

# A carbon price signal: What level, what form, emissions trading vs carbon tax?

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Thanks very much Alan, ladies and gentlemen. I think this session was advertised as a debate between Warwick and I, and I was rather looking forward to debating Warwick, but as you can see, it's a bit hard to have a debate with another economist with whom you almost agree. Now so instead of having a debate, what I thought I'd do is make a few fundamental – what I think are fundamental points about some of the issues that have been raised and what we need to do to address this particular problem. And there have been several questions raised in the audience over the last couple of days that I don't think have quite yet been answered. I wouldn't be arrogant enough to suggest that I have those answers, but there's a couple of things I want to say to try and get the thing moving along.

The first point that Warwick made, I think is a very pertinent point, and that is that the amount of economic transformation that you have to do in the world economy to solve this problem is enormous, and I just don't think that most people understand the extent to which we have to transform the world economy to do this basically. Now just I know it's very difficult to understand these numbers, but if you think just alone about carbon dioxide from the energy system, probably you have to strip out about 70 gigatonnes of CO<sub>2</sub> in 2100 out of what would have otherwise been there, and most of these model estimate that we're using to get that number are projecting, in that reference case, massive increases in energy efficiency as we go through time. These things are not static; they're assuming 1 or 1.2 percent increases in energy efficiency year on year constantly over the next 100 years. So these are not static models, and what we're asking the world economy here to do is an enormous task, and that's on CO<sub>2</sub> alone from the energy system. And if you look at the base year inventory for non-energy greenhouse gases, there's about 20 gigatonnes of non-energy greenhouse gases in CO<sub>2</sub> equivalent terms in the base, and you have to get rid of that as well, and these are really intransigent gases. Now let me just name one for you: when we do a whole bunch of insulation in buildings, we use a lot of blown foam, and that contains a whole lot of greenhouse gases with very, very high global warming potentials. When we do these metrics, global warming potentials – if Ron Quinn is in the audience he'll chastise me later for using a GWP because they're very approximate and quite bad from a scientific point of view, but from a practical policy point of view, it's not a bad way of adding up the different greenhouse gases.

Now these things have global warming – CO<sub>2</sub> has a global warming potential of 1. Some of these other gases have a global warming potentials of 36,000, and we have – in other words, one tonne of these things is equivalent to 36,000 tonnes of CO<sub>2</sub> in terms of radiate enforcing. In buildings today, we have an enormous bank of foam basically as insulation, that's holding these industrial gases in place. As soon as we pull those buildings down, as soon as we pull the insulation out, we disturb that foam bank

and we release that stuff to the atmosphere. So it's just not the case that you can do these things, you can transform buildings for example, without having the impact on the base level of emissions that we have to control. This is a big problem. When we look at the energy system in the world, and we take – and this is a reasonable metric – we take the amount of carbon we release per unit of GDP, and let's assume we can measure that in purchasing parity terms reasonably accurately. If you look at those numbers as best they can be calculated by economic historians since 1850, we've been decarbonising the world economy by about 0.3 percent per annum over the long term, out to about 2000. And why we've been doing that? Well it's pretty easy to think about that. Before the industrial revolution, we burnt mostly wood and biomass. If you take wood, there are 10 atoms of carbon to every atom of hydrogen, and we progressed the system, we use coal, we use oil and now we like to use natural gas – natural gas is one atom of carbon for four atoms of hydrogen. So in other words, we are basically decarbonising the energy as a consequence of changes in the fuel that we're using, and we're on the way to the hydrogen economy down there at 2050 or 2070 or something where we've got just hydrogen basically. So we've completely decarbonised the energy system, and that's where we've got to get if we're going to solve this problem.

Now if you look at – and I know there are the occasional person in the room that don't like the IPCC very much – but there are some good things in some IPCC reports if you look carefully. I submit as at least one of the authors. I don't guarantee that all of it's good, I'm just saying that there are some good things there. Now if you look at the working group 3 summary for policy makers, you'll find in the front of that – and this is up on the web, a nice graph that shows you the level of decarbonisation per unit of GDP expressed in PPP terms since about 1974, and you'll notice that we have stopped decarbonising the economy, we have stopped decarbonising the world economy. And the reason for that is among other things, that China is growing at 11 percent per annum, and a massive proportion of the energy being used now – a massive proportion of the increase is coming from coal, and that's very carbon intensive. So we've got off that trend. So what that means basically is we have a fundamentally difficult problem, and what we need here – not only do we need an ETS properly designed as Warwick has been talking about, but we also need an enormous amount of extra expenditure on R & D because if we don't get it, there's no way that we're going to have enough technology to suck off the shelf with Warwick's price. Yes, we need a price signal, but unless we have the technology to suck off the shelf, we're not going to be able to do the job. Now the purists would say well if you see the price signal, then everybody will rush about and do the necessary investment to make sure that this happens. I'm not necessarily convinced about that. I think basically what we need is a combination of the price signal and some decent R & D expenditure.

Now how much of that do we need? Well that's sort of an open guess, but I think we need a fair bit. What is the price that we need to get some of these technologies in to the mix? I think somebody asked yesterday, when does carbon capture and storage become commercial? Now of course that depends on how good the scientists are out there in sorting out the technology, but today, the best estimate we have is that you need a carbon tax of about \$40 a tonne CO<sub>2</sub> to bring the first tonne of CCS in, and believe me, if we're going to this job, we need an enormous amount of carbon capture and storage in the next 50 years to do this job. We cannot do it without applying every technology, including nuclear and carbon capture and storage. It just cannot be done if you do the numbers. And what are we talking about when we're talking about – I think I heard Robert Shapiro talk about a carbon tax to do the whole job of \$50 a tonne of carbon. Well I'm afraid that's just too low; it's not happening, it's not happening at that price. And this is one of the single problems we have with documents and the estimates in the IPCC group 3 report, they have reported very low numbers indeed in terms of the cost of doing this job. Now why have they done that? It's not because anybody has gone out and been scurrilous in terms of doing the modelling – and I certainly wouldn't say that, because I'm at least responsible for some of that modelling. It's because what's happened is that the majority of those models have assumed that from 2010, every country is engaged in the process, and every country has put in a perfect policy, probably a carbon tax or an emissions trading scheme, and we have evaded such that carbon price

everywhere in the world against every industry is the same; we've basically set the price equal to the marginal cost of abatement, we've got the solution and we have assumed that the world is perfect. Now I would be the first to admit – and I'm sure you'll all agree with me, that the world is not perfect. We struggle. We will struggle for many, many years to have a sensible international emissions trading scheme, because you need proper compliance and monitoring. Now you all – I won't name any country, but you can just think about them. Do you really believe that even if we were to agree that we were going to do this immediately from 2010 – and there's no way that's going to happen, and I'll come to that in a moment, that we can get perfect compliance in an emissions trading scheme across the planet? No we can't. Do you really believe that you can get perfect tax compliance? No you can't. It's impossible. So those estimates are massive under estimates of the cost of doing this job, and the price of carbon we need where it will be applied.

Now do we believe that we can get this process in place by 2010? Well lots of people hope we can, but we're not going to. Practically, it's impossible, and you only have to read the convention and the protocol to understand why. And I think I've got a protocol and a convention here. Beautiful documents, you should read them, you should get them off the web and read them, and if you don't believe what I'm saying to you about the difficulty associated with these negotiations, then I suggest, in terms of the protocol that you read article 3.9 and article 10, which will basically tell you that the negotiations under the protocol for a second commitment period preclude the possibility of engagement of developing countries in taking on targets. It precludes it legally. So you're not doing that under the protocol, so this leaves you with the convention, and the convention, if you want to see the difficulties associated with negotiations under the convention in terms of engaging developing countries, then I suggest you read articles 4.1, 3, 5 and 7 of the convention, and that will give you cause for pause with respect to the difficulty that our ambassador for the environment faces when she goes to international negotiations. These are really difficult negotiations, and this thing is going to take 20 or 30 years before you get action at the international level in a harmonised sort of way.

So what are we talking about here? Basically, we're talking about Australia doing the best it can, designing a domestic and emissions trading scheme that will take us forward, but we shouldn't fool ourselves that we're going to have the rest of the world on board all that quickly.

Now just let – Mr Chairman, I know you want to drag me off here almost instantaneously, but let me make one more point, and that is it's absolutely crucial that everybody in this room engages in the design of a proper emissions trading scheme. Warwick's already engaged, but what have we had? I mean this is the first time in 20 years I've actually been able to stand on a stage during an election campaign and a caretaker period, and actually say something about government policy. Now in the last three or four weeks – I've only got a minute, but this is worth waiting for. In the last three or four weeks, we've had a lot of people saying a lot of stuff about greenhouse policy, and we know that no matter what happens on the 24<sup>th</sup> of November, we're going to have an emissions trading scheme in Australia – and I agree with that; we should do something about this. But we shouldn't stuff it up. So what have we done? What have we done in the last little while? Well one of the things we've done – not me, but some persons out there who are engaged in the political process – one lot have said that they would – not only will they have an emissions trading scheme, but they will, in addition to that, whack on a 20 percent renewable target by 2020, and of course people have said 'Yes, well actually that's a really good thing. That will generate jobs'. Well let me tell you, that is a terrible thing. This is one of the worst pieces of public policy you can ever imagine. Why do I say that? That is because an emissions trading scheme, a properly designed scheme, will deliver you the right amount of abatement without the additional cost of regulation. Regulation – every piece of economic literature ever written basically shows that regulation is more costly than market mechanisms. Let me give you some estimates, Mr Chairman, before I end – and I know you're being very tolerant with me.

We did some calculations recently about the cost of the Labor renewable energies target imposed on top of an emissions trading scheme, and what we did was, we said let's hit the same level of abatement, in

other words, we hold the environmental outcome the same, so we let an emissions trading scheme do the job, or we let an emissions trading scheme and the renewables target do the same job. In other words, we've held the environment the same. The combination of those two policies will cost us in, according to the estimates, in 2020, \$1.5 billion loss in GDP and 3,600 jobs. We will lose 3,600 jobs because we're doing this job less efficiently than we would if we let them market work. Not only do we do the job less efficiently, we actually take out around about 19,000 gigawatt hours of gas out of the system – we don't take coal out, we take gas out. So we actually take the – we've been trying to get the fuel mix towards that fuel that contains more hydrogen and less carbon, and by doing these regulations, we actually make it worse. Now tell me, why on God's earth, would we agree with that? Thanks Mr Chairman.

**Chairman: Alan Oxley**

You can see why I was a little apprehensive about having to replace Mr McCrann as chairman of these two. Thank you very much. I mean both of you have underlined something which I think is apparent and can be concluded from our previous presentations that one of the things we seem to be drowning in with the effort to try to do something about climate change is bad public policy. We don't have one bad proposition in front of us on the table, Brian, we have two, because the schemes that the government's put up, the one he referred to as a scheme that's been put up by the Labor party, the scheme that the government's put up which is purportedly to use the market to regulate emissions, has got so many conditions and qualifications in it that it won't be actually the market who will determine that scheme; it will be the regulator. I made a throw away before about the East German economic commander control model, and someone took issue with me and said how could I say such a radical thing? I said 'Go and read the government's paper and see who actually, in the Australian system' – which they're envisaging will determine who can have permits, who can't, how long they're going to be there for and what they're going to be doing and worse, which industry is actually going to be applying the technology which at that time a regulatable determinant is the most appropriate low emissions technology. In other words, your so called market system is going to rest on the determination by a regulator of what is the right technology. It will be a very half-assed market system. But I think what's interesting from earlier discussions, is that it seems our European friends are facing similar problems. So gentlemen, the question I'd like to ask you is how do we get out of this conundrum of such bad policy and why is it happening. And then I'll throw to the audience for questions.

**Prof. Warwick McKibbin**

Can you hear me? Well Brian probably is better to answer that, because he's on the inside of a lot of these decisions, and I'm just a mere academic on the outside. But from what I can tell is there's – the fundamental problem is no one has made a commitment yet to take action on climate change seriously, so there's no credible commitment by a government to really do the sort of cuts that are possibly required. Secondly, without a system in place, you're always going to get vested interests lobbying for the system which they prefer in their own self interest, and you see that coming out in the Prime Minister's Emissions Trading Review. I actually like that document in many senses, because it's based on my work. The difference is there's a few compromises in there, which I don't like. For example, where the government has these aspirational targets, I'd like to have a perspirational target. I want a real target, not one which I can change every five years. They've got this five year window which I don't like; why would you relax a constraint with some probability? It undermines the credibility of the commitment and therefore reduces the long term carbon price. So there's a few things like that, which I think aren't necessary, but were compromises in the process, but the basic idea behind the emissions trading task group I think is right; that you do have to have some sort of long term goal, and you do

have to have a safety valve. They're the two key parts; manage the costs and have a credible long term target which you're trying to achieve.

### **Dr Brian Fisher**

Mr Chairman, I'm not on the inside, so I don't know what goes on on the inside. I think the reason we get to these circumstances in public policy is that in the end, public policy is developed by politicians and there's always compromise – there's always compromise. It's almost impossible to find the perfect public policy. But that doesn't mean that we should stop debating this issue. We should actually try and work the worst of this stuff away, and frankly, adding a whole bunch of regulations on top of a market mechanism is not the best thing we could do, so we should get rid of those things. For example, the notion that we should ban incandescent light bulbs is really bad public policy. Basically what we should do is introduce the price mechanism and smart metering so people can see the price that they face and then let the consumer make up their own mind about the best way to reduce their emissions. That's what we should be doing, and in addition to that of course, if there are some sort of impediments in the way of consumers getting options that they want to introduce for themselves, if they're prepared to pay for it, then they should be allowed to have them. But we don't do that. We would rather have command and control type approaches from Canberra because it's easy and it plays well in the community basically, but it's time that we had a proper open debate about this stuff so we get a bit better transparency.

### **Question**

Peter Burgess, Illumina Limited. I'm an engineer so I bring an engineer's bias to this discussion. I've listened and been part of this debate I guess for a few years, and I hear the environmentalists looking at the environmental data with horror I guess, and looking at what's happening to the world. They then look at I guess the economists, and you look at each other and the economists sort of say 'Yes, that's terrible and this is how much it's going to cost to fix'. As an engineer, I look at the models that you've talked about and have been talked about here the last couple of days, and I wonder if they miss the vast power of human innovation to change things, because I think there's so many things we don't know about what we could do with different technologies once there is a price for carbon, and I think – I've spent my life forecasting various things, and I know how hard it is to forecast. So I just wonder if you'd comment on that. It seems to me the tremendous power of innovation might be being missed in this discussion.

### **Answer**

#### **Prof. Warwick McKibbin**

The reason why you have a market price, is because that doesn't steal the innovation. It allows the innovation to happen. Our proposal is not based on my model being correct. In fact, our proposal was designed because we couldn't work out, in all the different models, what an optimal trajectory would look like. We had to step back and say how do you learn by doing? You create the markets, you create – everything's in place, and you move forward instead of negotiating and debating decade after decade. So you put in place the price signals. That futures market that I'll create, I think will be a powerful driver of all sorts of innovations that we never could have understood. Again, go back to 1900 and ask the question, what would the energy systems of the world look like in 1950 or 1960? No one in this room would have got that remotely correct. And so you need to create institutions and the incentives, not mandate and not target and not be very precise. It's a learning by doing strategy, and it's human innovation that's required.

## **Dr Brian Fisher**

Yes, I think that's an interesting engineering question, and economists fiddle around with their models, and there are models that have induced technical change, for example, embedded. But as the session talked about yesterday, that we were talking about uncertainty, it is very, very difficult, as you say, to know what technology might be out there in 2100. Now having said that though, there are only certain ways on the planet to generate energy, and there are – I think there's a fair bit of interesting work coming down the pipe about some of the technical and physical constraints on some of these energy sources.

For example, I've heard a rumour that a paper will be coming out in nature in a short while that gives you the physical limit on the amount of wind energy that you can generate on the planet, and those things are physical limit. And we can do the same sorts of calculations for solar. I mean I heard that during the discussion this morning or yesterday, the notion that Europe was thinking about covering vast proportions of the Sahara with solar cells. Now that sounds like a good thing to do, but it also – there's also a few technical issues with that, namely that the Sahara at the moment is a fantastic reflector, and as soon as you cover it with solar cells, effectively what you want to do is you want to absorb the solar energy. 10 percent of that will be turned into electricity, 90 percent of it will be turned into heat that you then keep on the earth. Previously it was reflected back in to space. So there are some serious technical issues here that we have to deal with. I agree with you, we really haven't got a clue what will happen in the future, but at least if we do more science and spend more money on worrying about the R & D and thinking about some of these problems, we're going to be a lot better off than we currently are.

## **End of transcript**

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