

Capital Ideas – Climate Change 2017: Restarting the debate

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Energy and climate change policy remain one of the most contested and important areas of Australian public policy in 2017. The Finkel Review will report by on what needs to be done to ensure the security and affordability of the national electricity market in the transition to a low-emissions future. The Federal Government will undertake its long-anticipated review of our domestic climate change policies against the emissions reduction targets to which Australia committed in Paris in December 2015.

In the first *Capital Ideas* public forum hosted through our partnership with the National Library, Helen Wilson who will lead the Government's review, Frank Jotzo a leading climate economist from ANU and Grattan Institute's Tony Wood discussed the review and what it is intended to achieve.

Speakers: Tony Wood, Energy Program Director, Grattan Institute
Helen Wilson, First Assistant Secretary of the Emission Reduction Fund Division of the Department of the Environment
Frank Jotzo, Professor at ANU Crawford School of Public Policy

KATHRYN FAVELLE: Hello, good evening and welcome to the National Library of Australia. My name's Kathryn Favelle and I have the great pleasure of looking after the Library's community outreach programs. As we begin I'd like to acknowledge the traditional owners of this land that the Library is built on and I thank their elders past and present for caring for this land that we're now privileged to call our home.

Tonight is the first event in our new partnership with the Grattan Institute, a partnership that we're delighted to be involved in that's bringing public policy discussions to the National Library. Since its launch in 2008, the Grattan Institute has established a profile as a leader of independent analysis of Australian domestic public policy, aiming to influence both public discussion and senior decision makers. Its focus is on the important rather than the urgent, on the things that could make a difference to the wellbeing of Australians over the long run, not distracted by three-year electoral cycles. In that way we think it's very like the National Library of Australia because we too are here for the long run and we take the long view in collecting, preserving and providing access to Australia's documentary heritage. Tonight's discussion will focus on one of the most contested and important areas of Australian public policy, energy and climate change. I think we could be forgiven for assuming that maybe the Grattan Institute has fed discussions over the past week, because is there a more timely moment for us to be talking about energy policy than tonight?

To tell us a little bit more about the work of the Institute and our guest speakers I'm introducing tonight Tony Wood, who is the Energy Program Director at Grattan. He's served as Program Director of clean energy projects at the Clinton Foundation advising governments in the Asia-Pacific region on effective deployment of largescale low emission energy technologies, and in 2008 he provided an industry

perspective to the first Garnaut Climate Change Review. Please join me in welcoming Tony Wood to the stage.

TONY WOOD: Thank you Kathryn and good evening. This, as Kathryn said, is the first of these events. We have a similar relationship which we've had for several years now with the State Library in Victoria and also in Queensland and New South Wales. There's something about Melbourne people, they get confused between public policy and football matches because we tend to get a pretty good crowd these days, but maybe that's something about the nature of Victoria. Thank you very much for coming tonight. Hopefully you'll find this an interesting discussion. It is at least somewhat timely. I think the good news for people like me, who work in energy policy, is that there's never been a more exciting time to be in policy in this country and it certainly keeps us well and truly employed.

Tonight we're going to be delving into an area that is important, challenging and, at times, also quite tricky, and hopefully you'll get a feel for some of this this evening in the way we proceed. I'll introduce Helen and Frank in a moment, but the intention is Helen Wilson will discuss the Climate Review, which in the noise of the last few weeks has been a little lost I think that this review was actually taking place. The Finkel Review is also underway and we can talk about that a little if people are interested and how that will dovetail into the Climate Review, but I think the Climate Review is a particularly important part of the government's process of identifying how we're going to move forward on climate change. After Helen has presented her comments about how that will go, and she's heading up that review, Frank Jotzo will make some comments in regard to the review from his perspective and I'll also do a similar thing. We'll have a bit of a conversation amongst ourselves to give you some time to think about the questions you'd like to ask of the panel and also I may use two or three of the questions that we had submitted before this evening. We gave people the opportunity to do so if they wanted to do that and I've got some, and I won't try and read them all out because some of them are longer than the presentations you're going to hear tonight. But that's the nature of the beast, people feel very passionate about these public policy and particularly climate change issues, and I'm sure some of that will come out this evening.

So what I'd like to do now is introduce our speakers. Helen Wilson is the First Assistant Secretary of the Department of Environment and Energy. I think one of the most interesting developments in the last 12 months was the appointment of the current Minister, Josh Frydenberg, to be responsible for both areas because it was actually starting to put into practice the recognition that, you know what, right now energy and climate change are actually very closely related. We're still I think some way from seeing how that's going to play out in terms of real hard policy, but I think it was an important step to have these two areas of government interest under the same Minister and under the same Department. Helen's been working in this area of climate change policy for a number of years, she wouldn't have achieved a position of seniority if she didn't know what she was talking about, so she's going to share her views and inform you a bit more about how this is going to play out. Kathryn mentioned that I spent most of 2008 working with Ross Garnaut on the Garnaut Climate Change Review and one of the people I met in that review was Frank Jotzo. Frank has an extraordinarily deep understanding as an economist of not just the Australian, but also the international world of climate policy and climate economics. There are probably very few people in Australia let alone people in the world who know more about this topic than Frank does and it's an interesting opportunity to engage with this particular topic.

We look forward to this discussion, hopefully some debate, some interesting topics, and I'm sure some points of view will come forward. Without more ado, let me pass over to Helen.

HELEN WILSON: Thanks Tony and thanks for the invitation to chat with you tonight at the first ever *Capital Ideas* event. As Tony just said, it is a big year for climate and energy policy with work underway on both the government's climate change policy review and the independent review into the future security of the National Electricity Market (NEM) led by the Chief Scientist Dr Alan Finkel. The Australian Government has been clear it's committed to addressing climate change while maintaining energy security, reliability and affordability. The Department of the Environment and Energy is conducting the climate change policy review with the help of other Commonwealth Departments and, as Tony said, it's my division that is leading this work. We are at the start of the process for the Climate Change Review. The government will shortly release a discussion paper inviting input and public submissions: we really do want to hear from business, the community and individuals. I thought what I'd do tonight is spend a few minutes outlining what's happening globally, then talk about what's happening domestically, and finish with an overview on the sorts of issues that the 2017 review will consider.

I want to start by saying that post the Paris Agreement there has clearly been a step up in momentum on action on climate change. Importantly, it's not just national governments that have signed the agreements, it's also subnational governments, it's business, it's cities and it's community groups and individuals; we all do have a role to play. The Paris Agreement was a game-changer. As the Prime Minister has said, almost a year on from the Paris Agreement it is clear the Agreement was a watershed, a turning point, and the adoption of a comprehensive strategy that has galvanised the international community and spurred on global action. The world is moving together to reduce emissions. For example, China plans to introduce a national Emissions Trading Scheme (ETS) this year after piloting it in seven cities and provinces, they are expanding renewable generation and improving industrial energy efficiency; India has set targets to increase their installed renewable energy capacity, increase forest cover, and improve efficiency of coal power generation. India will also tax both imported and domestically produced coal with the revenue directed to what's called the National Clean Energy Fund for renewable energy products. Interestingly, the International Civil Aviation Organisation will implement what's called a Carbon Offsetting Scheme for international aviation emissions from 2021. Australia and more than 60 countries will participate in the scheme and these countries together represent well over 80% of total international aviation traffic.

The government is committed to Australia playing its part in the global effort. Again, I want to quote the Prime Minister who said Australia doesn't make international agreements only to break them. They're ones that are achievable and that we can meet. Australia is moving in step with other countries. Our 2030 target is to reduce emission by 26% to 28% below 2005 levels and this target is comparable to other developed economies such as Japan and New Zealand. Under the Paris Agreement, we will review our target every five years to ensure we continue to play our part. Businesses are also taking action. Business awareness of climate risk and opportunities has grown in recent years and many of the companies I talk to are preparing for the transition to a lower emissions future. The G20 has acknowledged the change in climate poses risks and opportunities for companies. The G20 has a taskforce looking at how companies can voluntarily disclose the risks and opportunities they face as a result of a change in climate. This work is already influencing Australia

business practices. Individuals and households are also contributing; more than 1.6 million households have installed solar panels with the help of the Renewable Energy Target (RET). There are a range of ways the Australian Government is working to reduce emissions, these include the Emissions Reduction Fund and its safeguard mechanism. The fund provides incentives for business and landholders to reduce emissions and improve the environment. 178 million tonnes of emissions reductions have been contracted from 397 projects across the country. The average price paid per ton of abatement has been low at \$11.83.

The fund is delivering other great benefits besides the emissions reductions. For example, savanna fire management projects are providing cultural, environmental and economic opportunities for Indigenous communities across northern Australia. The safeguard mechanism puts limits on Australia's largest emitters. It covers about 50% of national emissions, ensuring the emissions reductions the government purchases through the fund are not offset by significant emissions increases elsewhere in the economy. The RET supports households to generate solar energy and incentivises investment in renewable energy. The target will see renewables grow from around 15% today to around 23.5% of Australia's electricity supply in 2020. The National Energy Productivity Plan is a package of measures and initiatives to improve Australia's energy productivity by 40% by 2030. The plan brings together energy market reforms, energy efficiency measures and efforts to reduce emissions at least cost, particularly in buildings, appliances and vehicles. For example, what's called the Equipment Energy Efficiency Program is accelerating appliance energy efficiency standards in priority areas such as air conditioners, fridges, freezers, swimming pool pumps and lighting. These improvements could potentially save consumers hundreds of dollars a year. Australia is working with other countries to encourage a global phasedown of hydrofluorocarbons (HFCs) which are used in refrigerators and air conditioners. Australia played a lead role in securing this important international agreement. The agreement will see Australia and other developed countries phasedown these HFCs to 85% of current consumption levels by 2036. This global phasedown will reduce emissions by 70 billion tonnes in the period to 2050 and that is equivalent to one and a third years of total greenhouse gas emissions. In July last year the government announced that it would take early action to phasedown HFCs as a contribution to meeting Australia's 2030 emissions reduction target. Australia's phasedown is expected to start in 2018, a full year earlier than the Montreal Protocol start date.

Work is underway to reduce emissions from light vehicles. The Department is consulting with industry on measures to reduce emissions from vehicles as well as improve the quality of Australia's transport fuels. The primary emissions reduction measure being considered under the work to date is a light vehicle fuel efficiency standard, like those that operate in the EU and in the US. As well as reducing emissions, these measures could cut consumer fuel costs, reduce health costs, and help give Australians better access to the latest vehicle technology. The government is also supporting clean energy innovation across the whole spectrum of research and development, demonstration and deployment. Australia joined the Global Mission Innovation in 2015 and has pledged to double government investment in clean energy research and development investment by 2020. Research and development grants are provided by a range of organisations including the Australian Renewable Energy Agency, the CSIRO, the Australian Research Council and others. The Clean Energy Finance Corporation provides support for the deployment of clean energy technologies in renewable power generation, energy efficient buildings and low emissions vehicles. For example, one of the projects

that the Clean Energy Finance Corporation is currently funding is the development of energy efficient community housing which will reduce energy costs for low income families and residents.

The government's carbon-neutral program helps business and organisations to become carbon-neutral, this means helping business to reduce their emissions where possible and using offset units to compensate for the remainder. By becoming carbon-neutral, a range of businesses are positioning themselves for growth and competitiveness in a lower emissions future. Going carbon-neutral often involves making operational changes that will reduce energy or fuel use. These improvements can lead to significant cost savings. There are around 40 organisations and businesses that are certified carbon-neutral and these include large corporations, local councils and small business. We're constantly surprised by the range of businesses that are keen to go carbon-neutral and ultimately this gives consumers more choice to purchase carbon-neutral products and services. I want to go back to the 2017 review and where to from here. All the policies I've just outlined are helping to reduce Australia's emissions. Australia does have a track record of meeting our international emissions reduction commitments. For example, we are on track to beat our 2020 target to reduce emissions by 5% below 2000 levels and we are making progress towards our 2030 target. Although progress is being made, further reductions are needed to meet the 2030 target. The 2017 review is looking at the current climate change policies to ensure they remain effective in achieving our 2030 target and our Paris Agreement commitments.

We have been anticipating this review for a few years. The government did commit to the review back in 2015 when they announced Australia's 2030 emissions reduction target. The review will consider a number of issues, including the integration of climate change and energy policy, the opportunities and challenges of reducing emissions for each sector of the economy, the impact of policies on jobs, on investment, on trade competitiveness, on households and regional Australia, and the review will consider a potential long term emissions reduction goal post-2030. As I said at the start, the government will shortly release a discussion paper seeking public submissions. Through our consultations to date, and I have already met with over 70 groups, businesses and individuals, businesses have emphasised the importance of policy certainty and stability, they would like to see the government build on existing policies. That is what the 2017 review is looking at. There is no single emissions reduction policy that can achieve everything. A set of policies crafted to suit each sector's circumstances can be more effective. A flexible and scalable approach to policy is also important because no-one is able to predict the future with 100% accuracy. Emissions are produced from a range of sectors and activities across the economy. In line with the terms of reference, the discussion paper will ask for people's views on the opportunities and challenges of reducing emissions in each sector of the economy.

Energy is very topical at the moment and, while generating electricity is a large source of emissions, secure, reliable and affordable electricity is critical for Australian businesses and essential for households. The electricity sector is also a large employer, with over 60,000 people working in the industry, many of whom are in regional areas. As Tony said at the start, the Council of Australian Governments has asked the Chief Scientist, Dr Alan Finkel, to develop a national reform blueprint to maintain energy security and reliability in the NEM. I know that Dr Finkel's review has received over 300 submissions. Dr Finkel's recommendations on policies to address the trifecta of providing energy security and affordability while reducing emission will be a very important input into the 2017 review,

but every sector will need to make a contribution to reducing emissions. The resources, manufacturing and waste sectors are important contributors to the Australian economy. In looking at the opportunities to reduce emission in those sectors, the government will need to be mindful of keeping in step with the actions of other countries. We know more can be done to reduce emissions from buildings and from the transport sector. In recent years over 200,000 new homes have been built each year and the average Australian travels a total of 49km every day. There's also an opportunity to store more carbon in the land, but the CSIRO notes this will need to be carefully managed to balance outcomes for water, land productivity and biodiversity.

We are at the start of the review process. The advice the Department gives through the review to government will be based on what we have heard from consultation and will be based on the terms of reference. I look forward to hearing what Frank and Tony have to say and then taking questions from the floor. Thank you.

FRANK JOTZO: Helen has one of the most difficult jobs in this town at the moment, leading the government's review on climate change policy. Helen mentioned the integration of climate change and energy policy at the federal level, that's a very good thing indeed because that is exactly what needs to happen. We need to develop a clear understanding that achieving climate change objectives in the long term really is an issue of getting energy policy right. But the reason I'm saying Helen has the most difficult job in this town is that she works in an intensely political field where good policy is often trumped by the politics, which is nothing recent, this is what we've seen in various guises unfortunately over a period of ten years or so. We think about the trilemma of what we want to achieve or the three things we need to deal with in the energy sector which are reliability, affordability and low carbon environmental outcomes. If we follow the recent policy debate on this then reliability gets big emphasis, affordability equally gets big emphasis, and we hear very little talk about the low carbon objective. In one sense that's understandable in terms of what we've seen happen over the last few weeks and months in terms of reliability, it's understandable in terms of the significant rises in electricity prices at the retail level that we've seen over recent years, much of it to do with network expansion. But we should not lose sight of the longer term picture here and that we're dealing with long-lived assets, we're dealing with investment decisions that as a society we will have to live with for decades to come and we will want to avoid a situation where we're looking back in two or three decades' time and thinking back that in the late 2010s we made some really bad decisions that left us lumbered with expensive high carbon assets.

The electricity sector is really central to achieving a long term low emissions outcome. Many analyses, including the Decarbonisation Pathway Study that we worked on at ANU together with Climate Works at Monash, show that Australia's electricity sector can be fully decarbonised, close to zero emissions, by the middle of the century. This can be done relatively cheaply and in a way that ensures we have a reliable electricity grid. There are many studies that show that, so it's of really central importance to get that done because it's relatively easy to decarbonise the electricity sector and once you've done that then you can shift all manner of other energy uses onto electricity. So that's really the blueprint into the future and lots of opportunity lurks there as well because we're actually a continent blessed with renewable energy opportunities and you can see opportunities for energy industries of the future to be built on that potential. But getting there seems to be really very, very difficult indeed and one of the reasons it's so difficult is that industry has had to deal with policy uncertainty now for a significant

period of time. Investors don't like uncertainty, investors deal with uncertainty but expect a premium in terms of the required rates of return or the interest charged on the loan, and when risk exceeds a certain level many investors will just retreat and not invest at all. That's what we've seen in the energy sector where the politics of energy and climate change have really become very unpredictable for investors and so we're just not seeing that investment.

So what we need is credible, predictable policy approaches that last for a while. That seems kind of a nirvana, but it's a back and forth and incremental progress can be made. As an economist, I can tell you the unanimous answer around the world as to what is the right policy instrument to use as a backbone of sensible climate policy is a carbon price. Put a price on it, create a lasting and widespread incentive throughout the economy to reduce emissions, and do that in a cost effective manner. Now if you can't do that there are other ways of getting effective incentives into the system and a lot of the emphasis over the last two years or so, and Tony has been very instrumental in that debate, is an emissions intensity scheme which is effectively a price-based emissions reduction incentive in the electricity supply sector. So it's fair to say that within this community there was a shared understanding that that's not such a bad second-best and also an expectation that this might be something that the two major parties could in fact in some way if not agree with, then at least both live with and that could be the kernel of a bipartisan situation going forward. For the time being the prospects of that appear rather dim, but we've seen swings and roundabouts in this. What are the alternatives to this? Well, you could think of turning the RET into a low emissions energy target which would similarly provide a uniform price signal throughout the electricity supply sector incentivising lower carbon investment, including gas.

Other policy instruments that may well have a role in the mix are policies to facilitate an orderly exit of old carbon-intensive assets. We put a proposal forward for a market-based mechanism for the exit of high-emitting coal-fired power stations into the mix; others have suggested there should be regulation. The fundamental point is, as we've seen with the Hazelwood closure, these announcements can come very suddenly and then they create problems in the market. The NEM was not designed with exit in mind, so there's room for positive intervention by governments to help the market anticipate what comes down the track. There's a whole lot that we could say about the need for energy market reform. It's not altogether obvious that the NEM as it stands as an energy-only market can really deliver to provide predictable revenue flows in a system that in the future may be dominated by renewable energy sources. There's a lot of analysis that needs to be done and we need to better understand the alternatives and the role of different aspects of market allocation and the role that the market can play in providing revenue streams to electricity generators. That may well take us to the question of state government investment. So we've had the South Australian announcement of government investment into a new gas-fired power station to cover those peaks in electricity demand, along with storage. What we need to keep in mind is all of these things - remember affordability in the trilemma - cost money. In this case it will cost taxpayers in South Australia money, they're talking I think about \$360 million for a gas plant that is anticipated to run for only perhaps a few days a year.

So these are questions for public policy. Is it a sensible decision for society to pay that amount of money for the eventuality of another peak pricing period in the South Australian grid? The analogy of the desalination plants of course does come to mind and that's not to say it's necessarily a wrong decision, but it's a decision that's not to be taken lightly. Once again, there are of course alternatives.

Storage through batteries or pumped hydro storage, where you pump water up the hill and let it back down when you need electricity, are viable options and crucially are options that are in fact compatible with the long term objective of a decarbonised electricity supply. Just on the question of how do we manage electricity demand on those hot summer afternoons, we've had two or three of those in Canberra over recent weeks and it's interesting actually when you talk to people who managed this. This was the first largescale episode I'm told where governments in fact resorted to what they call voluntary restrictions, so there were calls to major electricity users to please scale back. For example, buildings that periodically use their backup generators just to keep the generators ticking over in good maintenance were asked to run those backup generators on those afternoons; businesses were asked to turn their air conditioning down a bit. The estimated overall effect of these voluntary demand-side measures was about in the same order of magnitude as switching the Tomago Aluminium smelter off. So there's tremendous potential there and it essentially comes at very low cost, it just requires some co-ordination and an extent of goodwill throughout the community.

Of course, looking forward you might well achieve more by providing electricity consumers with accurate price signals, because when you turned on your air conditioner on that afternoon the amount of money you paid to run that electricity-guzzling device was heaps less than what your retailer actually had to pay for it. If we had that price signal as consumers we could do a lot more. I'll close by saying the long term vision is very clear, a lot of renewable energy supply can be harvested very cheaply, there's a transition issue and the important thing is not to get the short term investment decisions wrong. Really, the challenge for politics and policymakers is to hang in there and argue for those good policy settings and, in fact, the kind of stable, predictable policy settings that a large majority of the Australian business community is asking for. Thanks very much.

TONY WOOD: Frank used the words "politics" and "policy" in the same sentence and I might try and continue that theme just for a couple of minutes, because it seems to me that, on the one hand, you can be negative about this and look at the fact that the battlefield of climate politics is littered with the dead bodies of politicians who had a go and then gave up under various circumstances for all sorts of reasons. On the other hand, you can also see that at times the windows of politics and policy can line up; the train's passing and you might actually see through that. The problem is they don't stay open for very long and when they open people think we've got lots of time, but then they close and they can close for a long time. We saw that happen in 2005/6, probably again in 2007/8. The first one was when John Howard was, some might argue, dragged kicking and screaming into an ETS. The second one was when Kevin Rudd got wound up about it in terms of the great moral challenge. Even last year climate policy wasn't actually a big deal in the election because there was a broad expectation that we might see some alignment and industry was also, as Frank said, calling for that sort of clarity around policy. I guess when you've been doing this stuff for a while you can become very pessimistic, and I've got my long sleeves on so you won't see the slashes in my wrists, but at the moment we're somewhat more optimistic that we might actually see some things move because there are number of things that are aligned. That means the expectations are relatively high.

As Helen said, the current Prime Minister ratified the Paris Agreement which his predecessor had signed up to, and what I found particular interesting about that was that he chose to do that within 48 hours of Donald Trump being elected as President of the United States. He made it very clear, in the way Helen described it, that Australia had made its commitment and we intended to meet that

commitment. The role of the Commonwealth is central to the way this plays out, but of course we've also seen the roles of the states because we have this concept called federalism, sometimes called co-operative federalism but mostly, and more accurately, described as unco-operative federalism. You only have to see the pretty unedifying examples in recent times when, for example, the Victorian government basically said, "How dare you send *our* electricity to New South Wales and potentially put at risk the towns of Ballarat and Bendigo" to understand how parochial we become. Often I find that when describing energy policy and climate policy to people outside this country you need to explain that, relative to most countries in the world, we don't behave like a country; we behave like half-a-dozen different countries, all of which have their own very parochial issues. Nothing brings that to the surface more quickly than energy policy, partly because this area of policy and systems are more interconnected than just about anything else, and that's why I think it is important that we have a national approach.

The problem is that state and territory governments often go to COAG Energy Council meetings and say, "We are committed to a national approach" and then do exactly the opposite. That's unfortunately the history of the way some of these things are unfolding even today and some of the comments you will have heard already about yesterday's announcement from South Australia suggests that people are concerned that we've got another state going off doing its own thing and that will have dire consequences for everything else. Even the current Minister is suggesting it may be partly unconstitutional. The Finkel Review I think will play importantly into the Climate Review. To some extent, Dr Finkel is a mad scientist and will come up with mad scientist thinking about this, but he's got enough people on his panel and indeed 300 submissions to bring him back to what will be I think important recommendations for how our energy system needs to deal with the transition to a very different environment. Inevitably, that's largely being driven by how we reduce emissions and, in particular, the expectation that it's going to be difficult, if not impossible, to do this without increasing substantially the proportion of intermittent supply wind and solar into our system. I'm sure most people in this room would be aware that South Australia went from being the global exemplar of how to do this to the canary in the coalmine of how not to do it very quickly, and unfortunately they then became a magnet for political debate which plays out until this very afternoon.

I think there are interesting issues around the role of technologies and gas. Everyone gets really excited about technology that I don't think is actually all that important in one sense, and that is that if we get the policies right we might have some chance of delivering the technologies that we need. If we start with assuming the technology we almost always get it wrong, just as if we use forecasts for policy we also get that wrong. I think the discussion around what sort of policy will become important. Frank made some comments about policy. Maybe eventually, after we've tried everything else, we'll come back to what's actually the first best policy, but we've got to try everything else first and we're certainly so far having a pretty good go at that. In fact, I think Australia may be the only country in the world to have tried a carbon price and then got rid of it. I think one of the important drivers yet to be tested is to the extent to which industry will become increasingly frustrated with the lack of credible climate policy. Not because industry wants to save the planet, I'm sure most people in industry are not unworried about the future of their families and their children and grandchildren, but that's not their job as industry leaders. What they are worried about is how do you invest efficiently in anything to do with resources or energy or manufacturing in this country without some form of credible policy? That

brings me to the last comment which is what would be the minimum expectations we should have on the Climate Review this year? It seems to me there are at least two.

One is that it should be credible, and by that I mean in the context of achieving the targets to which Australia is committed. It needs to be seen that what was put in place is credible and it has therefore an element of longevity to provide the sort of confidence against which people can invest, knowing that it's not going to change every little while. Secondly, partly related to Helen's comment, it has to be scalable because, as I suspect everybody in this room knows, the view that's been taken is that the commitments that were made in Paris, including Australia's, don't add up to achieving the climate objective to which the international community committed. If that's true then those targets will have to be revised and they're only going to be revised in one direction, and that is tighter. As Helen said, we are already finding, broadly speaking, that our target for 2030 is turning out to be less than the target was only a few years ago for a whole range of reasons, therefore we don't need a policy that assumes a particular view of the future because we know that that future is unknowable and therefore we have to make sure that something is scalable. So it seems to me they would be two of the absolute key criteria on which we should judge the outcome of the Climate Review.

Finally, we need to think about the way this will interact with not just the energy sector. Many of the pieces of analysis you'll see talk about if Australia has to reduce its emissions by 26% we assume electricity has to reduce its emissions by 26%. Well anyone who's tried to stop cows burping and farting knows that's pretty tricky and it may turn out that the energy sector has to do a damn sight more than 26% to 28%, and that creates an even bigger challenge and that will be something, again, which I think we need to be thinking about as the policy frameworks unfold. So they're my comments. I'm just going to take my seat again then put a couple of questions to Helen and Frank and, please, if you could consider the sort of questions you'd like to ask in the next couple of minutes.

I'd like to start with Frank. We've seen in the last couple of weeks almost policy by billionaire Twitter feed and there are at least we know now two billionaires who communicate via Twitter quite effectively, obviously Elon Musk, and we can talk about him if you're interested later, but in particular I'm referring to the current President of the United States. One of the questions we had submitted before this evening was how does the world see the Trump presidency in terms of both impacting the global commitment to reduce emission and what it might mean and, more specifically, how we might consider that in the Australian context?

FRANK JOTZO: It's difficult to know just what the Trump presidency will mean for the global climate effort, but what we can quite confidently say is that the Paris Agreement and what came together there in terms of an expression of the will of individual nation states to come together and work collaboratively on the climate change issue, and each nation going there with their own defined targets and their own bag of actions that they have pledged, that effort is not being fundamentally derailed by the United States.

Trump has said that the United States will rip up the Paris Agreement. Well, they can't do that. What they can do is withdraw from the Paris Agreement, that would take four years and, in a sense, because this really doesn't have a great deal of hard legal ramifications, the nature of the Paris Agreement is one where nations come together and mutually reassure each other about their

intent and actions, in that light the greatest damage, if you will, to that agreement has already been done by the announcement of an intention to withdraw from it. You haven't seen it fundamentally derail, the last Climate Change Conference basically reaffirmed that things continue going their way. What it does of course is this one of the major countries taking a decidedly different tack on climate and energy policy and I think we will see the echoes of that or will hear the echoes of that in many countries. You could argue that we're already seeing them in Australia in terms of some positions prior to the election of Trump which were not really mainstream; we can hear about them on the daily radio.

TONY WOOD: Any comments about President Trump?

HELEN WILSON: What Trump says and what he does, I think, could turn out to be very different and it is early days. From what I see when I talk to companies and to other countries there are clear signs that international momentum on climate change action will continue. I think that's a really hopeful and positive sign. So I think momentum is there, it's happening, and, regardless of what Trump does, it'll continue to happen.

TONY WOOD: I think the other thing that seems to have not just Australian momentum but globally is the business community is pushing now for serious change and you'll see even the coal industry in the United States is now going down that track. Now who would have thought? You could argue whether they have their own self-interest at heart and if they don't then I'd be very surprised, in fact their shareholders should be seriously concerned if they don't have self-interest in this, but I think there's a realisation that, one way or the other, this is now a risk that has to be managed and you're better off managing it than having some sort of completely unanticipated change occurring. Helen, in the document that the COAG Energy Council put out for the Finkel Review they put it on Alan to produce a blueprint for the security of the NEM. I'm not asking you to give away any secrets tonight about what'll be in the discussion paper, but what do you see as the deliverable? Do you see a blueprint for climate policy? Do you see specifics? What do you see as the output of the review?

HELEN WILSON: I am not going to pre-empt the outcomes of the review and I'm not going to provide an opinion, but as to Dr Alan Finkel and the process with the independent panel that he's leading, it is a very important input into the 2017 review. The government has been clear that when it comes to the 2017 review we're starting from where we are, we're starting from the current policies, and that does provide certainty to business. We are going to look at every sector of the economy and look at the challenges and opportunities of reducing emissions in those sectors. I think, as the government said, we'll consult widely and broadly with a range of people and then the advice that we provide to government will be based on those consultations and the terms of reference that the government released in December.

TONY WOOD: Let me push a little bit more on that, I understand fully that the review that the Department is undertaking won't decide policy, but would you expect that the output would be a document of some sort which makes recommendations to the government and would that be public, or you don't have a view yet as to what even the output will be?

HELEN WILSON: No, I don't have a view on whether there will be a report that we make public. My job and the Department's job are absolutely to provide recommendations and advice to government.

How they choose to communicate the outcomes of the review I think is still a matter for discussion and decision, but ultimately how the government chooses to announce what's at the end of the review, that is a matter for government. We are thinking through, again, how we provide advice and the government has said we'll conclude it by 2017, but those sorts of questions on will there be another review public report or anything like that are matters for government. The discussion paper, as I said though, will hopefully be released in coming weeks and that really is the opportunity for everybody to have a look and have their say.

TONY WOOD: The other only slightly political question, which I won't push you too much on, is the interaction between the Commonwealth and the states. Is there any dialogue or connection going on between the review that you're undertaking and some of the activity that a number of states are doing in grappling with their own views about climate policy and how they can be better integrated? Because I think one of the problems we've seen previously is a lack of integration. Is that something that you can see occurring?

HELEN WILSON: I am constantly talking to my counterparts in all the states and territories to understand what they're doing, to understand some of the challenges that they're grappling when it comes to reducing emissions and, in fact, when it comes to adapting to some of the impacts of climate change. So yes, we will be talking to states and territories about what they're doing and they're certainly very interested in the 2017 review of climate change.

TONY WOOD: Frank, do you have a view on this question about the interaction between state and federal policies on climate change more generally and in energy specifically, because it seems that even in the last little while we've seen the South Australian Government - although, to be fair, the South Australian Government did make it very clear that the sort of policies that they're talking about would be folded into a national policy on climate change as one emerges. Now, I'm sure they've got their own view on what that should look like. What's your view about that question as to the extent to which we end up with an integrated approach versus a disparate approach?

FRANK JOTZO: We're seeing increasing action or at least announcement of impending action on climate change and low carbon things at the state level with the ACT Government, the Victorian State Government, Queensland, South Australia, and even New South Wales. So in a sense we've come full circle, because towards the end of the Howard government there was a movement by the states to investigate the opportunities for a state-based ETS where the states said, "Well, if the feds don't do it, we'll do it together in some way". That was quickly shelved of course as it became apparent that the Federal Government would in fact go ahead and it's pretty clear that a good federal solution is much more preferable to state-based action simply because it'll be more cost effective, it'll be less messy and it'll be less subject to the political swings that you get in individual states that tend to give you a bit of back and forth. On the other hand, of course, if you consider the federal situation in terms of this being a party political thing where one party takes one position and the other party almost invariably seems to take the opposing position, if this were to continue for quite some time to come then really at the end of the day there does seem to be a significant role for climate change policy action at the state level where the changes in government in a sense collectively even each other out over time. So perhaps that's what we'll see, I don't know.

TONY WOOD: Let's turn over to the audience.

AUDIENCE: I'm a bit concerned, the theme or the title was "restarting the debate" and my view is that we're a long way behind what the science is already saying needs to be done. A very strong view from the Potsdam Institute headed up by Professor Schellnhuber, who advises the German Government and the Pope, essentially said the Paris Agreement looked and sounded good and it was better than what was expected, but when you match it up with the science it's a fail. The same view of James Hansen, the former Head Research Officer from NASA, and the Climate Research Centre, headed up by Professor Kevin Anderson, are saying that we really are on the verge of a global catastrophe unless the top 22 nations start to dramatically reduce their carbon emissions. None of you have actually referred to the scientific premises to what your views are. Could I also just express my absolute disgust at the comments made by Josh Frydenberg and others making absurd claims that somehow there is clean coal and maybe we should be opting for a new coal-based power station and blaming renewables on the South Australian blackout. That's my comment and people can respond to it any way they like.

TONY WOOD: Any reaction to the comment?

FRANK JOTZO: It's really clear that if the world is to be in line with a two degree or less outcome then there is no role for the combustion of coal for energy or heat without carbon capture and storage (CCS). That's really clear and any kind of proposal to build a coal-fired power station without CCS in the western world needs to be seen in that light. To be clear, coal-fired power stations without CCS are being built and have been built quite recently in other places in the developed world and there's every chance that they will hang around the necks of these countries in decades to come like millstones; they may well end up being stranded assets. I'm happy to be quite outspoken about this. I've talked a lot to different players in the energy industry and the finance industry and there's no-one who sees this as investable without a really significant government subsidy or perhaps even further than that, a government guarantee or government ownership. So it really comes to a crucial point where if you take seriously the proposition that there might be a government-sponsored coal-fired power station that is a really steep proposition to do that on behalf of the Australian people.

AUDIENCE: I'd like to follow-up two points that were made. One is the 49km per person per day that we travel. What are we doing with a substandard national internet system? Our system is just appalling the way we've gone and it would substitute for a lot of travel if you could have effective action and interaction at home. The second question was you mentioned that we're going down the HFCs you said to 85%, so it's a reduction of only 15%. Am I understanding that correctly?

HELEN WILSON: I won't pretend to be the expert on the NBN, I can only make one personal comment that I don't have it in the suburb that I live in and that drives my 15 year old son absolutely insane, so I do take your point about with technology and things like the NBN we may not have to travel that 49km per day. On the issue of HFCs, the stat that I gave about the phasedown, which is an agreement that will see Australia and other developed countries phasedown HFCs to 85% of current consumption levels by 2036, you're right, but do think about that in terms of the amount of emissions that it's going to result in reducing. The global phasedown will reduce emissions by 70 billion tonnes

in the period to 2050 and that is quite significant. I'm not the expert on HFCs so I don't know what the plan is post that period, but why don't I take that on notice for you and get back to you?

AUDIENCE: I'd like to ask a question about gas, but not the sort of chest-thumping that there was today. I suspect that'll be easily overlooked in the scheme of things, but the idea that was mentioned a couple of times tonight that gas will be an important part of the grid going forward. Last week there was a report released by RepuTex which found that the cost of wind and solar together with the storage need to firm up that capacity was now, with the rising prices of gas and the falling prices of storage and renewables, actually below the price of producing electricity with gas. So with a view to not making bad decisions in this decade that we'll regret in later times, firstly, what would be the sort of policy drivers that you would need to incentivise that storage to come online? We have a RET that goes to 2020 which will keep renewables development going for the next couple of years, but not necessarily incentivise the storage, so what's the policy driver? Secondly, everything that we talk about in this space is potentially hamstrung by the politics. You guys will come up with awesome advice for the politicians, but what are the chances we'll actually see something valuable once the political process has made mincemeat of it?

TONY WOOD: I'll answer the second one first because I think part of the answer here is that people in industry and particularly energy need to be better at helping the government to find answers rather than criticising the government to fix things, because I don't think that's particularly helpful. One of the interesting things about industry and government in this country is that there's something that people have given in the water when they leave university such that when they're in the private sector they believe that government's got no idea and when they're in the government they believe that industry are just mad capitalistic hungry bastards. Other countries don't seem to have quite that same degree of angst between the two and until we find better ways of the two actually working together - I don't know what happened this afternoon, I heard the result but I haven't heard the detail of the discussion that went on between the Prime Minister and the gas industry. But if that's the beginnings of better dialogue that would be a bloody good thing because it seems to me the answer is for each party to help the other out of its problem, rather than to criticise the other for what they're doing and that may be part of the solution.

In terms of the policy drivers for things like batteries and so forth, Frank have you got a view about that issue?

FRANK JOTZO: It's a really good question and that relates then to the role of the NEM in a future system that is heavier on renewables and obviously storage. If you've got a storage facility, so you're on a battery park or pumped hydro storage facility, then you will be looking to make your money when electricity prices on the grid are really, really high and then fill your storage back up when the electricity price is low, so you live off the day-to-day, week-to-week variability of wholesale power prices. I don't think we have a really clear understanding what the variability of wholesale power prices in the future will be. Part of the reason we have such a limited understanding of that is that we don't know how the power mix will evolve over time, and part of the reason why we have such confusion over what the power mix will look like is that the policy settings are so confused and keep chopping and changing, so it comes back to policy uncertainty on that. If you do see a case for, for example, state governments directly investing in energy supply infrastructure, then to my mind

storage facilities are a reasonably good case for that kind of direct intervention because it's pretty clear that they will be needed in future and it's kind of unclear to what extent the private sector will really invest in them at this point.

TONY WOOD: The only caveat I'd put on some of this is that until someone's done it nobody know. I respect the analysis that RepuTex and others do about this, but as many people have said famously or infamously, "All economic models are wrong and some of them are useful". I don't know which ones are going to be useful yet, but I do know that if you seriously want to have value put on fast-start gas - and fast-start gas is very different from gas that runs all the time: you may not use it very much, but it's there when you need it in short bursts. Whether it's pumped hydro whether it's batteries, who knows? What we need is a market that values that reliability and that's something that Dr Finkel is certainly looking at.

AUDIENCE: You've talked quite a lot about the politicisation of the issue, which has been a huge frustration I think for everyone here. We had a Prime Ministerial thought bubble a month or so ago about pumped hydro and there's just been a study been proceed by the ANU, Andrew Blake at the Research School of Engineering, which startled me by arguing that, at least in the eastern half of the country, the resources are there and the sites are available to have renewable energy and pumped hydro at a very reasonable cost. I'd be particularly interested in the comments of Frank and Tony in particular if they have seen this study. It looks like a silver bullet so it's probably too good to be true, but what do you think?

FRANK JOTZO: We certainly know the study. It's a technical feasibility study, lo and behold, finding that the country is in fact not pancake flat but there are lots of cliffs and hills and so on and so forth, and all you need is a 100m or 200m drop with a bit of water available, because the water gets recycled up and down so that can be done. Does every one of these sites that you've geographically identified directly equate to a site that you can actually use for such a facility? Probably not, but if you can use in one in 50 that's probably enough. The big uncertainty, which I think comes back exactly to what you said Tony, is the proof is in the pudding in terms of what the costs are to build and operate. There is one such facility in Australia which is part of the Snowy Mountain Hydro and the cost data that we have from the construction of that back in probably the '60s is really not much use today.

AUDIENCE: I'm just a layperson looking to understand some of the barriers for investment and entry into renewable energy into the future. I'm wondering, who are we looking to internationally? Are there particular schemes operating at the moment that we are taking learning from or are we now in the position of taking leadership internationally in that space?

TONY WOOD: I think in terms of policy everyone's trying everything. We've tried basically everybody else's infectious diseases a few times, some of them didn't work and some of them have worked. We've used the RET, we've used feed-in tariffs, we're using reverse auctions; they all have perverse outcomes in a sense. None of them are actually climate policies, they're all industry policies to support specific groups of technologies, and they don't do what Frank was throwing out as a challenge before in terms of the Prime Minister's words that we want to be somewhat indifferent to the technologies, let's make sure the policies drive it. So if that turns out to be wind or solar or solar thermal or even combinations of gas with solar thermal, those sorts of things which could get very low

emissions if not zero, then we should have policies to support that. I think we're unfortunately not quite there yet and that's where I think we should focus our attention. Finkel has just come back from a two week trip around the world and I think one of the things he discovered is that no-one else knows how to do this any better than we do. You can't go out there and find someone else's answer and bring it back to Australia. We've tried that a couple of times and we came unstuck on that.

We are in some ways out there with everybody else, but there are particular circumstances in this country that are different. We've got a small number of middle-sized cities a long way apart. We can't interconnect them in the same way the European countries are interconnecting their system, so you can't take wind-rich Germany and connect it with hydro-rich Norway, unless we connect to New Zealand and bring it a bit closer. We have very specific challenges. We can learn from the others, but hopefully we can learn positively rather than negatively, which we seem to have done so far I think.

AUDIENCE: I've had a look at some reports from a whistle-blower in the gas industry, particularly she was in Origin Energy and she was discussing a whole lot of things where Origin Energy hadn't reported various breaches and stuff like that. My understanding is that this hasn't been to court and it may not get to court, but it raises the wider question of is there some way of making sure of the actual emissions that come from gas at each stage of the production cycle, so the exploration of it, the mining of it, the transport of it, conversion at the power station, etc.? If the emissions reported from gas are wrong it's vastly worse than CO₂ because it's 70, 80, some number like that higher in emissions intensity than CO₂ and so in fact we might be at the stage where the gas industry has higher emissions than coal rather than lower emissions. My question to all three of the panel is how do we get an emissions rating for gas in the national emissions inventory that actually reveals the real emissions from gas, rather than what the gas industry would like us to believe?

HELEN WILSON: I'm not aware of the report that you're referring to, but what I will say is that Australia's national inventory is highly regarded internationally. We have the UNFCCC coming and reviewing us regularly and the way that we measure and verify and report emissions is in line with international standards. I'm sorry, I'm not aware of the report that you refer to, apart from, again, just assuring you that the way that the Department measures, verifies and reports emissions in all sectors of the economy is best practice, it's world renowned. We do get reviewed regularly so, again, why don't I just take that on notice?

TONY WOOD: It's on my CV that I worked for Origin Energy, not since 2008 I should point out, and I'm aware of the report. The issue of full lifecycle emissions is important and there needs to be integrity around that. The answer is yes, you can. As with most other emissions, there's a combination of actual measurements, calculations and so forth, and the CSIRO have done a lot of work on that. There are people who feel very strongly that those numbers either are or are not accurate, but I think it's important that that be transparent because it does raise concerns that people genuinely have about whether the emissions from the full lifecycle of extracting gas and then burning it are as low as people would sometimes claim. I think the answer is yes, you can and we need to make sure that we do and that there are regulations in place for that.

AUDIENCE: I wanted to go back to some of the trends in energy use and emissions. In the US, for example, gas has come in and begun to displace coal faster than anything else and also drive a US trend of lowering emissions independent of government climate policy at the moment. So a question mostly for Tony and Frank, we talked about energy storage. Do you see other trends like that which governments can work with, incentivise and amplify that are currently happening without any particular policy drivers that would drive some of what we want to see and some of that transformation? I know it's difficult to look into a crystal ball, but what's happening that politicians don't have any control over?

FRANK JOTZO: There's one overwhelming trend that we see that's continuing and that's the drastic reduction in costs for renewable energy, in particular solar panels but also many of the other renewable energy technologies, including wind. This has very quickly come to a point where these renewable energies provide electricity kilowatt-hours more cheaply than the conventional fossil fuels for new build. So what we're grappling with in Australia is the transition from the existing build, which you can operate for the most part really cheaply, to the new build which is, of course, expensive because you need to invest in it. But for new investments we'll very soon be there. In sunny places and windy places it's really a no-brainer what you invest in and you need to couple storage. Often overlooked, a big technology trend is energy efficiency. Again, we talked about projections and how difficult it is to get projections and one of the factors there is that it was always predicted that Australian residential and business electricity demand would keep growing because we have an economy that keeps growing and a population that keeps growing, so our electricity demand will keep growing. Well not so, essentially because of energy efficiency, which has been improving tremendously but which still has a very, very long way to go. So both of those are really positive trends I think.

AUDIENCE: When policies are volatile, businesses should hedge themselves. There are a lot of available technologies to convert fossil fuel assets, like open pit mines or depleted oil reservoirs, into energy storage assets by compressing water or air into a closed mine or converting Genex Power, converting two lakes into off-river pump hydro. They have money put aside in their balance sheet for environmental costs after the reservoir is depleted, why are they not using this money to convert the assets into green renewable assets?

TONY WOOD: So the question is about why we're not using these abandoned mines for pumped hydro?

AUDIENCE: Yes.

TONY WOOD: My understanding is there is one being tested almost as we speak in North Queensland.

HELEN WILSON: Yes, there is.

TONY WOOD: The broad comment that Frank made in response to the point about the ANU study is that there is a lot of work being done to look at the potential for those sorts of sites. Pumped hydro is not a technology question, it's all about can you find the combination of the right geography, somewhere near where you can have solar or wind, somewhere that's near a transmission line, and

can you make the economics work? That's what some of the feasibility studies that the government's currently funding are intended to address. I think there are interesting potential possibilities here. I'm not sure they're going to save us any more than I think Elon Musk is, but we'll see.

On that note we should bring this to a close. Can I, firstly, thank Helen and Frank for being with us and sharing their views, particularly Helen. As anybody knows, the role of a bureaucrat in an area that's as tricky as this is a challenging one and Helen has certainly managed to weave her way through that with some degree of aplomb. Secondly, can I thank the Library. This is the first of our events, there will be more, and I would ask you to either check out the Grattan website or register with us as a member of the Library. I'd also recommend the ANU. Under Frank's leadership, the Crawford School also runs public forums, sometimes in conjunction with us as well. Can I thank the staff who helped us, both the Library staff and the Grattan staff, in putting this together and, finally, thank you very much for turning out in such a great number and with your questions and thoughts for this evening. I think it's been a success from our perspective and hopefully we'll see you again soon. Thank you very much.

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