and across the Mediterranean and North Africa can be very important for the whole world and they're learning things and we'll all learn from them. Some of it's pretty expensive, but that's what happens when you are the first in the field, we can all learn from that and other areas, we should be the first in the field and others can learn from us. I think it's very good work we've done at Melbourne University Energy Institute on a zero emissions' Australia. That doesn't pretend to have gone into the economics in a very profound way.

But what that work does is show us that we could do it. I think that we've got to get some of those perspectives into an economic framework and that's how that work will end up being most valuable, I think. We can hold it out as

something which shows what is technically possible and over time we've got to work out a cost-effective way of getting to that ultimate position.

COMPERE; Thank you. Over this side.

QUESTION; Professor Garnaut, Sue O'Connor. You mentioned in your presentation about the current regulatory environment for electricity potentially encouraging overinvestment in transmission and distribution. I'm just wondering what your views are about what alternative regulatory environments would be able to better address that issue.

ROSS GARNAUT; I must say that when my team and I started working into this, we got some surprises. We began with a puzzle. Why is it that since we put the new regulatory regime in place in 2006 electricity prices have been stable for a long time and Australia just took off? And why did that happen in Australia but not in any other countries? So we began with a puzzle.

And all I've suggested is a review, because you can't come to final answers in a concentrated piece of work like ours. But what I think needs reviewing is the way we set up the rate of return that is allowed by the investors, allowed for the investors in transmission and distribution, which gives them a huge incentive to overinvest in the network. The more investment they put in, the more profits they make and there's no risk because they just pile it onto the bills of their customers.

COMPERE; Thank you. This side.

QUESTION; Overseas emissions from Australian coal that's exported already equals Australia's total emissions and the Government wants to double it within twenty years. So how will that help us to reduce our total impact on global emissions?

ROSS GARNAUT; Well, for good or ill, the way the international community decided in a series of meetings to measure responsibility for emissions was to look at the country in which the emissions took place. So if the coal or natural gas is burnt here, it's our mission to burn it somewhere else as other countries' emissions. That's actually how the world decided to account for that. You could have done it in a different way - there are several different ways you could have done it - but that's the way they did it.

So just onto the actual question, how will we look, well, we'll be judged on the emissions here. People who burn our coal will be judged on the emissions from our coal combustion.

Now, when we expand coal and natural gas exports, there's a lot of what we call fugitive emissions. When you open up a coal field you can avoid this, but if you don't avoid it, you release a lot of methane, which is a very dangerous, a very damaging greenhouse gas. [Inaudible] natural gas [inaudible] you've got a lot of fossil fuel combustion. So we are responsible for those emissions and we're going to have to do something about those. We'll be held accountable for those. And that's going to make our job of reducing emissions that much harder.

COMPERE; Thank you. Around to this side.

QUESTION; Professor Garnaut, we need accurate local energy consumption information so that we can see the impacts of climate change mitigation initiatives at the local level where people live and work. Currently, the fundamental information's owned by the distributors and is unavailable largely to government and the broader community. So how can we change this situation?

ROSS GARNAUT; That's a very big question, but I'll just mention one thing. I think it's very important for each household to be able to know what its use of energy actually is, its use of electricity actually is. And the experiment that was

undertaken in Victoria, with the extension of smart meters, is part of what can be a way of correcting current information problems.

Now, we needed a lot more public education; we needed a lot more investment in software in the distribution companies. But Smart Systems are using information technology and using smart meters to let people know the relationship between things they do in the house and the amount of energy that's used. The cost of electricity varies a great deal through the day.

Households can adjust their electricity to that if they know what they're using at different times of the day. And going a step further, the sorts of smart meters which are becoming commonplace in parts of the United States and China and Europe and Japan, the distributors are developing a capacity to actually turn off appliances that don't have to be running during the periods of peak demand. So I think there's lots of answers to your question, but one of them is that meters that allow people to know what's going on in their energy use and that are linked to more flexible use can be a big step.

COMPERE; Thank you. Over this side.

QUESTION; Professor Garnaut, you mentioned in your presentation the feats of the US climate change bill proposed is attributed to the House of Representatives. Actually, the House of Representatives passed the Waxman-Markey bill in the lower house, but the US failed to pass the bill in the Senate. And the Senate have agreed - mentioned that they didn't have the numbers and in fact, that the Democrats have never supported either bill, partly because at least ten to twelve of the Democratic senators coming from coal states didn't provide support.

Now, obviously you mentioned the Latrobe Valley in Australia - in Victoria and the difficulty in transitioning the generators from coal to other sources. Can you also identify, is there a need to find some traditional - transitional measures for the jobs in the Valley that might be affected from these changes?

ROSS GARNAUT; Yeah, two parts to the question: the Senate in the end didn't vote on the bill that went through the Democrat House of Reps as you were coming up to the elections and the President didn't really use all of his muscle. So we don't know how that would've ended up. It was overcome by the election and by the Democrats' loss of the House of Reps.

But I think to be able to give the people of [that whole] region a view of alternative employment or alternative industry is very important. We made some suggestions about that in the paper on innovation last week. I think that there are reasonable prospects of doing that and thinking through that is a matter of high priority, I agree with you.

COMPERE; Thank you for that.

QUESTION; Professor Garnaut, can you say anything about the cost differential faced by the different alternative energies and any evidence as to how that might narrow in the future and if you like, how it might be affected by a carbon tax?

ROSS GARNAUT; Yeah, well the story is changing very quickly. The general story is that the very new technologies, we're finding the costs are falling very rapidly and they fall with greater use and learning by doing and they fall by investment in research and technological development. We've found that in a number of countries - in China and the United States, in Korea, Japan, parts of Europe - the very big investment in research and technological development, as part of the stimulus package of the associated great financial crash of 2008 - that has given an important spur to things.

In addition - well, I guess the biggest thing that's happening around the world is the huge increase in the scale of Chinese investment in low emissions' technologies. And in the last eighteen months, some of that was given a kick along by the stimulus expenditure after the Great Crash, but it's also partly their commitment to reduce emissions and reduce energy use. But they're finding that the costs of virtually all technologies are falling very rapidly. They've had, now, a lot of years in which photovoltaic costs have been falling in [inaudible] plus six or seven per cent per year and they're expecting that just to keep on going for a long time.

One of the big surprises they've got is that they greatly expanded with the scale of their nuclear program and so you're now getting effectively an assembly line production of components of nuclear reactors. And they've been surprised at how rapidly that's been bringing down costs. And I was told in January that they were looking forward to, within a few years, nuclear energy in coastal China being fully competitive with coal. Coal, of course, is more expensive in coastal China than the deep inland.

But you also have been seeing big reductions in costs of solar thermal, although there China has not done as much as the United States or Europe. And the question about solar thermal in Spain and the accompanying developments in North Africa are very important there.

So the story is changing very quickly. The rate of change is closely related to investment in research. And it's not very easy to predict future rates of change. The innovation paper that I put out last week suggested we should be investing heavily across a wide sweep of technologies, where we've got comparative advantage in research and a national interest in use of the technologies. And we'll find over time whether the opportunity has turned out to be great.

I've got some thoughts. I think Australia's got some very large opportunities in some of the biologically based sequestration strategies which can become a base for energy through biofuels - use of algae, for example. But the market's going to determine outcomes there and one thing for certain: there'll be a lot of surprises about which the winners are in the end.

COMPERE; Folks, we're starting to hit our time limits and you've been very well-behaved so far in keeping the questions brief. We're getting close to the last one from each side. Please here.

QUESTION; Professor, first of all thank you for the independence you've brought to this debate and I think bravery too.

I found your talk both uplifting and depressing. Uplifting because of the technical opportunities, particularly in Australia; the resources you've just listed. Depressing because of the psychological side of it where Australia, it seems, if you like, the most repulsive or retarded or ignorant or something - I'm interested in your views on why that is. Is it misinformation, is it straight ignorance and of course, what we can do about that, how we can best handle this?

ROSS GARNAUT; Well, what I'm doing about it is standing up here.

[Laughter]

Yes, public education is the key to it and if you want something else to get happy about just think of Australian public opinion on questions like economic reform, reductions in protection. The majority of Australians actually want to do something about reducing emissions. There was never anything like a majority of Australians who thought it was a good idea to reduce protection, but when the Government eventually got around to it we found it did us a lot of good.

The same can be said about virtually all of the economic reforms. So the good news in this one is, although we can be depressed at the ignorance of our public discourse, most Australians want to do something about it. They understand the issue enough to want to do something about it. So there's a base there for political leaders to work on, if they want to. So there's an opportunity for Australia to get it right in the near future.

COMPERE; On that uplifting note, one last question from each side.

QUESTION; Mark Wakeham from Environment Victoria. Professor Garnaut, you talk a little about forecast rising gas prices. I guess the assumption under pricing carbon is that the first power stations to close will be the most emissions' intensive.

But we've seen massive increases in coal prices, particularly black coal in New South Wales and Queensland. And I just wonder if you could say a few words about whether there's a risk that, particularly without carbon emissions, some of the first power station closures may actually not be the most emissions' intensive, [maybe] black coal stations.

And just as a supplementary - it's slightly facetious - you mentioned falling cost production, cost for nuclear power. I'm just wondering whether there's a similar falling production - sorry, similar falling cost for meltdowns of nuclear reactors?

[Laughter]

ROSS GARNAUT; I'm sorry; I didn't hear the last...

[Laughter]

It was something about falling costs of nuclear reactors.

QUESTION; Of meltdowns from nuclear reactors.

ROSS GARNAUT; Well, that's actually a very important - in fact I did answer the last one - a very important question for global mitigation. Global mitigation is much harder if nuclear doesn't work and it's the same conversation that I mentioned with the leader of China's work in this area. He was saying there was concern in China and Chinese communities about the experience in Japan. And the Chinese Government is going to have study what's happening in Japan and talk to the Chinese community about that, if it's going to be possible. [Inaudible] our investment, so that's an important issue.

If the safety, if the weapons' proliferation issues can be managed then nuclear can be very helpful. If there's anxieties about those issues then nuclear won't play that big role. Now I've answered the end of your question and I've forgotten the beginning.

[Laughter]

QUESTION; The increase in pricing black coal and that means we [inaudible].

ROSS GARNAUT; Yeah, look, there could be some quite complicated interactions. We're developing an export industry for gas in Eastern Australia based on the coal bed methane in Queensland, but that's going to start getting gas from Eastern Australia. That's going to raise the Australian east coast price of gas and I doubt that that will take away the competitive advantage that gas gets from the carbon price. But then it will be a bit of an issue to the extent that gas, as well as coal, is increasing in cost and that, of course, increases the competitiveness of lower emissions' technologies.

As an economist, I can't help feeling that the best way of sorting out all of these complicated interactions is to have the carbon price rising over time

and businesses responding to that rising carbon price in the cheapest way that they can. But it is in those circumstances we'll find the lowest cost path to reducing emissions. And we can be confident those processes, as long as the carbon price is high enough and rising enough and that it's generating the reductions in emissions that represent Australia's proportionate part in an effective global effort.

COMPERE; I think it's now time for the last question please.

QUESTION; Professor Garnaut, you mentioned that placing a price on carbon will increase the cost of electricity. A lot of Australia's consumer goods are imported as well as exported. Do you have a way of attaching that price so that imported goods aren't cheaper, because they didn't have the carbon price in their manufacturing?

ROSS GARNAUT; Yes, I heard yesterday the chairman of BlueScope Steel suggest that we should put imports on other goods. Right at the moment, consumer goods made here have less of a carbon price than consumer goods made in a lot of other countries, so we've got to catch up. We've got to put as high a carbon price on production here as they're doing in other countries before we have to worry about compensating for the fact that other countries have higher carbon prices.

If we do catch up, if we get to the position we should be in, where we do have to worry about our carbon price being, or the constraints we place on the use of carbon being greater than in other countries, then it is necessary for the efficiency of our economy to give some support for our trade-exposed industries. I talk about that in paper number six at some length and just refer you to the web site for that.

QUESTION; Thank you.

COMPERE; Folks, we've had a wide range of questions for which I thank you and they've all been sensible ones too, so excellent.

I've got to chair another two meetings this week. One of them is on the fallout from Japan and what we should be thinking on nuclear in Melbourne Energy Institute Thursday night. There could be some less than rational precedents.

[Laughter]

However, tonight has been very rational and it has also been - I think we've had the flashes of just absolute depth as well as breadth on the subject matter. As I said at the outset, it is both simple and extraordinarily complex. And on your behalf, I'd like you to join with me in thanking Professor Garnaut for the presentation and the team that's worked with him under his guidance preparing this material, which I hope we are all - and by that I include all our politicians as well - going to take it very seriously. Thank you.

[Applause]

- ENDS -

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