

Forward Thinking – Climate change: The great moral challenge was an election non-issue: What next?

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Weather patterns continue to be consistent with global warming. After the Paris climate conference in December, Australia has committed to targets to reduce greenhouse gas emissions beyond 2020. Yet, climate change did not emerge as an election-deciding issue.

In this public forum hosted by Grattan Institute, join John Connor and Tony Wood to hear about and discuss the prospects that with the new federal government and new minister we might really begin to address the great moral challenge of our time.

Moderator: Jennifer Hewett, The Australian Review

Speakers: John Connor, CEO, The Climate Institute
Emma Herd, CEO, Investor Group on Climate Change (IGCC)
Tony Wood, Energy Program Director, Grattan Institute

JH: Welcome everyone, my name's Jennifer Hewett and I'm going to be the moderator this evening for what I think will be a great session. It's another *Forward Thinking* even that the Grattan Institute does in association with the State Library of New South Wales and tonight we're going to be talking about *Climate change: The great moral challenge was an election non-issue* but, more importantly, what comes next? Before I start I'd just like to pay my respects to the traditional owners of the land on which we meet, the Gadigal People of the Eora Nation. Then what I'm going to do is explain how this evening will work, obviously there's a lot to get through and we've got three terrific speakers who will each give a speech including some slides for about ten minutes each. Then we'll have a discussion for a little while longer on some of the points that they've raised as part of their discussion and then we'll open the meeting to questions from the audience.

Since the election there's been an awful lot to think about in many areas, but one of the things I think was most surprising in many ways about the election and even the aftermath so far was the fact that an issue that has created so much political turmoil and so much intensity of emotion, as well as intensity of analysis, has received relatively little attention over the election and even leading up to it. Part of it I think was due to the fact that you had a new government under Malcolm Turnbull that made it harder for the Labor Party to attack Tony Abbott in the way that it had before, but also I think people are just generally confused about what's going on, so they decided to stick with relatively, some would say, simplistic messages of the election campaign. Yet weather patterns are clearly consistent with continued global warming and after the Paris Climate Agreement, Australia committed to targets to reduce greenhouse gas emissions beyond 2020. The point is that's all fine, but how are we actually going to get there?

We now have a new minister in Josh Frydenberg whose ministry has been put together with energy and the environment, which I think makes a great deal of sense after years of seeming to think they weren't connected somehow. He's having the first COAG meeting of course next week to discuss this issue with his fellow state ministers. I'm not sure how confident we can be, given the state of COAG, of what we'll get out of that, but certainly the thing about Frydenberg is that he is determined to try

and, of course, it suits him as an ambitious relatively young minister to try and get some runs on the board and make a difference in this area. So the question is whether or not that's going to be possible and what needs to be done.

What I'd like to do first is to invite John Connor from The Climate Institute to address us on his views on this issue, followed by Emma and then Tony.

JC: Thank you very much, thanks for coming along. I too would like to pay my respects to the traditional owners of this country and Elders past and present. I'm from The Climate Institute, we're an independent research organisation funded primarily by philanthropy and we've been around since 2005.

There's an image which is going to launch a thousand PowerPoint presentations, it's obviously from the impacts on Collaroy of the east coast low, but it's an example that we are in dangerous situations right now. The climate impacts are here, they are costing and they are growing, and that's being recognised across the board. Situations like that east coast low, as once scientist not very poetically put it, is that the chances of joined up probabilities arising are going to increase. What people don't generally do is join the dots of the impact, so we've got warmer waters driving greater energy in our systems and we've got higher sea levels that are increasing and these things combine and can have cascading consequences. It was fascinating in this instance where it knocked out some electricity systems, which knocked out Amazon's local hub, which knocked out Amazon's whole service and delivery system for a couple of days. This is the way in which climate impact economically and in surprising ways. So first of all, I want to talk about the attitudes and why it wasn't such an issue in the election. Just before the election we did some polling, we do annual polling, on these questions. We were rather fascinated about one of the bigger things since the last election of 2013. The top slide talks about concern about climate change and there's a surge in concern about climate change. It's a bit hard to see that, but it's "very concerned" is the darker blue, "fairly concerned" is the light blue, to "not very concerned" and so on.

The level of concern jumped in its intensity and it did so across the political spectrum. It did so with the Coalition voters, concern went up 50% to about 61%, and regional voters jumped significantly as well. Now that may talk to some of the apparent tribalism that may go with party affiliation and leaders and the like, but I think also speaks to broader concern about this issue. The bottom slide is one which we've tracked since 2008 about do you think Australia should be a leader internationally in climate change solutions? This aligns with other polling like The Lowy Institute has done, for example, that we had the height of concern after the millennium drought and all of the impacts particularly with water quality which made it actually very real for people. In 2008 people had elected a government they thought was going to deal with it and so some of their concern started to drop, and then of course we then went into dithering and a bipartisan split when Tony Abbott led a departure from the bipartisan support for a solution of emissions trading. Then we had of course the GFC, but also a big scare campaign around the impacts of a carbon pricing mechanism which, fascinatingly enough, went to its absolute lowest point right to the point at which that carbon pricing mechanism came into place.

So at the moment of the reality of that carbon pricing mechanism and that it didn't knock out Whyalla or it didn't knock over other industries and other elements, we started to see this rebound and that's continued not dramatically, but steadily through time. Now, why didn't this drive this to be a major issue in the election if we saw this level of concern? There's a whole bunch of other stats in behind that. I think climate change is one of these key issues going to trust in politicians overall and certainly

it was one of the major factors in Kevin Rudd's support dropping when he backed away from the emissions trading scheme. It's a key issue and one of the reasons, to be quite cynical, on why the ALP have had a stronger policy was because they wanted to highlight Malcolm Turnbull's differences and I think arguably it's one of the reasons why people lost some support for Malcolm Turnbull, because he wasn't taking action in the ways which he did speak about before he was tumbled by Tony Abbott. When we asked whether they thought the parties had an effective plan only 19% said the Coalition had one and only 20% thought the ALP had one, so there's also a question of payback for the political parties in the process about why would we bother coming up with strong policies if people don't believe our promises? Finally, and perhaps even most importantly, is that both the parties know they've got stuff to deal with, and we'll get on with some of those elements here. I think frankly that they made conscious decisions not to go fully over-the-top and we were actually quite glad that no-one went fully over-the-top during the campaign in locking in or out certain elements. So there are a number of reasons behind community attitudes and I can talk more of that in questions.

I want to briefly give some backdrop. I know Emma is going to talk to some of this as well and highlight that investors have moved as well, but it is and part of the reason that I think the political parties are now starting to realise that they've got a lot more to deal with is the Paris Climate Agreement, as well as the technological developments which are driving disruption and have driven a surge in investments and renewable globally. But the Paris process is a remarkable achievement in terms of accountability and countries committing to bring themselves before their international peers and, indeed, their citizens on a regular timeline and one that requires ratcheting up of commitments in terms of the process itself. So we see in 2018 there'll be a big global stocktake and in 2020 an update of the five year plans. Doing this on a regular basis is one of the improvements of the Paris Climate Agreement from previous ones, like Kyoto, we had Kyoto 1 and we had Kyoto 2 which were just various slabs of time. Paris has got this ongoing framework where we don't have to revisit all of the rules over time, and so there's this accountability element that comes in there.

Paris was also important in actually surprising people. We're all thinking that around two degrees was the goal, as we were talking to what are the objectives that we should be working towards, but in particular because of the powerful advocacy of effected nations in terms of climate justice, of small island states, the Pacific Islands, other countries which are beginning to see that it's their national interest, that two degrees is a highly dangerous limit and we should actually be doing as much as we can to avoid climate impacts. We saw this stronger goal of well below two degrees and trying to keep it to 1.5 degrees, which is very challenging because we're very close to having that locked in. So there's a strengthening of that as well. The other key element which I think has helped the discussion remarkably is there was agreement to this concept here in Article 4 which is a balance between the sources and the sinks, which is effectively, in other language, called "net zero emissions". So it's kind of put to bed this concept we can just sort of weasel our way through with low carbon emissions. This is really putting it front and centre that it's zero emissions and, indeed, below that we need to be talking about.

So low carbon solutions, if you hear anyone talking about low carbon solutions or outcomes it's so 2015. We've moved on, it's about zero emissions and, frankly, below. There are dangerous levels in the atmosphere now. It's not about carbon reduction, in the bigger picture it's about carbon removal, but we've got to be at zero emissions. So the Paris process is a really important thing where that's borne in mind. Longer term commitments, Australia has committed internationally that the 2017 review will consider longer term targets, and that's one of the things that Minister Frydenberg is going to have to juggle. I thought I'd just put up there where the varying party commitments that are out

there would have us at 2030 at a per capita level. So the government does talk about the fact that there are significant per capita reductions for its target of some 27% below 2005 levels by 2030, but in a world which is seeing more and more self-interest in getting to zero emissions these sorts of comparisons actually matter from a competitiveness view as well as climate. So the government's target would have us up with Saudi Arabia and Russia in 2030 in comparison, and you can see there the ALP. Nick Xenophon, the centrist that he is, happens to be bang smack in the middle. Through the election process Derryn Hinch, it may matter in the caucus, actually committed to a similar target and to net zero emissions by 2050, and the Greens, Lazarus also committed to Greens-type targets, but not so relevant anymore. So I guess this is a very important comparison to bear in mind when we look at this from a broader competitiveness issue and, indeed, as Emma may talk about, investment. So investors are actually also looking at where countries are at in their policy mix.

This is a very busy slide but it's relevant to the discussion, this is from work we've put out called *A Switch in Time*, which was co-funded by AGL, Australia's biggest polluter, Tas Hydro and GE where we're looking at the shifts that are needed in the electricity sector here in Australia and if a carbon budget matters, if the zero emissions and the total amount of emissions actually matter. So we get a calculation about what the carbon budget might be for the electricity sector if that two degree goal really matters and of course, like any budget, if you spend too much of it upfront then you've got a crash quickly and dramatically. So we did some scenarios, I won't go into the depths of that now, but it shows the volatility there in policy and the volatility there if the factors of politics, social norms, social impacts, justice stories and the actual climate impacts drive the change which actually does take climate change seriously. We will have to do a crash in our electricity sector, which will be impactful in terms of price, impactful in terms of jobs and impactful in terms of supply. So our broader push is we need actually to have a plan to manage this transition not only in terms of electricity and prices, but in terms of jobs and communities, and I think this election has brought home the costs of not looking after the regional consequences of transition very well.

My last slide is just to highlight that this is not like 2009, this is not like 2011 in terms of the politics now. We actually have seen a remarkable convergence in interests and recognising that net zero emissions and below and decarbonisation is actually a very mainstream business and investment concept and the recognition of the budget consequence that if we delay action that means bigger hits. So we facilitated a statement from those radical lefties there in the bottom right of your screen who backed and urged Tony Abbott, as it was then, and we put it out literally three days after the change in leadership again, but it was in mind of just the government going into the Paris negotiations to take it seriously. We are, with Emma, part of what's called The Australian Climate Roundtable which also includes the Business Council of Australia and the Australian Industry Group which recognises that countries like Australia need to be at zero emissions or below. We're working together and there are principles there which acknowledge this is a competitiveness issue and we've actually, as a high carbon economy, got to be smart about that, but also the consequences of not acting. So this orange/red slide is where the government's target is and the drop it will have to have in emissions if we take the carbon budget seriously and the blue is where ALP is at.

I'll leave it there and talk more about that in questions.

JH: Thanks. Now we're going to hear from Emma Herd, who is CEO at the Investor Group in Climate Change (IGCC) and, of course, also spent many years at Westpac where she had a range of roles across carbon finance and emissions trading. Thanks Emma.

EH: Thank you very much. I think a lot of what I'm going to say is going to be quite complementary to what John said, but adopting a different lens in terms of looking at some of the issues. Hopefully we'll also provide a good lead into some of the issues that I suspect Tony's going to talk about in terms of translating carbon and energy policy into financial risk. So I actually think this is unintentionally going to end up being quite a good alignment of messaging and slides, but also goes to highlight some of the main issues where there's actually some pretty broad consensus. I'm from the IGCC, we are effectively an industry association representing over 65 institutional investors, so superannuation funds, infrastructure funds, that part of the financial value chain, and we represent around a trillion in funds under management when we're making these arguments and observations around the impact of climate change policy on the investment landscape.

The same slide, slightly different lens, this is quite ironic - probably we're using the same smart art in PowerPoint presentation slides - but I think it's fascinating to see the bits that we've called out are the same, but how we've arranged them are slightly different. So John's were about the political moments, mine are about the investment implications, and there are a couple of points that I want to make here about the Paris Agreement. The first is that it was a whopping great big market signal. Effectively when investors look at the Paris Agreement and the outcomes of it there are two things that strike you. One is the numbers are pretty significant that have that strong international consensus around them, but the second is that it's a continuous process, so it's putting in place a direction of travel that we'll continue to move towards as a global economy, but also in terms of the national policies that need to be put in place to underpin that direction of travel. So that basically says no matter where you invest, no matter which market you're going into, no matter which sector of the economy you are active in, you will be facing carbon constraints and carbon is an investment signal.

The other part that I think is particularly significant to this is that we're now in a world that's about implementation of the Paris Agreement and we will be for the next few years, so we've definitely seen this shift from the big policy statements around climate change towards more of a focus on how are we going to transition into a zero emissions economy now that we're in 2016 and not a low carbon economy. As investors, we are increasingly looking to the companies that we invest in to move beyond just making qualitative statements around climate change, so climate change is real, we accept the science, and into a world where we're looking for a quantified analysis of the implications for your bottom line now and over the timeline of this process. So that's moving into both annualised impacts on returns, but also giving us some scenario analysis around what the implications of these carbon constraints will be for your business, particularly if you're an emissions-intensive business. This week one of the other major reports that came out, not just the one that came out today, in the energy sector was AGL's carbon scenario analysis where they actually set out to the market what the implications are of different decarbonisation pathways for their business. It's not particularly aggressive, but is interesting in terms of how they've articulated the financial implications for their bottom line.

As I said, it's all about the implementation. This is not the Australian version, this is the global version of what transitional pathways actually look like and I think it's no surprise to say the red line is the one we're on and the bottom three are the ones we need to get to. So what really concerns investors is the steepness of that turn and, again, that point that the longer we delay, the sharper it becomes but either way that's a pretty steep turn if you're talking about sunk investment or if you're talking about where you put your money over the longer term. My constituency institutional investors are long term investors, but even if you're a bank and you've got a two or three year tenure you'd be looking at that trajectory and going, "That's a pretty steep turn". This also goes to the issue that all of us have at the

moment in terms of being super holders, but also as investors and policymakers it's how do we make that turn smoother and how do we actually get that turn happening at the pace that we need to avoid costs on the other side, but in a way that's realistic? So where are the big decisions that need to be made now around implementation? So this, again, not about the science, it's not about the bipolar politics of carbon, it's about how do we actually do this from a nuts and bolts economic perspective.

This is how investors tend to think about this in how they're integrating it into their investment decisions; they bucket into transition risk and physical risk. Transition risk is increasingly the language being used to understand where you are on the spectrum of the steepness of that turn, so it's very much around understanding what are the policy and regulatory signals that you need to be aware of, but also, just as important, what are the broader market signals and what are the technological shifts that are coming through to support those or follow those signals which will be just as disruptive to your investments? The energy sector is a classic in this regard, it's hard to pinpoint where the policy impact ends and the technology shift begins in terms of understanding what decarbonisation means as a potential impact for your returns and where you should put your money. The other quadrant there is the physical risk component and this is a correlated cost, so the less we invest in transition the more we wear in cost on the other side, and understanding the physical risk implications in your investment decision making is just as dependent upon understanding where we are on the transitional spectrum. I would say it's a bit undercooked on the adaptation side because there's a lot of work to do, but increasingly that correlation is being made. If you're investing in a shopping mall, for example, you're just as much looking at energy demand and forecast prices as you're looking at physical extreme weather events and increased revenue, because people go shopping when it's hot, for example. Those are live, that's being done right now today.

Where we are in Australia, this is my somewhat simplistic diagrammatic representation of an incredibly complicated conversation, but basically what I'm saying is we've got the consensus around the international policy commitments and the decarbonisation targets and the process that comes in behind it which will continue to ratchet up those targets, the 2018 review that John mentioned, the continuing need for the decreasing levels of carbon out to net zero emissions. On the other side we have Australia's current policy commitments which everybody acknowledges won't deliver our existing targets, the 26% to 28% reduction goals that we already have in place. So we have an immediate gap, we have a medium term gap and we have a long term gap in terms of understanding what is the decarbonisation pathway for Australia, how steep is that turn and what will the cost implications of it be? How do we also realise the competitive advantages of that turn? Australia does actually have a number of competitive advantages in this area that we could, if we chose to, engage the rest of the global economy on as the whole world moves in the same direction. Competitive considerations are key for Australia. We are a carbon-intensive economy. This is not an issue that we can avoid. This is not something that we can hide from. Our export markets, our key trading partners, our home-grown businesses are all in that global market that are all facing the carbon price and investment signal.

In terms of the 2016 election, there are a couple of really positive points that I would make despite the fact it wasn't a headline-grabber every day in the news. One of them would be it wasn't a headline-grabber every day in the news in terms of the climate change policy discussion. I think there was actually, and it's possibly not accidental, a bit of recognition around the fact that this is now going to be a really hard conversation about very technical policy decisions, probably best not done through the lens of an eight week election campaign, probably better done in the context of post-election conversations within impacted industry sectors. One week after the election results were finally declared we're straight into it and now we're straight into it with COAG again. There are lots of moving

parts in this discussion and there will be a number of fixed point reviews that will roll out over the next 12 to 18 months and you will see that conversation around carbon policy re-enter more of the mainstream public debate. But it won't be all "capital C" Climate Change. It'll be "small C" carbon and energy, it'll be "small C" carbon and land-clearing implications, it'll be infrastructure decisions, it'll be adaptation strategy, it'll be energy productivity, it'll be vehicle emission standards; it'll be a whole range of different policy mechanisms that will all form part of the climate change policy discussion but perhaps, and this is also I think a positive thing, not necessarily a whopping great big self-contained do or die climate change debate. I think that's where we need to be in the post-Paris world.

Finally, I just would say what are investors actually doing about this? They're getting a lot more granular about what they want to see from the companies that they invest in. So this is part of a series, but I've not accidentally chosen the energy utilities' report to talk about in terms of the framework being applied by investors. So this comes from a report that we did with the North American, European and Asian investor groups and supported by a number of other international investor groups basically setting out what are investor expectations of companies in the utilities sector around managing carbon. There are a couple of things you can see here. One, we want to know that your board knows what they're talking about and that you have dedicated management structures in place to actually manage carbon implications for your business. Two, we want to know that you've got a plan and that you have something to do about understanding what the key risks are for your business and, again, that's introducing that forecast scenario component.

One of the other major initiatives that is happening this year is the global Taskforce on Climate-related Financial Disclosure (TCFD) which is being done under the G20 Financial Stability Board. Effectively what this is looking at is how do you get better at having financial reporting on climate-related impacts for your business and that will likely recommend, although the report comes out at the end of this year/beginning of next year, the inclusion of forward-looking statements around carbon impacts aligned to decarbonisation scenarios, which is quite a shift on a number of levels. So I expect to see a bit of argy-bargy about it because everyone hates forward-looking statements, but the only way we can have a clear pathway of the financial implications of decarbonisation is using a scenario-based approach. Again, you're beginning to see it, BHP before, AGL this week, businesses are getting more comfortable with setting out what their view of the world is in that regard.

Consumer-facing strategy, opportunity as well as risk, you're not just going to go out of business quietly, go into the night, we want to see you diversifying your business and actually increasing the deployment of low carbon product opportunities. Increasing operational efficiency, that's a trend anyway, also increasing resource efficiency, that's the physical risk component. If you're an energy company you're a massive water consumer, so what's your adaptation risk management strategy or, alternately, all of your major assets are on the coast, what's your physical risk strategy for increasing sea level rise or inundation? What's your position in public policy? How productive are you actually being? Are you telling us the same thing you're tell the market, the same thing you're telling the regulators, the same thing you're telling the politicians? And we're actively looking for that and are engaged on that. The last part being that disclosure, we want to see much better integration of carbon disclosure into financial filings. Sustainability reporting is great, I should know, I did it for eight years, for my sins. They are fantastic things, but what we want to see is the same rigour applied to financial reporting around carbon risk disclosure and carbon opportunity disclosure as we see on every other facet of performance.

I'll stop there and hand over to Tony, I'll just end with my really lame joke coming from the finance sector, but definitely what we're beginning to see is the carbon risk, the policy settings are incredibly important, but it's not the whole game. What we're actually talking about is wider economic transformation. Policy settings are incredibly important, so is technology, so is market structural change. Investors do look global and if they don't see sufficient policy support within Australia for clarity around how those sorts of settings work and how they actually support long term investor confidence, then they can just as easily look for decarbonisation investment opportunities offshore, and they have been. So the key challenge for Australia is how do we manage this in a way that actually supports greater investor confidence, that we have a plan and we know what we're doing? Thanks.

JH: Thanks Emma. Of course, we're now going to have Tony Wood, who most of you would know probably as the Energy Program Director and an extremely active one, as I know to my cost sometimes, at the Grattan Institute, so welcome to him.

TW: Thanks Jennifer. In my ten minutes I'm going to speak a little bit about policy, and that's a dangerous thing to do because the way the election result turned out it's not going to be about policy, it's going to be politics. And if you think it's going to be about policy then I think you might want to go to sleep for a couple of years and wake up again and see what happens next, because the politics will determine, I think, how this is all going to unfold. In the world that Grattan occupies, we often try and look at these things on the basis of the numbers and I think the numbers matter but, as I said, the implication of the politics side of things is that the language will matter even more and what things get called and how they're positioned will become really important. You only had to see what happened when Prime Minister Gillard lost the discussion around what's a carbon tax, so you can think about how that's going to unfold. I suspect, given that Josh Frydenberg and Greg Hunt both come from Victoria, if they've ever played football it'll be AFL so they may not have come across the term "a hospital pass", but I think Greg just manufactured one very nicely.

These are some numbers and one of the interesting things about the world we're in today is some people have described this as the post-factual policy world. We don't need facts anymore, we just need opinions, and you only have to look at what happened in South Australia in the last couple of weeks and look at everybody's opinion of what happened and how they seek to blame somebody else to realise how opinions can drive a whole lot of stuff. I've got two slides and both of them are somewhat busy, so I just want to unpack it. This first slide is about what is the challenge that Australia has for that 26% target that both John and Emma referred to. This chart is basically looking at Australia's emissions in millions of tons per year of carbon dioxide equivalent over time. These are the actuals. I don't think there's going to be too much debate about that part of the equation, although some people might still want to challenge conversions and so forth. Back in March the Department of Environment federally released this as being the projections that were considered to be where we were going for 2030. That was March 2015 and in the middle of last year of course the government announced that we were on track to achieve our 2020 target and that we would now set a 2030 target, which is this number here and it's actually quite a straight line, as you can see.

During last year what happened and why Minister Hunt got really excited to be able to say that we were doing a whole lot better is because when the Department released its figures in December, lo and behold, this is what the Department published as being the projections to 2020. That suggests, obviously, the task is getting easier for a whole lot of reasons, basically in many cases because our industrial activity has gone down, our exchange rates for a while had been quite high, manufacturing

wasn't doing so well, people weren't using as much electricity and so on. I don't think the Coalition government would be all that excited about the best way to do this is to shut down the economy, but that was some of the things that were actually occurring. You then see what happens here, and by the way, most people in this room I expect realise that when we say we're on track to meet a target which is 5% below 2000 levels by 2020 we'll actually be about 5% above 2000 levels by 2020. The only people who can really understand that are accountants, I don't know if there are any accountants in the room. If you want to understand the world of international carbon accounting then good luck, but that's way fundamentally it works and I'm not suggesting it's evil or anything else. Basically the accounting rules are the accounting rules and, because of the way Australia's history has been, we can actually say that we are on track to achieve the agreed target, which was actually more about the total emissions between 2015 and 2020 than actually about specifically in 2020.

The reason it's important is because it creates a different position about what you think the momentum is towards 2030, because that's when we now have this much more clear firm target. So what's interesting is that the Climate Change Authority reckoned this was where we should be heading and this is, broadly speaking, the policy direction that the Labor Party suggested we should also be heading towards. But remember, as John pointed out, the Coalition Government not only committed to the 26% and 28% target, it also committed to the review process and I would suggest that, because the world's governments know that the 2015 targets don't add up to the two degrees let alone 1.5, that means that those targets will be reviewed and they'll have to be reviewed in only one direction and that'll be down, so that creates this sort of tension. The reason I want to concentrate on this for a second is because it connects to the second slide I want to show you. This was where it was projected that we would be as of December last year. The Department has not released an update on the projection to 2030.

One could assume that it certainly isn't going to be up here, but it probably isn't going to be down here either, it's going to be somewhere in-between and who knows where it might be? But the minister, based upon a set of numbers, put together a chart which I'll show you in a minute which basically said that the task to achieve the 2030 target is to reduce our emissions between 2020 and 2030 by 900 million tons, and that's that wedge there. So if you want to achieve this target and you've got 900 million tons, you have to believe that the trajectory was going to do this, that that line, which was going up this way, for some reason is going to come down without doing anything and I would suggest that's at least something that somebody might want to think about when you hear the way in which this was going to be described in terms of the policy. Put that in your back pocket and when you see Minister Frydenberg start to talk about the policies, just think about is he talking about the target for 2030 or is he talking about the reductions, because they become important if you are worried about where they might have been, because I think that looks to me to be a challenging assumption.

The second chart was used by Minister Hunt in a National Press Club speech in December to unpick how are we going to achieve the 900 million tons? I wouldn't quite agree with Emma's comment before when everyone agrees that the current policies won't get us there. There are many people who would say the current policies are getting us there and will get us there. Whether you agree with them or not and whether you agree with the assumptions that go behind that is what becomes actually I think very important, because you have to put together a pretty ambitious set of assumptions to get there. Not totally implausible, but challenging I would suggest and this is what they are. What you've got here is 900 million tons and these are the things that the government said they're going to do to achieve this target. One of them is the Emissions Reduction Fund, which has already purchased

about 150 million tons of CO₂-equivalent for about \$12 or \$13 a ton, not a bad deal. The problem is that the total amount of money that was allocated, about \$2.5 million, is now \$1.8 million gone, not much left and no more money left in the kitty and no-one's actually said there'll be any more money between now and 2030 although, to be fair, Prime Minister Abbott and Minister Hunt did say that they were going to allocate \$200 million a year. Where that's going to come from and whether the Treasurer and Finance Minister agree with that remains to be seen, but it's certainly not in the forward estimates at the moment. It may not have to be because the forward estimates only go about three years, but we'll see. So that's the first thing is that there needs to be some more money.

We then have this thing called the safeguard mechanism which started on July 1st, some have somewhat cruelly said it's not safe and it's not a guard, but what it basically is saying is that we will give the top 140 emitters in the country a baseline which they're not allowed to go above. If they do, we'll fine them, we will hit them, we will, criticise them, we will penalise them; we will not allow them to buy international credits and we won't allow them to trade because there won't be anything to trade because we don't believe in trading. So one might ask, what will they have to do? Well, for example, they will be able to buy credits that have been created by those who have contracts under the Emissions Reduction Fund, which gets a bit complicated but basically there are things that could be done. The real problem is that the safeguard mechanism, those baselines above which these 140 emitters are not supposed to go above, is set at the maximum of the last five years and therefore is not going to do much unless the minister reduces the baselines, and the minister can do that without further legislation. So that's one of the things you could look for. The minister doesn't have to get new legislation to do this; he could just basically tighten the baseline. Then you've got a number of other things, the National Energy Productivity Plan, that is to increase our energy efficiency, that will basically do the same thing for less, two versions of that, one is energy and one is vehicles.

We'll also do something on ozone and we've got this thing called technology improvements and other sources of abatement. These are ones where you start to think about arm-waving in terms of a clear policy. This looks like basically "look over there, don't look here" because this looks to be challenging to me. This is what adds up to the 900 million tons and the 900 million tons, as I said before, is challenging. So this is the challenge that Minister Frydenberg now has. The government has committed to a 2017 review of the policies and the challenge will be for the government to bring together a set of policies and recommendations that will do and be compelling, for some people at least, and will address the gap that Emma was talking about. That is a set of policies that actually has more than just arm-waving behind it, it actually has some clear credibility that not only are we on track to achieve 900 million tons, we're actually on track to achieve the 26% target because, by way of comparison, if this line was to continue up anything like the slope of the green line then the size of that wedge isn't 900 million tons, it's 1.5 million tons. That's a slightly different problem and it certainly would suggest that not many people would think that this set of policies is going to get us there unless they're substantially strengthened.

So whilst I think it is true, and the Minister will say that, that our current policies are on track to deliver our 2020 target, it is still very difficult to see without significant engineering, design and strengthening the current policies will get us to 2030. Can it be done? I think it can, but that will be a political fight because, on the one hand, whilst I think the politics of the election suggest that Minister Frydenberg could actually get the support of Labor if they do this sensibly or well and the Greens, he's probably going to have more challenge within his own Coalition to start to move towards the policies that would actually start to get us towards the 2020, 2030 target. For those of us who are somewhat policy

wonks, it will be a very interesting challenge to see how this unfolds. Thank you and we look forward to questions.

JH: Thanks very much. One of the things that you said Tony was kind of post-factual I think and you used the opinions cited after South Australia. So what I want you to do is it obviously got people's attention not only in South Australia, but around Australia. What are the facts do you think that made the difference in South Australia and what do you think happens as a result, anything?

TW: What happened was that for a short number of weeks electricity prices in South Australia were very high. They were very high on an hourly basis, they were very high on a weekly basis, and over that period of time they were quite nasty, and major industrial customers in South Australia were seriously worried about the forward price and what that was going to do to them and they started screaming at the government to fix it. What happened was that a combination of circumstances arose that was quite nasty, some were obvious and some were more subtle. As a result of the renewable energy target (RET), which was the only policy we had left after the Abbott Government got rid of the carbon tax, people built more renewable energy, that was the deal, and they built it where the best resources were and one of them was in South Australia. This was absolutely what the policy was designed to do. So we built a lot of wind farms in South Australia. We also had in South Australia, as with many other states, very generous feed-in tariffs for solar so lots of people put solar on their roof. People love renewables, they love solar, and if the government's going to pay for it, more importantly, if their neighbours are going to pay for it, lots of people put solar on their roof. Consequently we've now got a lot of wind and solar in South Australia. That's fine on one side. The other side of course is both of them are intermittent and so you need to think about what the energy mix is going to be without that.

So in the last couple of months we started to see a couple of things happening. The intermittency issue was sort of around, but what was also more important was that the existence of all that wind and solar pushed down the wholesale price, which put real financial pressure on the other generators in South Australia and they closed down, so the coal generators shut down, at least one of the gas generators had been mothballed and another was about to be mothballed. Now that wouldn't necessarily have been a problem, except on one particular occasion when the wind was almost blowing too much and the wind farms had to be turned down; the interconnector between South Australia and Victoria, the transmission line that gets extra electricity into South Australia when it needs it from Victoria, was basically being upgraded, so it was partly down for maintenance and wasn't available; and when they started to really run on more gas, because that was the only thing left, the gas price was very high. So that combination of things ended up with a nasty circumstance in which prices were very high, people were very upset, and there was at least an inkling that if this had been worse the lights might have gone out in South Australia.

So what then became the story was it's the fault of the renewables because we shouldn't have had so much, they're intermittent, we can't depend upon them; it was the fault of the gas because the gas price was too high, it's the fault of those horrible gas companies; it's the fault of the generators who are gaming the system and they're the ones who have been pushing up the price; it's the fault of the National Electricity Market (NEM) or it's the fault of the interconnector. "Someone's to blame, but don't blame me", whoever you ask. So that's what happened and I think unfortunately everyone found some facts in there, because there are a lot of facts in there. Most of what I said actually happened, but if you believe one of those parties is guilty then you can find a fact to support that guilt. The problem is that they're all partly guilty and the message should be don't waste a good crisis. We need

to seriously think about how we're going to achieve the transition that both John and Emma have been talking about, because this won't be easy, anyone who said it's going to be cheap is lying and anyone who said it's going to create more jobs is just moving numbers around for the sake of it. This is a significant challenge and we need to get serious about how we're going to do it.

JH: Emma, you talked quite a lot about that idea of implementation and there are two things, there's the 2030 target obviously on reduction, but there's also the RET and how you see that as going. At the moment there just doesn't seem to be the level of investment that we should be seeing or that the targets demand we see?

EH: There are a couple of things in there. The other part that I would mention, the other fact that was missing was the role of industrial entities and hedging or lack of hedging, which was a factor in the price spikes as well, and the point that I would make there is that it is fundamentally a market and prices drive behaviour, but how that interacts with the consumer need and other aspects of the debate are also something that we're probably not very good at managing in the conversation about crises that we've been having.

In terms of renewables, we had the RET and the RET was fine, it was driving investment, it was doing what it was supposed to, then we had the threat of no RET for 12 months and then we had a RET that's back, but it's back 18 months later and substantially reduced. A lot of the investment projects that were required to meet the RET have very long lead-in times and you actually need those strong stable frameworks to be in place for a period of time to allow for the investment case to be built, for the actual assets to be built, and for the rest of the market to respond in terms of the price signals that flow from the increased penetration of renewables into the market as a whole, so these things take time. The problem that we have is that political cycles are short, investment cycles are long, and what we've had for the last few years is a fundamental mismatch. When you have a fundamental mismatch, investment goes elsewhere because they go to jurisdictions where they can actually find opportunities where there are stable policy settings, where there are clear investment signals, where there is a better understanding of what the returns will be over the period of the investment that you have in place, and where you know that you won't have a crisis every 18 months in terms of the policy settings would be the main thing.

But having said all that, there has been a lot of talk about investors not supporting renewables. Investors have been supporting renewables; they just haven't been in Australia. They've been supporting renewable projects in other jurisdictions, a lot in China for that matter, but also in Vietnam and other parts of South East Asia where there is clear demand and clear opportunity. The challenge for Australia is how do we bring that money back and how do we actually get the renewable projects built onshore, because at the moment we're at risk, with the nature of our economy, of onshoring all the carbon risk and offshoring all the carbon opportunity.

JH: Right, well that sounds encouraging! You say there's a mismatch, do you still think there's a mismatch and what do you think the chances are of actually changing that in the short term?

EH: I think the fact that there was the stability around the setting of the RET was key, that it is in place and you are beginning to see investment coming back in this year, you have seen a number of announcements of projects getting up and that will continue. Of course, everybody's now looking forward to the end of the official RET period which is 2020 and, even though it's in place from 2020 to 2030, it's now misaligned with the carbon targets as well. So you actually need to have that integrated

carbon and energy conversation going. So in that sense it was actually quite welcome that we now have a single minister for both that's not in the Resources Department, that's actually looking at domestic energy generation and looking at market implications as a whole, because I think, as Tony set out very succinctly, you can't look at renewables without looking at gas, without looking at coal-fired generation, without looking at the grid, and also without looking at the impact of new and emerging technologies in the storage area, for example, and then looking forward to the impact of things like electric vehicles as well. So we need to be walking and chewing gum at the same time in this particular area.

JH: The energy regulator had a new report out today John and I don't think it used shocking words like "blackouts" or "brownouts" or anything, but it did say that, as seems likely, if we wound down coal generators then we were at risk under the current scenario of getting significant electricity shortfalls. How do you deal with that in terms of the politics of that that you were talking about?

JC: It was a graphic highlight of both politics but also of substance when you get into that, because we did have screaming headlines of blackouts when it was really talking about an increased risk of I think it was 11 minutes of downtime over the course of a year.

The reality is we've all just woken up to the fact that we've got rather a brittle electricity market and it's because we've had a decade now of divergence between climate and energy policy and just general policy wars overall, and that we do need to realise we need to have a comprehensive plan that deals with all the matters that Emma and Tony were talking about. South Australia is not a template about how to deal with it, it's a signal about how we need to get on with it, and I think to some degree the government's actually beginning there to work out we've now got to sit down and work out how do we make this transition to what is zero emissions? They're looking at that and they teamed up with AGL just the other day and were talking about virtual batteries teaming up with 1,000 households with solar panels and how they can help manage that intermittency. That's going to be a fact of life, a whole bunch of technologies and software that's emerging now that can deal with that, and that's what we need to deal with.

So the core message out of I think even the AEMO report today, but also about what's been happening in South Australia, what happened in Tasmania of course when the dams were drying up and they went to diesel generators, is we've got to have a plan here and we've got to get some strategies together on that. I think that's where we do have an opportunity now. I mean, 2017, if it's handled properly, could be the first serious national policy conversation for five years. We do tend to go in cycles on these matters, how we handle that with the politics we have is where we've all got opportunities to be creative, but also opportunities to show leadership I think because this actually is, as I said in my presentation, quite a common ground amongst investors, business and others who are sick and tired of this and actually starting to realise this has economic impacts and it has social impacts as well as the environmental impacts. We've got to get on with it.

JH: One of the things that you mentioned that I was a bit surprised about when you talked about arm-waving, there's always plenty of arm-waving but you used it in the context I think of technology improvement. Surely that's where in fact the great hope lies isn't it, whether it's storage or?

TW: If this transition depends upon the great hope then I'd be more concerned. I mean, hope is one thing, but having some plans and some real strategies would be better to get there I think. So I think vaguely talking about there's going to be a technology to save us is optimistic to say the least and,

given the consequences of what we're talking about, you would think we have more than hope. So I think that's why, for me, I get concerned when people are framing it that way. I don't have a problem, by the way, with saying, "Look, if we get our policy settings more or less right so we create the circumstances for people to invest in the sort of technologies we're going to need, then it will happen". It's not really about a shortage of technologies, but the technologies we have today need to be significantly improved to get there. So whether it turns out to be batteries, whether it turns out to be hydrogen stored as metal hydrides, whether it turns out to be fundamentally different forms of solar, whether it turns out to be pumped hydro; I don't care very much because I can come up with all sorts of plausible technologies that would do the job.

The real challenge is to make sure that the people who could invest in those technologies have a real incentive to do so, because if it wasn't for climate change we wouldn't be having this conversation and the difficulty with that is it's very difficult to see how investors will do anything else except respond to policy, because it's only governments that can do that horrible economic jargon term, and that is internalise the externality of climate change. It's very difficult to see how investors, in the absence of that, will just keep doing what they're doing until maybe it gets too late. So my concern is where does the policy and the investment actually occur, and that's an area that Emma focuses on all the time I guess?

EH: Yes, I can comment on that actually because where you see the answer to that question is now always where you're looking for the answer and if you're looking at, for example, the impact of household solar and battery storage on the NEM then the example that immediately sprung to my mind in terms of where investors are going is the property sector, not the energy sector at all. What they're actually doing is now going into the ground, precinct level greenfields developments that have inbuilt household solar and battery storage pilot testing as well in partnership with different types of providers. So you've got a property company, an infrastructure company, a solar panel installer and a battery storage company partnering in a property development. And it's a property investment; it's not an energy investment. So policy signals might be challenging for baseload, but it's all guns blazing when it comes to property investment and integrated renewables. So if the policy signal is weak they find a way to do it somewhere else, but then of course it loops back round again when you've got decreasing demand and you've got the impact of intermittency and you've got the impact of battery storage and what that does to depress peak prices on the other side for the energy investors.

So it is a complicated conversation that's going on, but the drive is definitely in all asset classes to find those low carbon investment opportunities, the reason being, on the other side just to finish my point, is that investors are aware that they're carrying high carbon risk which is vulnerable to policy shifts. So they want to diversify that risk by investing in new low carbon emerging opportunities because, even if you're still making money off the old assets, you want to start building the relationships with the new ones if you're sensing which way the wind is blowing with that big arrow that both John and I used in our PowerPoint presentations.

JH: I'm about to go to the audience for questions so prepare your questions, but John just wanted to make a few comments beforehand.

JC: There are a couple of things to say to that. Our analysis of the market and the transition we need is that we are being blocked by the big old clunking coal-fired power stations which are running at pretty low cost, most of which have been amortised or are running very cheaply, so that's a big blockage in the reform process. Part of the problem with the RET of course is that with flat demand

we've been trying to drive - when the RET was designed it was going to be taking up the increasing load and not trouble all those fellows, so that's now a problem that needs to be dealt with. We actually need to have a program for replacing those. I take probably a little bit of issue with Tony in the sense that it's not only just because of climate change now that this situation is arising. We have got, partly driven by the drive of trying to respond to climate change, but they are in greenfields cost competitive and so it's going to continue to be chipped away at. So you have this instability and this brittleness that's in the electricity sector which, for all of those reasons, we're going to need to tackle.

AUDIENCE: Looking at, as you said, the opportunity that we've got with the crises that happened in Tasmania and South Australia certainly we need a plan to revise the networks, but how do we address the problem that so many people who will be sitting at the table when those plans are constructed only ever worked in a hub and spoke grid? So the automatic response is, "Oh, it has to be fossil-fuel fired power stations" or, "It has to be nuclear power plants" and we can't evolve rapidly to a distributed grid, like the thing the CSIRO look at.

TW: I think you've put your finger on an interesting point. The central challenge here is that we've a system that was largely designed 100 years ago and it was fundamentally designed around centralised let's call it dispatchable, or baseload is another term people could use, but it's dispatchable power. We're now looking to impose upon that system decentralised intermittent power and, in addition to that, in a market that dispatches power on the basis of marginal cost when a lot of the energy we're putting into the system has zero or even negative marginal cost. To think that's all going to work perfectly is simply ridiculous, and yet many of the people who designed this system and are now running it - you don't easily shoot your children that you brought up, so the people have got to destroy the system that they designed and love so much before we can introduce the new one. Disruptive change is very difficult, particularly if you're inside.

So I think the challenge here is that we need to start from where we are, but as we reinvent this to suggest that the current physical and financial market will simply and smoothly work is very challenging. An article, which I haven't read the detail but I've read part of, put by AGL suggested that all that has to happen is that electricity prices would spike not just to \$10,000 a megawatt hour but to \$60,000 a megawatt hour and that would provide the price signal for investment. Well, no-one's going to build a power station that might run for four hours every three years and get \$60,000 a megawatt hour and no politician will ever let prices do that anyway even if, as Emma said, price volatility is what markets need. So I think we've got a long way to go before that mindset changes and we can actually start to think about what's the nature of this system, because we have to start from where we are, despite the Irish joke.

JC: I think that's just part of the challenge and the reality that faces us and it's absolutely right, we're dealing with a transition, but it's underway. I think it's unstoppable. I think we pretend that it's anything else and it has a whole lot of exciting co-benefits in health and a whole range of other ways, but let's get on with it.

EH: I'll just make the observation that I was looking at a program for a conference which is coming up talking about transformation in the energy sector and what was interesting was looking at the list of speakers. So you had TransGrid and you had Google speaking one after the other in terms of implications for energy sector transformation, as well as having solar companies, as well as having a couple of the technology providers, and Tesla were there as well. So I actually thought in a snapshot that was the challenge that the energy market faces where you've got incumbents, you've got

completely new technology providers and service providers coming in to look at how you can actually moderate some of these challenges, but you've also got very real implications for the community that can't be wished away. We have to actually manage what is going to be a pretty messy and a pretty difficult conversation, but there are new providers coming in that are developing new services to make money off it - I was going to say assist in it, but make money off it would be more accurate. So it's a real live conversation, it's not something down the road; it's something that's here right now.

AUDIENCE: Looking at the more micro level, what would you suggest that an individual community member could do to make a difference towards the transition that we need?

JC: A good question. I think we've got to all play a leadership role in challenging the post-proof politics that we are there, so we've actually got to stand up and confront people when they engage with that. I think there's certainly a way in which we look at our lives and take pledges about trying to be carbon neutral and offsetting. I like to tell people about being active with their super funds, it's something we've had fun together with in the IGCC. We do a significant amount of work in that area because that's where the big capital is, that's where the money is going to make the difference. You have a direct relationship with your super fund as a trustee, a fiduciary duty, so engage with them and ask them what they're doing. We've got this whole thing called the Asset Owners Disclosure Project we helped set up which helps some of that conversation and accountability on Emma's members. Get in there and keep her honest as well.

AUDIENCE: Following on from the comments about super funds, do you see a bigger role in terms of activist investing where it's more, "Look, we own 10% of your company and if you don't do what we say, we'll install two board members who will do what we say"? Especially since I heard you have \$1 trillion under management, do you see that being a potential movement regardless of the policy direction from the government?

EH: I think most investors would love to have two positions on the board of every company they invest in, but the companies themselves might have a bit of an issue with that! There are degrees of level of engagement here from the investor community, so across the board from all of the mainstream funds, the biggest funds in Australia, you are seeing much more proactive engagement processes around what is your carbon response, how are you impacted, what are your risks? Then you have the spectrum of levels of engagement and activist activity. I think in the last 18 months, or six months in particular, we've seen a significant increase in the number of votes going towards shareholder resolutions asking for disclosure around two degree scenarios and two degree stress testing, and some of the vote levels that have been recorded not just in Europe, which is where you'd expect to see it, but in the US have been really significant as well.

You've also seen a lot more activism at AGMs in terms of some of the big impacted companies where people are getting up and saying, "What are you doing with my money in terms of how are you responding to climate change?" Then more broadly I think what you're actually seeing is the development of a whole suite at different levels and different types of investments of environmentally conscious products and services, and these range from deep green ethical investment funds options for socially conscious investors, but also to just straight low carbon asset passive investing risk management products, to overlays in terms of reducing the most carbon-intensive to full divestment products and services. There's actually a huge amount of variety out there in terms of how different types of investors and fund managers and product developers are actually responding to this and I think it reflects the two main streams of thought. One is for those investors who want to be specifically

supporting the transition or, as it's often called, two degree-aligned products and services. They want to be only having their money in those sorts of investments or super products that are actively supporting decarbonisation. Then the other side is just straight carbon risk management: are you out ensuring that you are not investing in highly exposed and vulnerable assets to policy changes, to physical risk or to market and technological shifts?

Those two streams are kind of coalescing, deep green versus straight carbon risk management, and a lot of the products and services and investment approaches are coalescing around that. Then over the top of that you have a lot more shareholder interest and engagement around, "Just tell us what you're doing so that we can make our own decision on where to put our money and where to manage it".

AUDIENCE: You've all spoken about Paris, which is obviously the main international agreement focusing in this issue, but it also links with two other international processes, the financing for development and particularly the sustainable development goals. So I'm interested in Australia, both for government and for business, how you're seeing those other processes link in with this.

JC: I spoke to this the other day at a sustainable development goals event put on by Unilever who have been very active in this regard, so there are a range of other companies who realise it's getting to this nest of accountabilities and, quite frankly, self-interest. As Paul Keating said, this stuff actually matters for their broader long term sustainability and economic viability, and so I think they are important markers and indicators that companies and others will see themselves being tested by and are actually representing themselves. One number to add to what Emma said before, our survey said there was a 63% increase in engagement from investors just from the last year by the top 500 funds. So this is, again, a big trend. I'm delighted to hear more from companies that investors are hassling them even more than the grassroots activists at their front gate.

TW: One point, where the investment issue and the policy issue join is now, I think, becoming really important because if you look at big companies, many of them, BHP Billiton, Shell and so forth, and AGL in their sustainability report, are being asked and they're now doing, "If the world governments do what they said they were going to do in Paris, then what does it mean to your balance sheet, the assets you're currently reporting on your balance sheet?" When you do the numbers they're challenging for many companies because, for example, if the world does do what it said it was going to do, let alone the 1.5 degrees, then there is no future for coal. Beyond 2020 coal starts to decline in demand, so if you've got a coal company how do you measure that? The same thing applies for gas by about 2030, 2040. So the carbon prices that are implicit in that are not insignificant and when companies say, "Well we've used a \$30 a ton carbon", what if you use a \$70 a ton carbon price or \$100 a ton carbon price, how sensitive is your company, your balance sheet to that future because that's what the world governments have said they're going to do? I personally think that's where we may see a lot more companies taking this very seriously.

AUDIENCE: I was interested in your binary thing of policy versus politics and I think your issue is framing actually, and there are two really compelling examples about framing at the moment, one is Brexit and one's Donald Trump. Experts in the intelligentsia struggle to understand how he's got credibility, and it's about framing. So I feel like continuing to frame it as transition, you might as well shackle your feet to the floor, to use a metaphor, and I think it's about transformation. I also question the long term interests of investors, because if they were interested in the long term they would have made the change ages ago. So what are you doing to understand cognitive linguistics and framing?

People like George Lakoff, who's done the best analysis of framing I've seen around Trump and really nails it, and I would suggest you'd be more effective.

EH: I think the comment on framing is an excellent one and I think Tony also made the observation about the carbon tax versus the carbon pricing mechanism and how that influenced the debate to come and how influential that is in politics. Transition risk is the language that investors use, a constituency not traditionally renowned for its eloquence, but it's the language that they're using from a pragmatic and a practical perspective. But you're right, it's not particularly compelling from a "let's all get on board and transition" kind of angle. I can only talk from the perspective of what they're doing and what they're putting in their policies. The other observation I would make that I often find it's interesting when we're talking about the energy sector that we use the language of disruption, which is basically a complete framing by incumbents as in "my business model is disrupted by these new entrants", whereas if you talk to some of the new service and technology providers they use the language of "modernisation" of the electricity sector or "transformation" of the electricity sector, and that's a really key component as well. So you're bang on with the framing, but that's politics it's not policy, and I guess when I'm talking about transition risk I'm talking about investment policy.

AUDIENCE: I understand the world is already on track to 1.5 degrees of warming and I can't see that curve changing anytime soon. At what stage will the realisation be that we can't meet the two or 1.5 degrees and it's more likely to be three or four? Are countries likely to give up and say it's all too hard or do you think it'll just accelerate the efforts in the right direction?

JC: As you say, we've had about one degree of warming now above and this is all about measures prior to the Industrial Revolution. We've actually put about 2 trillion tons of carbon dioxide into the atmosphere since the Industrial Revolution and about 40% of that has been soaked up by oceans, trees and other things, and it stays long term in the atmosphere. That's sometimes a number that helps you think about what's going on there. Carbon dioxide in particular is a long-lived one, so that's why things like carbon budgets are actually really important tools to build in there. We've seen some estimates - because we've just had the hottest year and after the hottest year some Senator-elects are after empirical evidence, there's a fair bit of it about - that we will be very close to the 1.5 degrees and we've locked in a fair bit of that. I see it's very hard to keep it to 1.5 degrees, but there is a chance and it's technologically able to be done, and we've been doing some carbon budget analysis to get it back down to 1.5 degrees by the end of the century.

So it's certainly not worth giving up on that at all. This is where partly that jagged graph I showed around the electricity sector and the story I told about Paris and climate chance. I think people are very wrong to view the politics - we talked about politics before - of this issue from the red meat campaigning days of 2009 to 2011. There are human direct stories, you talked about framing and the stories are going to come more and more about these strong impacts. We've just seen the hottest days on record in the Middle East and that's a place which has got very significant consequences and, of course, the pollution problems in China, not just climate ones. These stories are going to continue to build and build for greater disruption and Mark Carney, the Central Banker from England, talks about the looming need to jump to distress to actually have really significant policy shifts.

AUDIENCE: I'd just like to pose a question to the panel, if I had to paint a picture I would say our current process on climate change and energy policy is in total chaos; that would be my overview. As you said, you have states that are totally different to the federal position and I agree with John and what he was saying and about we don't have a plan, we don't have a policy. I would be interested to

see what you would say about how do we get our government to actually focus on a strategy to deliver an outcome out of this whole debate?

TW: Well, the worst outcome would be the lights go out, because that would cause governments to do things that just about everybody would regret and I suspect they would eventually as well. So my point really was don't waste a good crisis. Whether you look at the various things, but at least in the South Australian example there was "this may not turn out well" and I think the situation now is that for the first time ministers have seen that. I think the situation is that Frydenberg is both ambitious and smart, that's good because I think definitely he needs to make a success of this portfolio. He's got a cat-herding exercise because most of the ministers all talk nationally but they behave parochially, so his challenge is to find a way to bring them together. I think the common interest may be possible and I think if he can demonstrate that there are some possibilities here of addressing the sort of things that the South Australian situation demonstrated we might have some chance.

Remember, last year was the first time that the COAG Energy Council actually I think used the words "climate change" in their communique. They actually recognised the connection. This is the first meeting since the December meeting that Josh has been to - it's his second meeting as Chair, but first as Minister for Energy and Climate Change. I think my observation would be, and I've seen a couple of his interviews, he is saying similar things but he's talking about it differently, he's actually saying, "I accept climate change, we're going to do this". Now that's not enough, but it's the beginning and I think if he's got some chance. In this state, the New South Wales Government, some of you may have seen, has announced the development of an advanced energy strategy. Who knows what it'll finally look like, but people are starting to get on board with this. So I think we've got a long way to go, but I do think there's the beginnings and I have some optimism that in what Hunt left behind, ugly as it might be and with all the arm-waving stuff I talked about before, the impossibilities, and I think the South Australian and Tasmanian examples, the work of AEMO that was published - and very sadly the guy who was very much behind that, Matt Zema, is no longer with us - I think that work will also play into this powerfully.

I don't think they get can off the hook this time. They'll try, but I'd like to think there's enough pressure from investors, energy and non-industry, the people who are concerned about not having clarity will put pressure on governments and I think we have an opportunity this time around. If we waste it then we have some really challenges, but if we do get it right I think I've got some optimism we might have a chance.

AUDIENCE: There are two political issues, one's just happened today and one's coming up. Today the Treasurer knocked back Chinese investment in the New South Wales grid, and China already owns parts of the South Australian and Victorian grids. In terms of restructuring electricity grids I wonder how you react to that development. The other thing that's happening in politics is we've got council elections coming up later this year, in some places shortly and in some places near the end of the year. Is there anything that councils can do, anything that people should be campaigning about in relation to climate at the council level and can that have any impact at all? What do you think?

TW: I think in relation to the Treasurer, I don't think it's a final decision but it's certainly a direction. My first reaction was it is bizarre. Some people know the history here, but you've got a consortium that was led by a major entity, being State Grid which is a mainland Chinese company largely owned by the Chinese Government if not 100%; and you've got another company called CKI, a listed company in Hong Kong on the Hong Kong stock exchange who was the other bidder. Both of those have been

at least temporarily knocked back and the Treasurer's indication is that under the Foreign Investment Review Board process they would be rejected. Both of companies already own substantial assets which are exactly the same in other parts of the country.

The problem is that the Treasurer has given no inclination as to what the security reasons are and he more or less said, "If I told you I'd have to shoot you". So that's not terribly helpful when you're trying to understand what the hell is this all about? I think it's perfectly fine for Australia to have a national interest Foreign Investment Review Board because we should be concerned about who owns these assets and is it likely that the ownership may not be aligned with Australia's interests, however, the demonstrable fact is that privatised network businesses do the same job more cheaply, produce lower prices for consumers, and they have the same level of reliability if not better than government-owned businesses, therefore they should be privatised. Now it may matter who owns them and it may very well be that it would be better if superannuation funds owned them maybe than a consortium for example, but I think it's very difficult to see how where we go from here is going to be anything except pretty ugly.

EH: Again, without having any understanding of the rationale behind the decisions difficult apart from "security" it's extremely difficult to comment, but what I would say is that it's not particularly helpful. Anytime an investor community gets blindsided by a decision like this it's problematic because it means that you're undermining the level of certainty in which you put a lot of time, money and resource towards building the case for putting forward ownership of the asset in the first place or investing in the asset. You kind of need the clear signals in terms of the pathway towards that decision and you need greater clarity around how the decision will be made, that's for sure. Having said that, there are a lot of moving parts in that decision as well, it does make it problematic. I guess we have to wait and see if there's anymore information forthcoming as to how or why it was made under those circumstances before commenting further, but it was a surprising decision, it would be fair to say.

In terms of the other comment about councils, I would say that one of the interesting things about the climate change response that it makes it challenging but also exciting is that it's at all levels of government. One of the key roles that councils play is actually in terms of that precinct level development that they help facilitate where you have multiple businesses, multiple players, households and different levels of industry, all in the one area and a lot of the work that they do in terms of providing the binding thread works for supporting precinct level or ecosystem level development, low carbon development is really key, particularly if you're talking about distributed energy, for example. But also if you're talking about energy efficiency in the property sector is the other one, and particularly in terms of adaptation, that's key. A lot of the adaptation that's required in an urban environment will be driven by the council, local government and state government working co-operatively. So that would be the other area I would say, distributed energy adaptation.

JC: Eloquent answers there, each of those I think are absolutely adaption and mitigation and leading by example. One of the things about the Paris Agreement is that it brought in sub-state actors and so it brought in cities in particular, so the stories that they can bring, the stories of modernisation and what they're actually doing on the ground is important. The ACT is perhaps a large council, amongst others it's helped prop up the renewable energy industry while it was becalmed by some of its direct purchases, but again not ideal. I think overall in the councils we've got to be clear about where we want to be, this is one of the things, and I think what's actually exciting is we're seeing a lot of the stakeholders recognise this is about net zero emissions or below. And that's not just groups like us,

but it's the Business Council, Australian Industry Group, investors and the like, and that's where we've got to think about our policies and stop thinking about low carbon halfway houses.

We've got to have policies which ensure investor, business and community confidence, so that's why it is important, maybe a plan is too Stalinist for this kind of government, but it's about a roadmap, it's about how we have all the various bits and pieces converging and de-risking the clean energy investment, actually taking out some of the clunking coal that's blocking us up. Then we've just got to integrate more into mainstream decision making, costs and opportunities. There are abundant examples around that around the world. Overnight one of the US courts upheld the US using social cost of carbon in decision making, for example, so this isn't radical stuff.

JH: Well, we'll see how that turns out I guess. I think one of the issues, back to that framing question, has been in terms of community support. I think you're right John in your views about how it's become now much more accepted and we've no longer got the worry of fights, but I think people are also very wary of the fact we've had expert opinions on all sorts of things over many years and all that's happened is those expert opinions and predictions have been proven wrong many times not all the time, but a lot of the time, so I do think that adds to a little bit of scepticism when it comes to particular policies. But I think after this evening I, at least, feel slightly more reassured that we're on track to do something, so I'd like you to join with me in thanking our three speakers.

TW: Can I also ask you to please join me in thanking Jennifer? She has done this a couple of times. Jennifer prepares assiduously for these things. She has a daily article, many of you would know, in the inside front page of The Financial Review. She's put some time into this and she's thought deeply about many of the issues and I'm sure we'll look forward to her articles in the future and also, hopefully, moderating one of our *Forward Thinking* events in the future. So thank you very much Jennifer.

END OF RECORDING