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STANDING COMMITTEE ON THE ENVIRONMENT AND ENERGY


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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON THE ENVIRONMENT AND ENERGY

Friday, 29 January 2021

Members in attendance: Mrs Archer, Mr Burns, Dr Gillespie [by video link], Mr Ted O'Brien, Ms Steggall [by video link], Mr Josh Wilson [by audio link], Mr Zimmerman.

Terms of Reference for the Inquiry:
To inquire into and report on:
WITNESSES

ARCHER, Mr Brad, Chief Executive Officer, Climate Change Authority ................................................................. 1

ARMSTRONG, Mr Dennis, Member, SOS Central West NSW ................................................................. 44

ARMSTRONG, Mrs Margaret, Member, SOS Central West NSW ................................................................. 44

ASHMAN, Dr Kita, Threatened Species and Climate Adaptation Ecologist,
WWF-Australia [by video link] ..................................................................................................................... 19

BERRY, Dr Janet, Volunteer, Veterinarians for Climate Action [by video link] ................................................. 9

BOELE, Ms Nicolette, Executive Manager, Policy, Research and Standards,
Responsible Investment Association Australasia ................................................................................................. 35

BOWMAN-DERRICK, Mr Felix, Acting Assistant Secretary, Climate Adaptation and Services Branch,
Department of Agriculture, Water and the Environment ......................................................... 1

BRADLOW, Professor Hugh, President, Australian Academy of Technology and Engineering .............. 1

BROCKHOFF, Mr John, National Policy Manager, Planning Institute of Australia [by video link] .......... 9

BRUNORO, Ms Beth, First Assistant Secretary, Climate Adaptation and Resilience Division,
Department of Agriculture, Water and the Environment ................................................................. 1

BUCKLEY, Mr Tim, Director, Energy Finance Studies, Australasia/South Asia,
Institute for Energy Economics and Financial Analysis .................................................................................. 27

CRAIK, Dr Wendy, Acting Chair, Climate Change Authority ................................................................. 1

FREEMAN, Ms Anna, Policy Director, Energy Generation, Clean Energy Council [by video link] ............ 27

FRIMBERGER, Dr Angela, Board Member, Veterinarians for Climate Action [by video link] ................. 9

HARTER, Ms Suzanne, Climate and Energy Campaigner,
Australian Conservation Foundation [by video link] .................................................................................... 19

HUGHES, Professor Lesley, Councillor, Climate Council of Australia [by video link] ......................... 19

ISON, Dr Nicky, Energy Transitions Manager, WWF-Australia [by video link] .................................... 19

MUNRO, Ms Kushla, Acting Deputy Secretary,
Department of Industry, Science, Energy and Resources ............................................................................. 1

MUSKOVIC, Ms Francesca, National Policy Manager, Sustainability and Regulatory Affairs,
Property Council of Australia [by video link] ................................................................................................. 27

O'CONNOR, Mr Simon, Chief Executive Officer and Executive Director,
Responsible Investment Association Australasia [by video link] ................................................................. 35

PARKER, Mr Robert, Founder, Nuclear for Climate Australia ............................................................................. 9

PENTONY, Ms Alannah, General Manager, Department of Industry, Science, Energy and Resources ...... 1

REED, Mr Tennant, Head, Climate, Energy and Environment Policy,
Australian Industry Group [by video link] ....................................................................................................... 35

STURGISS, Mr Rob, General Manager, Department of Industry, Science, Energy and Resources ...... 1

VAN DER KALLEN, Dr John, National Chair, Doctors for the Environment Australia [by video link] ...... 9

WALKER, Ms Kylie, Chief Executive Officer, Australian Academy of Technology and Engineering .......... 9

WHEELER, Mr Tim, Policy Manager, National Advocacy Team,
Property Council of Australia [by video link] ................................................................................................. 27
ARUCHER, Mr Brad, Chief Executive Officer, Climate Change Authority

BOWMAN-DERRICK, Mr Felix, Acting Assistant Secretary, Climate Adaptation and Services Branch, Department of Agriculture, Water and the Environment

BRUNORO, Ms Beth, First Assistant Secretary, Climate Adaptation and Resilience Division, Department of Agriculture, Water and the Environment

CRAIK, Dr Wendy, Acting Chair, Climate Change Authority

MUNRO, Ms Kushla, Acting Deputy Secretary, Department of Industry, Science, Energy and Resources

PENTON, Ms Alannah, General Manager, Department of Industry, Science, Energy and Resources

STURGISS, Mr Rob, General Manager, Department of Industry, Science, Energy and Resources

Committee met at 09:32

CHAIR (Mr Ted O'Brien): I declare open this public hearing of the House of Representatives Standing Committee on the Environment and Energy. Today, some committee members and witnesses are together here at Parliament House in Canberra, while other committee members and witnesses are joining via video conference or teleconference. I appreciate the patience and cooperation of committee members and also our witnesses as we work in this more challenging format. Today, I believe we'll have the use of video and phone and, of course, here in Parliament House, we're face-to-face. Today's hearing is for the committee's inquiry into two private members' bills introduced in parliament by Zali Steggall MP on 9 November 2020 and referred to the committee for review.

Today's public hearing is an opportunity for the committee to hear from witnesses, including the key Australian government agencies managing Australia's climate change framework. We will also hear from representatives of the health, science, technical, environmental, infrastructure, energy, planning, business and investment sectors about their perspectives on the proposed bills. The committee will consider carefully the viewpoints presented today, as well as the submissions provided to the inquiry, to formulate its report. In accordance with the committee's resolution of 24 July 2019, this hearing will be broadcast on the parliament's website and the proof and official transcripts of the proceedings will be published on the website. I remind members of the media who may be watching online of the need to fairly and accurately report the proceedings of the committee.

I welcome representatives of the Department of Agriculture, Water and the Environment, the Department of Industry, Science, Energy and Resources, and the Climate Change Authority to give evidence today. Although the committee does not require you to give evidence under oath, I should advise you that this hearing is a legal proceeding of the parliament and therefore has the same standing as a proceeding of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. The evidence given today will be recorded by Hansard. I now invite you make a brief opening statement before we proceed to a discussion.

Ms Munro: I will make some opening remarks. The department provided its submission to the committee just before Christmas. It looks at the climate change policy framework that is currently in place in Australia, but also how elements of the bill would interact with the current and institutional reporting arrangement. The submission sets out the international climate change framework, and the rules and standards and also the reporting requirements that apply under that framework; Australia's domestic climate change framework, and, again, the monitoring, accounting and reporting, and the legislative framework that supports that; the emissions reduction targets, our budgets and reporting; details of international collaboration; and also state and territory collaboration. We're very happy to go into more detail on any of those areas or in any other way that we can assist the committee.

CHAIR: Thank you very much, Ms Munro. I will start. I note that in your submission you say that Australia's system of greenhouse accounts has been designed to be one of the most comprehensive, transparent and timely emissions reporting systems in the world. Can you provide some commentary on why you make that claim?

Ms Munro: Absolutely, Chair. I will defer to my colleague, Mr Sturgiss, who is responsible for the national inventory and reporting system.

Mr Sturgiss: Thank you, Chair. I will flesh out a little bit our reporting commitments and our reporting processes. Each year, we make a submission under the UN Framework Convention on Climate Change. We make a report, which is called the National inventory report. It includes data on Australia's emissions of greenhouse gases from the period 1990 until the most recent year. That document is prepared in accordance with IPCC guidelines for the preparation of such reports and meets the reporting commitments under the UN Framework.
Constitution of Climate Change. Each year, the report is subjected to an annual expert review by a review team put together by the secretariat for the UN Framework Convention on Climate Change. They prepare a report on our work and it's published on the UN website each year. In addition, we prepare inventories of greenhouse gas emissions for our domestic audiences which relate to individual states and territories and relate to individual industries, and we also put together a quarterly report of emissions, which has a five-month lag. That's purely for a domestic audience; that's not an international commitment.

In that report we also report an estimate of emissions for an inventory which is prepared along consumption based lines, so emissions associated with Australia's consumption. I note in the submission made by the UK climate change commission that they also note that they prepare a similar inventory in the UK.

CHAIR: So from that summary, Mr Sturgiss, what you're saying is Australia complies with its international obligations but also furnishes a range of additional reports—correct?

Mr Sturgiss: That's correct. Our goal is to be as transparent as possible about what we do and to make available emission calculations for variables of interest to decision-makers in Australia.

CHAIR: Your submission also includes a comparative emissions reporting matrix. I just want to make sure we understand that correctly. It looks as though you have a list of countries here, not just countries but European Union also included. Reporting required by international rules is one category. Reporting not required under international rules—if I cast my eye down there, that matrix, it says: 'Age of emissions data: Australia one year.' For all the other regions or nations listed, it's two years. So I'm clear about what that is saying, does that basically mean that the data we provide is annual data whereas these other countries accumulate two years of data before publishing? Is that right?

Mr Zimmerman: Or are they two years late?

CHAIR: Or are they two years late? What is—

Mr Sturgiss: The table just confirms that other countries like ourselves meet UN reporting requirements. In fact the reporting requirements to the UN relate to the period at least 15 months ago, or maybe longer. The fact that we've recorded there that our data is less than one year is because we provide additional data that's not required under the UN rules. So it underlines that we do our best to provide up-to-date information in a timely way using the best available data, and this is done on a voluntary basis by the department.

CHAIR: Okay, so that's one year. I'm also interested in another attachment. I don't know if it's you, Mr Sturgiss. It's attachment E. If one of you wouldn't mind speaking to that. Several of our submissions go to the issue of emissions reduction but also investment in renewables. So if one of you could talk to that, it would be appreciated.

Ms Munro: I'm happy to talk attachment E in our submission, which looks at a comparison of change in emissions and also the renewable energy comparators for a number of countries and also groupings of countries such as the OECD, G20 or the EU. The first column in that table looks at, in absolute terms, the change in emissions from 2005 to 2018 as a percentage. Australia's emissions decreased by 13 per cent, so that's minus 13 per cent. Other countries, such as Canada for example, only saw a 0.1 per cent reduction. Again, in terms of comparators to, say, grouping of OECD countries, their reductions, on average, were minus nine per cent. I think that demonstrates how we also stack up internationally. China, for example, actually had an increase in its emissions of around 69 per cent in that same time period.

This is one of the issues, in terms of there are very clear rules set under the UNFCCC, and developed countries have had higher levels of requirements. The Paris agreement was very significant in the sense that those rules now apply to all countries. The degree of their reporting will depend on their national capacities, but actually having to be able to compare countries is very important in the whole transparency and commitments under the Paris agreement.

When you look at the next column, which is the change in per capita emissions from 2005 to 2018, on a per capita basis our emissions actually decreased by minus 29 per cent. That is actually one of the highest in the world on a per capita basis.

The other thing that we reported here was change in emissions per unit of GDP. That is minus 51 per cent from 2005 to 2018—again, one of the highest reductions globally. This goes to both the fact that we have increase in population but also the structure of our economy, the sort of exports that we have as an energy and resource producer. It is actually very significant in terms of the emissions per unit of GDP as well.

Then there is a lot of commentary on renewable energy, what's actually happening in other countries, what's happening in Australia. So I thought it would be useful for the committee if we provided a different comparison...
This one looks at new renewable energy capacity installed per person in 2019. This is that difference between how much per person in watts—so not necessarily something that people easily grapple with—but it does show, on the new renewable energy capacity installed in 2018, that Australia installed 243 watts per person. Then you go down into even the OECD average, that was 53.9. Again, it's very significant over and above what's happening globally.

Then there is the last column there. There are different ways that we can look at these factors in renewables, but that was per capita investment, so that is just in terms of per capita investments, $324.7 per person. Again, that is well above what has been happening in other parts of the world. Probably the closest comparator that we had was the United States, which had per capita investment of $255. So I think it demonstrates where Australia ranks and how we rank very favourably in terms of actual results over what has happened from 2005 to 2018 on emissions, but also a more contemporary measure in terms of renewable energy installations. The reference year was 2019.

CHAIR: Is there any major economy excluded from this list that has also had a considerable reduction in emissions per capita or GDP basis?

Ms Munro: No. We have tried to use the best available data that we have. It includes, for example, Canada, Germany, Japan, New Zealand, South Korea, the United Kingdom and the United States. Then there is a broader grouping, as I said, for the OECD and the EU and the G20 countries. I think it's actually a very fair and comprehensive analysis that we have provided.

CHAIR: So based on that, tell me if this summary is right: no country or, let's say, economy or group of economies if you look at the G20 or OECD, has recorded greater per capita investment in renewables up to that period listed?

Ms Munro: Yes. For the countries that we have stated in our table and grouping of countries, that is correct.

CHAIR: Australia is the second highest when it comes to the reduction or the change in per capita emissions over that period of 2005 to 2018, as well as the second-best performer when it comes to the per unit of GDP—is that correct?

Ms Munro: Yes, that's my understanding.

CHAIR: Good, thank you. That explains it. One more question for you, Mr Sturgiss—

Mr ZIMMERMAN: Could I ask a technical question on the table?

CHAIR: If it is on the table, go ahead.

Mr ZIMMERMAN: Could you explain why you stop at 2018?

Ms Munro: That goes back to the national reporting and the lag period—

Mr ZIMMERMAN: Is this the two-year lag?

Ms Munro: So this is the best available data that we have. We have the latest data but other countries don't, so that's why we called it at 2018.

Mr ZIMMERMAN: Thank you.

Mr BURNS: Thank you all for being with us this morning; it's good to see you here. Ms Munro, if I can ask a question on what you were referring to before in your previous answer: you referred to Australia having a 13 per cent overall reduction since 2005. The majority of that reduction hasn't happened in the last decade or nine years; is that fair to say?

Mr Sturgiss: I think it is important to note that there are a number of pressures on the national inventory totals that make analysis of the national trend a little bit complicated. The most important driver of emissions reductions since 2005 has been in the electricity sector, where emissions have fallen by, off the top of my head, around 15 per cent. There have been falls in the land sector as well from reductions in land clearing activity. There have been two important pressures increasing emissions the other way. One relates to transport emissions—they have grown strongly over the period—and the other relates to the expansion of LNG exports that have been in the pipeline for some time and those emissions associated with the production of LNG, which is quite emissions-intensive activity. They have been pushing the national inventory up over the last little while. I haven't got precise numbers, but there are a number of factors.

Mr BURNS: So you're saying there are a number of factors that have led to the slowing down of emissions reduction in Australia, and that at the moment the amount of emissions we are reducing in this country has slowed in the last five, six, seven or eight years compared to the first half of that 2005 period.

Mr Sturgiss: A large number of different factors have been at play over that period—
Mr BURNS: Sure; this is complicated policy.

Mr Sturgiss: and the land sector has been quite important in that change over time. Just to note: in the last 12 months, in which COVID has been a factor, inventory fell by three per cent. A large portion of that was to do with the COVID restrictions on transport activity but also with the importance of the ongoing decline in electricity emissions.

Mr BURNS: That leads to my next question. Obviously COVID has caused a bit of a drop, but it's fair to say, looking at the very transparent numbers that the department does a wonderful job of producing, that the shape of the emissions reductions is becoming more horizontal and less vertical. It is not coming down as fast as it was, say, prior to 2013. On current trajectories—putting aside COVID, because that is a bit of an outlier; let's hope that the world returns to normal—has there been any work done by the department on the time frame it would take for us to get to net zero emissions if we continue on our current trajectory?

Ms Munro: We produce projections, and the projections go out to 2030. That is a regular annual update in terms of what the emissions trends look like. The latest report of that came out at the end of last year. That broader question in terms of what would the emissions projections be to 2050—is that what you're asking?

Mr BURNS: It wasn't about 2050 necessarily; it was about net zero. Has the department done any estimations of when we will get to net zero emissions?

Ms Munro: The work we are currently undertaking—this builds off the work done last year on the Technology Investment Roadmap and the first Low Emissions Technology Statement—provides a much deeper analysis in terms of the technologies—we started off with 140 and we ended up with five—that potentially offer the greatest emissions reductions, and also in thinking about jobs growth and opportunities. In building on that work, though, the government has also committed to producing a long-term emissions reduction strategy and to have that out well ahead of COP26, which will be in Glasgow in November this year. The analysis and work is ongoing in the department, and that will absolutely provide advice to the government and therefore support a long-term emissions reduction strategy.

Mr BURNS: But there's no estimation on current trends of how long it will take? We don't have anything like that available at the moment?

Ms Munro: That's not the concept we use in terms of the international reporting and the tracking. You have higher levels of confidence a decade out on what that looks like. It depends on so many factors which will happen within the economy and what happens globally as well as the investments that governments, private sectors and others make. Hopefully, it will bring down the cost of the low-emissions technologies.

Mr BURNS: My observation would be that net zero emissions is not something that is foreign to Australia; in fact, every state and territory government has a net zero emissions target. While it's clear that there is work ongoing—good work, can I say—is it true to say that, at the moment, the federal government and the federal departments aren't calculating how long it would take to get to net zero emissions at the moment, that that's not something that you are working on?

Ms Munro: I have to go back to what the actual commitments are under the Paris Agreement. Starting in 2020, the government has set its NDC—a 26 to 28 per cent reduction on 2005 levels. The work that is going on—I think it is important to take a global perspective here. You have the IPCC updating their assessments. That very important scientific work will be completed in the next two years. This is intended to inform a global stocktake, which happens under the auspices of the Paris Agreement, in 2023—

Mr BURNS: Which includes a net zero target.

Ms Munro: and then the target setting is a new target—the highest ambition that a country can have—set in 2025. As part of that, under the Paris Agreement is the collective commitment to net zero emissions in the second half of this century. So that is the structure, the global process. The processes that we are following in Australia go down to making the best assessments in terms of policies, emissions reductions, and how that impacts on what will happen out to 2030, and referring that to the ongoing analysis and work which is incumbent upon a long-term strategy. That's the work being undertaken, and that's the advice we provided to government.

CHAIR: Let's go to Ms Steggall.

Ms STEGGALL: If I could continue on that point—this is to the Department of Industry, Science, Energy and Resources, and it's very important we have a clear-cut answer because a lot of people would like to know: the IPCC came out with a report in 2018 identifying that, for 1.5 degrees to be maintained, we need to get to net zero as soon as possible—certainly before 2050. With that report being in play, has the Department of Industry,
Science, Energy and Resources done the work and advised the government on the time needed to get to net zero by 2050? Is it a yes or no—you have done the work or you haven't done the work?

Ms Munro: If you are referring to the IPCC report it may be useful to invite Ms Brunoro to the table, from the Department of Agriculture, Water and the Environment.

Ms STEGGALL: Ms Munro, I would like to hear it from you. You've said you're not doing the work—

Ms Munro: It is more trying to step through what the work of the IPCC 1.5 degrees report actually said. So I think it may be of value to the committee to hear that directly.

CHAIR: I'm happy for that to happen.

Ms Brunoro: The special report on 1.5 degrees, specifically the emissions pathways in there, was obviously focused on 1.5 degrees, but it actually makes some commentary about when emissions would need to be at net zero to keep within that 1.5 degrees but also two degrees. The report stated that with no or limited overshoot of 1.5—and when they say 'overshoot' there were some emissions pathways that slightly went over and then stabilised at 1.5—we would need to reach net zero around 2050, as was said. With two degrees, it was reaching net zero around 2070. It is important to note around the 2070 date it is actually about the probability of achieving that. There is a further footnote that references the pathways limiting global warming to two degrees are based on a 66 per cent probability of staying below two degrees. Those are the two broad statements in the special report about around when net zero would need to be achieved to stay at 1.5 or two degrees of warming.

Mr Sturgiss: Just on Ms Brunoro's comment there about the report by the IPCC on 1.5 degrees of warming, it might be useful for the committee to note that the IPCC frame the task in terms of reaching globally zero net emissions of carbon dioxide. In the National Greenhouse Gas Inventory we actually identify a number of greenhouse gases in addition to carbon dioxide—methane, nitrous oxide and hydrofluorocarbons. The IPCC distinguished between the impacts of carbon dioxide, which is quite long lived in the atmosphere, and the impacts of other greenhouse gases, like methane, which is quite short lived. When we talk about net zero emissions, I just want to clarify that the IPCC report is really talking about zero net emissions of carbon dioxide, with reductions for other gases but with separate targets for those other gases.

Ms STEGGALL: Ms Munro, the government has, at various times, said that net zero by 2050 will wreck the economy, but the most recent comments today by the minister are, 'We would like to get there as soon as possible.' Taking that at its face value about getting there as soon as possible, can you confirm whether or not the department has calculated a projection for net zero by 2050 and costed it and worked out how to get there?

Ms Munro: I need to refer back to my earlier answer, but I might just supplement it first. When those IPCC reports come out, there is advice provided to the government and the responsible ministers on the content of those reports. Then, going back to the work that is underway at the moment, it does look at what would be options for the long-term emissions reduction strategy for Australia.

Ms STEGGALL: Can I take you to figure 2 on page 5 of the department's submission. We have calculations there of 2020 projections and high-technology sensitivity projections.

Ms Munro: This is in the projections? Sorry, which submission?

Ms STEGGALL: It's figure 2 on page 5 for emissions projections 2020.

CHAIR: Attachment D—is that right?

Ms STEGGALL: Yes. There we have two lines of projections on the graph. We have the 2020 emissions projection, which does not reach the government's ambition of 28 per cent by 2030. It's a very flat curve. Then we have another line, which is the high-technology sensitivity projection. That appears to overshoot slightly the 28 per cent. These projections finish at 2030. So is it your evidence that you have not calculated out from 2030 a projection line to net zero?

Ms Munro: According to what we are required to report under, we have done those projections to 2030.

Ms STEGGALL: You say 'required to report on'. I am asking you as a department: have you advised the government on how to get to net zero?

Ms Munro: That is ongoing work in terms of long-term emissions reduction strategies.

Ms STEGGALL: You are still not answering my question. Have you advised on how to get to net zero?

Ms Munro: I just need to keep answering that we are undertaking work to assist the government in what it will take forward ahead of Glasgow on its long-term emissions reduction strategy. There are a number of elements to that.
Ms STEGGALL: So you will only do what the government asks you to do. Can we take it, then, that you have not been asked to calculate projections to net zero and what it will cost?

Ms Munro: If I go back to the government's policy, you're right that the Prime Minister has been very clear that it's no longer a question of if we need to reach net zero but how we will do that. That work is underpinned—and it was kicked off last year—by the technology investment roadmap. Again, under your bills, you would continue that work and assessment. But there are a number of things right across the economy which will be considered and provided in advice to the government on how those longer term emissions reductions can be met.

Ms STEGGALL: Ms Munro, it is clear from your evidence that the answer is, no, you haven't done that work. Can I take you to—

CHAIR: Sorry, Ms Steggall. I just want Ms Munro to have an opportunity to respond to that, because, in fairness—and I might be getting it wrong—I'm hearing her say that that work is ongoing. So let's hear from Ms Munro.

Ms Munro: You are obviously trying to ask: 'Has this work happened or not; yes or no?' The advice and analysis that departments are providing to the government is based on both the work that we have done in the 2030 projections and the understanding of those trends as well as the additional work that we have been doing through the technology investment roadmap. A number of factors will be looked at across the economy. That will culminate in comprehensive advice from a number of sources that we will bring together to provide as advice to the government as part of its long-term emissions reduction strategy.

Ms STEGGALL: In attachment E, which you referred to before—it's on the following page—you can see the United Kingdom have reduced their emissions from 2005 to 2018 by 34 per cent. Their recent forecast was that they would reduce by 68 per cent by 2030. So do you agree that is considerably more effective than what is occurring in Australia? And do you agree that the climate change bills proposed, and which we are discussing, are in fact modelled on the legislation that had that impact?

Ms Munro: In terms of change in emissions, the United Kingdom had a minus 34 per cent reduction from 2005 to 2018. There were very significant structural changes happening in the UK economy over those years. There are always a number of factors in terms of both the policies and the underlying economic shifts and changes. I don't think you can ever clearly say it's just because of X or Y. There are a number of factors that go into what gets reported in terms of change in emissions.

Ms STEGGALL: Thank you.

Mr ZIMMERMAN: I have a number of questions that focus on aspects of the bills. I assume you've familiarised yourself with the bills. They essentially establish the reporting requirements and policy development requirements of the federal government between now and 2050. There are a number of elements to that. The reporting we currently do, which you have outlined, is predominantly in accordance with our international obligations, but that's supplemented by additional information. None of that is required by statute in Australia. Is that a fair summation?

Mr Sturgiss: That's correct. The reports are prepared in accordance with the government's treaty commitments under the UN Framework Convention on Climate Change and its Kyoto protocol and under the Paris Agreement. We do have legislation in place to assist us in our reporting processes. The National Greenhouse and Energy Reporting Act gives us the legislative basis to collect data from the most important companies in Australia if they meet certain emission thresholds. That is an important input into the inventory that we prepare, but then we prepare the inventory in accordance with the treaty commitments.

Mr ZIMMERMAN: I want to go to the various aspects of the reporting and planning proposed in the bills. I want to run through some of those and do a stocktake of where Australia currently sits in relation to some of those aspects. Firstly, obviously emission budgeting is an important part of the framework in the bills. Am I right to say that we have an emissions budget for the 2030 target? Is that correct?

Mr Sturgiss: That's correct.

Mr ZIMMERMAN: And that is a published emissions target?

Mr Sturgiss: Yes. The budget is laid out in fact in the chart we were referring to earlier. Yes, the budget is documented in the annual projections report.

Mr ZIMMERMAN: So that's effectively reviewed annually?

Mr Sturgiss: We publish annually, yes.
Mr ZIMMERMAN: That emissions budget takes us through to meet our Paris Agreement targets. If we had targets beyond 2030, such as net zero by 2050, in practical terms could you prepare an emissions budget for a post-2030 period, or is it best to do it on a five-yearly or 10-yearly basis?

Mr Sturgiss: In terms of the Paris Agreement targets, a range of target time frames have been put forward, so Australia's target is out to 2030.

Mr ZIMMERMAN: Yes. I'm more going to the heart of how you do emissions budgets. Could you realistically do an emissions budget beyond the 10-year period or would that be so speculative that it would be meaningless?

Mr Sturgiss: No. I think it may be sensible. There's a question about how the different emissions budgets join each other. The UK legislation and the New Zealand legislation allow for banking and borrowing between emissions budgets. Banking we refer here to as 'carryover' or 'overachievement'. The UK call it 'carry forward'. Also the UK legislation talks about 'carrying back' some emissions allowance, if you like, from a future period. So that actually means that you might set five-yearly or 10-yearly targets but they all run together, and so we have one cumulative budget between now and 2050.

Mr ZIMMERMAN: The bill proposes a national climate change risk assessment. Is that something that the government already does in some form?

Ms Brunoro: With respect to climate adaptation, a number of risk assessments have been done over the years and some of those have focused on specific sectors. There are also assessments that occur at the state and territory level.

Mr ZIMMERMAN: But it's fair to say there's not a national risk assessment document that I could look up on the web as of today that is current?

Ms Brunoro: No.

Mr ZIMMERMAN: It also proposes a national adaptation plan. Is that something that the government has, in whole or in part?

Ms Brunoro: We have the National Climate Resilience and Adaptation Strategy, and the government is committed to updating that strategy this year. So we are commencing that work, and so that's—

Mr ZIMMERMAN: Is there a commitment to update that at set intervals, or is that on an ad hoc basis?

Ms Brunoro: Under the Paris Agreement there is a requirement for adaptation communications, and we also report our adaptation action as part of our national communications. Under the convention but also the Paris Agreement, there is a requirement for us to look at those things regularly and then report to the UN convention on our activities. The last strategy was developed in 2015, and, as I said, we are commencing the work to create the new strategy this year.

Mr ZIMMERMAN: Finally, on this reporting, the projections document that we release each year—is that as a result of our international obligations, or is that something we do in addition to those? For example, the emissions projections that we released, I think, in December and we update annually—which presumably are the source of that information for that table that Ms Steggall was referring to—are they an international obligation, or something we do domestically?

Mr Sturgiss: The answer is: yes, there is an international obligation to prepare a projection that is published as part of the national communication that Ms Brunoro just referred to. That's a document that the government prepares every four years or so, which includes a requirement to prepare emission projections out to 2030, let's say. We actually elect to update that projection every year. That is a voluntary publication that we undertake. That annual update is not an international requirement.

Mr ZIMMERMAN: In your submission at attachment C, you make some observations about the use of offsets and then that accounting emissions construct, and that's obviously a particular reference to one of the constructs in the bill, which I think you diplomatically raised. But could you just unpick, for the benefit of the committee, what the construct in the bill would mean for the way in which we deal with offsets?

Mr Sturgiss: The observation is about the national accounting framework really, and you might look at the New Zealand legislation; it gives a clear illustration of the slight difference between the expression in the current bill and how the New Zealanders implemented it. Once the government has set some emission budgets, then it's the role of the national greenhouse gas inventory to test the progress towards the acquittal of those emission budgets. What happens in New Zealand is that the legislation allows the emission budget established by the commission to be augmented with the purchase of offsets from international sources. The point is that an offset or
a carbon unit acquired from international sources will add to the national budget; internal domestic transfers of offset units in domestic markets do not affect the national accounting outcomes.

**Mr ZIMMERMANN:** So New Zealand, basically, permits the New Zealand government to purchase international carbon credits to help it meet its targets?

**Mr Sturgiss:** Well, the legislation allows for that possibility.

**CHAIR:** Maybe it's you, Mr Sturgiss, who will answer this. I see in the submission that reference is made to the definition of 'emissions' and, in particular, using the same concept as the National Greenhouse and Energy Reporting Act, or the NGER Act. You mention the difference between scope 1 and scope 2 emissions and talk about the possibility that that 'would lead to double-counting'. Can you explain the risk to which you are alluding there?

**Mr Sturgiss:** It's just to note that the definition of 'emissions' in the NGER Act may not be fit for purpose for this task. In the National Greenhouse Gas Inventory, we report emissions that arise from within our sovereign borders. In the NGER framework, that's the same as what we call a scope 1 emission. That's the actual gas going out the smokestack. That's an emission of a carbon dioxide, and we refer in NGER to that as a scope 1 emission. A scope 2 emission is looking at that same process in a different way. A scope 2 emission means, when you as an electricity consumer turn the light on, what emissions were generated in the economy as a result of you turning the light switch on. They're referred to as scope 2 emissions, but actually it's the same process; we're still talking about the same gas that's going up the smokestack at the power station. It's just to observe that there would need to be more clarity around the definition of 'emissions', that the NGER's definition may not be fit for purpose and that other government legislation simply refers to the definition of 'emissions' in the National Greenhouse Gas Inventory.

**CHAIR:** For the sake of clarity for the committee, are you saying that the bills that we're doing this inquiry on adopt a definition or a concept of emissions that could lead to double-counting?

**Mr Sturgiss:** Yes, if the drafters are not careful. I don't think anything is intended by the proposal. I just observe that for clarity it would be better to cite the definition of 'emissions' as used in the National Greenhouse Gas Inventory rather than the NGER Act, because the NGER Act may not be fit for purpose. That's all.

**CHAIR:** I see. Thank you.

**Mr BURNS:** Just going on a slightly different line from my earlier questions around projections and costs, as part of the adaptation work that the department is doing on climate change, has any substantial analysis or work been done on, depending on where the world gets to—if we get to 1.5, if we get to two, if we get to three, or if we get to four—what that would cost the Australian economy?

**Ms Brunoro:** There has been work done in the past which looks at what the impact of different types of impacts would be and how much they would cost—for instance, the impact of rising sea levels on the built environment and infrastructure. That goes back to the science to determine what levels of sea level are possible, but that was done some time ago. There's new work—

**Mr BURNS:** When was that done?

**Ms Brunoro:** There was work done in 2012, and we can provide you with those reports. We're looking, as part of our adaptation work this year, at the recent work that's been done. We've also got the benefit that the sixth assessment report will be progressively released this year, and that has a chapter on Australasia. It will actually be based on the most recent international modelling. I note that you've also got Professor Mark Howden here on Monday. He is a scientist that we support to engage in the adaptation working group work, so he would be a good person to talk about that.

**Mr BURNS:** Sure. So the last big piece of work that the department did—not the international work, but the department specifically—was in 2012 on costings and economic impacts?

**Ms Brunoro:** There has been a range of work over the years that has focused on individual sectors. For instance, we are doing work on the implications of climate change to our World Heritage properties. In terms of national, all sectors, that hasn't been done. But there have been a whole range of studies which have focused in on the natural environment, biodiversity or the built environment—those sorts of things.

**Mr BURNS:** Thank you for that.

**Dr GILLESPIE:** I haven't been able to hear for about the last 15 to 20 minutes, so you may have already been asked this question. I've got in front of me your deposition from the department, thanks very much, and I've got our quarterly update of Australia's National Greenhouse Gas Inventory to the middle of last year. I'm just puzzled as to the question about double-counting. We appear to have a very thorough and very extensive reporting system...
in place and a very active and busy Climate Change Authority. I'm just trying to work out—isn't this bill basically trying to reinvent the wheel? We've got pretty much everything in Australia already that would meet the sentiment of the proposed bill. Your brief comments would be great.

Ms Munro: What we put forward in our submission does clearly document what the international requirements are, how you set the target, how you report against it and what the updating procedures actually are. That's what the government is committed to doing and also building on the 20 years of experience that we have. We have very mature systems, so much so that we've worked very closely with countries such as China, Indonesia as well as Thailand to share both our knowledge and expertise. In some instances—I will refer to Thailand here—their system of national inventory is actually based on our system. Mr Sturgiss has been instrumental in that work.

Thank you for your reflections. It does accord with, obviously, the fundamental structure in governance in terms of how we set the budgets and how we report against it. That's on the ongoing basis, as we referred to.

Dr GILLESPIE: Thanks very much.

CHAIR: Given the time, maybe I can ask a final question on that exact topic. Is there any other country whose system is as comprehensive, transparent and timely as Australia's is?

Ms Munro: We don't like to be boastful, but—

CHAIR: You are given permission to just state the facts, Ms Munro.

Ms Munro: The table in the submission does go through a number of different aspects of what would go into best practice in the world. We are definitely well above or more accurate in the latest information being reported. So, yes, across the board, it is world class.

CHAIR: We politicians can learn from your humility! Thanks for the work you do. I appreciate your time today. If you have been asked to provide additional information—I don't believe you have, but we might have further questions for you—could you please pass them through the secretariat. Any further questions on notice we will pass to you, again, via the secretariat. You will be sent a copy of the transcript of your evidence and will have an opportunity to request corrections to transcription errors. Thank you very much for your time.

Ms Munro: Thank you, Chair.

BERRY, Dr Janet, Volunteer, Veterinarians for Climate Action [by video link]

BRADLOW, Professor Hugh, President, Australian Academy of Technology and Engineering

FRIMBERGER, Dr Angela, Board Member, Veterinarians for Climate Action [by video link]

PARKER, Mr Robert, Founder, Nuclear for Climate Australia

VAN DER KALLEN, Dr John, National Chair, Doctors for the Environment Australia [by video link]

WALKER, Ms Kylie, Chief Executive Officer, Australian Academy of Technology and Engineering

[10:30]

CHAIR: Welcome. Although the committee does not require you to give evidence under oath, I should advise you that this hearing is a legal proceeding of the parliament and therefore has the same standing as a proceeding of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I invite you to please make some opening statements, starting with you, Mr Parker.

Mr Parker: Mr Chairman, thank you for the invitation to present today, and I thank the rest of the committee. It's good to be able to address the climate change bills. Nuclear for Climate supports the legislation in principle and in particular the appointment and roles of a climate change commission. We have concerns regarding the status of some of the organisations listed in the guiding principles—that is, in division 2, on informed decision making—in particular, two organisations: the Commonwealth Scientific and Industrial Research Organisation, the CSIRO, and the Australian Energy Market Operator, AEMO. Based upon concerns that I will now outline, we do not believe their research and reports should take precedence over others. You can refer to them, but they shouldn't take precedence. Firstly, the reasons are that CSIRO has consistently produced flawed information in their GenCost data regarding the cost of small modular reactors. This is carried over into the draft GenCost 2020-21 publication, at around $16½ thousand per kilowatt. As previously outlined to this committee at another time and place, Mr Tony Irwin has not been able to adequately justify the number that was put forward by CSIRO. This is in direct contradiction of the GenCost report's own definition of current costs, which states:

Our preferred definition of current costs are the costs that have been demonstrated to have been incurred for projects completed in the current financial year (or within a reasonable period before).
No suitable small modular reactor has yet been built and there is no basis, by CSIRO's own definition, for the inclusion of these values in the GenCost reports. Further, they have not produced data for large nuclear power plants even though these currently are the least cost and most reliable form of low-carbon generation available to Australia on a system levelised cost basis. We therefore don't consider CSIRO have sufficient objectivity to take precedence over all other sources of information. This is impeding Australia's attempt to effectively decarbonise its energy sector.

Secondly, the aim of AEMO’s Integrated Systems Plan is to project clear pathways to transition from fossil fuels, yet all scenarios contain only variable renewable energy options. This has been caused in part by CSIRO's incorrect cost reporting of nuclear energy. Dr Robert Barr’s Electric Power Consulting and Nuclear for Climate have participated in modelling of the ISP scenarios out to 2024 and found that they contained gross shortages of generating capacity to meet the specific loads. This has led to an underestimation of costs, including for transmission and distribution and scale of storage required. We intend to forward these findings to AEMO for comment. Dr Barr is prepared to demonstrate the fundamentals of the EPC model to AEMO in an attempt to reconcile these differences. At this stage, the problems encountered with the ISPs indicate that AEMO cannot take precedence over other sources.

Thirdly, and this is my last point, CSIRO and AEMO have made excessively hopeful predictions in the GenCost cost reports. For example, wind is assumed to have a capacity factor of between 35 and 44 per cent. Our calculations, and those of energy analysts at a major generator, indicate it is close to 31 per cent. Likewise, similar problems exist for utility-grade solar. At every turn, from capital cost to efficiency predictions, the ISP’s scenarios take the most optimistic projection. Even then, however, these scenarios fail to provide accurate system levelised costs of energy, which prevents accurate forecasts of costs of energy to consumers.

In summary, the ISPs are very high-risk concepts based on significant, untried complexity. The models contain upward of 10 different types of generators and storage devices, most of which are at threat from the vagaries of weather and require a market to respond in a coordinated and timely manner. By failing to properly model the elegant simplicity of a system incorporating nuclear energy, CSIRO and AEMO are placing our economy at great financial risk. While these concerns are significant, we remain supportive of the concept of the climate change bill and a climate commission. Thank you.

CHAIR: Thank you, Mr Parker. Ms Walker?

Ms Walker: Thank you. I invite Professor Bradlow to give the opening statement on behalf of the academy.

Professor Bradlow: May I just start by pointing out that the Australian Academy of Technology and Engineering represents the leading technologists and engineers across the country. Fellowship is by election. We have 900 fellows, and they are elected for their prominence and leadership in technology and engineering. Our mission is to provide evidence based advice on how to use and adopt technology for the future wealth and welfare of Australians.

We recognise that the overwhelming, No. 1 priority for us in 2021 is climate change. I won't dwell on climate change, but, overwhelmingly, we accept that the science is unequivocal and the lived experience is starting to reinforce that. It’s important to point out that this horse has already bolted. Greenhouse gases have gone beyond the level which causes global warming, and we are starting to see impact. If we continue to emit, we will see an accelerating threat to our infrastructure, for example from bushfires and coastal flooding; our agriculture; our tourism industry; our biodiversity; and our natural environment. We therefore believe that there's an urgent need for global action to address carbon emissions, and in Australia in particular we need to look at adaptation strategies to mitigate the already emerging effects of climate change. What's more, we believe that, for Australia, if we have inspirational policy leadership, then that will give us leadership on a global stage, and that will enable new industries and new jobs. So there's significant double benefit to this.

In that regard, we overwhelmingly support the need for net zero emissions by 2050. We think it is eminently achievable, possibly even achievable earlier. We are working on that at the moment. We have already, effectively, as a country, committed to a de facto national net zero emissions target in 2050, because the states and territories have already agreed to that target, and significant organisations, like the National Farmers Federation, have also published their view on that. However, national legislation to enshrine the target will create investment certainty and will also give us the opportunity to return to the international stage for advocacy for global emissions reduction.

However, we also believe the legislation must be accompanied by enabling policy, research, technology development and investment, and in that regard we advocate four key principles. Policies and programs must be long-term and bipartisan in order to create that investment certainty. Adaptation and mitigation intervention
should be tested against leading-edge climate modelling, particularly focused on Australia's unique terrestrial and marine environments, so that we are clear about the benefits. We need more research on low-emissions technologies in order to give us leadership, particularly in areas where we have natural advantages, such as solar power, soil carbon and carbon storage. Also, Australia must be part of international programs to achieve climate mitigation, because it is a global problem.

We strongly support the review of emerging technologies, as outlined in the bills. We think that this is necessary and we, in fact, have developed a methodology, which we have tested on three different industry sectors, to evaluate emerging technologies in terms of their technological viability, their economic feasibility, their social acceptance and the skills gaps that may accompany them. Finally, we strongly support the legislation's intent to implement risk assessment and adaptation strategies on a regular basis, which will give us a greater degree of certainty and planning.

In summary, our view is that we need to act; we need to act now. There will be significant benefit not only to the climate but to the Australian economy in terms of the new jobs and industries created. Thank you for the opportunity. We welcome questions.

CHAIR: Thank you, Professor Bradlow. Dr Van Der Kallen?

Dr Van Der Kallen: I'd like to thank the committee for this opportunity to endorse the climate change bill, based on the health impacts of climate change and the urgent action required to mitigate and adapt to climate change. Doctors for the Environment Australia is an independent, self-funded non-government organisation of over 2,300 doctors and medical students, in all Australian states and territories, who advocate for a healthy environment, because without a healthy environment we can't have a healthy population.

Climate change is the greatest threat to our health. This may seem an unrealistic statement, given the impacts of the COVID-19 pandemic, but daily we are experiencing the impacts of climate change on our health. Every day I see people whose health is affected by climate change. It may be the elderly person who has become dehydrated in the heat and ends up in hospital, the child who's had an exacerbation of asthma due to air pollution, the farmer who has had to sell his breeding stock due to the drought or the bushfire victim who has lost his house in the fire. The list goes on, and these impacts are not going away.

The most recent report on the 2019-20 megafires in Australia highlights the enormous health impacts of this single environmental catastrophe, which affected nearly 80 per cent of Australians. Nearly 19 million hectares were burnt, one billion vertebrates died and the economic cost is estimated to be upwards of $40 billion. Smoke related health costs were calculated to be $1.95 billion—a sum driven by the estimated 429 smoke related premature deaths, 3,230 hospital admissions for heart and lung disorders, and over 15,000 emergency visits for asthma. Thirty-three lives were lost directly in the fires, and it is likely that the mental health impacts and costs will be significant and protracted. We should do everything possible to stop this from occurring again.

Extreme heatwaves are associated with significant rises in mortality and emergency presentations. An excess of 374 deaths were observed during the four-day period when temperatures exceeded 40 degrees in Victoria in 2009. Without significant mitigation, we can expect to see cities such as Melbourne and Sydney with temperatures in excess of 50 degrees by 2040.

Fossil fuel consumption that drives global warming is also a major contributor to air pollution. Every year this silent killer is linked to the premature deaths of 3,000 Australians. Higher levels of air pollution are associated with increased illness and death due to ischaemic heart disease, chronic obstructive airways disease, lung cancer, asthma and also adverse pregnancy outcomes including low birth weight and stillbirth.

Australia's doctors are very worried. We are worried about the increasing health impacts and we are worried about how we are going to cope. In 2019 DEA led multiple medical organisations in declaring a climate health emergency. Nothing much changed. Last year, medical organisations representing over 75 per cent of Australia's doctors wrote to the Prime Minister urging a climate focused healthy recovery from COVID-19.

The climate change bill is the opportunity needed to make significant changes in a nonpartisan way. The current climate trajectory is pointing to catastrophic impacts and, just like COVID-19, we need to act now and the impacts can be minimised. Just like Australian governments listened to the experts in dealing with COVID-19, Australian governments need to listen to experts in mitigating and adapting to climate change. The proposed Climate Change Commission would be that critical independent, scientific voice which could guide Australia out of the climate emergency. Furthermore, reporting regularly, independently and publicly without referral, it will ensure transparency and accountability for the Australian people. Health considerations need to be included in the Climate Change Commission.
Urgent action is required to keep global warming at less than two degrees. Ongoing greenhouse gas emissions will accumulate in the atmosphere, making it even more difficult to mitigate against climate change. Unless we create legislation to make legally binding emissions reduction targets, the cost will also accumulate. The legislative vacuum for climate change action has meant that the last assessment of climate change impacts on Australia was the Garnaut climate change review report in 2008. Little has been done adapt the country for climate change health impacts. For instance, multi-purpose health shelters will need to be established throughout the country to prepare for future extreme heatwave events. We need adaptation plans for food security and water conservation. There is no indication of federal planning or funding for adaptation to climate change. The climate change bill will assure that this does happen. It will require regular national risk assessments from which five-yearly adaptation plans can be implemented. Therefore DEA, along with other medical organisations such as the AMA and CAHA, have endorsed the climate change bill. DEA sees this as a critical piece of legislation that will provide the framework for action on climate change.

Our own medical industry wants to reduce its emissions. DEA has outlined a plan similar to the UK in its recent report Net zero carbon emissions—responsibilities, pathways and opportunities for Australia’s healthcare sector in which we advocate for zero emissions by 2040. Mitigating and adapting to climate change is not a political issue. The science is clear, and we can no longer afford to kick the can down the road. We are suffering the health consequences of climate change now. We must have laws which outline our path to zero emissions and a commission independent of politics which includes a health voice to guide us out of our current predicament. Thank you.

CHAIR: Thank you very much, Dr Van Der Kallen. Welcome, doctors. Would one of you wish to make some opening remarks?

Dr Frimberger: Yes, thank you. Good morning. Thank you for the opportunity to contribute to this important process. Veterinarians for Climate Action advocates for action on climate change within and beyond our profession on behalf of animals. As veterinarians we have sworn an oath to use our scientific knowledge for the protection of animal health, the relief of animal suffering, the conservation of livestock resources and the promotion of public health. Climate change threatens all of these. So we believe that we're duty-bound to use our knowledge and skills for the mitigation of this serious and urgent problem and to speak up on behalf of our patients, who cannot speak for themselves.

Veterinarians' role in society is to deliver knowledge and practical support to people who own and look after all kinds of animals. We're also scientists, accustomed to relying on published scientific findings and making evidence based decisions. Because of this, we understand the science of climate change and we know that the data clearly shows that this problem is anthropogenic, severe and urgent. We're also used to working within a regulatory framework, and we understand the importance of good legislation in achieving good outcomes.

Climate change has several negative impacts on the health and welfare of animals, and we'll mention just a few examples. Direct heat stress presents a well-documented, major risk to the welfare and productivity of livestock animals. It is a well-known danger to companion pets and a serious threat to many species of both terrestrial and aquatic wildlife.

From a veterinary perspective, the distribution of infectious diseases is influenced by climatic conditions, and I'm sure Dr Van Der Kallen would be able to elaborate on this from a human health perspective as well. Warmer conditions increase both the geographic range and season for vectors, such as mosquitoes and ticks, that carry a whole range of pathogens, and extreme weather events that cause flooding trigger the spread of waterborne diseases.

Extreme events, such as bushfires, droughts and floods, are not caused by climate change, and Australia has always seen these events. But what climate change does is set the background conditions such that fire, droughts and storms are more severe more frequently. This is an aspect of climate change where the impacts on animals are only too obvious.

Last summer's fires killed or displaced an estimated three billion native vertebrate wild animals. An additional 80,000 to 100,000 livestock were also killed in last summer's fires. A year before that, approximately half a million cattle were killed in widespread flooding in northern Queensland—and note, these deaths were not peaceful or painless. This is severe, and it is urgent.

The farmers who rely on these livestock animals feed us all, and they deserve strong government respect and support. But they're at the forefront of climate change impacts, and measures like drought relief packages are only temporary bandages. Genuine government respect and support for farmers would mean serious efforts to address the root cause of these problems—climate change.
To date our federal government has lacked a cohesive plan for limiting the severity of climate change, and the climate change bill 2020 will substantially address this. By setting a net zero target and encouraging practical measures to achieve that target, the climate change bill will ensure that Australia contributes a fair share to preventing further warming and these catastrophic impacts on the health of people and animals won't be further worsened. In addition, by requiring climate risk assessment and innovation, the bill will open up the opportunity for Australian farmers to lead the world in the production of carbon-neutral and even carbon-negative food and become climate champions. My colleague Janet Berry has some expertise in this area and would be happy to elaborate further if the committee will ask her.

Through these measures and by mandating the establishment of an independent climate change commission the bill will ensure that the Australian government, on behalf of this nation, becomes a leader in managing climate change and saving the lives of people and animals. Climate change is already happening, and there's no measure that will prevent it altogether. So to limit the severity of its impact in the coming decades we must do no less than the very best we possibly can to mitigate it. It's not a question of 'good enough'.

At the beginning of this statement, we mentioned the veterinarian's oath. Even without an oath, though, we have a strong sense of professional, ethical, and moral responsibility. We appeal to our elected representatives to join us in this sense of moral, professional and ethical responsibility and to legislate in the genuine best interests of the public they represent. The duty to do everything possible to limit climate change is a great moral responsibility, and in this light we strongly support that MPs be given a conscience vote on this bill.

In summary, Veterinarians for Climate Action strongly supports the climate change bill because Australia urgently needs practical and evidence based legislation that offers a good chance of limiting climate change and its effects on animals and people. We thank the committee for your attention to this important matter.

CHAIR: Thank you very much, Dr Frimberger and Dr Berry and also Dr Gillespie. While we have lost the vision of you at the moment, the audio seems to be working perfectly fine, and it is still broadcasting, so let's just proceed even if we do have some technology issues.

Let me start by asking some questions, and then I'll pass over to colleagues. Let me start, Dr Van Der Kallen, with you, if I may. In the comments you made and, I see, in your submission, you stated that Australia has failed to reduce emissions adequately. We've just heard this morning—I don't know if you listened in—from the department and the government agencies, and they provided evidence to us showing that, both per capita and on a per-unit-of-GDP basis, Australia has reduced emissions by more than Canada, China, the EU, the G20, Germany, Japan, New Zealand, the OECD, South Korea and the United States and is one of the highest performers in the world. I'm wondering how that evidence reconciles with your views that Australia has failed to reduce emissions. I just welcome the opportunity for you to elaborate if you may.

Dr Van Der Kallen: Yes, that's fine. I think that, if you look at the National Greenhouse Gas Inventory over the last decade, from 2013 to 2019 it was actually going up. Sure, as a percentage of the population there may be a decrease, and I think that a lot of those numbers that were reported were a percentage decline, but the fact remains that Australia's emissions per capita remain some of the highest in the world. There are certain sectors within Australian industries that have been going up—for instance, the fugitive emissions from gas production. Over the last year, there has certainly been a trend downwards, but the mechanisms have not been put in place for significant declines. Even though there's a target of around 26 per cent to 28 per cent decline by 2030, and I have seen some of the documentation saying that we're on the way to that, those targets were set over a decade ago, and things have changed dramatically in that time. A decade ago, we thought that we would have 30 years to significantly reduce our emissions, and now it's pretty clear that we have only 10 years.

So, even though they may argue that there's been a decline and that there has been a change, it's far from adequate with what we are seeing as far as emission reductions are concerned, and we have this urgency now to accelerate it, as outlined by my presentation and by the data that's come from the bushfire season and the drought that preceded it. We've had the driest period ever recorded in Australia, and the BOM has noted an increase of 1.4 degrees since 1910. If we're talking two or three degrees, this is just not compatible with the way of life that we're accustomed to.

CHAIR: Thank you. Although you mentioned the 2030 target being set about 10 years ago, if I'm not mistaken it was 2015 when the Paris Agreement was established. I hear your point nonetheless. What I hear you saying is that even more should be done, but you're not rejecting the evidence provided about the substantial drop on a per capita or GDP basis.
Dr Van Der Kallen: Yes. Certainly coming from a high point, the percentage of the decline is what has been measured. I think the previous person spoke about how well Australia has recorded its changes, which is very helpful.

CHAIR: Thank you. I have one question for Dr Frimberger and then I will pass over to my colleagues. In the evidence you've given this morning and in your submission, you talked about the risk of delaying legislation on climate change and the confusion that it causes, and you talked in particular about the food industry, I believe. My question, then, again goes to what we heard from the department this morning, which seemed to present evidence that Australia probably has the most comprehensive, transparent and timely system in the world, and its framework consists of, by their submission, up to eight pieces of legislation in the domestic climate change framework in Australia now. Dr Frimberger, when you say 'delaying legislation on climate change', can you tell us where you see a problem in the existing legislative framework or the systems used to report on it?

Dr Frimberger: Yes; I'd be happy to speak, and I would also like to invite Dr Berry to chime in, if she would like to address this question as well. I would like to firstly say that, as a veterinarian, I don't have expertise on the climate change legislation in other countries compared to our own. What we're seeing is that we don't have a comprehensive, cohesive framework of climate change legislation. The shifting sands cause uncertainty and confusion for industry, investors and farmers. In order to invest enthusiastically in innovative agricultural technology, for instance, investors need to know what the legislative framework they will be working with is. Regardless of how Australia's legislation may compare to that of other countries, I would like to go back to what I said when I said that we must do no less than the very best we possibly can. Because of the severity and the urgency of the threat of climate change to animals, we shouldn't be asking ourselves: how little can we get away with? We should be asking ourselves: what is the very best we can possibly do? Dr Berry, would you like to say anything?

Dr Berry: Thank you, Angela, but I think you've expressed that very well. I will leave it at what you just said.

CHAIR: Thank you. Let me go to Mr Burns.

Mr BURNS: Thank you, Chair. Thank you all for being here and for your opening remarks. I have two parts to my questions. I will start with Dr Van Der Kallen and also the veterinarians who are here with us today. Obviously, one of the things that compel climate activism or the groups here today is the potential of what could happen if we don't reduce our greenhouse gas emissions. To both Dr Van Der Kallen and the veterinarians, could you outline, for evidence to this committee, the costs in your field of inaction? In your opening remarks, you both touched on what the consequences are of potentially two, three or four degrees increase and what it would look like both for humans and for animals. Could I ask Dr Van Der Kallen to start?

Dr Van Der Kallen: The health impacts are multifactorial and intertwining. There are always the catastrophic events—the heatwave events, the flooding events, the droughts—and those have immediate health impacts on people and then there are more complicated, indirect issues like water supply, for instance. This will be an issue as far as providing food for people, water security for animals. The drying of the land will cause an increase in pollens, et cetera, which will increase things like as asthma and allergy, and increase ozone, which is a pollutant which increases the risk of cardiovascular disease, et cetera. Overriding all of those things are the mental health issues. Already since the floods, the drought and the fires, we have seen an upsweep in mental health problems. As the climate impacts worsen, people's health gets affected and they can see it; they know it. And when they see that there is an inaction from our leaders, from government and from legislation and that things are not changing then their mental health issues get worse. Consequently, we are now at this stage where we are seeing almost a pandemic of anxiety and depression related to the events that we've seen before.

Dr Frimberger: Firstly, in your question you mentioned what could happen with climate change, and I just wanted to mention that climate change is in fact happening now.

Mr BURNS: Good correction, my apologies.

Dr Frimberger: Thanks very much for that.

Mr BURNS: No worries.

Dr Frimberger: If I'm not mistaken, I believe Dr Berry has some costings with regard to the agricultural sector but I just also wanted to mention the impacts of heat stress on companion animals. Everybody right now is worried about their dog being heat stressed. But most importantly, our wildlife don't often get costed in dollars and cents but the impact of two, three, or four degrees warming on Australia's iconic wildlife and the tourism sector that stems from that is honestly incalculable. We have already lost massive swathes of kelp forest along Tasmania. The Great Barrier Reef is looking at annual bleaching if business as usual continues in this vain for even a few more years. We have already spoken about the loss of wildlife in last year's fires. In my location on
the Mid North Coast, our iconic koalas are threatened by habitat destruction but they were already vulnerable. Because of fragmentation of habitat, they were even more vulnerable to the impacts of the fires. With heat stress, they need to migrate to try to find moisture and better food. When they migrate, they are vulnerable to trauma from cars, dogs and also vulnerable to drowning in pools, so it becomes this multifactorial negative cycle for our wildlife. Again, I just wanted to speak about this because it doesn't get costed in dollars and cents. Over to Dr Berry for comments on the agricultural sector.

**Dr Berry:** I realise you are meeting with Farmers for Climate Action later on in the day and I'm sure they will have a whole lot more to say on this. Livestock products are an important source of food for people, both the meat and the milk. As the world population increases, this demand for food will increase. Furthermore, global demand for animal protein will rise as populations become more affluent and eating habits change. Therefore, animal production plays and will continue to play a key role in our food supplies.

Australia produces only three per cent of global beef production but accounts for 17 per cent of world trade and has remained one of the largest exporters for over seven decades. The Australian government and the National Farmers' Federation have a united vision to exceed $100 billion farm gate output by 2030. But if we are not careful, if we don't have a strategy, a net zero emissions target and a strategy to get there then other countries might begin to impose carbon taxes on our exports, including our food exports, and that's going to mean less of an income for Australian farmers.

I would like to carry on and say that the livestock industry has acknowledged that it plays a part in gas emissions with the methane emissions of ruminants. With considerable research, they are setting about to attend to that matter and reducing methane emissions in one of several different ways and that work is continuing. Meat & Livestock Australia have a target of reaching carbon neutrality by 2030. That's a great target and they have a whole load of strategies, a list of strategies, to achieve that. I would like to say more about regenerative farming at some stage but I don't know whether this is the time or whether you would like me to stop now.

**Mr Burns:** Dr Berry, I'm very sorry to interrupt, but I think both you and Dr Frimberger have given a lot of evidence there. In the interests of time, I do have one more question I would like to ask, so I apologise for cutting you off but I do thank you for your comprehensive answers. My question is to Dr Bradlow. You and your colleagues are some of the eminent experts in the technology that will be used to bring down emissions. In your submission you also talk about the importance of net zero targets and heading towards net zero emissions. One of the points of contention between us and the government at the moment is that there is a reluctance to have that target. The government does talk about the importance of technology as the pathway—of course they do. From your perspective and from your point of view, why is it important to not just have an examination of the technology and an investment in the technology but also a net zero target to accompany it as well?

**Prof. Bradlow:** The net zero targets and five-year updates are extremely important in creating investment certainty. People don't just invest in technology because they like it; they invest in it for a purpose, and that purpose, ultimately, has to have economic viability and, without those targets, it won't have economic viability. With the targets, we can actually make rational decisions between different technologies. If we have the same caps on emissions between different technologies then it's purely a market decision and we will get valid economic outcomes.

**Ms Steggall:** If I could continue with Professor Bradlow. You touched on the fact that we really don't have sufficient adaptation and risk management planning currently under our current legislative framework. In relation to the impact of climate change on our technology, you mentioned roads and infrastructure. Could you explain a little bit more what difference would the proposal to have risk assessment and adaptation management legislated make to your sector, with technology?

**Prof. Bradlow:** I think that the risk assessment will at least allow forward planning. These adaptation strategies take time to implement. For example, if you want to prevent coastal erosion, you can't just stick up a wall overnight. It takes years of planning and understanding of where the flooding is going to occur. So you need to have forward planning on things like adaptation if you are going to be successful. It is the same thing with bushfires in terms of planning the amount of capacity you need to fight them, in terms of where you locate people and housing standards. These are all influenced by long-term planning and so the adaptation planning will be extremely important.

**Ms Steggall:** The evidence we had from the department this morning to some of the questions has been, 'Look, what we have currently in terms of legislation is sufficient. We are doing a good enough job.' From your sector's point of view, do you feel that there isn't actually clarity and sufficient legislative framework to drive your sector?
Prof. Bradlow: I think that more needs to be done. One good example is that the UK has a framework for doing this. If we applied the same methodologies it would be of significant benefit to us. They have more or less proven that these methodologies have very important outcomes. So I think more needs to be done, and I think my fellows at the academy, if you talked to them, would overwhelmingly agree.

Ms STEGGALL: Lastly, one of the aspects that I questioned the department about was the planning—that, at the moment, it stops at 2030. I would say it is unclear whether any real planning is occurring beyond 2030 in relation to technology projections or how technology will bring down emissions. What impact does the lack of certainty beyond 2030 have on you?

Prof. Bradlow: I think it's important for a number of things. For example, something like 18 per cent of emissions in Australia come from the transport sector. Clearly, we've got to electrify the transport system. The average vehicle stays in the economy for 11 years, and there is a long tail of vehicles that are there for 20 or 30 years. If we want to electrify the transport system, that is going to be over a 20-year to 30-year horizon, and therefore we need planning into the 2030s and 2040s, just as one example. Clearly, the longer-term horizon has got to be part of the process.

Ms STEGGALL: I have one question for Dr Van Der Kallen, in relation to the health impacts. Late last year the Bureau of Meteorology gave evidence to the Senate that we are on track for 3.4 degrees of warming worldwide but for 4.4 degrees in Australia. Can you explain to the layperson what that means for our conditions of living?

Dr Van Der Kallen: Some say that a global temperature rise of 3.2 degrees is incompatible with human existence. It's so scary to think what it will be like at three degrees. We have seen 1.4 degrees of warming since 1910, and in 2019 we had the highest forest fire danger index ever; 60 per cent of the country was on the highest index ever. People weren't able to grow their usual fruit and vegetables in their gardens because four or five days in a row of 45 degrees just kills everything, let alone our large agricultural industry trying to maintain productivity. It's almost impossible to imagine what three degrees is going to be like.

Ms STEGGALL: From a human health point of view, what does it mean? The body regulates its health; the human body operates at a fairly fixed temperature. What will those increases in temperatures do to the human body's ability to regulate?

Dr Van Der Kallen: These are what we see with the extreme heatwave events. The elderly and children are quite susceptible. The usual mechanisms that you have to tell you that your body is dehydrated don't work so well. People can get dehydrated quite quickly, get low blood pressure and have falls. Recently a patient of mine who I have known for a long time showed up with two black eyes and a broken arm. During one of the extreme heatwave events we had about two months ago she was at home and there was a blackout, so she had no air conditioning. She wasn't sure what to do: do you go somewhere? How do you keep yourself cool? She went outside, fell down the stairs and ended up in hospital. The adaptation that we need to do from a health perspective is virtually non-existent. We need some regulation. We need the climate change commission to help direct this. We need a health sustainability unit, like they've got in the UK, so that we can have mechanisms to adapt to climate change as well as try to reduce our own emissions. This is something that the AMA, colleges, Doctors for the Environment have all been advocating for. We want to reduce our own emissions as quickly as possible, and I think the best way to do it is with the climate change commission and the climate change bills.

Ms STEGGALL: If I could just go to the veterinarians' point of view, I appreciate and acknowledge your focus from a wildlife impact, but I think it is interesting and important to highlight the impact on our agricultural capacity and our livestock capacity. The farming sector has been quite slow to accept climate change as being an impact in regional communities. Have you quantified the impact of, for example, large farm livestock, what that will mean economically at plus 3 or 4 degrees in terms of capacity to have large livestock farming?

Dr Berry: I would love to speak to you about the slowness of the whole farming community to move with, say, strategies and targets set by Meat & Livestock Australia. Meat & Livestock Australia is funded partly by government, so the government could use this as an argument to say that they are doing something. Meat & Livestock Australia's strategies are excellent; they are there and in place. But I live here in Tasmania on a regenerative agriculture farm. It is managed by our son. He is putting in place many principles of regenerative agriculture, which I won't go into in detail. They are not terribly complex, but the ultimate result is a greater depth of soil. That means a greater capture of carbon in that soil, which means that there is carbon dioxide being taken out of the atmosphere.

That's one of the strategies of Meat & Livestock Australia. Here in Tasmania, the majority of the people in the farming industry don't seem to be aware of climate change affecting them. They are not aware of regenerative...
agriculture as being something important, carbon capture in the soil as being imperative. It is going to need something like the climate change bill, the targets that it will set and the strategies that it will develop to really bring in the majority of the farming population into what is happening.

If you can say that about the farming industry, I would suggest you could also say that about all industries in Australia. We have a very slow approach to doing something with climate change. It needs the leadership of this committee that we are talking to today in taking this climate change bill back to parliament and ensuring that it is pursued with good debate. That is what we need to ensure that the whole of Australia works and gets behind climate action.

Mr ZIMMERMAN: I want to follow up a comment that Dr Frimberger made in her opening statement. You said you wanted to see a system that kept the politics out of climate change. Would you like to unpack that a little bit more?

Dr Frimberger: Thank you very much. Climate change is not an inherently political problem. It's a science problem, and that shouldn't be political. Climate change has become politised, but it shouldn't be. This politicisation, in my view, is one of the major factors of putting the brakes on taking meaningful action to address this problem that is essentially running away without us. I believe that one of the strongest positive things that could be done with improving our response to climate change would be to take the politics out of it, exactly as you said—thank you. Therefore a non-partisan, independent climate change commission would be absolutely key, and a bipartisan progress on the climate change bill, which would give us that long-term, cohesive, overarching legislative framework that's not partisan, would be absolutely one of the strongest things we could do in Australia on climate change.

Mr ZIMMERMAN: Can I follow up that question. In what areas of national policy do you think that partisanship has a role?

Dr Frimberger: Specifically with regard to climate change, or in general?

Mr ZIMMERMAN: You said that climate change is unique and that there shouldn't be politics or partisanship. I'm just wondering in what areas of national policy you think that politics and partisanship do have a role?

Dr Frimberger: I'm an immigrant—obviously!—and I was surprised, when I first arrived in Australia 17 years ago, at the degree of partisanship in political discourse in Australia. And that's saying something—I come from America. But I so often see debates proceeding purely along strictly party lines rather than along evidence or what is in the public interest.

Mr ZIMMERMAN: At the last election we saw climate change as a pretty central issue in the election campaign—I'm using this as an example—and Australians had a clear choice about two quite different approaches, at least in relation to the medium-term targets. Why shouldn't the outcome of the judgement of Australian voters be what guides federal government policy in this regard?

Dr Frimberger: Well, I think that, to use the general election as a proxy for a specific issue is probably hazardous because a general election is an election on many, many different issues—climate change being one of them, absolutely, and it was a feature issue in the last election, but there were many other issues and many other factors. So I think that, if you really wanted to genuinely find out the Australian public's opinion on a specific issue, you would need to ask about that specific issue separately. There have been a number of public opinion polls published in the last few years showing that public opinion is that government should be doing more on climate change—should be acting more strongly and more urgently.

Mr ZIMMERMAN: So if a government came to power promising a different climate target—for example, the Chinese model: net zero by 2060; or the Ardern model of last year, of 2050 but with carve-outs—shouldn't that government be allowed to implement its policy?

Dr Frimberger: Again, if that policy was the only policy that the government took to the election then, sure, that would be fair enough, but in the last election there were many issues and many policies before the public, and I don't think we have any way of knowing that the outcome of the election was based strictly on climate change policy.

Prof. Bradlow: Can I make a comment? The key political issue is emissions caps and emissions budgets, and without them you can't manage climate change—you can't manage the emissions reduction. It's all a furphy without it.

Mr ZIMMERMAN: Yes, and that's why we have an emissions budget for our 2030 targets. But it's an interesting point because, for example, the bill gives the commission complete power to advise government
without direction from government—unlike the UK model, which does have a power of direction for the secretary of state—and the bill specifically envisages that it can provide advice in relation to strategies in relation to pricing. I would've thought it was not an unreasonable proposition to say that a government could indicate to the commission the parameters that it was prepared to consider, so it didn't go down the path of providing advice that would actually have no functional reality in policy. So, for example, in the current environment, where both major parties have said that they will not go down the path of carbon pricing, I would have thought it would be reasonable for a government to say to its bureaucracy: 'We want you to prepare options for getting us to net zero, but the carve-out from that is that we're not prepared to consider options with carbon pricing.'

Dr Frimberger: But if carbon pricing is the most effective mechanism to achieve the outcome, then shouldn't government take advice from its independent body whose sole purpose is to provide that advice?

Mr ZIMMERMAN: If the majority of the political spectrum has already made a determination that it's not prepared to go down that path, then it's a little bit meaningless in some ways.

Dr Frimberger: But shouldn't the majority of the political spectrum take expert scientific advice?

Mr ZIMMERMAN: Well, you would've hoped they might have!

Mr BURNS: This is taking me back. You could be a political adviser, Dr Frimberger!

CHAIR: We're running out of time. You've only got a minute to go, Mr Zimmerman.

Mr ZIMMERMAN: I'll leave it with you to have the last word, Dr Frimberger.

CHAIR: Dr Frimberger, why don't you have the last word on this one, and then we'll wrap up this session.

Dr Frimberger: Sorry, me?

CHAIR: Yes. Go ahead if you've got anything else to say on this before we wrap up.

Dr Frimberger: I've finished, thank you.

CHAIR: Thank you very much for your attendance here today. If you have been asked to provide additional information, could you please forward it to the secretariat. The committee may have additional questions for your response on notice, which will be sent to you by the secretariat. You'll be sent a copy of the transcript of your evidence and will have an opportunity to request corrections to transcription errors.

Proceedings suspended from 11:30 to 11:50
ASHMAN, Dr Kita, Threatened Species and Climate Adaptation Ecologist, WWF-Australia [by video link]
HARTER, Ms Suzanne, Climate and Energy Campaigner, Australian Conservation Foundation [by video link]
HUGHES, Professor Lesley, Councillor, Climate Council of Australia [by video link]
ISON, Dr Nicky, Energy Transitions Manager, WWF-Australia [by video link]

CHAIR: I welcome representatives from the Climate Council of Australia, the Australian Conservation Foundation and WWF-Australia. Is there anything you would like to add to the capacity in which you appear today?

Prof. Hughes: I am also a member of the Wentworth Group of Concerned Scientists. Whatever I say today will be consistent with the positions of both organisations, but I'm here primarily as a representative of the Climate Council of Australia.

CHAIR: Although the committee does not require you to give evidence under oath, I should advise you that this hearing is a legal proceeding of the parliament and therefore has the same standing as a proceeding of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. The evidence given today will be recorded by Hansard. I now invite each body to make a brief opening statement before we proceed to a discussion.

Prof. Hughes: Thank you very much for the invitation to appear before this inquiry. In brief, climate change is the most important issue facing humanity. We are truly in a climate emergency, and recognition of this is spurring increased international momentum to reduce emissions. Australia is internationally regarded as a laggard on climate action, and, at the same time, is acknowledged as being the most vulnerable developed country to the impacts of climate change—last summer's unprecedented bushfires being an extraordinary example of this vulnerability. The cost of inaction far exceeds that of action. On the positive side, we also have extraordinary opportunities to be brought together in a strategic way, especially given our renewable resources. Frankly, it is a no-brainer for Australia to be leading, not lagging, on climate action.

The bill we're discussing today is absolutely essential for Australia to be in leadership position, rather than be a global embarrassment. Both the Climate Council and the Wentworth Group are extremely supportive of this bill. It's a well-crafted and holistic framework to finally tackle our most important risk. I'll leave my general remarks there, but I'm happy to address any specific issues. Thank you for this opportunity.

Ms Harter: On behalf of the Australian Conservation Foundation, I'd like to thank the members of the committee for the opportunity to appear today. I'm sure I won't be the only person appearing before the committee who will state that Australia and the world face an unprecedented climate and mass extinction crisis. Our oceans are heating and acidifying; ice masses are melting at record pace; our insects and pollinators are dying in vast numbers; historical rainfall patterns that sustain agriculture and life are changing; droughts are becoming more severe; extreme weather is becoming more commonplace; heat waves, Australia's deadliest national hazard, are increasing; and bushfires are ravaging more and more of Australia's land and communities. The climate science is decided, and it's irrefutable. Human induced climate change is not only real, it's progressing towards the tipping point at a frightening pace. Australia's BOM, or Bureau of Meteorology, have projected that we're on track for a heating increase of 4.4 degrees this century, which they assert would be catastrophic for our society, our health, our economy and our environment. Years of national climate policy paralysis have put us all at risk.

Australia's inability to build political consensus around climate based targets and policy is also impacting the way we're seen globally. Australia's currently seen as a global climate laggard. We've become increasingly isolated on climate change. Our major alliance and trading partners have woken up to the dangers caused by global heating and they're stepping up their own commitments. China, South Korea, Japan, the EU, the UK and the US: they've all recently committed to net zero targets and stronger action. More than 120 countries have mid-century net zero emissions goals, as do all of Australia states and territories. Organisations representing Australia's major sectors—from business and industry to energy, the social sector, farmers unions and the conservation sector—have endorsed a mid-century net zero emissions target.

Australia's current climate action is coming mainly from states and territories under leadership that spans the political divide. Surely it's in the role of the national government to lead a national approach? We need a climate approach that will reduce climate emissions in line with the science based temperature goals that our country has already committed to by signing the Paris Agreement. We also need a clear risk based, well-funded adaptation planning process and a national plan to build resilience in the face of climate impacts that are already locked into our climate system. [Inaudible] commitments aren't covered putting a single target for 2030. In fact, we signed up
to do our part in holding the increase in global average temperature to well below two degrees above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees. I would say that any claims that actions to address climate change are too costly truly ignore the enormous costs of inaction. Experts have done the math, and the economy-wide cost of not achieving the Paris Agreement objectives far outweigh the cost of a smooth transition to net zero emissions. Also, investors in the private sector are crying out for policy certainty.

The ACF support this bill. We support it as an authentic proposal to build a durable legal policy framework for a national action on climate change. We support the bill's proposal to legislate a national net zero emissions target by 2050, at the latest; to set five-yearly economy-wide emissions budgets; and to develop five-yearly emissions reduction plans. We know the importance of building in a regular process for updating emissions reduction and adaptation plans, and ACF support the bill's five-year time frame, which is consistent with the Paris Agreement.

We also support the bill's dual goals of climate mitigation and adaptation. We support the creation of an independent climate change commission that provides independent expert advice to government, that has sufficient representation from climate scientists and climate policy experts whose advice cannot be directed, and that has a clear remit. We note the importance of ensuring that progress towards emissions reduction plans is transparently monitored, tracked and reported. We support the establishment of guiding principles that set clear standards for decision-makers.

Finally, we note that there is tremendous opportunity tied to unlocking emissions reductions. Australia is well placed to take advantage of enormous renewable energy resources and to export clean energy products to the world. Australia is truly on the cusp of becoming a clean energy and clean technology superpower, rich in jobs and doing our part to create a safer future. Predictable, [inaudible] policy tied to a clear commitment to cut our climate pollution and achieve net zero emissions well before 2050 will help unleash this potential.

In closing, ACF is strongly of the view that Australia needs a national, economy-wide approach to climate change mitigation, consistent with the science, and an adaptation planning process based on regular assessment of risks. We need a framework that is acceptable to all sides of politics and that allows us to move forward with credible, durable policy and plans. This will set us up for success in addressing the climate crisis and reaping the enormous economic rewards that come from leading the way as a clean energy superpower. Thank you.

CHAIR: Thank you, Ms Harter. Can we have some opening statements from WWF Australia?

Dr Ashman: Thank you for inviting WWF to speak today. WWF is the world's leading conservation organisation and has a 40-year history of working on wildlife conservation in Australia, with scientists, communities, farmers, businesses and government. WWF Australia strongly supports the enactment of this legislation. We believe there's an overwhelmingly urgent need for such legislation, as climate change is one of the biggest threats, if not the biggest threat, we face globally, and it's imperative that Australia work to reduce our emissions and to adapt to the warming that has already been locked into the system.

Climate projections indicate that, over the coming decades, nationwide we will experience increased average temperatures, fewer frosts, decreasing rainfall in many areas, and harsher, more dangerous fire weather climates. These changes in the climate will have significant impacts on our environment and wellbeing, including agriculture and our built environment, our economic prosperity, and especially on our ecosystems and threatened species. To adapt to the pressures that climate change is exerting on our natural environment, animals and plants are likely to attempt to migrate from their current areas to more favourable climatic regions elsewhere. However, human activity such as agriculture and urbanisation, combined with the impacts of invasive species, are destroying and fragmenting many remaining habitats. This makes it almost impossible for many species to migrate to new areas, as the habitat they would need often simply doesn't exist or has been degraded or fragmented so badly that it's no longer suitable. For these species that can't move to more climatically suitable habitats or who have limited suitable habitat left, the risk of becoming extinct is extremely high. Australia is already the world leader in mammal extinction. In the last 200 years we've lost over a hundred species, and recent studies have found that up to half of all plant and animal species in biodiversity hotspots like south-west Australia could face local extinction by the turn of the century due to climate change, if carbon emissions continue to rise unchecked.

I would like to hand over to my colleague Dr Nicky Ison, who is going to talk about the opportunities of becoming a renewable powerhouse.

Dr Ison: Thank you so much. I want to acknowledge and say that the threats of climate change are, of course, threats not just to species but to human health and to Australia's economic prosperity. I am the energy transition manager of WWF, and it is my role to work to accelerate Australia to be the world's leading renewable export
nation by 2030. While climate change is a huge multidimensional threat, acting on climate change presents a huge economic opportunity for this country.

Just yesterday, US President Biden announced, 'It's climate day in the White House, and that means it's jobs day in the White House,' because climate action means jobs and investment. There are few places in the world as well equipped [inaudible] as Australia. We are the sunburnt country. We have some of the best renewable resources in the world, we have abundant land and we have strong trading relationships with countries like Japan and South Korea, who are going to need our help and our renewable resources in order to achieve their net zero by 2050 targets. We also have the expertise. Australians invented the modern solar cell. We also have the mineral resources essential to decarbonising the world. We are, for example, the world's leading exporter of lithium, a mineral essential to the production of batteries and electric vehicles. However, last year we captured just 0.5 per cent of the value of that commodity. We are also the world's leading exporter of iron ore. If we were to create an onshore green steel industry, the Grattan Institute projects we could create 25,000 new jobs, though Andrew Forrest, just last week, put that number closer to 40,000.

Our abundant renewable resources mean that we will have some of the cheapest renewable electricity in the world. This can power our manufacturing in existing industrial centres, such as Gladstone, the Hunter Valley and Bell Bay. Indeed, Bell Bay is arguably already being powered by renewable energy, as Tasmania achieved 100 per cent renewable status last year.

These are just a few of the many opportunities that Australia is presented with as the world acts on climate change. However, we risk being left behind in the global race to renewables. Whilst global companies and nations are looking to Australia's endowment of renewable resources, they are doing so to prosper in a world that acts on climate change. The absence of Commonwealth legislation that addresses climate change acts as a deterrent, indicating that Australia does not take this global threat seriously and thus is not seriously open for business on climate solutions. Legislating the Climate Change National Framework Bill, including a net zero emissions target in line with the climate science, will send an important market signal to all countries and businesses globally that addressing climate change is an Australian priority.

Whilst Australia has almost all the ingredients needed to capture significant market shares of globally decarbonising energy and commodity markets, the missing piece of the puzzle is a Commonwealth legislated commitment to climate action. That is why WWF Australia so strongly supports the climate bills being discussed today. Thank you.

**CHAIR:** Thank you very much. Why don't I start with Professor Hughes, the Climate Council, and some of the comments you made that were also reflected in your submission, where you talk about the potential for a transition to renewable energy. To put WWF on notice, I will also pose the same sort of question to you. We actually started this morning with evidence produced by the Department of Industry, Science, Energy and Resources on Australia's performance on investments in renewable energy. The evidence was pretty compelling. It basically said that, when it came to new renewable energy capacity installed and then the investment—well, in 2019, when it came to 2019 per capita investment in renewables—so renewables installed and then the investment itself. And this is not all that different, I think, from some evidence the Clean Energy Regulator presented in Senate estimates last year, saying that Australia's pace of investment in renewables was running at, from memory, 10 times the global average. That's how fast it is. Professor Hughes, does that level of achievement, exceeding the global average by 10 times in terms of speed of investment, satisfy where your thinking is at in terms of the need for renewable energy? Are we going in the right direction, based on that evidence?

**Prof. Hughes:** We're certainly going in the right direction, but it can always be improved. It's fantastic to see that business in Australia—and, as some of my colleagues have just pointed out, the states are stepping up to support renewable investment—is happening at such a pace. However, what we have currently is a vacuum at the federal level of policy certainty to support those investments. We believe that this new bill will provide that policy certainty and accelerate what is already great progress. We would support any further building of business confidence to ramp up, as my colleague Nicky has just pointed out, the ability of Australia to become a renewables powerhouse. The sooner we get there, the more opportunities Australians will reap and the better we will be able to address the climate risk.

**CHAIR:** Do you have a view on what we should aim for in that regard if, at the moment, we're No. 1 in the world and the speed of our investments is 10 times the global average? Do you have a view as to what we should be trying to achieve, if that's what we're already doing?
Prof. Hughes: Well, the first thing to achieve is to completely replace fossil fuel energy production with renewables energy production and then to go beyond that to be a net exporter of renewable energy. So the first thing is to electrify all the systems that we can electrify; support them with renewables; phase out the use of fossil fuels as quickly as possible; and then go beyond that to become a net exporter of renewables and, as Nicky just pointed out, build up our green manufacturing here. We could recapture the manufacturing that we've lost but do it in a clean, green way. The possibilities are endless, but investor certainty from solid holistic frameworks and a good governance structure is critical for that.

CHAIR: Thank you. That's a good segue back to you, Dr Ison. I will just put that same question to you, because I think you were saying that Australia risks being left behind when it comes to investment in renewables. If we're the world leaders, if the speed of our investments is running at 10 times the global average, how do you reconcile that with your view that it looks like we might be left behind?

Dr Ison: I think the thing to say is that we are doing incredibly well in the decarbonisation of our electricity sector. However, we come at it from a low baseline. We had one of the most polluting electricity sectors in the world, and we have transformed that rapidly over the last 10 years, taking us to a point where we are at 30 per cent renewables. However, that is still not far enough in terms of electricity. We must continue at the rate that we are going in the electricity sector, but then what we see is that actual decarbonisation is not just about the electricity sector but about total energy use. That means the energy we use in the transport sector, the building sector and the industry sector. We need to look at ways we can accelerate renewable deployment for energy that can be used as end-use energy in all of those sectors, so we need to think a lot bigger. That's why, at WWF-Australia, we have a goal of taking Australia to 700 per cent renewables, which is in the order of 700 gigawatts of renewables. At the moment, we are deploying renewables at the rate of about six gigawatts a year. If we are to achieve this 700 per cent, 700-gigawatt target between 2040 and 2050, we need to increase the deployment rate of renewables by approximately five times. Interestingly the IEA came out late last year and said that globally we need to be increasing the deployment of renewables by about five times. If we are to continue positioning Australia as a renewable export superpower—and put us on the pathway to doing so—we must continue to increase the size of our renewable energy sector in line with the increases of size in the renewable electricity sector globally so we can continue to maintain that front position. But it is not just about the deployment of renewable technologies itself; it is also about the commodity sectors that can be powered by them. I'm talking about green fuel, green aluminium, hydrogen and ammonia and the technologies that are needed to produce them, as well as the clean technologies themselves around batteries. It is in those sectors, where there is a global race on, that Australia could position itself as a leader but is not yet a leader.

CHAIR: There is one last question from me—staying with you, Dr Ison—and then I'll call on my colleagues. The submission from your organisation says:

The absence of Commonwealth legislation addressing climate change acts as a deterrent, indicating that Australia … is not … open for business …

We've just talked about Australia's track record, which is No. 1 in the world with renewables. We heard again this morning from the department about Australia's existing domestic climate change framework. It looks like a robust architecture. There are eight separate pieces of legislation, and the systems that underpin it in terms of monitoring, reporting and data provision seem to be, if not the best, among the best in the world in terms of being comprehensive, transparent and timely. So, with that being the evidence we've heard from the government agency, I'm trying to reconcile that with your organisation's claim that there's an absence of legislation at the Commonwealth level and a disincentive for business. Can you just provide some commentary on that?

Dr Ison: Yes. I will start by making three points. The first thing to say is that we do not have a legislated target. The second thing to say is that, as we have seen in multiple submissions, the business sector is saying that there is a lack of certainty around climate action. The third is that, while we have a piecemeal approach to climate change, I would not call it world-leading. Places like the UK, New Zealand and Germany are the places where we see comprehensive legislative packages that cover all sectors of the economy.

Then the final point—or a fourth point, maybe not my final point—is that, under the system that we do have, Australia's greenhouse gas emissions continue to rise, and that's because the enforcement mechanisms are not there and they are not in line with what the climate science is saying is necessary. I would defer to my colleague Lesley Hughes to talk more on the climate science and the need for climate budgeting in line with the climate science. That requirement, we believe, is absent or at least underdelivered upon. Ultimately, the test of Commonwealth legislation is whether it is actually seeing a reduction in greenhouse gas emissions, and that is currently not the case.
I would say one final thing, which is that unfortunately, while we do have a strong track record on renewable energy in Australia, we are regularly called out by global businesses and in international agreements for inaction on climate change, and that does provide a deterrent. We know from speaking to global businesses that they're reluctant to move to Australia because of the lack of climate change legislation, a legislated target and the certainty that comes with the type of framework that this bill would deliver.

CHAIR: Thank you very much.

Mr BURNS: I have two different topics. I'll start with Professor Hughes, and then I'll come to you, Dr Ison, with my second question. Professor, the first question I have goes to your recommendations about coordinated targets across different levels of government and different levels of government collaborating. At the moment in Australia, obviously, all of the states and territories have a net zero emissions target, as does the Business Council. We can list off the usual list that we often do. In your view, what is the cost of the Commonwealth being an outlier in that, and how detrimental is it to Australia's efforts to achieve net zero? Does it matter that everyone in the Commonwealth has a net zero emissions target and the Commonwealth doesn't? Does it matter whether the federal government has one as well?

Prof. Hughes: Thank you for the question. Yes, I think it does matter. Coordination is key. Consistency is key. To pick up on Nicky's previous point as to why we need different and new legislation to do this, last year the UN's 2020 report on how well different countries around the world are meeting the Sustainable Development Goals rated Australia as the second-worst country in the world, out of 177 countries, for climate policy and climate action. So clearly the legislation that is in place at the moment is not achieving what it may have intended to achieve, so clearly we need something better and something new. The fact that the states and other subnational bodies and businesses are stepping up is partly a result of them stepping into the vacuum of the lack of effective legislation and policy at the federal government level. We saw with the COVID response that, for the most part, the government listened to the experts, prioritised the threat and acted early, and Australia is coming out of that pandemic very well. It's exactly the same sort of thing we need to do with climate change. As a national cabinet approach was seen to be appropriate for the COVID pandemic, and the climate change issue has not gone away this year, we need that national cabinet approach to this issue as well, and these bills will help provide that.

Mr BURNS: Thank you, Professor. I might move to Dr Ison for my next question. This might be a topic that we discuss in the next group as well. Dr Ison, given your role as Energy Transitions Manager of the WWF, you may be able to provide some insights into this. Obviously huge international changes are afoot. The US is probably the biggest one that has happened in the last couple of weeks. There is now significant investment and funds being diverted towards the transition of energy and towards cleaner energy and the electrification of the United States and moving away from the older ways of producing energy. In your view, what does Australia have to lose by not being a part of that action and by not being a part of this international demand and the growing international demand for cleaner products? As part of this whole conversation of moving towards a lower-emissions technology is Australia isolating itself in the international market, not just in terms of the science of climate change but also the economics of where people want to buy cleaner and cheaper products?

Dr Ison: Absolutely. I mentioned in my opening statement that Australians engineered the first modern solar cell. The solar cell industry globally is now worth $115 billion each year. We missed an opportunity in the 1990s to commercialise solar production in Australia and so we now do not share in that $115 billion industry. Battery production, electric bus production, green [inaudible] production, and hydrogen and ammonia production will be industries of similar or larger sizes. Unless we position ourselves [inaudible] as well as clean energy we miss the opportunity to capitalise on and gain significant market share in these emerging new clean markets. We have the comparative advantage. We have potentially the lowest cost form of renewable electricity generation that underpins these commodity productions; however, without the type of commitment to action on climate change, as I mentioned, we do isolate ourselves and we are seen globally within a group of countries, such as Russia, Saudi Arabia and Brazil, that are laggards on climate change and are regularly called out as being so. This creates conflicted geopolitical relationships rather than streamlined geopolitical relationships that could transfer into significant economic opportunities for Australia.

I will mention one thing. We were pleased to see some of the commitments in the federal budget by this government last year in relation to hydrogen, ARENA, the Clean Energy Finance Corporation and others. However, if you look at the global investment in clean recovery and what other countries are spending, we calculated in conjunction with Oxford university that South Korea is spending over AS$1,000 per person, the UK is spending over $500 per person and Australia is only spending just under $100 per person on a clean recovery. So we are being outspent in that race to renewables and decarbonisation.

Mr BURNS: Thank you.
Ms STEGGALL: Can I start with this attachment E that you've been referred to, that was presented by the department of energy this morning. I don't know if you've got that table available to you. Can I start with Dr Ison. It is essentially a table that is celebrating, I would say, given the way it's been put during the inquiry, the change in emissions that has occurred in countries. Can you explain for the average Australian what a change in emissions means? I assume where you start is also important. If we start from a very high base, celebrating a high degree of change is not an achievement in itself if you're already too high a user and emitter in the first place.

Dr Ison: My apologies; I don't have that table in front of me to look at, but I can speak to the general principle. Australia absolutely has some of the highest per capita emissions in the world. We are also responsible for larger emissions than we generate in this country. We are a larger contributor to climate change per person than most countries in the world. That high base means that we have much further to go. We are making progress but nowhere near as much progress as is required, hence the need for the type of legislation put forward in this bill.

Ms STEGGALL: The department is presenting figures of a per capita investment in renewables and celebrating that we are ahead of the curve. Is this coming from a government led initiative or from the private sector, and what difference will a government led initiative make to that transition?

Dr Ison: It would be a nuanced approach. We have seen a mixture of policy mechanisms that have helped establish a very successful renewable energy industry in Australia. That per capita investment in renewables will predominantly be both from private citizens, in the form of rooftop solar, and large-scale investors investing in large-scale and commercial-scale renewable energy projects.

The degree of these renewable projects is currently underpinned by three programs—firstly, until last year, the federal Renewable Energy Target. However, that target has now been exceeded, so we don't see a federal legislative mechanism continuing to push forward for deployment of renewables at a rapid rate. There is also ARENA and the Clean Energy Finance Corporation, but they are not targeted at early commercial technologies or the deployment of renewables such as solar and wind, which are now commercial but need to continue to be deployed, as I mentioned, at five times the rate we are currently deploying them.

There are state based mechanisms, however, such as reverse option programs in the ACT and Victoria, and as of the end of 2021 we will see a reverse option program in New South Wales and a similar program in Queensland. These are all programs that help provide investment certainty and help with the unlocking of that renewable investment that's been discussed. I would say that the majority of programs at the moment [inaudible] in renewable energy are coming from a state level.

Ms STEGGALL: Professor Hughes, I note you were part of the Climate Targets Panel, whose views are in a report that was released yesterday. Clearly, the purpose of these bills is to legislate net zero emissions by 2050 and then have a mechanism of getting there with five-yearly budgets informed by the science. Could you explain a little more the importance of being able to adapt to the science as it comes. For example, one issue raised this morning is that, unless it's taken to an election, you can't do anything about it. But you raised the example of COVID, where we clearly didn't take to an election the idea that we would lock down borders in reaction to COVID. So it is important to adapt to the science and the state of affairs between elections, and it is the responsibility, I guess, of government to do that.

Prof. Hughes: Thank you for the question. Yes, it is incredibly important to adapt to new information, whether it be climate change information or anything else. It is certainly the case that, over the last few years, especially since the Paris climate agreement, the mantra of the need for net zero by 2050 has become an international mantra, and that is why it's in this bill. What is important now is that, due to past inaction, where the world has been continuing to burn fossil fuels and continuing to put greenhouse gases into the atmosphere, the carbon budget—that is, the amount of carbon that we can continue to emit to stay below a certain temperature target—is diminishing all the time and it has been diminishing very rapidly over the past five to 10 years. This means that, according to the science and the modelling we released yesterday, what was once a reasonable target, net zero emissions by 2050, is now smaller than that. We absolutely have to focus on near-term targets. It's very important to reduce emissions by 50 per cent by 2030—that is what the science is telling us—with a net zero target achieved by between 2040 and 2045 at the latest.

But what this bill does is allow for such adaptation to new science to form the basis of action. So, while it sets at the moment a net zero target of 2050, it also allows for that target to be ratcheted such that it can be brought back to 2045 or 2040 et cetera, as the science becomes available. So that flexibility to increase our ambition is really at the heart of this legislation, and the Climate Council would support that part of the legislation extremely highly.
**Ms STEGGALL:** Ms Harter, in relation to WWF—and we've heard a lot of evidence already about the impact of climate change on our biodiversity and our natural environment, and on human health, of course, as well. One of the things we did hear from the department this morning was that, actually, there has been no updated adaptation and risk management planning done for some time. My own research indicated it hasn't been since 2015, but from evidence this morning it might be even longer than that. What is WWF's view in relation to that failure to have adaptation and risk management planning in place?

**Ms Harter:** Sorry, is that directed to me or to WWF?

**Ms STEGGALL:** To Ms Harter.

**Ms Harter:** Great. Yes, thank you for the question. Certainly, there are two sides to the sort of work that we need, and they are the climate mitigation and the adaptation. There was a time when we had a climate change national adaptation facility that did research and helped various jurisdictions with adaptation planning; however, that was defunded. I think, in the last few years, Australia has done very little in terms of assessing the risks that are related to climate change and to really plan for that and build resilience around that. The recent bushfires have probably prompted a lot more of that, and we have seen some good recommendations coming out of the bushfire royal commission. However, I think this bill, in putting in place a periodic review of risks and including those risk assessments in new adaptation plans, is really what we need. Just as Professor Hughes has noted, the impacts are changing rapidly, the understanding of impacts is being updated over time, and we really can't have a static plan or a static policy; we need to have a framework that allows us to do continuous updates. Besides an announcement that was made, I guess, last week, where the government has made some further commitments around climate adaptation, joining some international efforts, we haven't seen a lot; in fact, it has happened mostly in states and through local government.

**Ms STEGGALL:** I might just ask Dr Ashman about—

**CHAIR:** I might leave it there and go to Mr Zimmerman, just given the time. We now have less than 10 minutes for this session; apologies.

**Mr ZIMMERMAN:** Dr Ison, thank you for your comments about the enormous potential that Australia has to take advantage of the move towards new technology. I agree that the solar panel is probably one of our nation's biggest missed opportunities, but I want to focus on batteries because, like you, I see this as an area where there is enormous potential for Australia to do more than send lithium overseas. Do you have any thoughts about how the Australian government could best support the development of an industry in that area? Secondly, I note the great work at UNSW is continuing with the hydrogen batteries that they were talking about last week. Do you think that lithium batteries have a long-term future in battery technology, or have you seen evidence that it might be overtaken by hydrogen or other forms of power?

**Dr Ison:** I may take the last question first. We believe that both lithium battery technology and hydrogen will play a critical role in global decarbonisation, but we believe that the lithium battery is a safer and more modular technology that would work better at the consumer end of the spectrum—household batteries, community-scale batteries and electric vehicle batteries—whereas hydrogen, given the safety concerns around it and the fact that it is so difficult to contain, would be much more appropriate at an industrial scale, in industrial heating, for the manufacture of things like steel and for the production of things like ammonia that can then be used as a fuel, particularly in the global shipping industry and heavy transport. We see that both technologies are going to be absolutely essential, and we see them having large markets that Australia could play a role in, at both scales.

The first question was in relation to what the Australian government can do to unlock the lithium battery supply chain here in Australia. The first thing is, I would say, using demand creation to then stimulate the development of an Australian industry. The South Australian Liberal government is a great example of that. The South Australian—

**Mr ZIMMERMAN:** Your sound broke up at a crucial moment there.

**CHAIR:** I think you could rewind yourself by about 20 seconds.

**Dr Ison:** The first thing that the Australian government can do is help to stimulate demand for lithium batteries in Australia and, in doing so, help shape the procurement of locally produced lithium-ion batteries or at least some degree of local content. The South Australian government is an excellent example of that. Its household battery rebate program, in collaboration with the Clean Energy Finance Corporation, was skewed towards locally manufactured or locally assembled batteries, which then helped capitalise the establishment of two battery compilation factories in Australia, one of them being in the old Holden factory. The Australian government has a much greater scale, so it can do that on a national level. Indeed, today WWF Australia is putting forward a new policy proposal to the federal government that outlines four proposals for what it can do to...
help stimulate battery demand and the battery supply chain in Australia. A national household and community battery program is one component of it. Another component is a national battery strategy, similar to the hydrogen strategy that has been so successful, as well as setting a target for battery and lithium recycling that would help to create an end-to-end and circular economy battery supply chain. There are certainly other elements, but I think I will leave it there.

Mr ZIMMERMAN: My next question to Dr Ashman—or it might be to anyone else on the panel—is: do you see ecological benefits as well as other benefits in Australia significantly expanding its development of geosequestration? Secondly, would Australia's involvement in the international carbon credit market assist that?

Dr Ashman: Thanks for the question. I might defer a little bit to Nicky here, but I'll start on the ecological benefits of harnessing renewable energies, particularly carbon credits and capturing carbon in our ecosystems. The more that we can do this through woody vegetation and by preserving our forests, the more it's going to have a huge benefit to many of our terrestrial and marine ecosystems through things like reducing the expected increase in temperatures, which is really one of the things that's going to have such drastic impacts on many species. As temperatures are increasing, many species are not able to cope, and they're not able to move to suitable areas. In marine environments too, this is creating all kinds of problems with coral bleaching, and the loss of huge revenues for ecotourism in places like the Great Barrier Reef. I think there is huge potential to see benefits ecologically in a vast array of our ecosystems through harnessing more carbon into the system. I don't know if anybody else would like to add to that.

Dr Ison: I'll just clarify: did you mean geosequestration or biosequestration?

Mr ZIMMERMAN: Biosequestration.

Dr Ison: We can certainly take that question on notice and get some of our experts who work in soil carbon, biosequestration and carbon markets to respond.

Mr ZIMMERMAN: Thank you. A final question to the whole panel. Have any of your organisations been involved in the development of this bill?

Prof. Hughes: I can speak first. Various members of the Climate Council did see an earlier draft of the bill and the regulations associated with it. They did comment on that, but most of the comments were concerning the regulations rather than the bill itself.

Dr Ison: Our head of government and horizon scanning, Quinton Clements, before he joined WWF, was involved in drafting the bill. He may be known to many of the members of the committee. I believe that is the only involvement that we've had. I did see an early draft myself and provided some limited input. I can also take that on notice and clarify. We are a large organisation, and there are other parts of the organisation that were involved.

Mr ZIMMERMAN: I understand.

Ms Harter: ACF was not involved in drafting the bill. We did see an earlier draft as well, and provided comments at that time. We also provided a submission on the bill.

Mr ZIMMERMAN: Thank you.

CHAIR: Thank you very much for your attendance here today, everybody. If you have been asked to provide additional information, could you please forward it to the secretariat. The committee may have additional questions for your response on notice, which will be sent to you by the secretariat. You will be sent a copy of the transcript of your evidence and will have an opportunity to request corrections to transcription errors. The committee will suspend for a short break while we get other witnesses on the line.

Proceedings suspended from 12:45 to 12:54
The second data point: in January 2021, we saw news that Vietnam installed nine gigawatts of rooftop solar in just one year—nine gigawatts—which is three times more than Australia. It's the highest in the world. It was absolutely unforeseen, unpredicted and profound, in my view. Vietnam is probably identified by the Minerals Council as the number one growth market for Australian thermal coal exports and no-one predicted that Vietnam would embrace renewables as fast as they have.

The third data point: in January 2021 China announced that they had installed a record 133 gigawatts of renewable energy, double the prior year, in 2020, and double the entire Australian electricity grid. That is how fast China is moving.

The fourth data point: in January 2021, President Biden returned the US to the Paris climate agreement, and the run of executive orders has shown a huge amount of urgent, decisive action on climate change. They're our No. 1 ally globally and they're moving decisively to become a world leader. Only this week, we saw the executive order that demands the elimination of all fossil fuel subsidies and also that America will cease providing fossil fuel finance externally to America. That is a huge change in the global finance landscape.

The second-last point I will make is that in January 2021, last week, we saw Andrew Forrest explain his thinking behind a proposed $250 billion investment program for renewable energy, green ammonia, green hydrogen and green steel for Australia. That is transformational and the Australian government should be absolutely embracing the huge employment, investment, exports and technology opportunities that brings. I wholeheartedly agree with what Andrew Forrest said. To me, that is an example of where the opportunities for Australia are. We should be embracing the future.
My final point is about formal coal exit policies. Finance globally is moving so fast. We saw eight major new announcements in December. We saw seven in January 2021. Just this week, we saw a $200 billion New York City fund divest $4 billion of fossil fuel holdings. So, global finance is moving. It is leaving fossil fuels behind. Their stranded asset risks are rising every day.

In conclusion, IEEFA supports the bills. The opportunities for Australia are huge and we should embrace them.

**CHAIR:** Thank you, Mr Buckley. Ms Freeman from the Clean Energy Council.

**Ms Freeman:** Thank you for the opportunity to speak to the committee today. I am the Policy Director, Energy Generation, of the Clean Energy Council, which is the peak body for the clean energy sector in Australia. We represent over 800 of Australia's leading businesses operating in renewable energy and energy storage. I appear before the committee today to also speak in favour of the parliament supporting the bills tabled by Ms Steggall. In our view, they provide a strong, yet flexible, framework for Australia to get on with the urgent task of lowering our emissions across the Australian economy and embracing the huge opportunities available to us provided by access to plentiful, clean, low-cost electricity. These bills are important because they also provide the prospect for us to finally end the climate policy impasse that has afflicted Australia for the past decade and has resulted in a very turbulent investment environment for the electricity sector and, ultimately, higher costs for consumers, businesses and industry. I'm getting a bit of background noise, but I trust that you can hear me.

**CHAIR:** We can hear you perfectly well, thanks.

**Ms Freeman:** Thank you. Without these bills, we will effectively be putting ourselves on a path to continue to just muddle our way through the global shifts in trade and capital deployment that are inevitably coming our way. They are already taking place in our terms of trade, our economic prosperity and our standards of living. There is a very large change that needs to happen in Australia. It's a very large shift, but Australia has exceptional potential to do well in a world of ambitious climate change mitigation if we plan, prepare and invest. We have a stand-out comparative advantage in our exceptional renewable energy endowment. We take it for granted, but few, if any, other developed countries in the world enjoy the combination of high quality and abundant wind and solar resources that Australia has at its disposal. These resources don't just allow us to deliver low-cost power to Australian households, business and industry but also pave the way for Australia to hedge its risks against the certain long-term decline of our fossil fuel based commodity exports, such as thermal coal and liquefied natural gas, and ultimately support economic expansion in a carbon constrained world by supplying our region and beyond new, clean energy exports and [inaudible].

A long-term target matters for long-life assets such as wind and solar farms, which have operating lines of between 20 and 30 years. So we need long-term targets. The current reluctance of the Australian government to establish a goal beyond 2030 leaves a lot of guesswork for investors about the likely market dynamic and investment conditions for their assets, increasing the risk premiums applied to Australian projects. A long-term target also matters for communities and regions whose lives will be impacted by the investment and trade shifts underway across the globe.

The bill outlines a principle of fair employment transition, and the most effective way to ensure a fair transition is to offer a clear timeline for change. An anticipated transition allows people and business to plan and adjust. So there is no reason for delay. We recognise that this is a large shift, moving to net zero emissions, but the renewable energy sector is ready to do the heavy lifting in the early years. We have already been the single biggest contributor to Australia's emissions reductions over the past decade and have proven our ability to meet and beat any target in front of us. Around 200 renewable energy projects have been built or committed to since 2017. The only thing currently holding us back from doing more is a lack of ambition and transition planning.

So without further ado, Chair, I would like to say that the Clean Energy Council urges the Australian parliament to pass this bill, to help us unlock its full potential, to confidently grow a clean economy in our move to renewable energy resources to power our economic recovery expansion and to secure our economic prosperity in a carbon constrained world.

**Mr Brockhoff:** The Planning Institute supports the bill, its framework and associated plans and accounting measures targeting a goal of zero net carbon by 2050. But, fundamentally, planners are interested in this framework because it will help us do our job. It would reduce risks and the costs of doing business in the built environment sector and increase investment accordingly. It would help planners and others players in the built environment sector play their role in reducing carbon more cost-effectively. It would establish planning benchmarks that would help us plan for adaptation more effectively as well.

The ensuing national adaptation plan would be expected to work alongside a national settlement strategy to offer coherent planning parameters and benchmarks for infrastructure and strategic planning, particularly things
like establishing some coherence around per capita demand for certain types of infrastructure, such as water, and climate adaptation and hazard responses—for instance, some coherence in how we plan for sea level rise, flood intervals and heat exposure.

Ultimately, the national adaptation plans would include accountability measures and in particular quantitative budgets that are relevant to our industry, the built environment sector—budgets for what the carbon task is for different places and components of our industry sector so we can plan according to those budgets. Ultimately, this will contribute to reducing greenhouse gases, ensuring our sector plays its fair role and support planning for living conditions that respond to a changing climate.

In conclusion, the institute support the bill. We've done an analysis of what the key components of the bill are and the extent to which the components of the bill respond to key needs of planners and developers. I point you towards that in our submission. We also urge and recommend that the committee consider some specific recommendations planners have made—that the bill recognise the key role of integrated land use, infrastructure and social planning in enabling a transition to low-carbon future settlements and that that be recognised in the principles, that the national adaptation plan specifically enable a setting of carbon budgets for the built environment sector at scales that are relevant for planning for cities and regions and, lastly, that the independent climate commission include a planner to ensure balance in the development of these plans.

Ms Muskovic: The Property Council thanks the committee for the opportunity to provide a submission to its inquiry and participate in today's hearing. The Property Council is the peak body for owners and investors in Australia's property industry. We have a long-term stake in helping our capital and regional cities to thrive. Our industry contributes 13 per cent of Australia's GDP and employs 1.4 million people, more than mining and manufacturing combined.

The Property Council is supportive of this bill and of the Commonwealth adopting a target of net zero by 2050, consistent with our commitment to the Paris climate accord. There's regulatory certainty needed for businesses to make long-term investment decisions. Our property assets are around a very long time, buildings having life spans of 50 years or, in many cases, longer. We need a comprehensive national plan to guide the transition and investment decisions towards a low-carbon future, especially with the consideration of adapting to the impacts of climate change we're already seeing in the built environment and other sectors in the economy.

Australia's buildings contribute to over half of Australia's electricity usage and almost a quarter of Australia's emissions through their operations. So we offer significant shovel-ready and largely untapped opportunities for emissions reduction. Our industry leaders are world leaders in sustainability. We've topped benchmarks, like the global real estate sustainability benchmark, for at least the last decade. Over that decade, those market-leading companies have demonstrated the potential for emissions abatement in the property sector, [inaudible] emissions intensity by around 65 per cent compared to [inaudible] baseline.

The challenge has remained for policymakers to extend the substantial progress made by market leaders across the sector as a whole. While advances in technology will certainly assist, there are very persistent non-financial barriers to the uptake of energy efficiency through renewables that require strong, long-term policy and programs at every level of government targeted towards the different actors and decision-makers in what is a very fragmented sector.

At the same time, Australia's increasingly exposed to disasters caused by natural hazards and has incurred significant economic costs from damage to infrastructure, essential services and community. Without action, to start planning for and building and retrofitting more climate-resilient infrastructure, the economic impact alone—that's not considering all the intangible costs, which are incredibly significant, [inaudible] and the like—will be costs expected to reach $39 billion per year on average by 2050. That's if we're not doing anything to plan for better climate-resilient infrastructure. We look forward to the discussion at today's hearing and are supportive that the bill will take us forward.

CHAIR: Thank you all very much. My first question might go to the Clean Energy Council and, Ms Freeman, some of the comments you were making on a high degree of uncertainty holding back investment. The submission from the Clean Energy Council goes to the same point—that a lack of certainty is restricting investment. I certainly don't challenge the tie between certainty and investment. I understand that link. But I just go back to data we were presented this morning from the department showing that Australia is investing more money in renewables on a per capita basis than probably any other country in the world. The Clean Energy Regulator confirmed last year that the deployment of new renewable energy in Australia on a per capita basis is happening 10 times the global average. So my question to you, then, is: do you reject those statistics on performance or are you talking more about things from a prospective point of view—that, as we move forward, even more can be done?
Ms Freeman: Thanks for the question. You're absolutely right. We've seen outstanding investment in the last three years. I think we've had something like 200 projects since the start of 2017 be commissioned, be financially committed or are under construction at the present time. A lot of that was driven by the Renewable Energy Target, which no longer provides that same incentive, so there has been a bit of chilling in some of the investor interest. There have been strong incentives for the states, but certainly in the last 18 months or so we've seen a reduction in projects. That's because projects are becoming more tricky because our grid is somewhat congested. There is a bigger threat at play, which is the fact that we have real uncertainty about the timing for the exit of coal fired generators. We have established expectations about what the general life will be of particular assets. We've got a lot of assets due to retire over the next 15 years, but the exact timing of that is unknown and it is expected that some of the coal fired generators may not serve out that full time that's on the coal requirements chart that is within the Integrated System Plan published by the Australian Energy Market Operator. That creates some uncertainty about prices in the electricity market and the best time to invest. When there's that uncertainty—I'm not saying it needs to be absolute certainty for investment, there's always risk, but when there's such a high degree of uncertainty as to when they will be retiring—it makes it difficult and it makes investors pause a little bit while they see what's going to happen to the prices. That's one of the challenges at the moment, so we really need a planned exit strategy for those large coal-fired power generators which we know are going but we just don't know exactly when.

CHAIR: A question, if I can, to Mr Buckley: in your submission you talk about the renewables investment collapsing in 2019, which, again, surprises me unless Australia has absolutely swum against the tide given what we've seen being installed and invested in Australia over that 2019 period. Can you explain what's happened there?

Mr Buckley: Firstly, the comment about collapsing is a direct reference to Bloomberg New Energy Finance study which shows investment collapsed, so I'm happy to table their report or you can access that, but I think we reference it in our report. They showed a 40 per cent reduction in investment in new investments. But, to me, if we do go back to the department's data that you cited—

CHAIR: Can I ask before we extend into other things, because that was my question: are you saying that there has been a collapse or not? I know you got it from Bloomberg. I'm just looking now and your reference is from a magazine from January last year. But a 40 per cent collapse—because later you talk about how Australia's investments have been hammered? So has there been a collapse in renewables?

Mr Buckley: That Bloomberg report is a statement of fact. That was their assessment of the investment in Australia in the first six months of 2020.

CHAIR: How do you reconcile that then with the Clean Energy Regulator? They confirmed in recent Senate estimates that claims that investments in renewables having collapsed are false. They basically said, if I'm not wrong, along the lines of: 'It is not true. There's nothing like a collapse on.' It concerns me that if we hear on one hand evidence that there's a collapse in the marketplace, there's a lack of confidence in Australia and there's uncertainty, but the Clean Energy Regulator says, 'That's untrue,' and then this morning we're hearing evidence that Australia is investing more in new renewable energy capacity than I think any other country—at least on this long list—as well as on a dollar value financially. And that's Canada, China, EU, G20, Germany, Japan and so forth. Can you reconcile those two for me?

Mr Buckley: The Bloomberg data, at the time, was absolutely correct. It was talking about total investment in zero emissions and low-emissions technology. You're citing a specific category, and the Clean Energy Regulator is talking about a specific category within renewable energy investments. As Anna Freeman just referenced, the renewable target was a key catalyst. That expired, is no longer an imperative, and so there isn't the framework to drive new investment. The question is: were those investments completed last year or were they new investment proposals going forward?

Is Australia a world leader, 10 times better than every other country in the world on average, as you cited? To me that's cherry-picking the data. At the end of the day, per capita, we're a very small country. I will go back to the guiding principle of the Paris Agreement: common but differentiated responsibilities. Australia is an OECD country. We should be doing more than our fair share because India, Africa and China didn't cause the problem; Indonesia is wearing the problem. So when we talk per capita, it's a great way of redefining the data to try and make Australia look good, when the opportunities for Australia are huge. As Professor Hughes cited, the UN is ranking Australia as a global laggard. That's the independent referee, not the data for any particular day, week, month, year. To me, if we want to divide numbers by per capita, that's missing the big picture. The opportunities for Australia to be a world leader are very clear.
Australia is not doing our fair share. If we want to look at other stats—EVs—we're a global laggard; vehicle emissions standards, we're a global laggard; power plant emission standards, we're a global laggard; and if we look at value-adding of our resource exports, we're a global laggard. So we can talk about the residential consumer market and, yes, we are an absolute world leader on rooftop because the consumer is sick of paying ridiculously high prices from the lack of a national energy policy. Electricity prices have gone through the roof in the last decade, and the consumers are trying to protect themselves by putting in rooftop solar at world record rates.

Mr ZIMMERMAN: That scale remained exceptionally strong last year as well.

Mr Buckley: Yes, but when were those investment decisions made? You build a project, you invest in a project and you complete a project, so are we talking about project completions or new investment proposals? At the end of the day, Australia could be doing so much more. We could haggle over the details. Is Australia a global laggard? The UN says it's not. The department you're citing figures from says that, on a particular number when we divide it by the population, we're a world leader. I don't see Australia as a world leader. I think we're a global laggard.

I would say we're a global leader in exporting fossil fuels. We are the No. 1 exporter of LNG, the No. 1 exporter of coking coal and we are the No. 2 exporter of thermal coal. I don't see any financial analysis that divides it by our population. We are No. 1 in absolute. We are one of the top three exporters of fossil fuels, so we're profiteering as the rest of the world is getting on to decarbonise. We need to recognise our economy is exceptionally exposed. Dividing it by our per capita is an irrelevancy.

CHAIR: Can I welcome you to provide more evidence on notice to the committee to support some of those claims, especially if you claim we're being laggards as a country and the rest of the world is decarbonising. Yet again, this morning, the detail in the statistics—the evidence, not the claim—says a reduction in our emissions compared to a whole range of countries. I know you referenced the Bloomberg article, and I will certainly read that article. But if you have other evidence to put to the committee, we would certainly welcome receiving it from you to support those claims.

Mr JOSH WILSON: My first question is to the Property Council. It goes to the risks and the costs of inaction. I note that there was a national coastal risk assessment undertaken around 2010-11 that identified on a higher emission scenario that there will be somewhere between 150,000 to 250,000 residential properties at risk in Tasmania, New South Wales and Victoria alone by the end of the century and also potential impacts to key community infrastructure if sea level rises were to occur in line with that kind of emissions scenario. I'd be interested to hear from you about your view on the need to not only guard against those risks but also to carry forward the work that was done in that national coastal risk assessment, which, as far as I know, over the last 10 years, hasn't really been revisited or enacted. If there's anything to the contrary that you're aware of, it would be useful for the committee to hear.

Ms Muskovic: There are a number of studies that have been done, I'd say a decade ago, that set out some of the well-documented risks to building construction and location due to various natural hazards. That study is one. But there was also a lot of work done, I'd say about 10 years ago, by the Australian Building Codes Board, who are responsible for setting the national minimum standards for new construction and significant retrofits. They looked at the range of natural hazards that would impact on the construction of buildings over time. Interestingly, in 2010, the Productivity Commission called on government to look at incorporating a national risk assessment into the mandate of the Australian Building Codes Board over time. To your point, yes, there has been work done over the past decade. It is not integrated into the policy instruments we use today, either for land use planning decisions or for building standards more particularly. So in our submissions both to the national Royal Commission into Natural Disaster Arrangements and to this committee inquiry, we're urging that government has an ongoing process for reviewing climate risk. As we said at the outset, buildings are around a really long time and unless we have [inaudible] those risks are likely to be with us for the long term. We can't construct resilient or future-proof housing and infrastructure from the get-go. With the cost of refurbishment, it's more expensive to retrofit than to build something appropriate at the time. We're supportive of that sort of risk assessment being embedded in policy-making process. There are a couple of quite important policy instruments, like the National Construction Code, that those sorts of risk assessments would inform.

Mr JOSH WILSON: I have a quick question to the Clean Energy Council. Your submission notes the proposed bills—the bills we're considering—lack an explicit policy mechanism for emissions reduction. What would be better, in your view?

Ms Freeman: Look, there are different policies. Obviously an emissions trading scheme or a carbon price in general with the ability to trade has long been regarded as the most efficient way to send a signal about emissions.
reductions in the economy. There have been quite a number of mechanisms that have been prosecuted over the course of the past decade, and, frankly, a solid robust mechanism would be welcomed. We looked at the National Energy Guarantee and decided to support that as well. We need a mechanism, not only for just creating those clear signals but also on things like renewable hydrogen. That's going to be a challenge for Australia without a carbon price. Hydrogen and development of that industry, which is something that has bipartisan support, would be greatly assisted through a carbon price.

Following on from the exchange between Mr Buckley and the chair, the Clean Energy Council tracks financial investment decisions. We have seen more than a 50 per cent reduction in financial investment [inaudible] over the last two years. Since the start of 2019 there has been more than a halving of new financial investment commitments to large-scale energy projects. I can provide that report.

CHAIR: Thank you.

Ms STEGGALL: Ms Freeman and Mr Buckley, I want to ask about investment confidence. At the moment the government only has a 2030 target. It is evident that there is no certainty beyond that to 2050 and how we're going to get to net zero. What impact does that have on long-term confidence for energy investment? Also, the government is currently focused on gas recovery. What impact does that have on market confidence for renewable investment in Australia?

Ms Freeman: Thank you for the question. At the moment the problem is with the way the 2030 target is set out. The government has made it quite clear that it expects each sector of the economy to do their fair share, but it's very clear that the electricity sector and the renewable energy sector could do far more than what is being expected of them. Really that 2030 target has either a stifling effect or is simply not doing anything at the moment for us. It's a missed opportunity because of the role that renewable electricity can play in the economy. It will underpin the electrification of the transport sector and can be the basis of the renewable hydrogen sector, which will help us [inaudible] fuels to the economy and export. It is really a missed opportunity not having that high degree of ambition for 2030.

As I said in my opening remarks, it provides a lot of guesswork for investors at the moment in terms of what is going to happen in terms of the emissions reduction trajectory and what are likely to be the electricity market dynamics. The people who are building projects and investing in large-scale electricity projects are constantly modelling in terms of electricity market prices, but with the absence of information you build in a premium because you just don't have that certainty. So it is adding a higher cost to projects, which obviously then has a higher flow-on cost for consumers and businesses [inaudible].

Mr Buckley: There is an absolute impact on investor certainty and confidence here. As the chair acknowledged, certainty and required rates of return go hand-in-hand. When I talk to the CEOs and CIOs of our Australian major asset owners and managers they talk about investing in offshore markets, because capital at the end of the day doesn't have to worry about borders. They will go where the best risk-adjusted returns are available. We saw just this week IFM invest $5 billion in Spain. That follows Macquarie investing in Spain last year in renewable energy and grid. At the end of the day IFM had a choice to invest in Australia. They're an Australian based company. They're an asset owner. They're an infrastructure investor. They have to invest on 20-, 30- and 50-year timetables because they're investing in assets with that sort of investment life. IFM only this week invested $5 billion.

As Ms Freeman mentioned, there is a huge missed opportunity. That money is not creating new investment and new jobs in Australia. The investment by Snowy Hydro in pumped hydro storage is crowding out private investment. The proposal to build a new gas power plant up at Kurri Kurri is crowding out private investment. So the government's picking winners. It is picking technologies that private industry would happily invest in. At the end of the day—this may be where we're differing, Chair, on the agreement—Australia is going to see this investment. We've just seen Twiggy Forrest talk about $250 billion of investments. But that is an export orientation. The money's there. Let's facilitate it. Let's grab the opportunity. Let's build our economy, grow really fast and be a world leader rather than doing it despite the lack of a policy framework that would drive investor confidence up, drive investment and mean we're on the world leader scales.

CHAIR: One last question, Ms Steggall, and then we'll go to Mr Zimmerman.

Ms STEGGALL: This is to the Planning Institute and the Property Council. Adaptation and risk management, I would say, are a very clear and present priority that we need to have, especially when we look at the bushfires, with whole communities and a lot of infrastructure being built and destroyed. Are we currently rebuilding and integrating climate resilience and risk mitigation in our building, or is that really a piece that is missing and leaving us exposed?
Mr Brockhoff: We are introducing ways of adapting in our strategic plans for a changing climate, but we're not doing that coherently or consistently. We do not have cascading from the national level a clear understanding of the benchmarks to plan for and how the world is changing around us and how we need to plan for it differently. We don't have guidance on how our strategic plans for different regions, cities and country areas should adopt and reflect changing sea level rise parameters, how they should deal with different fire intensity and frequency, how they should deal with different flood intervals, and how the planning system, before we even talk about individual buildings and construction codes, should regulate the use of land to ensure that what is built and what is built back is more resilient and better able to manage exposure to that changing climate in the future. So we're looking for a national adaptation plan to provide that pyramid, that top-level authority and legitimacy, for strategic planning to do its job better and more cost-effectively.

Ms Muskovic: I'd echo John's comments from a Property Council perspective. What we really lack there is that consistent one-stop shop at a national level for climate risks across the board. We've seen a response, and I think there are some good recommendations out of the bushfire royal commission's report addressing that particular risk, but we need to be cognisant, as John said, that there are a range of natural hazards that we need to be monitoring the risk for and planning for into the future. Unless you have that consistency at a national level in how we're defining risk and tracking it over time, we can hardly expect consistency in the different levels of planning, legislation and frameworks, let alone building standards. So it really does need to be dictated by a common set of data and an approach to reviewing and managing those risks over time. I think that's where we're still missing.

Mr Wheeler: To add to Francesca's point, the risks that we have and the information that we have available to date will be very different to the landscape that we'll be facing towards the end of a building's lifetime. A lot of the buildings built today will be around for 50 or 60 years, and the landscape will be very different then. That's potentially what we should be planning for at the moment. So the establishment of that top-down information and the one-stop shop where people can easily access this information and don't have to go digging for it or rely on overseas predictions of what it might look like would be really helpful to industry.

CHAIR: Thank you, Mr Wheeler. We'll go to Mr Zimmerman and extend the time, with a hard finish at 1.45 pm—so another five minutes, or sooner in fact.

Mr ZIMMERMAN: I'll be very quick. I'll cut my questions. I spoke to Ms Freeman. Thank you for having the most impressive backdrop this morning! I want to know what's in those picture frames. The latest projections from the department saw a figure that was revised upward in relation to renewable energy contributions to the NEM reaching 55 per cent by 2030. Do you think that is realistic at the moment? Would you describe that as an ambitious or a conservative assessment?

Ms Freeman: I don't have the numbers in front of me where I could model that out or forecast that for you. However, I do note that, for example, a step-change scenario by the Australian Energy Market Operator looked at something like up to 75 per cent renewables by 2030, which would be a very ambitious level of action. I am confident we will overachieve on the 26 to 28 per cent target in Australia. We're already at 24 per cent renewables in the electricity sector. Obviously, a very substantial amount is going to be simply forced into the system in New South Wales, which is going to have a very big impact in the National Electricity Market. I don't have the figures, I'm afraid, but, yes, I'm sure we will see a strong level of renewable energy. We could go greater than 55 per cent. We have the smarts to do it. We've got the technology. There's nothing else we need. With batteries, pumped hydro and renewables, we could power the nation—I have no doubt about that. There are new supporting technologies. Whether it's the digitisation of our networks or things like grid-forming inverters that will also support the system, these technologies are coming. So I'm very confident that we could have a very high level of renewable energy penetration by the end of this decade, without any problem. That transition is going to require some work.

Mr ZIMMERMAN: I should note that that 55 per cent was pre the new New South Wales approach, which will obviously add to it. I'll slip in one other final question. Beyond Zero has talked about the value of having a major interconnector constructed between the west and the NEM. How significantly important do you think that would be in supporting a surge in renewable energy projects in the western half of the country?

Ms Freeman: Between Western Australia and the NEM?

Mr ZIMMERMAN: Yes.

Ms Freeman: I'm not sure—

Mr ZIMMERMAN: The logic is that you get an extra three hours of sunlight.
Ms Freeman: It's not something that we've done any work on. I think it would probably be hard to justify. It would be hard to justify.

Mr ZIMMERMAN: Thank you.

CHAIR: Thank you very much, everybody, for attending today. If you have been asked to provide additional information, could you please forward it to the secretariat. The committee may have additional questions for you, which will be sent to you by the secretariat, for your response, on notice. You'll be sent a copy of the transcript of your evidence and will have an opportunity to request corrections to transcription errors. The committee will now suspend for a lunch break.

Proceedings suspended from 13:43 to 14:32
CHAIR: I welcome representatives of the Responsible Investment Association Australasia and the Australian Industry Group. Although the committee does not require you to give evidence under oath, I should advise that this hearing is a legal proceeding of the parliament and therefore has the same standing as a proceeding of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. The evidence given today will be recorded by Hansard. I now invite you to make a brief opening statement before we proceed to discussion.

Mr O’Connor: Thank you, Chair and committee members. The Responsible Investment Association Australasia represents around 350 member organisations, investors across fund managers and superannuation funds who jointly manage over $9 trillion in assets under management. Every day our members are allocating capital across the globe, navigating economic trends and policy environments in order to deliver investment outcomes ultimately for all of us, through our superannuation. Hence, many of them are investing over very long time periods; for a young Australian entering the workforce today, this might be 50 years plus.

As a result of this, climate change is a critical concern to our members, our investors, and they're already seeing the way climate change is occurring and impacting investment outcomes. Globally, we are seeing countries setting very clear long-term targets on emissions reductions, supported by clear trajectories in order to deliver on those targets, out to 2050 in alignment with the Paris Agreement. This has resulted in a significant increase in companies and investors themselves setting their own targets out to 2050, around net zero, in alignment with the Paris Agreement.

Furthermore, investors are increasingly being required to manage for climate change risk. Globally, regulators are setting this requirement. They are seeing climate change as a critical investment risk that has the potential to impact economic stability, financial stability and, ultimately, investment returns. Our members are increasingly being required to report on how they're managing for climate change.

On how this relates to today’s discussion: this has been made all the more difficult in Australia by a lack of clear, long-term direction and a coordinated national climate change policy suite in Australia—in particular, one that sets national emissions pathways, trajectories and emissions budgets which investors can assess and align with to ensure their portfolios are aligned with that long-term trajectory for this nation. This lack of clarity has made the job of allocating capital harder and therefore riskier. The potential is here for this to become a costly risk, if policy settings change over the lifetime of those investments. Therefore, this puts at risk the investment returns for all Australians through our superannuation. It’s also missing really good opportunities for Australia. Currently, capital is either waiting to see where policy settings land or invest in offshore, or is investing in a lower-than-should-be measure in Australian industries. So this is a lack of opportunity of investment flowing into industries that create real jobs and economic growth for this century in Australia.

I want to draw on earlier conversations. We will no doubt still see investment—and we are seeing investment—in alignment with a lower carbon future, but we will see less investment. This has been modelled by groups such as the Investor Group on Climate Change. Even in the next five years alone we’ll see $43 billion less investment, with lack of clarity around policy certainty, trajectories and pathways in Australia. It’s a missing opportunity for jobs and investment, including regional economic development opportunities across many sectors—land, energy, vehicles, manufacturing and beyond.

These are largely the reasons why I've commended these bills to the parliament to consider, and why the RIAA strongly supports the introduction of laws that provide a national framework for progressing our transition to a net zero economy. We see these bills as a really strong step in that direction. I will pass over to RIAA’s executive manager of policy, Nicolette Boele, to finish this opening statement.

Ms Boele: To back Simon’s introductory statements, I have five points of evidence that we draw on from our own research. One is that we undertake annual consumer research in Australia, statistically significant, looking at the sentiment of consumers and Australians. Essentially they don't just want action on climate; they expect action on climate. Particularly after the extreme weather events last year—we're about to re-run the research—we found
last year that three in four, or 74 per cent, of Australians would consider shifting their banking and superannuation to alternative providers who invest responsibly or ethically, and that four in five, or 79 per cent, of Australians think the Australian financial sector has a role to play in ensuring we're less vulnerable to climate change.

We know we can do the heavy lifting on this. Through the co-chairmanship of my CEO, Simon O'Connor, we've run the Australian Sustainable Finance Initiative. We launched a road map in November last year—it's very ambitious—that brings together for the first time insurers, bankers and investors so that we can achieve a healthy environment, a strong and prosperous economy, and, really importantly, jobs. We've done that because we want to align with helping that economy achieve the Paris Agreement and also the Sendai Framework for Disaster Risk Reduction. So we are willing to do the heavy lifting, but, of course, it's faster and cheaper if we have a coordinated approach working alongside government.

We're now starting to see legal action in our industry, and I don't have to tell you that that becomes problematic, costly and, frankly, not ideal. With policy certainty, hopefully we won't have as much of that. The lack of policy certainty is also starting to impact on trade and diplomatic relations. We've already heard today that we have 100 countries now committed to carbon neutrality. In 2020 we had China, Japan and South Korea all announce goals to reach zero gas emissions by around the middle of the century. Those three countries together take in 75 per cent of Australia's exported coal and nearly 60 per cent of our exported gas. So it's making it more difficult for our investors to hold these assets because of the risk of holding straitened assets, and no-one wants those in their portfolio. Of course that all goes right down to jobs.

There is, I think, the good news story, which I would like to impart to the committee as well, and that is that, yes, it is good business to address climate change and climate change risk in portfolios. In fact, our 17 years of research shows again and again that responsible investing, so those that take into account a broader risk of environment, social and governance issues, which includes climate, is actually providing superior returns on one, three, five and 10 years for multi-asset products. So it does make good business sense. That's why we saw, from 2019 to 2020, a rise of 17 per cent in the growth of responsible investment in our marketplace, which takes us to a full 37 per cent of all professionally managed funds are now managed with some kind of responsible investment strategy. That's $1.1 trillion of our total professionally managed asset pool. It's probably also worth noting that the analysis we did around the middle of last calendar year also showed that, amongst the massive market disruption in 2020, those that did responsible investing were weathering the financial impacts of the COVID pandemic better than those who hadn't.

We are seeing our members moving fast to set their own net zero emissions targets, including some interim targets for 2030 and 2040, because it's good business to do so. We've had HESTA, Cbus, IFM Investors, Rest, AustralianSuper and the insurer QBE doing this, just to name a few, and we even had, in December, Macquarie Asset Management. So it's right across retail and industry. This is not something that's a nice thing to do to be socially responsible; this is just good business.

My final point is that we recognise our sector could deliver stronger results by working hand in hand with policymakers. By having a clear policy, we're going to have faster and cheaper assets come into the market because the risk will be much lower with policy certainty.

Mr Reed: I will briefly go through the matters raised in our submission. The Australian Industry Group represents thousands of businesses of all sizes around Australia, including manufacturers, businesses in construction, technology, defence, energy, logistics and many other sectors. We regard the importance of enhancing our action on climate change as very high. Climate change is a substantial threat to Australia, to our economy, to the operations of our members, and of course to the wider community. Equally, successful action on climate change can be, if we match it well, a big opportunity, including to re-establish a competitive advantage in energy, which has historically been an important part of Australia's economy. Neither Australia nor the world is yet on track to succeed on climate. Every nation is and should be in a process of ratcheting up their action and ambition. We support and have supported for some time the adoption of a national, economy-wide, net zero emissions by 2050 goal and an evolution of policy to achieve that and to build competitive advantage in a net zero emissions world.

Returning to the bills, the broad approach in the bills that are the subject of the committee's hearings is sensible and workable. We divide it into three elements: seeking a clear, long-term national goal, which would be helpful in guiding policy and investment; a number of process improvements to how public policy around climate change is developed, reviewed and regularly scrutinised, which would help policy to be more integrated, joined-up and effective—climate change is a matter that goes well beyond the energy sector to many portfolios of government and many parts of the economy, and it is something that a broad, integrated review process would be very helpful on—and, finally, independent advice, which would build consensus and could help policy to last longer but also
evolve as needed by having an improved understanding of the state of the economy and the state of the science. It is important in all of that to preserve the role of the government in governing and the role of the legislature in legislating.

We are perfectly open to other ways of achieving similar ends. In our submission we review a couple of those opportunities. The government could simply commit, as a matter of policy, to net zero emissions by 2050. The government could institute a budget-style process around climate change making, comparable to the fiscal budget involving all portfolios and a regular discipline cycle. The government could centre the existing Climate Change Authority as a source of advice and review on many relevant matters. Within the framework of the bill itself, there are some matters that could be improved with some specifics. In our submission we've provided some suggestions on how to resolve those. We see none of them as fatal or irresolvable. Were the parliament to pass the bills, we think that would be a strong contribution, though hardly the last word, to the long task of building a successful Australian and global response to climate change. I will end my statement there.

CHAIR: Thank you very much, Mr Reed. I will start with some questions, probably to you. Your last comments were about the importance of government governing and legislators legislating. It is one of the discussions we had with witnesses earlier today. Are you satisfied with the bills as they are presented in maintaining the role of the parliament and the executive in decision-making deliberations on climate change? If so, why? If not, what would you recommend?

Mr Reed: As we read the bills, the process that they would establish would leave the federal government and the minister with exactly the discretion and responsibility that they currently have to formulate policy and take decisions on policy, but it would require them to work to a time line around decision-making and review, and to at least consider advice that is provided to them. That seems—

CHAIR: Mr Reed, could I stop you there. We're getting some feedback. We can hear somebody else speaking. If you are on the phone or video, could you please ensure that your phone is on mute, unless you are speaking. Thank you. Back to you, Mr Reed.

Mr Reed: Thank you, Chair. To us, the process appears to be one where parliament would remain sovereign, as it should, and where ministers would ultimately hold responsibility for decision-making, but with the assistance of and the discipline of a framework around the information that is presented to them and the tempo of decision-making, which seems reasonable and certainly not more restrictive than the processes that the parliament and the government have already seen fit to subject themselves to around the fiscal budget, the remaking of defence procurement arrangements and the Closing the Gap process around the position of indicators for Indigenous wellbeing.

CHAIR: Thank you, Mr Reed. I will ask a question of Mr O'Connor or Ms Boele—you can decide who answers. In your submission and the evidence you've given today you've talked about the importance of certainty for investment, and I totally get that. I don't know any industry or any company in the world that doesn't want more certainty so I understand the point. You also talk about the need for a comprehensive policy suite and this is where I'm starting to get a little bit concerned. The evidence we heard this morning from the government agencies about the existing suite was pretty compelling. The framework to manage climate change in Australia and the systems that underpin it seem to be the most comprehensive, timely, transparent in the world. We have other countries coming to Australia wanting to learn. We've also seen record investment in renewables. My question then goes to: is your concern about the policy suite as it exists today, and what it has delivered over the past, or are your comments very much focused on post 2030? Do you know what I mean? Are you saying, 'The system is fundamentally broken and if you'd fixed it years ago investment would be so much better', or are you more focused on saying, 'We've got our eye towards 2050 now and in order to build on what's done so far this is what we need to do?'

Ms Boele: Thank you for the question. I think possibly I'd probably go to the latter of the two. For us 2030 is possibly two business cycles away. I'm looking at the member for Macnamara—I might have done a little bit of cyberstalking on him and worked out he is quite young. Providing we keep the preservation age of 67 it might be the year 2055 before he retires, and this suite of policies, if you like, is taking us to 2050. Our members who are registered superannuation entities, trustees, have a fiduciary duty to their members to act in their best financial interest for their lives. If they have someone at the age of 16 who is joining the workforce now and is contributing to superannuation in a mandatory capacity, it could be the year 2072—provided we don't move the age from 67 further away—before they retire. I'm absolutely looking to the future. The past is the past but it's possibly why we really need this coordinated approach. I'm not sitting before you critiquing the suite of measures we have, but we need to set a direction that says where we're going, why and at what pace. They're the kind of parameters that are going help us make some of those decisions about our big assets.
If you look at the ASX and the market cap in terms of the sectors to which we have exposure we have a very, very heavy tilting towards minerals and resources, and we're very proud of that. But there are countries out there who don't want to take our exports at the moment—for other reasons as well—and that's not good for our economy. It's not good jobs. It's not good for communities in certain areas of Australia. So we quite genuinely understand that we need to have our universal assets. These are the things that we call 'the tide that lifts the boats'—this is fast broadband that's reliable, this is cheap electricity that small businesses can use, this is our education, and this is our health systems. Investors who are our members are investing in these universal assets at hopefully the least cost, because that helps lift everybody up so that they can make money, people can have retirement savings and that sort of thing. That's why we need the certainty about where we're going and at what pace. That's the sort of signal that reduces policy risk for us, and then we can start doing all the other pricing stuff and making money in other areas where we've got opportunities and what have you. That is what we are really asking for from government. Perhaps, Simon?

**Mr O'Connor:** Only additionally, I would make a distinction to say that we in Australia do have some really strong mechanisms, data and measures in place around measuring climate and measuring emissions. That actually makes it a lot easier for us to take the next step in this job, which is around those long-term targets, budgets and trajectories and ensuring some reliability and consistency in their timing and that they're informed by science and have some independence in them so that those long-term investment decisions can be made assured of that underpinning future state and trajectory we're heading toward. So I think there's an important distinction to be made there. I don't disagree we have some really strong assets in our climate policy suite already in place. It's the full package we don't yet have to complete it, and I think this bill brings in a number of those elements we've been looking for.

**CHAIR:** Thank you. We'll go to the—

**Mr Burns:** The googled—

**CHAIR:** googled one!

**Mr Burns:** member for Macnamara! I'll have to check my Google review after this to make sure it hasn't dropped a couple of stars—I kid! Maybe we'll give both the Responsible Investment Association Australasia or Mr Reed a chance to answer this question. You've both sort of touched on it. Ms Boele, you mentioned in your response just then about how the Australian economy is interplaying with the international economy and especially how climate change is such a big factor in that. I'd be interested in your view on the world, especially some of our big trading partners and those people who are buying our resources and buying our big assets right now, and what the trends are going into the next 10 to 20 years. If we aren't moving, diversifying and changing with international demand, what sort of financial position is that going to leave the Australian economy in? In the context of this debate, how does that relate to the demand of wanting to do something about climate change as well? I'd be interested in your thoughts on all of that.

**Ms Boele:** Can I ask a question of clarification? Are you referring specifically to the industries that comprise our economy?

**Mr Burns:** I think that, most specifically, you mentioned the resources sector and what the demand is at the moment for Australian products, but where is that heading, what are the changes in international demand, and what is that going to do to us if we don't move with that demand?

**Ms Boele:** Simon, do you want to go first?

**Mr O'Connor:** If I sit here from a finance perspective, what we're seeing globally is this rapid shift to embed climate change policy requirements and compliance requirements for global capital markets. At the moment in Australia we're a receiver of that. We're having to try to second-guess the changes that are occurring. We risk at worst that capital flows away from Australia, that Australian capital increasingly flows offshore and that we miss the opportunities for investment here and even beyond that—that we start seeing things such as border tax adjustments on some of our resources that already impact some of the ASX listed companies operating here. This makes investors nervous about our exposures. You will see increased allocations to international offshore investing and capital flowing out of Australia. This is a greatly missed opportunity.

You heard a reference earlier of IFM investing offshore in a large Spanish renewables company in the last week. Many of our major asset owners, superannuants, setting net zero targets in place mean they will start shifting the flow of capital towards lower carbon assets, and they're going look for those opportunities en masse. We have a choice right now as to whether we want that capital to stay here to invest in our industries, our economy and our jobs or whether we want that to flow offshore. At the moment, to be blunt, the more attractive destination for that capital is offshore, and that's where it's going. So we are losing that amount of additional capital investment that
could be happening here. I heard the discussions earlier. There is still really good, strong investment occurring in Australia, but it could be so much greater. So there is that opportunity cost of what's been lost here, and that's been captured and quantified quite strongly in some economic research undertaken by the Investor Group on Climate Change. That was noted in their submission.

Ms Boele: I would add that there's probably not that much sympathy for us white-collar finance people. The other part of the ASX, of course, is the finance sector, the banks and what you have you, and certainly we've lost that enviable lead that we had probably 20 years ago as a carbon hub. I can probably name all the Christmas cards I had to send over to London, Singapore and other places where all my besties had gone to take jobs in different markets. There is a real rush in South-East Asia and in Europe to be the hub for sustainable and responsible investing. It won't happen here in Australia; I think we may have missed out on that one. That, again, goes to a very large part of who we are in terms of what we can invest in with the ASX—not just mineral resources but also, because these proposed bills also deal with climate change adaptation and risk management, our tourism and services sector. I'm sure you're fully aware, particularly as this is happening in many of your electorates, that this is mopping up a lot of semiskilled and other non-white-collar people in jobs. Our tourism industry, under climate change, is one of those industries that, of course, bear the brunt of that. I've just come from the South Coast of New South Wales to Canberra today, and in Bega they're giving out vouchers for people to go back to restaurants and what have you. So it's a real thing—bushfires, floods and business continuity in those areas.

Mr BURNS: Thank you both for your answers. Mr Reed, is there anything you want to add on this topic?

Mr Reed: Yes. I'll try to be brief. Looking internationally, we are seeing an acceleration of commitments and substantive action by major economies and by large businesses around the world. You may have seen General Motors' announcement overnight that they would seek to be a carbon-neutral company by 2040 and that they aspire that all of their light-duty vehicles by 2035 will be zero emissions. That is an increasingly common form of ambition. We are going to see more commitments and more announcements through the course of this year in the lead-up to the Glasgow conference of the parties. That said, it's going to be a long, grinding ratcheting process, a bootstrapping process, of countries lifting their ambition and following through on that and deepening it further. We are not going to solve all of our problems this year.

If we look at the impacts for Australia, we see opportunities, threats and uncertainties that have been reported. In terms of opportunity, there are a lot of mineral inputs that are needed for building a clean economy. Some of them are things we already predict. Alumina and aluminium are likely to grow in consumption in the world of lightweight surface vehicles. Others face uncertainty, such as iron ore: the world is going to continue to need steel, but the world may be recycling more of its steel and producing less primary steel going forward. But equally that could go the other way. If we look at some of our exports currently—thermal coal, metallurgical coal and natural gas—there are pretty dark clouds on the horizon for those, albeit with some technological uncertainty around the prospects of carbon capture and storage in particular.

So we are going to have to work very hard to manage the threats and to capture the opportunities, because plenty of other countries can do what we can do and are looking to take up those opportunities. Saudi Arabia would like to be the Saudi Arabia of clean energy too, and they're going to give it a go, because if they don't manage that transition as oil demand peaks—which it may indeed have already done last year—they will have even bigger problems than we would if we failed to manage the dismount from some of our current export sectors.

Mr BURNS: How are we going for time?

CHAIR: Why don't we go to Ms Steggall?

Mr BURNS: Sure.

CHAIR: Then we'll cycle back to you if we have time.

Ms STEGGALL: Firstly, I will follow up with Mr O'Connor and the whole panel in relation to investment and current policy. The department's evidence this morning was: 'We've already got legislation'—and I should say their submission at attachment A identifies that we've got the Climate Change Authority, the Clean Energy Regulator, the Australian Renewable Energy Agency and the Clean Energy Finance Corporation as far as domestic agencies go; our international policy is under the Minister for Foreign Affairs, when it comes to treaties, for example; and then our adaptation resilience is under the Minister for the Environment and a different department. So, when you say 'policy certainty'—just so the committee can understand, is it a fair description that, at the moment, we have a piecemeal approach that is very focused on energy but no other sectors, and, in fact, it's the whole accountability that we're missing in Australia? The bill is modelled on the legislation in the UK and that has driven significant certainty and investment, so maybe you could comment on that.
Mr O'Connor: I will start, and Nicolette will have more to add. I think you're right. We see each of those pieces you've cited—from CEFC to ARENA to the Climate Change Authority—as serving a particular purpose that is quite useful in the broader scheme of how we are going to respond to climate change. What we really are lacking is that overarching piece that brings each of those pieces together to make it much clearer and more precise as to who is delivering on what piece of the Australian national climate change response, underpinned by long-term budgets and targets and trajectories. They each need those to most efficiently operate, and each of those will serve some part of the economy. But I guess, from a large institutional investor perspective, those large long-term goals are really what's missing—and that coordination across those agencies. I think we have good data; we have great support for venture capital early-stage investment through ARENA; we have early commercialisation from CEFC. We see all of these as quite useful tools, but it's really the coordination beyond that.

I think you cited as well: is this for us, as an investment community who invest across the whole economy? This is so much more than just an energy sector issue. This is land; it's transport; it's infrastructure; it's property; it's manufacturing. So we really need to see a whole-of-economy response. That's where we see the missing piece that we really want to be filling here, to give that reliability, consistency and alignment between each of those elements that we already have in place. So I don't argue that those elements do not serve a purpose that is useful as part of Australia's climate change response, but it hasn't got the holistic economy-wide response from a long-term, broad, economy-wide investor—a universal owner of all assets in the economy. That is really what's missing there. Nicolette, I will hand to you, because you will have more of the specifics, I'd suspect.

Ms Boele: I agree with Simon; it will just be additive. Whilst we don't need everybody reporting up to the one area, there are obviously things coming out of defence, agriculture, fisheries and forestry; there's the cities angle; there's transport—all of that. They're all impacted by or create emissions—and it's not just about emissions; it's also about resilience and adaptation investment. I did have another idea, didn't I? I've forgotten it. I'll have to pass on that one.

Ms STEGGALL: Are you familiar with the legislation? It's modelled on the UK legislation. From an investor point of view, have you seen or modelled or compared how much progress has been made in the UK as a result of having bipartisan framework legislation and how that has driven confidence, compared to what I would call the haphazard approach that we have in Australia?

Mr O'Connor: Yes, I do think it's about that coherence, that bipartisan nature, which I see as really important and which is a great opportunity that can be delivered through these bills. But it's also that reliability—knowing that we have set a commitment to five-yearly budgets. We will see. On Monday, the New Zealand Climate Change Commission will be releasing their first advice to government, for example. We see these as really important pieces under which all government departments can align and direct, and we see this as a really critical missing piece, and it's one that we think is partly solved by these bills. That's all I would add to that.

Ms STEGGALL: Maybe Mr Reed can comment as well.

Mr Reed: Certainly. I just add that every jurisdiction has similar problems. Climate is a big, complex, multifaceted issue everywhere. The state of Victoria, which has its own version of legislation along these lines, is grappling now with how to tie together the work of different portfolios and ministries in their first run through of the process established by their act. We do have some strong pieces of the policy framework or tools in the box at the national level in Australia. We also have gaps and areas where, as others have said, clarification would be very useful. For instance, the Clean Energy Finance Corporation needs, as part of its existing work, to form a view of what low-emissions technology is. If the parliament passes the legislation for the Grid Reliability Fund, they will need to form a view of what a low-emissions energy system is. Their job in doing that would be greatly assisted by a clear steer of the long term, the endpoint, rather than some commitments over the next nine years.

In terms of gaps, we have a pretty important gap between the sorts of projects and technologies that ARENA can support as demonstrations, pilots or early-stage work and the sorts of investments and projects that the Clean Energy Finance Corporation can support which must be close enough to commerciality in their own right that the modest level of concessionality that CEFC can offer suffices. Between those two things is a valley of death where many climate friendly technologies that ultimately will be cost competitive are too expensive to be viable without some big policy of some sort. These bills as we see it do not themselves fill that gap, but by having a regular, integrated assessment process of how we're doing, what current policies amount to, where we need to be and how we can get there—they create a reliable mechanism for finding those gaps and filling them through the policies that the government of the day chooses to devise and is able to legislate where necessary.

Ms STEGGALL: Thank you. We heard from the department this morning. It was, I would say, not happening, but maybe unclear from other people's view whether the department is in fact modelling a trajectory to net zero, whether it be by 2050 or not, and what that will cost. The government at the moment will only say that
the commitment is net zero 'sometime in the second half of the century' or 'as soon as possible'. How concerned are you with your respective industry and investment that the government or the department may not in fact be modelling and calculating net zero as soon as possible?

Mr Reed: I'm happy to start there. We need to be cautious of how much we expect from economic modelling. Economic modelling is a useful way of thinking through the coherence of our assumptions and testing policies for their interactions, but it is definitely not a crystal ball. We can see from the repeated revisions downward of the emissions projections updated by the federal government every year just how hazy a crystal ball it is, even for the next few years. The importance of government looking to 2050 or looking to net zero is probably more in the coherence that it lends to and the tests that it lends to policies, investments, trends and developments in the near term rather than: 'Are these consistent with where we have agreed we need to be? What will the consequences be down the track of a near-term action?'

Those are useful things that modelling can help with, but, in the absence of a dollar figure or a precise model trajectory, the one thing we know is that it's going to be wrong—and probably wrong based on the experience of the last couple of decades in this particular area. We are probably overestimating the difficulty of achieving our goals and underestimating the power of innovation and the workings of the market when it has a strong, clear policy framework to work around.

Mr O'Connor: Can I just add to that?

CHAIR: Go ahead, Mr O'Connor.

Mr O'Connor: What we see as an important piece here is, as a nation, we have committed to achieving the Paris Agreement objectives, and, as a result, we would expect a national government to have a view, in broad terms, as to what that pathway or those pathways towards that may look like, without prescribing a percentage to every single mix of energy versus transport et cetera. There will be a lot of change in that over time. Having that view will certainly help to ensure that the private sector and financial services can align behind a particular view.

The data that we do have—noting Tennant's comments, which I do agree with, that the modelling will move around will give us a sense of the direction of travel. We need to at least be attempting to do that. When we see that there is the potential for a lost opportunity, according to that IGCC economic modelling, to the extent of $385 billion between 2020 and 2050, if we don't have strong and clear pathways and 2050 net zero commitments, that to me is concerning enough to say we need to start filling that information gap. We have investors now being required by APRA to start doing their own scenario testing out to 2050 and being able to report on that. It would be helpful if, at a national government level, we also started providing some of that information and some guidance as to the direction of travel. I will leave it there. Do you have anything more to add, Nicolette?

Ms Boele: I always bring it back down to jobs, which is being quite blunt. The finance sector needs people to have jobs so they have money so they can spend it on the goods and services that businesses want to sell. I'm listening to some of our members, particularly our asset owners—the superannuation funds—talking about not having clear direction from government in terms of the pace, for example, with which we wish to decarbonise the economy. It's troubling because there are a disproportionate number of communities that are going to be impacted by, I suppose, absent voices. There's jargon around a 'just transition', but there are some electorates where people are going to have a lot of pain, and we are concerned about that, as are our members. There is a responsibility, and I don't know whose it is. We're willing up to roll up our sleeves and play our part. Some of these communities need to transition out of what they are currently dependent upon for their livelihoods and their jobs—and all of those SMEs that are in those value chains in those communities—towards jobs that are part of a lower-carbon future, and there are many of them. That's the exciting thing. It's not a trade-off thing. It's about timing, it's about accountability and it's about leadership. I think what we're looking for, with this coordinated approach to climate, is some leadership on this one.

CHAIR: Let's go to Mr Zimmerman.

Mr ZIMMERMAN: Firstly, Mr O'Connor or Ms Boele, can you explain in simple layman's terms how you model future forgone investment in the way that you suggest many people are doing?

Mr O'Connor: Basically, the result of a lack of clear settings, guidance and trajectories is leading to two outcomes. One is that capital is flowing preferentially offshore instead of seeking those investment opportunities in Australia. Secondly, investors are choosing to wait and see rather than deploying capital now. That's effectively what's been modelled through the piece of modelling that I'm referring to there, where they're starting to forecast how that is actually playing out and project that forward, based on clear policy signals versus a lack of clear policy signals. And then, as with any economic modelling, there is a base of assumptions that underpin how that's modelled out.
Mr ZIMMERMAN: What types of sectors do you think are missing out from investment because of the perceived lack of certainty?

Mr O'Connor: I think that particular report cites energy; it cites the opportunities in vehicles, including heavy vehicles, such as charging infrastructure; it cites manufacturing sectors; and it cites the land sector as a massive opportunity for carbon abatement, for example.

Mr ZIMMERMAN: Let's take energy, for example. The trajectory is pretty clear in relation to energy, and the renewable energy alternatives are clearly more economically sensible than most of the existing technology that we deploy in Australia. Under those circumstances, what is the hesitation caused by?

Mr O'Connor: I can pass to Tennant; I see a hand going up there. But my response to that would be, operating under a market of full information, what we're seeing at the moment is that it's who's investing in what kinds of energy assets. So, at the moment, there is investment in renewable assets, but it's more coming from private households or government funded as opposed to large utility scale, which we're not seeing. We heard some of that discussion earlier today. It's about who is investing and the opportunities from leveraging the larger-scale institutional investment as well. Tennant, I saw your hand go up, so—

Mr ZIMMERMAN: I might come to Tennant in a tick once I've finished this. But why wouldn't they be? That's what I don't understand. For example, there is little doubt that any state or federal government is going to be directing the energy sector to include new coal-fired power stations, for example, at scale.

Mr O'Connor: I think to date there is sufficient noise and debate in policy circles—

Mr ZIMMERMAN: Despite the dreams of some, I should add.

Mr O'Connor: Yes, that's right. And, even in the last couple of days, there is the talk of government funding a gas-fired plant and talk of ASX-listed companies such as an AGL who put in place a transition plan and a very clear retirement plan for plants but is supported by its investors and then is threatened or not allowed to go ahead by political interference, which makes this very unpredictable. And, really, it's these big, chunky retirement phases of this very dated fleet of energy-generating assets we have in the NEM right now that we know will be retired. But it's the timing and sequencing of those, if we're to bring on new utility scale assets to fill those gaps. And that is very hard to pick right now, particularly when it's taken out of the hands of ASX-listed companies in a measured way.

Mr ZIMMERMAN: Presumably the certainty being provided by the New South Wales legislation will address that in New South Wales at the very least. Let's take another example: the transport sector. Whatever happens, it's largely going to depend on some market factors in terms of electrifying the transport sector and things like price parity et cetera. It is unlikely, you would assume, that you would see the government exercising a significantly heavy stick, at least in the short or medium term. And we're already seeing, obviously, the players redirect their own internal R&D and investment towards electrified or hybrid vehicles. So why would the private sector have doubt about the value of rolling out charging stations, for example?

Mr O'Connor: I guess it's the pace of change. What we're seeing in many developed, advanced nations globally is very clear policy signals to help set the pace of change towards the electrification of vehicle fleets, for example, which makes it much easier then to predict that, in five years time, we'll need X number of charging stations across X number of parts of the economy. When we have none of that direction feeding down from government policy through to Infrastructure Australia's policy priorities, for example, it takes much more of the certainty out of those kinds of decisions and just makes them harder to align. So we've become takers of global trends rather than makers of national direction ourselves, in that sense.

Mr ZIMMERMAN: The issue I have is that, if we've got a headline target of 2050, working backwards, it is still going to be up to—I'll put it this way—partisan decisions of the government today as to which levers to pull and not to pull through each five-year period, for example.

Mr O'Connor: Yes, but I think then we can start saying, 'Right, we've got some scientific input and advice into that.' We already know some really good data around greenhouse gas abatement curbs and the most effective and cost-effective industries to shift, so we would assume that that kind of data would inform the next five-year budget and you'd say, 'Let's work on those cheaper segments, land or vehicles or energy, and then move onto those harder to abate sectors.' We think there'd be more science, and it means that we could go away as investors and do the analysis ourselves. There will be investors who are better at navigating that, but under more consistent and predictable terms.

Mr ZIMMERMAN: Tennant, did you want to comment on that narrative?

Mr Reed: Yes, thank you, Mr Zimmerman.
Mr ZIMMERMAN: If I can I be rude enough to call you by your first name, you can call me by mine.

Mr Reed: Thank you. Thinking about if the global trends and the national trends are clear why would anything dissuade investors, if we look at power Australia is a globally significant supplier of energy today but not by our electricity. Our electricity sector, as important as it is to all of us, is globally insignificant. What we supply is coal and gas and a bit of oil. We have an opportunity to help the world decarbonise and to make a lot of money along the way, but we are not in any way guaranteed to win that role. So securing our place as a home for globally significant investment, whether that turns out to be in direct exports of electricity in the making of hydrogen or in the making of energy intensive goods for world markets, like clean aluminium, is something we really have to fight for. And just knowing that eventually, yes, most likely all of our retiring power plants will be replaced by a combination of wind and solar in various forms of firming does not put us in the box seat to get that investment.

With respect to transports, the global auto industry is prioritising the delivery of EVs and low-emissions vehicles to jurisdictions that require it or support it or otherwise encourage it. There's plenty of room for us to be at the back of that global pack for quite some time. That would have consequences for our emissions trajectory but also for our ability to seize the quite tantalising opportunity to actually cut the cost of electricity supply through the smart integration of electrical vehicles. That's a tough goal to achieve. We have to do a lot of things beyond just have the vehicles to get grid services from them, but we can't get that all and we'll be paying more for our electricity as a result if we don't have a healthy fleet of those vehicles over the next decade and beyond.

Mr ZIMMERMAN: I have one final question to you as well about your submission. In your submission you make a point about the impact of the current structure on international emissions units. Can I get you to talk about that a little bit more?

Mr Reed: There is a reference in the current draft of the bill in, I think it is, section 26 subsection 9, which is aimed at preventing the carryover of assigned amount units from the first and second commitments under the Kyoto protocol to count them against Australia's Paris Agreement commitments. That objective is fair enough. There are some concerns, internationally and domestically, about that proposal, and the government itself is moving away from that proposal. We expressed a concern in the submission that as drafted that provision would have a wider effect of preventing any carry forward of units from future periods to later periods or, indeed, the use of international carbon credit units that may in future be used and accepted within Australia beyond one accounting period, so we recommended a narrower redrafting of that section to focus on what we take to be the intent of it.

CHAIR: Thank you very much. We might leave it there—this has been most productive. If you have been asked to provide any additional information, could you please forward it to the secretariat. The committee may have additional questions for your response on notice, which will be sent to you by the secretariat. You'll be sent a copy of the transcript of your evidence and will have an opportunity to request corrections to transcription errors. Thank you for attending today.
ARMSTRONG, Mr Dennis, Member, SOS Central West NSW

ARMSTRONG, Mrs Margaret, Member, SOS Central West NSW

[15:34]

CHAIR: I welcome SOS—Save Our Surroundings—Central West NSW to give evidence today. Do you have any additional comments about the capacity in which you appear today?

Mrs Armstrong: I’m an SOS member and probably the head researcher, I guess, for SOS.

CHAIR: Although the committee does not require you to give evidence under oath, I should advise you that this hearing is a legal proceeding of the parliament and therefore has the same standing as a proceeding of the House. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. The evidence given today will be recorded by Hansard. I now invite you to make an opening statement, and then we’ll proceed to a discussion.

Mr Armstrong: Thank you for inviting Save Our Surroundings—SOS—to participate in today’s hearing on these 2020 climate bills. My wife, Margaret Armstrong, the main researcher, is seated beside me. Members of SOS and others already live with the negative consequences of Australia’s emissions reduction fever. Every wind and solar advisory body, development application, environmental impact statement, climate related legislation and company reports et cetera that we have read use the reduction of CO2 emissions as justification for destroying the natural surroundings and people’s lives, both in Australia and overseas. Yet, you will not find any mention or analysis in these papers of these negative consequences.

As spokesperson for the many and growing number of community groups that make up SOS, I will endeavour to answer questions you have about our submission. It reflects both our extensive research and personal experiences, especially in relation to weather dependent renewables. SOS has extensive experience with weather dependent renewables. Just last week, I read the 966-page EIS for a 400 megawatt capacity industrial solar works that will, among other things, fence off an area of agricultural land the size of the new Western Sydney airport—which is twice the size of the existing airport. It is unreasonable to expect anyone, let alone local farmers, tradespeople, businesspeople et cetera to read and understand such documents and then have the time and resources to prepare and submit a submission for each development application.

Many more of these massive industrial developments are under consideration within a few kilometres of our town. Despite the enormous amount of land involved and the material consumed, a total of eight such 400 megawatt solar works will produce electricity, on average, less than 30 per cent of the time and, on the cloudiest day, will produce less than 10 per cent. Where will the other 70 per cent and 90 per cent come from? Are there less resource-intensive alternatives? For example, just four 250 megawatt combined-cycle gas turbines, or one 1,000 megawatt nuclear power plant, require a fraction of the lifecycle resources of renewables but will provide the same amount of electricity that is able to be provided over a 24-hour period every day. Our submission includes the November 2020 SOS research paper, which details a lot more than the claims I’ve have just made.

Why am I the SOS spokesperson? There are two reasons: my background and quotes like the following from impacted farmers. When a decision was made to go ahead with a particular solar farm, one of the members there said, ‘It’s gut-wrenching.’ For another solar farm in a totally different part of our region I received this message: ‘Hi Dennis. I’m gutted. We lost. So unfair. In anger.’ We’re now talking about hundreds of people in our regional areas feeling like this.

My background: although I’m now retired, all my adult working life involved identifying, developing and implementing better ways of doing things. My career included several years in electronic engineering, management accounting and management consulting. I worked for 15 years in the telecommunications industry and 21 years as a management consultant, including several years in my own consulting and project management business. I consulted and managed transformation projects for many Australian and international organisations, such as the Electricity Commission of New South Wales, Sydney Electricity, CityRail, Westfield, Hamersley Iron, Boral, Rexel and the Department of Defence. I believe my qualifications and experience enable me to assess the merits or otherwise of a wide variety of claims and proposals.

In relation to the two bills, the first thing to establish is whether the stated purpose can be achieved—that is, for Australia to limit global temperature increases to below 1.5 degrees Celsius by mandating a target of net zero emissions by 2050. Whether Australia has a zero or 50 per cent or a hundred per cent target and achieves any one or all of them, the result will be the same—that is, no measurable change in global temperatures. Our Chief Scientist confirmed what is mathematically obvious—that is, even if Australia reduced its total carbon emissions to zero it would do virtually nothing to reduce global temperatures. If these bills were to become law, the whole
restructure of the Australian economy and our way of life would be drastically affected for no climate benefit. Mandated targets along the lines already seen in the electricity generation industry become almost the sole justification for ignoring the many negative consequences that are the reality of ignorance. Therefore, the climate 2020 bills should be disregarded.

While there are many more things SOS could say, I'll be happy now to take questions from the committee. Thank you.

CHAIR: Thank you very much, Mr Armstrong. In your submission, in the last page of the letter—I think it's your page 5; for colleagues it's page 154—you say, 'We are very concerned with the sweeping powers proposed for the commission.'

Mr Armstrong: Yes.

CHAIR: Can you please elaborate on that point.

Mr Armstrong: If you really look at the wording of this, where the minister is not able to direct his full ministerial roles and he has to accept certain recommendations under the conditions that are associated with the bill as presented, we think that the responsibility for the minister is diminished. He would have difficulty, in time, if this committee were then able to put forward things that may not in a normal sense, in our view anyway, be based on proper science—because we've already found that to be the case. He is then in a difficult position. He's in a difficult position for two reasons. One is the pressure of the various governments overseas. The IPCC rulings and things like that which we're a party to mean that he's unlikely, even if he believes they're not right, to go against what may be recommended—even though it may be fallacious. That's what I was trying to get at there.

When I say 'sweeping powers', I mean that if you just read some of what the bill concerns, with any information provided between two leaders of a country it basically doesn't specify how that can occur. I gave you the example where a tweet or a private letter between them could be used by that committee to justify an emergency situation or something in need of further action, without it actually having been supported if the scientific evidence isn't there. That's what we're trying to get across there.

CHAIR: I'd just seek your clarification on an extended point. We've heard today a comparison between how Australia has managed the COVID-19 pandemic and how Australia could manage the issues of climate change. I note that in your submission you say you have concerns—I'm trying to find the exact wording—that federal and state health advisers 'each had different "expert" opinions on how to deal with the pandemic'. What is it you're getting at there?

Mr Armstrong: What I'm getting to is that the bill itself says it's based on science, and we raise this issue: which science? Science is not an absolute thing. Science is a continuum. Therefore, which science do you use? We've got, in our paper, plenty of evidence and scientific papers which are in disagreement with a number of other sources. There isn't this absoluteness. But the way this bill is written is that the science would be the absolute. When you get that, you get the problem of people justifying their selective bit of science, which we've found with the pandemic: each of the states doing their own thing. But, admittedly, they didn't really tell us what science they were basing it on, and there was definitely contradictory science available, whether it was about masks or whether it was about lockdowns. The World Health Organization said that should be a last resort. In Australia we've seen it as a first resort. Borders were closed instantly. Half a dozen people get sick in North Sydney, and what do they do? Queensland closes the border. The Northern Territory closes the border.

Mr ZIMMERMANN: Northern Beaches, not North Sydney.

Mr Armstrong: Northern Beaches—correct.

CHAIR: You're touching on a sensitivity of the member here.

Mr Armstrong: Don't worry—we lived there for 39 years, so we know the Northern Beaches well.

CHAIR: Please finish your thought, sir.

Mr Armstrong: You distracted me then, sorry. The thing is that those were the actions that were taken. Now, the driver was just health—except for New South Wales, which did worry about other people, did worry about the economy, did worry about jobs and, as I read today, saved $9 billion in taking the approach they did. Queensland didn't. Queensland is now asking for hundreds of millions of dollars of extra federal money for decisions that they made. That's my point. Each of these states said, 'We're taking the medical advice.' Can you tell me what the medical advice was in each of the states? It wasn't published. It was asked for; it wasn't published. This commission in the bill could do the same thing, simply because of the way the bill's written. It's so loose. It's so wide sweeping. That's the problem.

CHAIR: Thank you, Mr Armstrong. Let me go to Mr Burns.
Mr BURNS: Thank you, Chair. Mr Armstrong, can you tell me a little bit about your organisation, Save Our Surroundings?

Mr Armstrong: Yes. Save Our Surroundings started in about July 2019. We, at Gulgong, had a DA put forward for a solar works that was going to be 600 metres from our town boundary. We're only a small town, with 2,500 people. As a result of that, some concerned residents approached us, and we had a group that got together and said: 'We've got to fight this, because there are so many things wrong with this. There's so much danger, particularly in terms of fire.' When we have big fires like the one we had at Dunedoo in 2016, with a 12-kilometre-an-hour fire front—it was three minutes away from our buildings. If a fire like that starts on a solar farm, firefighters cannot go on the premises to fight it; they have to fight it at the perimeter. When you're looking at 16 hectares, that's a big area to try and fight a fire on at the perimeter. That was one of the things.

The other thing was contamination from the panels. We have the Beryl solar farm only five kilometres from the town. That's a big one—it was the third biggest, but it's small these days; it's only seven megawatts—and it's got the most toxic panels available.

Mrs Armstrong: Cadmium telluride.

Mr Armstrong: We found out a lot of these things as a result of our group talking. So we started off with that group, we fought it and we won it. We got four-nil from the independent Western Regional Planning Panel, who agreed with us that that was the wrong thing to do.

Out of that, then, because we found out some information, we realised that people didn't know a lot of this stuff. You never read about it in the papers, but there's a lot of material available. So we went from there. The SOS started a monthly bulletin, which is published in our Gulgong magazine. We wanted to educate people. It moved then to another DA, 4½ kilometres outside of Mudgee. Because we'd had a win, we had contact from Queensland, from Wellington, from Orange, from Greater Hume and from Mudgee—they phoned us up. We also beat that one at Mudgee, five-nil.

So the community has grown. Because of our win, and the information and education that we've put out there, they realise what the risks are now. They realise they're not being told what dangers there are. They realise that animal life is being destroyed. When you fence something off something the size of Western Sydney airport—or, if you don't understand Western Sydney airport, twice the size of Sydney airport, which most of you would certainly know—with a 2.4 metre fence all around, with barbed wire at the top, you tell me where all our wild animals go. On our property—we only have a small property, under six hectares—we had 30 species that went through in the last 12 months, I can tell you: turtles, frog types, kangaroos, echidnas, all sorts of animals. Some of those species cannot go into that area we're going to fence off. We're not just fencing off one; we've already fenced off 310 hectares for Beryl. There's another one about to go down on the other side of our hill. Heaven knows how that will go, because they're getting bigger all the time. They're just taking up massive amounts of land, completely cutting them off from our township, and they're all within 10 kilometres of our township. I walk five kilometres every morning before breakfast, and I could easily walk twice that. If I did that, I'd walk to any of the several solar farms that exist now.

Mr BURNS: How many members do you have?

Mr Armstrong: We're a decentralised group. In the central group, which is us, there are a number of us. I don't know the number, and I'll tell you why: decentralised. When I get somebody phoning me up saying, 'Our group has been fighting the one at Wellington'—there are several solar farms at Wellington; this one was Suntop 1, and Suntop 2 is now being proposed. They said, 'We've been fighting that.' They heard about us. We disseminate information. With that paper you saw, we developed that paper simply because we wanted to educate other people and we wanted them to know what was going on. All the references are there: the scientific papers have all been quoted; I've quoted every single source; every single dot point has multiple references. We cross-check things, we make sure we're as accurate and factual as possible and then we pass that out. In each of the groups—Queensland is quite a big one. I believe—we only deal with one person; we're only two people. We only deal with people through email; we will not go on social media. I have some correspondence here that I can show you. People send us information, send us links, tell us about the batteries, tell us what's happening at Beryl now—they're doing another adjustment to the Beryl solar works—and, consequently, they all know. They run their own show.

Mr BURNS: But the Central West branch is your branch?

Mr Armstrong: Yes.

Mr BURNS: How many are in that branch, roughly?
Mr Armstrong: It varies. Some people have left the neighbourhood, and things like that. I distribute information to multiple sources. Of people that we would call members—we don't have titles, we don't have hierarchy, we don't have money; we're just volunteers, and we do what we do because we love where we live, our environment, Australia and the world—we're at about 22 people for our group. I send out our publications to many other people—politicians, media, everything. We've now gone to a second publication with another body—the Midwestern Mail, which only started up in December. The first one will be this month and the next one will go into February. I send out to our local politicians, and other politicians, probably 30 of those as well. So that's just the central bit. Then we've got Orange, Wellington and Greater Hume. I have no idea what—I don't ask them; I'm not interested in how many they have. I'm not going to contact their people. I'm only going to contact what we call the lead, and we deal with them and they deal with us.

Mr Burns: Perfect. Thank you very much.

Mr Armstrong: If I may extend one bit: just remember, I said Gulgong was a town of 2,500 people. There were 445 submissions made on the Gulgong solar works I was talking about, and 439 were against it. In the case of the one in Burrundulla, just outside of Mudgee, over 1,100 people were against it and hardly anybody was for it. How many members? I don't know. These are the people in our community who, when we say, 'These are issues', submit lots of reasons—at least some of them based on the fact that they have some knowledge. When you have to read a thousand-page EIS or hundreds of pages of a DA—these people are farmers, and they don't just farm; they also work in administrative roles or in tradie roles. They do all sorts of things. They don't have time. So I took it on because I was asked to take it on originally. I didn't start this. Somebody else started it, but they left and I took it up.

Chair: Thank you, Mr Armstrong. I might go to Ms Steggall.

Ms Steggall: It is good to hear your concerns in relation to loving your environment. We've heard a lot of evidence today from a number of organisations about how real and urgent the risk of climate impacts to our environment is. Do you accept that there is an urgent risk to our environment as a result of carbon emissions?

Mr Armstrong: What we accept is that, no matter what Australia does, we will not make any difference to the global environment. Do you agree with that?

Ms Steggall: No, I don't agree with that.

Mr Armstrong: Alright. Mathematically, the chief scientists of Australia and many, many other scientists and other people would disagree with you. Therefore, my view is that we can't do anything. Yes, China can do a lot. Yes, India can do a lot. Yes, the USA can do a lot. Seventy-odd per cent of the emissions are being generated by them. Unless they do a lot, why should Australia go down the path? I've shown it. Having the target that you're proposing is incompatible with lowering electricity prices. Nobody has done it. Germany hasn't done it, and they're the leader. They've been doing it for 20 years.

Ms Steggall: We've received a number of pieces of evidence today, in fact, that energy prices will be lower from industry sectors with certainty and a clear pathway to net zero. Do I take it you don't accept that evidence or that science?

Mr Armstrong: We're just talking pricing, are we? If we're just talking pricing, I'll give you two examples, including the example I gave. In our paper in 2019, I showed from published data, from respectable bodies that do this, that Germany—

Ms Steggall: Could you tell us who these respectable bodies are? You're saying we're not listening to the right science.

Mr Armstrong: Excuse me.

Ms Steggall: Which science do you say we should be listening to?

Chair: Go ahead, sir. Finish your answer. If you have the sources, as Ms Steggall has asked, you can do that on notice.

Mr Armstrong: Just read the paper. They're all there in the paper. As I said, in 2019 Germany had the highest electricity prices in the world, even though they had something like 46 per cent renewables. I looked at where it was for June, and they're still the highest. Denmark slipped back one: they're the third-highest. But they were the second-highest in 2019. Denmark has 60-odd per cent renewables. I put this data together, by the way. This isn't something you will find anywhere from any of the papers that are submitted to all of you politicians and everything else. You will not see people draw the two things together. What are the electricity prices? I drew that, and then I drew the conclusion: how do they produce electricity? When I look at that, in every case—including
California and South Australia—where you have a high proportion, usually about 30 per cent or around that area, you will find that the price has happened. There are scientific papers that show you that is the case.

That's the macro. Let's come back to the individual. I have solar on our roof. In fact, we have a worm farm and the whole bit. We don't use town water; we use tank water and all that sort of stuff. But I had a letter from Energy Australia last December saying, 'Oh, we're going to have to reduce your feed-in tariff,' so we're going from 10½c down to 9½c. But it was 12½ only—

**Mrs Armstrong:** A year ago.

**Mr Armstrong:** No, 11 months. So you know what the cost of that is. At the start of 2020, they sent me another letter. I'd only been with them since March the year before that. They then said, 'We've got to increase your rate.' They did, by 11.9 per cent. So my electricity went up by 11.9 per cent from the start of the month. On 27 January last year, it went up by 11.9 per cent for the whole thing. I get a 28 per cent discount on my use rates, so I'm talking about it going up by 11.9 per cent net. Then in December they reduced the rate. So my bill has gone from $300-odd in credit for a year to $300 in debit. In other words, I now have to pay for electricity when I thought, when I got the solar system, it was going to reduce the cost of electricity.

Do you know the two reasons they gave for the price increase? The first was infrastructure costs. Sure enough, if you look at our infrastructure costs they're going up. We're building transmission lines, we're building substations, we're building right out 300 km from Sydney—right where I live, right where she lives and right where all these people I can quote live. That's the problem. The second is the feed-in tariffs. Why did the feed-in tariffs go? They said the feed-in tariffs are going down because there's too much electricity being produced when the sun's shining. If you want this, I've got the documents that actually show that that's what they said.

One other thing, if I may: there are two other bodies that you've no doubt heard from today—maybe not, because one is New South Wales. The New South Wales strategy came up with a figure for 10 years from now that will save consumers $40 against their bill. Mine just went up $600 in one year, and we're going to get $40 in 10 years based on doing what you say. You know New South Wales have set the same target that you're proposing. They've created these renewable energy zones, which we reside in; we're right in the centre of it. The other one was the AEMO ISP. Theirs has a 20-year time frame. Their 20-year time frame says we'll save $11 billion. $11 billion over 10 million households works out at $55 a year. One overlaps the other, so you have the $40 for the 10 years we have to wait and then you have the $55 which will come in 20 years, based on doing all of this stuff that you've proposed to have a target of 50 per cent. I've gone from the global, all the major companies, the top ones. Their highest electricity also has the highest renewables content. I've gone down to a personal level. And I've gone in-between with government bodies that actually support the same thing. $40 goes like that. It's nothing.

**Mrs Armstrong:** A year.

**Mr Armstrong:** That was your bill over a year. $40 for a year; $55 for a year. That wasn't per quarter. That's documented. That's available to you. That's recommended by the same people who you get recommendations from no doubt. The same people are recommending them. Why is this happening? I'll tell you why it's happening if you're interested. Are you interested?

**CHAIR:** Ms Steggall, this is your question. Would you like to proceed?

**Ms STEGGALL:** I know there may be other members who have questions. If I could move on from energy. A major part of the bills is adaptation and risk management. We've heard from a number of witnesses and organisations today about how important that is. Do you accept that we need to manage the risks and impacts of climate change in particular on regional communities?

**Mr Armstrong:** Let's see. Our biggest risks—

**Mrs Armstrong:** We could do it with nuclear.

**Mr Armstrong:** Yes. We could manage the risks in the electricity sector. Of course, you're going to need it if you want to flow it into transport with electric cars. You're going to need a much bigger and much more robust electricity system than we currently have. In the regions we get no benefit. This is what we've put to independent bodies that agree with us. The jobs don't come. Don't tell me that somebody who has a 450 MW solar works—who then only has up to 10 people employed. That means in our case—I'm talking from the facts, the information we know in our situation, but it can be extended elsewhere, as I said. The people up in Queensland are in the same position, and they tell me the same sort of thing.

Do we do other things? Yes, we can do other things, but, if you set a target like you're proposing, that becomes the be all and end all. We use the electricity because we're there. We're seeing the impact. We're seeing the impact...
on our environment. We're seeing the impact on the world environment with all the minerals—a huge amount of minerals—and the land space required. You could generate from a very modern HELE coal-fired power station or the combined closed gas turbines that take up less than one-tenth of the space—in one case about one-sixtieth of the space—to generate the same amount of electricity.

There's something else I have to mention, though. It is wrong. I have challenged that the New South Wales legislation that was passed in November is fundamentally flawed. It's fundamentally flawed because people don't know the difference between capacity and the capacity factor—that is, electricity at capacity [inaudible]. A 400 megawatt gas turbine nuclear power station is nothing like a 400 megawatt solar or wind works.

Mrs Armstrong: They're not equal.

Mr Armstrong: They're nothing alike! But they're talked of that way. The very people that advise you talk that way. And it's wrong. It's just wrong! And if they're fundamentally wrong in that place, how much else are they fundamentally wrong on? Every one of them says at the start of their paper: 'We're doing this to reduce emissions to save the climate'—every single one of them. So that's what I mean about the target. You set that target at 50 per cent, and they'll all say, 'I'm justified in doing this,' and ignore the human aspect of the environment—the people who are dying already from this. More people have died just producing the minerals for solar and wind than in the whole of the nuclear industry, for instance. These are the facts. You can get them. But I've put them in a paper for you, to make it easy. It's only 50 pages. Is it that hard to read a paper for 50 pages?

Mrs Armstrong: I don't think anyone's read this paper. Has anyone read this paper?

CHAIR: The reason you're here is because your paper has been read and you've been invited here, and we're grateful to you for coming. Ms Steggall, any further questions from you?

Ms STEGGALL: No, Chair. Thank you.

CHAIR: Alright.

Mr Armstrong: May I apologise. As you can see, I'm passionate about this. I'm passionate about the environment—have always been—

Mr BURNS: Good. We like passion.

Mr Armstrong: If I get out of line, pull me in line.

CHAIR: No, no—and we would. You're not out of line. You're expressing yourself with passion, and that's okay.

Mrs Armstrong: Can I get permission to speak?

CHAIR: Mrs Armstrong, please, go ahead.

Mrs Armstrong: It was actually 2018 I started researching.

Mr Armstrong: You did, yes.

Mrs Armstrong: No money has changed hands. I've researched—I'm talking six hours a day, most days—for two years. So a lot of research has gone into this paper. Nobody asked questions. People talk about the environment, and the environment that's been discussed here seems to be solely around emissions—and also jobs. It's around jobs. If you're talking about jobs in Australia, in regard to renewables, they're not there. Most of the jobs are in mining—

Mr Armstrong: Processing—

Mrs Armstrong: processing, manufacturing and transport, and none of those jobs are here in Australia. Those are all before they arrive here. And when we're talking transport, we're talking shipping, too. So when you're taking CO2 into consideration, you must take into consideration that many of the minerals and ores are transferred from places like Africa and South America to China to be processed in China. So you've got the CO2 created by the shipping emissions, the transport and then the processing. I don't know if you're aware, but when we're talking about 'environment', we're not only talking about CO2. Renewable energy is the most highly toxic of all. It's not clean energy. In the paper we talk about the acids and the toxic waste. There's 300 times more toxic waste from renewable energy than there is from nuclear. And nobody talks about the waste at the end of it, either. It's all being dumped on the regions, and we're talking millions of solar panels and also turbines. What's happening to these at the end? No-one talks about that. Victoria has declared these panels as toxic waste—

Mr Armstrong: E-waste.

Mrs Armstrong: e-waste, I'm sorry, which means that they can't go to landfill. It's not the same. It's not regulated right throughout the country. So we're basically being dumped on.
There is no recycling in Australia. There is one company in South Australia that, at this stage, is a collection agency, and they have collection agencies within each state. They're not recycling. There is no full recycling company in Australia at this stage. The reason is that it's horrendously expensive. Again, it creates a lot of CO2 because of the heat—the energy. Some of the panels like the ones at Beryl are cadmium tellurium. They can't be easily recycled because of the nature of them, and they do have valuable minerals in them, but they're sent to Malaysia—the closest one is Malaysia—and there they use acids to break them down. There's just so much—I don't know why none of this is taken into consideration.

CHAIR: And thank you—because you've been given the floor today in a parliamentary inquiry which is being broadcast, and all this is on the Hansard and shall be considered part of our inquiry.

Mrs Armstrong: There is also the humanitarian side. We mentioned in—

Mr Burns: Chair, I've got to catch a flight. See you later.

CHAIR: Thank you, Mr Burns.

Mrs Armstrong: I don't know if the document mentioned the collapsed mine in the Congo.

Mr Armstrong: We didn't mention that, no.

Mrs Armstrong: It is in the paper, but you have to open up the links. There was one incident in 2019 in the Congo where, in the artisanal mines, 63 people lost their lives. That was in one incident. There is also a science paper. So that comes from a science paper which five universities collaborated on to write up, and then there's a follow-up interview with someone who went back there that was written up in The Guardian. Obviously, they're not going to tell you when mines collapse and people die, but she happened to go back and was there when it happened. She was there when these 63 people died and she wanted to follow up on the children. There are refugees coming in from other parts of Africa to work in the artisanal mines. If adults are killed—and there's murder, there's violence, there's rape, there are young girls becoming pregnant—there is no-one for the children. Because they've come from other parts of Africa, there is no-one to look after them, so these children are forced to work in the mines. There are up to 40,000 children working in the Congo in the cobalt mines. Why is this being ignored? The pressure put on that with renewable energy is just overwhelming.

Mr Armstrong: There would be an expansion. It's going to be enormous.

Mrs Armstrong: Why is that okay? And there's the environmental damage in China with the processing of the minerals, the—

Mr Armstrong: The rare earths.

Mrs Armstrong: the rare earths. People think there's going to be less mining. There's 82 per cent more pressure on mining because of renewable energy. We use massive amounts, more material. There's 10 times the amount of materials—

Mr Armstrong: We've got figures in our document.

Mrs Armstrong: used for renewable energy than for any other form of energy. Why is that all ignored? And the IPCC haven't even established that CO2 is a problem. They haven't. We've read the papers. They have not established that CO2 is causing the temperature to rise. If you read the paper—honestly, it's all there. The frustrating thing for us is that no-one wants to hear it. No-one wants to listen. This is the first time we've been in front of any members.

CHAIR: And we thank you for giving us your time today; we do. Do colleagues have any other questions?

Ms Steggall: I just wanted to clarify that final statement, if I could.

CHAIR: Go ahead, Ms Steggall.

Ms Steggall: Mrs Armstrong, you said you've done all the research. Could you have your qualifications or research background, just to understand the basis of that research you've done. Also, do I take it from that last statement that you don't accept the IPCC recommendations on the need to decarbonise to limit global warming and climate change impacts?

Mrs Armstrong: The IPCC haven't established that carbon dioxide is the dial for the temperature. They have not established that. They have not established that. If you can tell me where, I'd apologise to you—if you can point out to me where it says that CO2—

Mr Armstrong: Is definitely.

Mrs Armstrong: is definitely the cause of any rise in temperature.
On the other thing, as far as research goes, most of it's been on the internet. And I don't know—if there are professional researchers, I'm not sure where they gather their information. But, if you've read this paper, Ms Steggall, you'd have seen that many of these articles are from science papers. They're not just because somebody told me. It's not just because I asked a friend and they said these things. If you read our paper, you would see where I got the information from.

Mr Armstrong: I read. Margaret does the research. She sends me the information. Sometimes I get an idea. For instance, today in the *Daily Telegraph*, Joel Fitzgibbon, the Labor member for Hunter, said that he would love to have a coal-fired power station built there, which has been proposed by the Nationals, but then he said no-one would want to build it for $3.8 billion, right? But, if you look at Hornsdale, which is a wind farm, a wind-generating works, it has the biggest battery in the world—well, I think it's not the biggest battery now, but it extended by 50 per cent one of the biggest batteries. I showed what they'd have to spend to run for three days when the wind doesn't blow—and there are studies being done for Australia that show that, on average, three days in every week will not have any wind blowing in areas right throughout Australia. So, if the wind farms are there, what you're going to get is that they're not going to be able to produce electricity for three days.

Therefore, where's it coming from? That's what I mentioned right at the very start: where's the other 90 per cent or 70 per cent going to come from? People say just two things: batteries and storage, which would be hydro-pumped or hydro-electricity, which has also blown out from $2 billion to $5.1 billion, as I saw reported this week. That's why our energy costs keep going up. What's driving it is this concept.

Believe me. I was a fellow CPA. I've done engineering, I was a fellow CPA and I've been a consultant for a long, long time. Everything that I did transformed businesses. My own business was called Armstrong Business Transformations. That's what I did. I ran multibillion-dollar projects or hundred-million-dollar projects to transform businesses and organisations. In doing so, I interpret what is sent and I give some direction. If I find something, I think: 'We've got to explore this. Can we find multiple sources?' I never do that. I'm a very factual person. I cross-reference it. Where is it cross-referenced? Who else has done studies on this? Do they match up? I go through that process before I write anything in that paper or any document that I publish in public.

CHAIR: Mr Armstrong and Mrs Armstrong, thank you for giving us your time today. In fact, you're the last witnesses for the day. It's been a pleasure to have you. If you have been asked to provide any additional information, could you please forward it to the secretariat. The committee may have additional questions for your response on notice. If the committee does have further questions, we'll pass those to you through the secretariat. You will be sent a copy of the transcript of your evidence and will have an opportunity to request corrections to transcription errors.

That concludes our proceedings today. We thank you both very much, and we thank all witnesses and members of the committee for your participation.

Committee adjourned at 16:17