

Chapter 4

Policy and regulatory measures

Introduction

4.1 This chapter considers key policy and regulatory measures to hasten the rollout of storage technologies and localised, distributed electricity generation including:

- a coherent and consistent long-term carbon price signal to drive investment in both renewable generation and a diverse range of energy storage technologies;
- a consistent national renewable energy target including ways in which Large-scale Generation Certificates could be used to incentivise the deployment of pumped hydro and thermal storage systems; and
- the reduction of the price settlement time in the NEM to five minutes to incentivise the rapid deployment of storage technologies such as batteries.

The business case for policy certainty on a carbon price signal

4.2 A consistent theme that ran through this inquiry was that a substantial majority of Australia's generating capacity has already reached the end of its life-span and urgently needs replacement.

4.3 For example, representatives from AGL told the committee that about 70 per cent of the electricity generation supply in Australia is now past its designed technical end of life.¹ Similar figures were provided by the Australian Solar Council, which stated that 65 per cent of these generation assets need to be replaced by 2030 and 85 per cent by 2040.²

4.4 Despite the urgent need to replace ageing coal-fired (and some gas-fired) electricity generation infrastructure, the committee heard striking evidence that the lack of policy certainty over the last decade has prevented investors from making efficient decisions to invest in any new generators. Mr Danny Price, Managing Director of Frontier Economics, described this situation to the committee:

[T]he power system...security and reliability [is] visibly deteriorating. It is often said that this is the fault of the market—that there is some form of market failure that is causing this. I am very confident that it is not the market; it is a political failure to have a national plan for the way in which the market should operate. Investors simply cannot respond to the uncertainty that we see in the market. They cannot invest in conventional plant because that could well be redundant in the future with a carbon price and they cannot invest in high-cost and low-emission plant because at the moment it would not be economic. They are basically caught between a

1 Mr Douglas Jackson, Executive General Manager, Group Operations, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 7.

2 Australian Solar Council and Energy Storage Council, *Submission 36*, p. 3.

rock and a hard place. There is no investment that they can make that is going to be economic at the moment, so they are doing what is completely rational and that is just sitting on their hands, and as they sit on their hands the system gets worse. That is our basic problem.³

4.5 Similarly, King & Wood Mallesons submitted that policy failure had undermined investor and business confidence:

Policy stability and consistency is crucial for investment confidence. For businesses to take risks on the future and invest, they need to be confident that emissions reduction policies and the mechanisms to achieve them...are stable. The lack of clarity and long-term direction with respect to Australia's renewable energy policy has impacted the industry in a profound way.⁴

4.6 The Australian Academy of Technology and Engineering observed that the failure of government to provide a level playing field in electricity generation was preventing the necessary deployment of innovative solutions:

Current market conditions mean that large-scale storage is not economically viable in most cases. While carbon emissions remain a market externality, cheap but greenhouse gas intensive resources (i.e. coal, gas) dominate generation and the provision of inertia and other system services. Correcting this market externality failure would provide a level playing field for all generation technologies and incentivise development of innovative supply – and demand-side solutions, which are likely to hasten the deployment of significant quantities of energy storage.⁵

4.7 Professor Ross Garnaut explained how a failure to price carbon, and a lack of political leadership at the national level, had caused such uncertainty amongst business that it had paralysed investment in the energy sector:

While there is extreme uncertainty about policy, it raises the supply price of investment to every form of generation and inhibits investment in every form of generation. While there is such uncertainty there will not be new investments.⁶

4.8 Describing the current political debate around climate and energy policy as 'incoherent', Professor Garnaut warned that the failure to adopt a coherent policy meant that Australia was missing the opportunity to secure a low-cost path to the 'necessary low-emissions electricity system of the future'.⁷

4.9 Mr Price emphasised that the critical element in the energy policy debate was what investors thought about carbon pricing:

3 Mr Danny Price, Managing Director of Frontier Economics, *Committee Hansard*, 7 March 2017, p. 27.

4 King & Wood Mallesons, *Submission 37*, p. 4.

5 Australian Academy of Technology and Engineering, *Submission 38*, p. 2.

6 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 24.

7 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 21.

It does not require a belief in climate science to accept that carbon pricing is necessary. It does not matter what you or I think; what really matters and the only thing that matters is what investors think. If they think there is the possibility that a carbon price could come in place in the lifetime of an investment, they will have to make investments with that as a possibility. The argument about the climate science is neither here nor there for us. It really comes down to what investors think.⁸

4.10 Along similar lines, Professor Garnaut advised the committee that the removal of a carbon price had left business in the untenable position of second-guessing government policy:

...the absence of a carbon price since the middle of 2014 has contributed to the uncertainty about the investment environment. Business knows that we have to move towards a low-emissions energy sector. A carbon price provided very clear guidelines for making business decisions on how to proceed. In the absence of those guidelines, business has to second-guess regulatory decisions by government. They know they will come and it is a matter of second-guessing them. That is a problem for the environment and for the cost of energy.⁹

4.11 Professor Garnaut argued that a form of carbon pricing, including an emissions intensity scheme, would increase business confidence. He told the committee:

If, for example, we had bipartisan support for a form of carbon pricing, which could be an emissions intensity scheme, and business had confidence that was going to last for quite a long time, then it would be much easier for business to calculate that there was going to be a role for gas for a certain period of time, which would justify investment. In current circumstances the extreme uncertainty about policy inhibits all investment.¹⁰

4.12 Mr John Bradley, Chief Executive Officer of Energy Networks Australia, told the committee that policy uncertainty and blame would lead to higher costs for consumers and 'a less secure transition to a lower carbon economy'.¹¹ He argued that Australia 'cannot afford to have inconsistent or fragmented policy frameworks across state and federal governments'.¹²

4.13 Mr Douglas Jackson, the AGL Energy Limited (AGL) Executive General Manager, told the committee that policy certainty was critical because energy assets

8 Mr Danny Price, Managing Director, Frontier Economics Property Ltd, *Committee Hansard*, 7 March 2017, p. 28.

9 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 22.

10 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 24.

11 Mr John Bradley, Chief Executive Officer, Energy Networks Australia, *Committee Hansard*, 10 February 2017, p. 31.

12 Mr John Bradley, Chief Executive Officer, Energy Networks Australia, *Committee Hansard*, 10 February 2017, p. 36.

are long-term 'bets' as they typically have a life-span of 20 to 40 years during which investors need to make a return on their money.¹³

4.14 Likewise, Mr Richard Wrightson, General Manager of Wholesale Markets at AGL, told the committee that the Commonwealth government's failure to secure a bipartisan national policy approach had crippled energy investment:

For any policy in this space, be it that or any other policy, if you want to drive a 30-to-40-year investment, you need that bipartisan support.¹⁴

4.15 Dr Noel Simento, Managing Director of Australian National Low Emissions Coal Research and Development, told the committee that the electricity sector needs policy certainty in order to create investment certainty because of the risks involved in investing the substantial funds needed to deploy low-emissions generation technologies.¹⁵

4.16 Mr John Pierce, Chairman of the Australian Energy Market Commission (AEMC), responded to questions about an emissions intensity scheme with the following observation about the need for policy certainty over the long-term investment cycle:

...the main thing the sector needs to provide that sense of certainty and security that will then enable the market participants to do what they do—make investments and operate their businesses—is certainty around the policy framework and the policy instruments that are going to be operating and affecting the sector...

They need to know what investments are going to fly or not, which means they need to know what is the policy framework that is going to apply, not just today but in five years' time, 10 years' time and 15 years' time. It is the confidence people have in the stability, not necessarily in the specifics but of the framework, that underpins the confidence that people have for an investment.¹⁶

4.17 Mr John Bradley, Chief Executive Officer of Energy Networks Australia, was of the view that a national approach that incorporated 'an integrated, outcome focused transition plan' was necessary to overcome the 'technical economic and regulatory challenges' facing the industry. He warned the committee:

...without a well-planned approach with timely action by governments to create policy and regulatory cohesion, Australia's energy system is unlikely

13 Mr Douglas Jackson, Executive General Manager, Group Operations, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 8.

14 Mr Richard Wrightson, General Manager, Wholesale Markets, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 11.

15 Dr Noel Simento, Managing Director, Australian National Low Emissions Coal Research and Development, *Committee Hansard*, 10 February 2017, p. 7; Mr Jim Kouts, Head of Corporate Affairs, ENGIE in Australia, *Committee Hansard*, 20 February 2017, pp. 5 and 12.

16 Mr John Pierce, Chairman, Australian Energy Market Commission, *Committee Hansard*, 10 February 2017, pp. 56–7.

to efficiently and securely integrate diverse technologies, large-scale renewable energy sources and customer owned distributed energy resources.¹⁷

4.18 Mr Oliver Yates, Chief Executive Officer of the Clean Energy Finance Corporation, outlined why energy policy requires a coordinated national approach and the reasons that the private market alone cannot solve the problem:

The private market will not be able to make long-term investment decisions in a highly volatile situation...People do not quite know the direction of government policy. People do not know the timing of the need to make adjustments in carbon emissions. People do not know the speed with which that may or may not have to be made. In that environment it is very hard for the private sector to make long-term investment decisions, which are necessary if you are going to move from one type of asset to another type of asset. It is incumbent on all governments to work together to come up with a pathway and a framework, which has to be bound around a long-term objective that is set around general scientific terms as to what we need to do, and then they need to build an investment climate that facilitates the market to go from A to B.¹⁸

4.19 Mr John Grimes, Chief Executive Officer of the Australian Solar Council told the committee that the market had already moved and that what was required from government was leadership and a national plan to manage the inevitable transition to a clean energy future:

Most of all, we need a plan. We need a plan to get us from where we are today to where the market is going to take us. Whether you believe in this stuff or not, this is inevitable and it is unstoppable. It is the market.¹⁹

4.20 Mr Price of Frontier Economics argued that the lack of national plan, rather than market failure, is to blame for the deterioration of the power system. He stated:

It is often said that this is the fault of the market—that there is some form of market failure that is causing this. I am very confident that it is not the market; it is a political failure to have a national plan for the way in which the market should operate. Investors simply cannot respond to the uncertainty that we see in the market.²⁰

4.21 AGL emphasised that a staged transition would allow market participants time to plan:

17 Mr John Bradley, Chief Executive Officer, Energy Networks Australia, *Committee Hansard*, 10 February 2017, p. 30.

18 Mr Oliver Yates, Chief Executive Officer, Clean Energy Finance Corporation, *Committee Hansard*, 10 February 2017, p. 39.

19 Mr John Grimes, Chief Executive Officer, Australian Solar Council, *Committee Hansard*, 10 February 2017, p. 24.

20 Mr Danny Price, Managing Director, Frontier Economics, *Committee Hansard*, 7 March 2017, p. 27.

We support something that is transparent and creates a transition plan that I think customers, the communities, the markets and policymakers can respond to. The market participants need time to plan; there are often five to 10 years in planning horizon, and we need some sort of predictability of when to replace assets to avoid the disorderly transition we are currently experiencing today.²¹

4.22 In terms of the Finkel Review, some witnesses expressed optimism that the terms of reference and approach of the review could deliver a holistic approach. Mr John Bradley, Chief Executive Officer of Energy Networks Australia stated:

We would be optimistic that, if we take an evidence based approach through that Finkel review, if it focuses on outcomes rather than trying to pick technology winners or identify the most likely solutions and instead creates resilient market frameworks within which a technology competition can occur to get the outcome we want, whether it is decarbonisation, security or energy affordability, that will be the right model.²²

4.23 However, other witnesses such as Mr Grimes expressed disappointment that the Commonwealth government had pre-emptively ruled out certain options in relation to energy policy:

Why the Finkel review is so important, in our estimation, is that it has the ability to produce that plan, that blueprint for the future—to recognise what technology is doing and to recommend the most efficient way possible to transition to the new reality, which is coming, ready or not. So we are very supportive of that process. We are disappointed when some things are pre-empted, are already ruled out.²³

Emissions intensity scheme

4.24 A number of witnesses expressed support for an emissions intensity scheme. For example, AGL argued that it would enable a stable, predictable and low-cost path to a lower emissions system.²⁴

4.25 Mr Price told the committee that an emissions intensity scheme would allay the concerns of consumers who are 'very sensitive' to electricity prices and might not favour carbon pricing. He outlined that:

One of the great features of the emissions intensity scheme is that effectively the costs of that scheme fall on high-emission generators, but the way that you introduce that can be easily managed by those high-emission generators. In fact, only yesterday the two biggest emitters of greenhouse

21 Mr Douglas Jackson, Executive General Manager, Group Operations, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 4.

22 Mr John Bradley, Chief Executive Officer, Energy Networks Australia, *Committee Hansard*, 10 February 2017, p. 32.

23 Mr John Grimes, Chief Executive Officer, Australian Solar Council, *Committee Hansard*, 10 February 2017, p. 25.

24 Mr Douglas Jackson, Executive General Manager, Group Operations, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 2.

gas—carbon dioxide—AGL and Energy Australia have called for an emissions intensity scheme. That is how much they value the certainty that comes with that type of scheme over the damage that it does to their business. They have already accepted that this is going to come into place, as most investors have.²⁵

4.26 Amidst calls by the National Farmers Federation,²⁶ AGL²⁷ and Energy Australia²⁸ for an emissions intensity scheme, Mr Price informed the committee that '[p]eople are already making decisions as if there was a carbon price in place'.²⁹

4.27 Professor Garnaut told the committee that despite its limitations, 'an emissions intensity scheme in the electricity sector would do the job', advising that:

...an emissions intensity scheme would serve the purpose of providing appropriate incentives for investment in lower emissions technologies. In fact, as far as the climate change objectives, the emissions reduction objectives, and also the energy investment efficiency objectives are concerned, the emissions intensity scheme is very similar in its merits to carbon pricing.³⁰

Committee view

4.28 Evidence received by the committee makes it clear that the debilitating investment strike in some sections of the electricity sector has been caused by the abolition of a price on carbon and changes to the renewable energy target. Witnesses were very clear that political failure at the Commonwealth level to agree on a carbon price had caused such extreme uncertainty in sections of the energy sector that investors and energy companies were unwilling to invest in new electricity infrastructure.

4.29 Contrary to the evidence provided to the committee by Mr Price and a number of incumbent operators, the committee does not accept the assertion that investment in generation capacity is stalled, across the entire energy sector, due to uncertainty.

25 Mr Danny Price, Managing Director, Frontier Economics, *Committee Hansard*, 7 March 2017, p. 28.

26 Mr Paul Karp, 'National Farmers' Federation joins calls for market mechanism to lower carbon emissions', *The Guardian*, 7 March 2017, <<https://www.theguardian.com/australia-news/2017/mar/07/national-farmers-federation-joins-calls-for-market-mechanism-to-lower-carbon-emissions>>, accessed 21 March 2017.

27 Ms Caroline Winter, 'AGL joins calls from National Farmers' Federation for carbon price', ABC News, 7 March 2017, www.abc.net.au/news/2017-03-07/agl-joins-calls-from-farmers-peak-body-for-carbon-price/8332058, (accessed 21 March 2017).

28 Mr Mark Ludlow, EnergyAustralia and AGL back an emissions intensity scheme for the electricity sector, Australian Financial Review, 5 March 2017, www.afr.com/news/politics/energyaustralia-and-agl-back-an-emissions-intensity-scheme-for-the-electricity-sector-20170305-guqyn2, (accessed 21 March 2017).

29 Mr Danny Price, Managing Director, Frontier Economics, *Committee Hansard*, 7 March 2017, p. 28.

30 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 23.

4.30 While it is certainly the case that investment in new *fossil fuel generation* is stalled because of the uncertainty around future carbon scenarios, the committee notes that investment in new *renewable* energy capacity, either under construction or due to commence construction in 2017, equates to an enormous 2.2GWs.³¹

4.31 Far from there being a poor investment climate for electricity generation, the evidence of actual projects being built demonstrates that there is a thriving renewable energy sector at the moment despite the impediments of an outdated regulatory framework and the Commonwealth government's refusal to give the sector long-term carbon policy certainty.

4.32 The committee further notes that, in addition to the 2.2GWs of generation referred to above, there have been a further series of enormous renewable energy projects announced in just the last two months. These include:

- Riverland Solar Storage in Morgan, South Australia that will add 330MW plus significant storage which is aimed to be constructed and operational during 2017;
- Kingfisher Solar Storage in Roxby Downs, South Australia which will add 120MW plus significant storage in 2018;
- Bodangora wind farm near Wellington in NSW which will add 113MW; and
- a potential expansion of the Snowy Hydro system, which is estimated to add 2GW of capacity to the NEM.

4.33 Discussions also continue around the construction of a 100MW solar thermal power generator at Port Augusta, South Australia. While a long term purchase agreement and confirmation of any grant or loan funding are still required before this project can proceed, it will ultimately contribute significant generation and storage capacity to the market.

4.34 The committee urges the Commonwealth government to reconsider its approach to carbon policy. A carbon price is so clearly in the national interest and so clearly required for stable investment in the electricity sector that the committee is strongly of the view that a mechanism for signalling a price on carbon be considered and implemented as a matter of priority.

4.35 There is much to be gained from a carbon price. The weight of evidence over at least the last decade has indicated that a carbon price will drive the necessary investment in renewable energy technologies required to reduce greenhouse gas emissions. Furthermore, the evidence going back to both the *Stern Review* (2006) and the *Garnaut Review* (2008) indicates that the costs of mitigating climate change are significantly less than the costs of doing nothing. The intervening years since those two reviews have shown that Australia is uniquely placed to become a renewable

31 Clean Energy Council, New renewable energy projects point to biggest year for industry since Snowy Hydro, 11 February 2017, <https://www.cleanenergycouncil.org.au/news/2017/February/2017-renewable-energy-projects-snowy-hydro.html> (accessed 3 April 2017).

energy superpower, a position that will bring enormous economic benefits in a carbon constrained world and one that will create many tens of thousands of new jobs in the clean energy sector.

4.36 Beyond the investment in renewable energy that a carbon price would help deliver, the committee also received a wealth of evidence (see chapter 3) that a range of storage technologies are available to help successfully integrate intermittent renewable energy sources such as wind and solar PV into grid networks. Furthermore, a diverse range of storage technologies that will offer the full range of ancillary services required for the grid security are capable of being deployed now.

4.37 However, the NEM contains antiquated rules that act as a barrier to the uptake of storage technologies. These matters are discussed in a later section of this chapter.

The renewable energy target

4.38 Just as with carbon pricing, the committee heard that a failure to secure a consistent political approach at the national level to the renewable energy target (RET) had plagued investment in renewable energy projects because of the massive uncertainty it created for business. Mr Wrightson, AGL, told the committee:

A renewable scheme that has a review of its targets every three years creates such a huge political uncertainty. I know the option is that those targets could be increased, and, as we discovered, they could also be decreased.³²

4.39 AGL described how the three-year reviews of the renewable energy targets held back investment in long-term renewable energy generation:

When you are looking at building a wind farm that hopefully has something like a 20-year life, bearing in mind that the bulk of the earnings from a wind farm actually comes from the renewable energy certificates, a three-year cycle for reviewing targets is difficult and has hindered investment up until now.³³

4.40 The committee also received evidence that changes to the RET could be used to incentivise the deployment of macro scale renewable energy storage projects such as pumped hydro.³⁴

4.41 Genex noted that pumped hydro storage is currently ineligible for Large-scale Generation Certificates under the RET because the amount of 'auxiliary loss', that is, the amount of electricity consumed in pumping, always exceeds the total electricity generated. Genex argued that pumped hydro storage should be recognised as an eligible Large-scale Generation Certificates under the Renewable Energy (Electricity)

32 Mr Richard Wrightson, General Manager, Wholesale Markets, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 5.

33 Mr Richard Wrightson, General Manager, Wholesale Markets, AGL Energy Limited, *Committee Hansard*, 7 March 2017, p. 5.

34 Genex, *Submission 3*, p. 6.

Regulations 2001 and proposed that the definition of auxiliary loss be redefined in the Regulations:

3B Definition of auxiliary loss

(i) For a power station, auxiliary loss means the amount of electricity used in generating electricity, and operating and maintaining the power station, but does not include any electricity used for network control ancillary services.

(ii) Subject to clause 3B(iii), for a hydro-electric power station, auxiliary loss also includes the amount of electricity that is used to pump or to raise water before its release for hydro-electric generation.

(iii) For a pumped storage hydro-electric power station that is accredited under section 15 of the Act on or after [a nominated future date] auxiliary loss does not include the amount of electricity used to pump or to raise water before its release for hydro-electric generation.³⁵

Committee view

4.42 The committee is aware that the future of the renewable energy target is shrouded in uncertainty beyond 2020. The committee notes that in the absence of a carbon price, the renewable energy target has been a necessary mechanism to drive new investment in renewable energy generation. The committee is of the view that the renewable energy target has performed a vital function in encouraging investment in renewable energy, particularly in the absence of a carbon price, and for this reason alone, it should be maintained and expanded beyond 2020.

4.43 The committee is also aware that aspects of the renewable energy target could be modified to incentivise investment in macro scale energy storage systems. Given the importance of macro scale energy storage, the committee is of the view that such proposals should be given careful consideration as part of a detailed review to examine whether there are any policy and regulatory barriers to the implementation of energy storage technologies to facilitate the operation and resilience of Australia's electricity networks.

Recommendation 4

4.44 The committee recommends that the Commonwealth government continue and expand the Renewable Energy Target beyond 2020.

Market rule and regulatory changes to incentivise the deployment of storage technologies

4.45 This section considers a proposition put forward throughout the inquiry that the key to the rapid deployment of storage technologies is a change to economic and regulatory requirements that would allow storage technology providers to better capture the value that storage offers.

35 Genex, *Submission 3*, p. 6.

4.46 The NEM rules currently provide for different dispatch and settlement periods. That is, bids to supply electricity into the market are made every five minutes, whereas payments for supplying that electricity are averaged from the prices over a 30 minute period.³⁶

4.47 Dr Matt Wenham, Executive Manager of Policy and Projects at the Australian Academy of Technology and Engineering (ATSE) told the committee that ATSE had spoken to over 80 organisations and stakeholders involved in the energy sector and the need to change the settlement rules was mentioned repeatedly by stakeholders. Dr Wenham stated that feedback from stakeholders indicated that storage providers would be much more able to enter the market if the settlement period was changed to five minutes to align with the dispatch period because they would be able to access a clearer revenue stream.³⁷

4.48 In response to questions from the committee, Dr Wenham explained that the current settlement rules were a hangover from the days of coal and gas-fired electricity generation and the rules were no longer adequate to deal with large fluctuations over short timeframes.³⁸

4.49 Dr Evan Franklin, from the Energy Change Institute, ANU, told the committee that a key advantage of battery storage was the ability of a battery to provide one element of system resilience, namely responding rapidly to dynamic system disturbances that occur over a matter of seconds.³⁹

4.50 Dr Franklin explained that under the current rules, if prices spike dramatically for a five minute period, a supplier of electricity for that period may only get a fraction of the value of that electricity supplied to the system because it is averaged over a 30 minute price:

If there is one five-minute period where you need a lot of extra generation to meet demand, it will come in at a very high price, but the average price over that 30-minute period may not reflect the need over that five-minute period. So if you are a generator who supplies much-needed electricity during that five-minute period, you get paid for the five minutes but you get paid on the 30-minute price. You may get paid a fraction of the value of that electricity for that period of time.⁴⁰

36 Dr Matt Wenham, Executive Manager Policy & Projects, Australian Academy of Technology and Engineering, *Committee Hansard*, 7 March 2017, p. 29.

37 Dr Matt Wenham, Executive Manager Policy & Projects, Australian Academy of Technology and Engineering, *Committee Hansard*, 7 March 2017, pp. 28–29.

38 Dr Matt Wenham, Executive Manager Policy & Projects, Australian Academy of Technology and Engineering, *Committee Hansard*, 7 March 2017, p. 29.

39 Dr Evan Franklin, Senior Lecturer; Fellow, Energy Change Institute, Australian National University, *Committee Hansard*, 10 February 2017, p. 3.

40 Dr Evan Franklin, Senior Lecturer; Fellow, Energy Change Institute, Australian National University, *Committee Hansard*, 10 February 2017, p. 4.

4.51 Similarly, Mr Bruce Mountain, Director of CME, explained that his research revealed the market is flawed because it fails to adequately reward batteries for the value they can contribute by putting power into the system at very short notice:

The market we operate sets prices in five-minutes trading intervals or auctions. The trading period, the settlement period price—the price that the generators receive and that the consumer pays in the mandatory wholesale market—is the average of those five-minute trading prices. So batteries, which can actually respond in very short intervals and can adjust either the demand that they are taking from the grid or the exports back into the grid at a very rapid pace, are not getting their full compensation for that because the value they offer is very high in that five-minute interval but the price they get is the average over the half-hour. Essentially, the market is not reflecting that very short transient value that batteries, first and foremost, and hydro, secondly, have the greatest value in actually producing. So a lot of the economic value that batteries has is not captured by that particular market flaw.⁴¹

4.52 In effect, therefore, the current rules which provide for a 30 minute settlement period for prices may have a perverse effect because they act as a disincentive to the provision of batteries that are able to provide resources within milliseconds for periods of one, five or ten minutes.⁴²

4.53 Even worse, the committee heard very forceful arguments made by some witnesses that the current rules allow, and possibly encourage, perverse behaviours in the market during times of extreme stress in the system. These behaviours, while within the rules, do not benefit the system, but rather benefit particular operators.⁴³

4.54 For example, Dr Matthew Stocks, from the College of Engineering and Computer Science, ANU, explained that not only are operators such as storage providers being deprived of the full value of the services that they supply, but other generators are encouraged to make negative bids merely in order to participate during periods of high stress when they will also reap a share of the rewards provided by storage operators:

Dr Stocks: I will certainly take a much stronger position on the settlements. One of the challenges with having a different dispatch and a different settlement period is that you have people who come in and support the system at times of very high stress and then, when that stress disappears, people who continue to generate get rewarded for the very high prices in that period. One of the things that are happening, particularly with storage, is that people will be able to respond faster—we are talking seconds for batteries and less than a minute for pumped hydro. People can respond to the needs of the system much more rapidly, so if the price heads

41 Mr Bruce Mountain, Director, CME, *Committee Hansard*, 7 March 2017, p. 61.

42 See, for example, Dr Evan Franklin, Senior Lecturer; Fellow, Energy Change Institute, Australian National University, *Committee Hansard*, 10 February 2017, p. 3.

43 See, for example, Dr Matthew Stocks, Fellow, College of Engineering and Computer Science, Australian National University, *Committee Hansard*, 10 February 2017, pp. 4–5.

to a price gap of \$14,000 a megawatt hour then everyone, for that 30-minute period, benefits from that divided by six for that entire half-hour. So if you are just idling along through that entire period then you get rewarded for somebody coming in and helping out, at a very high price, for a short period of time, and it then drives behaviour like what we have seen recently in South Australia, where operators will bid at negative prices to ensure that they get that average price for that entire period. There were examples where people bid at minus—

CHAIR: Isn't that price gouging?

Dr Stocks: No, it is working within the market that exists. If you have a set of market rules then everyone will behave to optimise their outcome within those rules. So what we have is a difference between settlement and dispatch which rewards particular behaviours, and they are not necessarily behaviours that are best for the resilience of the system; they are best for those particular operators. The technology and the ability to respond are changing, and to some extent this has really come out of old established rules where things did happen much more slowly, and it really did not matter that there was this five-minute period, because everyone had to ramp up, ramp down and take much longer periods of time. The challenge there is that, if storage is going to come into that, if you really want it to develop that very fast instantaneous response, it needs to be rewarded for filling in that gap and not end up being paid six times less than what that was deemed to be worth because whoever supplies in that six-minute period only gets about \$2,000 a megawatt hour rather than the \$14,000 that they bid. So it drives different behaviours in the system, and not necessarily those that best balance out the overall system.⁴⁴

4.55 The committee heard from a number of witnesses that changing interval pricing to allow payment for short-term storage and discharge would incentivise battery storage.⁴⁵

4.56 Mr Oliver Yates, Chief Executive Officer of the Clean Energy Finance Corporation, told the committee that:

Currently you only get paid on 30-minute interval pricing. Five-minute interval pricing, from our own analysis on battery projects, would change the revenue profile significantly and would then encourage batteries to come into the market and be available for short-term supply. This is exactly what you want: a very fast response.⁴⁶

4.57 Dr Franklin pointed out that a change in the market rules could encourage batteries to be installed at the household level and that this would make that stored

44 Dr Matthew Stocks, Fellow, College of Engineering and Computer Science, Australian National University, *Committee Hansard*, 10 February 2017, pp. 4–5.

45 Mr Oliver Yates, Chief Executive Officer, Clean Energy Finance Corporation, *Committee Hansard*, 11 February 2017, p. 41; Mr Ivor Frischknecht, Chief Executive Officer, Australian Renewable Energy Agency, *Committee Hansard*, 10 February 2017, p. 40.

energy 'available to provide fast-frequency response in the case of supply-demand imbalance in the wider system'.⁴⁷

4.58 Dr Stocks observed that a change to the market rules could also incentivise macro solutions to energy storage such as pumped hydro.⁴⁸

4.59 The Australia Institute explained that 'fully rewarding demand side market participants for 5 or 10 minute entries to the market' would not only encourage them to participate in the market but would have the added benefit of 'moderating overall price levels'.⁴⁹

4.60 Mr John Pierce, Chairman of AEMC told the committee that the AEMC had already received a proposal to change the settlement time within the spot market from 30 minutes to five minutes. Mr Pierce advised that the AEMC was currently assessing the proposal against the National Electricity Objective. The assessment includes a consultation process, a directions paper containing options for implementation, and the publication of draft rules 'akin to exposure drafts of legislation' on 6 July 2017.⁵⁰

4.61 The committee also heard that the design of the electricity tariff paid at the household level also acts to undermine the full value that customers could receive from installing a battery:

Around one-third of the residential price to a household consumer or a small business consumer is a fixed charge, which does not vary as a consequence of how much the customer consumes. Batteries and solar, which are a fixed cost outlay to a household, do not capture that value because the household or the business is still exposed to the fixed charge, so the economic value that it has is actually diminished to the householder or the small business that puts in a battery by virtue of the tariff structure.⁵¹

4.62 Mr Bruce Mountain, director of CME, also explained to the committee that, in many instances, high prices were not necessarily the result of any genuine shortage of electricity. Rather, many generators exploit the current rules to game the system by forcing prices higher and therefore maximising their profits at consumers' expense:

It is my view that in many trading intervals and half-hour settlement periods, most notably in South Australia and in Queensland, the prices we see do not reflect a genuine scarcity in the market; they reflect the exercise of market power. Generators through their actions can withdraw capacity from the market by either not making it available to the market at all or, alternatively, only making it available at extremely high priced bands and

47 Dr Evan Franklin, Senior Lecturer; Fellow, Energy Change Institute, Australian National University, *Committee Hansard*, 10 February 2017, p. 3.

48 Dr Evan Franklin, Senior Lecturer; Fellow, Energy Change Institute, Australian National University, *Committee Hansard*, 10 February 2017, p. 4.

49 The Australia Institute, *Submission 54*, p. 41.

50 Mr John Pierce, Chairman, Australian Energy Market Commission, *Committee Hansard*, 10 February 2017, p. 53.

51 Mr Bruce Mountain, Director, CME, *Committee Hansard*, 7 March 2017, p. 61.

as a consequence, although they lose production through the smaller volume that they are dispatched to, they gain a price which is a multiple of the lost production. This is a straightforward exercise in market power. In my opinion it is well documented by the regulators and noted duly. I think the enforcement regime we have in Australia is inadequate in dealing with that. I think prices would be lower if those issues were adequately addressed.

...

The maximum price that a generator can receive in a half-hour is \$14,000 per unit that they produce. The typical annual average price is in the range of \$50 per megawatt hour to \$100. So by withdrawing capacity and achieving extremely high prices in a number of these half-hourly periods they can obtain two orders of magnitude or three orders of magnitude more revenue than they otherwise would. It is impossible to say how much they actually get because the amount they get is a function of their contracts in the market. The wholesale market is a mandatory spot market. They have to produce and sell into that market but they can hedge around it by entering into contracts.

Not knowing the contract position, I cannot identify how much any individual market participant gets, but I know that they can affect spot market outcomes and hence contract market outcomes and hence enforce their own competitive position in the wholesale market and most notably in the retail market, where they can drive out competitors who can otherwise not get access to contracted positions that will hedge this extreme volatility.⁵²

4.63 Mr Mountain did not agree with the proposition put forward by regulators that this type of behaviour was reasonable. Instead, he argued that it indicated the exercise of market power by generators who were able to 'make the price' at certain times:

But I am of the view that that sort of picture and that pattern of behaviour is consistent over time, and is a form of capacity withdrawal. It is a market, and the regulators will say: 'This is reasonable market behaviour; there is a capacity shortfall, or a prospect of one, and so we do not have to make our plant available.' In market economics, that is pure and simple the exercise of market power. You are not taking the price in the market, you are making the price in the market.⁵³

4.64 Mr Mountain also warned that the concentration of market power after the closure of Hazelwood brown coal-fired power station in Victoria would intensify the problems arising from the vertical integration of the incumbent power generators:

I think there is a vertical integration and incumbency problem, and I think it is particularly acute in South Australia. I think it is also a problem in Queensland and then New South Wales and Victoria, in that order. I think the loss of Hazelwood will probably introduce the problem into Victoria

52 Mr Bruce Mountain, Director, CME, *Committee Hansard*, 7 March 2017, p. 61.

53 Mr Bruce Mountain, Director, CME, *Committee Hansard*, 7 March 2017, p. 62.

because Hazelwood has been a largely uncontracted trader. It has had excess capacity compared to the retail generation that its owner, ENGIE, had through its retailer, called Simply. And as a consequence, the loss of that generation will put greater contractual authority and power in the hands of the incumbent generators. This evidence is quite visible, simply looking at the number of contracts traded in the contracts markets, for which there is good data; there are almost none traded on the SA market and, as a consequence, if you are seeking to compete in that market you are at a disadvantage.⁵⁴

4.65 Mr Mountain was of the view that the only way to tackle the perverse incentives within the energy market that currently incentivise the exercise of market power was to institute 'a combination of a capacity payment, a payment to be available, and a payment to actually produce'.⁵⁵

Committee view

4.66 A recurrent theme throughout the inquiry was the need to align the time periods for price bids and price settlements in the NEM. Currently, the bid period is at five minute intervals, but the payment settlement period is set at 30 minute intervals.

4.67 The committee heard that the rules in the NEM are now outdated and merely serve to privilege the old fossil-fuel generators. The committee also heard evidence that the current rules allow the larger players to game the system.

4.68 The committee is aware that the current market rules may engender perverse unintended outcomes where suppliers may choose not to bid into the market to deliberately create a price spike and then only bid at the peak of the spike.

4.69 The evidence provided to the committee concerning the five minute rule issue and the capacity for other rules to produce perverse and unintended outcomes demonstrate a deeper problem: The outdated regulatory framework and the reluctance of the rule maker to embrace any change in a timely manner, proves the need for reform in this area.

4.70 The committee has received evidence from a number of witnesses indicating the surprising ignorance of both the AEMC and the Australian Energy Market Operator (AEMO) concerning new technology.

4.71 The fact that AEMO was not even aware of the proper technical settings to enable windfarms to 'ride through' certain disturbances on the grid in the South Australian 'blackout' event in 2016, even though these had been in operation for many years overseas, demonstrates a blatant lack of competence.

4.72 It betrays a culture of both astounding ignorance and of an attitude completely averse to change. The committee considers that this is unacceptable and requires immediate substantial reform.

54 Mr Bruce Mountain, Director, CME, *Committee Hansard*, 7 March 2017, pp. 61–62.

55 Mr Bruce Mountain, Director, CME, *Committee Hansard*, 7 March 2017, p. 62.

4.73 The AEMC is in need of fundamental reform. It is clearly both captive to the incumbent industry and hostile to the inevitable transition away from the current status quo. It is mired in pointless process and delay in any matters that threaten the revenue streams of the incumbent generators. The committee considers that this method of operation is completely contrary to the statutory duty and obligations of the AEMC which is to pursue the long term interests of consumers.

4.74 A case study on the five minute rule in this context demonstrates the counterproductive model we have now — and the immediate need for comprehensive reform.

Case Study – the 5 Minute rule

4.75 The AEMC operates by examining and ruling on requests for amendments to the rules of the electricity market. It can change rules or it can reject them — so it is the key regulatory body.⁵⁶

4.76 A major electricity user, Sun Metals, operates a zinc smelter in northern Queensland. It has requested the AEMC to amend the rules to introduce the so-called 5 minute rule.⁵⁷

4.77 The primary result of not introducing the 5 minute rule to this point has been to the long-term detriment of the consumer—effectively the generators are being allowed to rip them off. One would expect that the AEMC would be keen to fulfil its statutory duty but, unfortunately, the opposite has happened.

4.78 Sun Metals made their application for a rule change to the AEMC on 4 December 2015.⁵⁸ Then, a full six months later, the AEMC formally initiated the review process.⁵⁹ That is, it took the AEMC six months to issue a consultation paper of about thirty pages on an issue that it had examined in the context of an earlier rule change process.⁶⁰

56 Australian Energy Market Commission, *Energy Rules*, <http://www.aemc.gov.au/Energy-Rules> (accessed 5 April 2017).

57 Sun Metals, Letter to the Australian Energy Market Commission— Proposed rule change: To have 5 minutes settlement pricing instead of 30 minute average settlement pricing, 4 December 2015, <http://www.aemc.gov.au/getattachment/6a518011-533d-49dd-bb27-e6e8175bcabd/Rule-change-request.aspx> (accessed 3 April 2017).

58 Sun Metals, Letter to the Australian Energy Market Commission— Proposed rule change: To have 5 minutes settlement pricing instead of 30 minute average settlement pricing, 4 December 2015.

59 Australian Energy Market Commission, Notice under National Electricity Law, 19 May 2016.

60 Australian Energy Market Commission, Consultation Paper—National Electricity Amendment (Five Minute Settlement) Rule 2016, 19 May 2016.

4.79 The rule change decision is supposed to be made within six months, but this did not happen. On 25 August 2016 the AEMC gave notice that it was extending the date for its draft determination from November 2016 to 30 March 2017.⁶¹

4.80 Then, on 2 February 2017, the AEMC gave further notice that it was extending the time for the draft decision to 6 July 2017 with a final determination date of 14 September 2017. It made the point in the announcement that it had only convened two stakeholder meetings on this issue during 2016.⁶² Clearly where there is a threat to the revenue of incumbents the AEMC does not work efficiently to protect consumers. There is a culture of appeasing the status quo by glacial process with no accountability at all.

4.81 Disturbingly it appears that the AEMC has missed the next deadline in this process. When announcing the delay from March to July it promised the release of another issues paper by 30 March 2017. At the time of publication there is no such document on the AEMC website.

4.82 Apart from the consumer and competition issues relevant to the five minute rule another interesting point was raised in submissions by Zen Energy. It makes the point that the 5 minute rule would improve the stability of the electricity system as well.⁶³

4.83 For the above reasons the committee strongly supports moving to a five minute settlement process as soon as possible. It does not consider the conduct of the AEMC on this matter to be acceptable, and does not accept the need for a further delay through a protracted phasing in of the new rule.

4.84 The committee is strongly of the view that the NEM rules more broadly currently incentivise the gaming of the system by generators with substantial market power. Such outcomes have seriously adverse consequences for the electricity prices paid by electricity consumers. The committee therefore recommends that an urgent review be undertaken of the payment systems operating within the NEM including careful consideration of the merits of instituting two payments, namely a payment to be available and a payment to generate.

Recommendation 5

4.85 The committee recommends that the settlement time in the spot market be reduced from 30 minutes to 5 minutes, with phase-in of this rule change to be completed before 1 November 2017, and for the reliability of electricity

61 Australian Energy Market Commission, Notice under National Electricity Law, 25 August 2016. See also Australian Energy Market Commission, Information sheet: extension of time for a draft rule determination, 25 August 2016.

62 Australian Energy Market Commission, Information sheet: extension of time for draft rule determination (February 2017), 2 February 2017.

63 Zen Energy, Letter to the Australian Energy Market Commission— Proposed rule change: To have 5 minutes settlement pricing instead of 30 minute average settlement pricing, 30 June 2016, <http://www.aemc.gov.au/getattachment/82e102ba-5aae-4925-9305-7f7c4b852820/ZEN-Energy.aspx> (accessed 3 April 2017).

frequency to be supported by new markets for additional services to support the grid.

Recommendation 6

4.86 The Committee recommends wholesale reform of the Australian Energy Market Commission (AEMC), to guarantee faster decision making and a prioritisation of the long term interests of the consumer over the interests of incumbent power generators, and a much tighter supervisory role over the Commission for the Commonwealth Energy Minister.

Recommendation 7

4.87 The committee recommends that the Finkel Review identifies other major rule impediments to assist in the full integration of renewable energy and storage with a view to speeding up the Australian Energy Market Commission (AEMC) processes in regards to their reform. These should then be presented to the AEMC as an urgent agenda of reform work to be prioritised and completed within six months.

Recommendation 8

4.88 The committee recommends that investment in the renewable energy sector be further encouraged through the introduction of a market-based carbon trading scheme.

Frequency Control Default Settings

4.89 The committee has also become aware of an emerging debate occurring in the context of the resilience of the electricity network due to the relaxation of control settings concerning the frequency of dispatches.

4.90 Put simply the standards which govern the rules by which generators contribute to the NEM were relaxed in 2001 to allow greater variation in frequency around the control frequency of 50 hertz (Hz).

4.91 Previously generation equipment was regulated to only be allowed to submit electricity onto the NEM if its frequency was between 49.9Hz and 50.1Hz. Most often it was considerably closer to 50Hz.

4.92 However, in order to create a larger frequency control market this standard was relaxed. What this means is that the electricity going into the NEM is now less 'reliable' than was previously the case.

4.93 In the context of concerns around system stability, having an electricity system that is deliberately less frequency-stable than it could be is a matter that should be reviewed immediately.

4.94 The committee understands that the former tighter frequency control range could be re-imposed on most if not all existing synchronous generators in a very short period of time and at essentially no cost. This would then improve the resilience of the NEM by lessening the frequency variations that ordinarily occur, thereby minimizing the likelihood of failure in parts of the system.

4.95 The committee has not had sufficient time to examine the issue in detail, but suggests that the Finkel Review should examine this issue as a priority. Whilst this is a difficult technical issue on the face of it, it could provide a significant boost to the resilience of the system whilst the transition to renewable energy proceeds.

4.96 The committee notes a submission to an inquiry by the South Australian regulator, the Essential Services Commission of South Australia which deals with this issue, inter alia, which contends:

A re-assessment of the NEM frequency control ancillary services (FCAS) markets should be undertaken. The governor control that was required prior to the start of the ancillary services (FCAS) markets illustrates why there appears to be a serious decline in the ability of the power system to withstand significant events. The introduction of a market structure and the separation of various ancillary services has brought with it a level of risk which has been highlighted by the system black that occurred in South Australia on 28th September 2016.

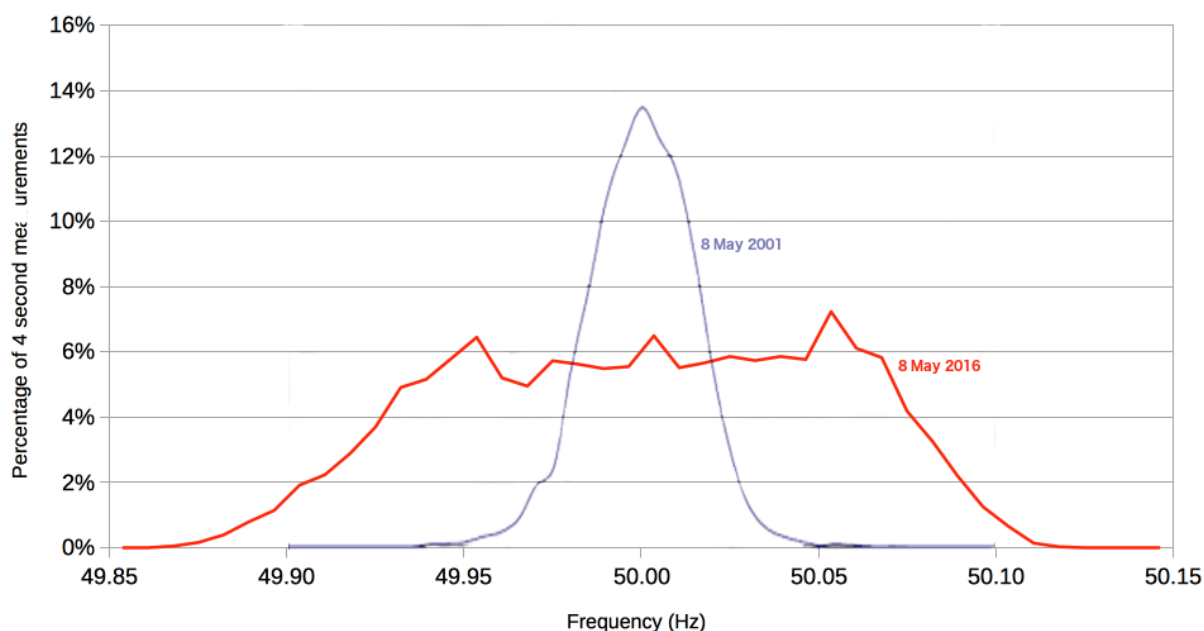
It is time to re-examine the technical risk and inefficiencies introduced by a culmination of more than a decade of decision making (and flow-on regulatory changes) which have led to a significant decline in the primary frequency control systems on the synchronous units within the NEM. Many other markets treat ancillary services that are necessary to support the energy trade as part of the mandatory requirements, this is in contrast to the NEM in which the frequency control is optional and economically sourced.⁶⁴

4.97 Most other countries simply regulate this issue, as Australia used to, whereas deregulation in our system has contributed to instability and a lack of resilience.

4.98 The issue is highlighted by Ms Summers in Figure 4.1 below.

64 Kate Summers, Fast Frequency Service – Treating the symptom not the cause?, *Submission to the ESCOSA Inquiry into licensing arrangements under the Electricity Act 1996 for inverter-connected generators*, p. 1, available at <http://www.escosa.sa.gov.au/ArticleDocuments/1047/20170208-Inquiry-LicensingInverterConnectedGeneratorsIssuesPaperSubmission-KSummers.pdf.aspx?Embed=Y> (accessed 3 April 2017).

Figure 4.1: Frequency distribution 8 May 2016 vs 8 May 2001



Source: Kate Summers, Fast Frequency Service – Treating the symptom not the cause?, *Submission to the ESCOSA Inquiry into licensing arrangements under the Electricity Act 1996 for inverter-connected generators*, p. 4.

4.99 Figure 4.1 demonstrates the significant increase in variability of frequency levels over the last 15 years. Given that this is an indication of a lessening of the total system resilience, this issue should be examined immediately to determine if corrective action is desirable.

Recommendation 9

4.100 The committee recommends that the Finkel review specifically examine the market rule change introduced in 2001 redefining of the normal operating band from 49.9Hz to 50.1Hz to 49.85Hz to 50.15Hz, as well as the impact that change had on total system reliability and whether it should be reversed.

Economic opportunities arising from deployment of renewable energy and energy storage technologies

4.101 This section briefly outlines the evidence that Australia is well placed to capture substantial economic value from implementing measures such as a carbon price and changes to the NEM rules that would incentivise the rapid deployment of renewable energy including distributed generation and a panoply of storage technologies.

4.102 Professor Ross Garnaut reminded the committee that Australia possessed a huge advantage in a world that was moving to low-emissions energy:

Of all the developed countries in the world, Australia has by far the richest endowment of renewable energy resources. The exact combination of resources that makes greatest sense varies across the continent. In Queensland it will be a combination of solar and biomass, usually; in

southern Australia it will be a combination of solar and wind. Later on, with the development of new technologies, there will be other renewable energies in that mix.⁶⁵

4.103 Given the huge advantages outlined above, Professor Garnaut was of the view that Australia could supply 'low-emissions energy-intensive goods' to the global market. Such an outcome would secure substantial economic benefits for Australia in terms of both employment and income.⁶⁶

4.104 Similarly, Mr John Grimes, Chief Executive Officer of the Australian Solar Council emphasised the value that would accrue to Australia positioning itself as a global leader in the new economy:

Our message for regulators and legislators is that it is better for Australia to identify what is going to happen and position Australia so we can win a disproportionate value of that change—skills development, training and providing consulting advice to the rest of the world. We are actually leading the world in this stuff, so there are huge economic opportunities.⁶⁷

4.105 Both Professor Garnaut and Mr Steve Blume, President of the Australian Solar Council, warned the committee that policy incoherence was a grave threat to Australia's ability to take full advantage of the global transition to a low emissions future. Mr Blume noted that the government's energy policy was reactive rather than properly considered, and as such, was a poor foundation on which to develop good 'long-term policy in the public interest'.⁶⁸

Jobs created by deployment of energy storage technologies

4.106 The committee heard that as well as providing an economic benefit to households and increasing system resilience, increased uptake of energy storage systems would create jobs in the industries that support them.⁶⁹ The Australia Institute observed that:

If Australia is smart then we can create local jobs and generate export opportunities right across the value chain, from the storage hardware, to control software and in creative new finance and business models that can power the smart grid of the future.⁷⁰

4.107 The School of Photovoltaic and Renewable Energy Engineering at the University of New South Wales pointed out that job creation in the renewable and distributed energy market is likely to be concentrated in installation:

65 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 21.

66 Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 21.

67 Mr John Grimes, Chief Executive Officer, Australian Solar Council, *Committee Hansard*, 10 February 2017, p. 24.

68 Mr Steve Blume, President, Australian Solar Council, *Committee Hansard*, 10 February 2017, p. 23; Professor Ross Garnaut, *Committee Hansard*, 7 March 2017, p. 21.

69 Nexergy, *Submission 25*, p. 4

70 The Australia Institute, *Submission 54*, p. 9.

Renewable and distributed energy technologies, due to their relative small scale, modularity and distributed deployment are more employment intensive than conventional large scale generation...[t]he key driver of job creation will...likely be the level of local deployment, rather than just seeking to develop and sell distributed energy systems into international markets.⁷¹

4.108 Nexergy was of the view that the cost savings that would accrue to participants engaged in distributed energy trading would lead to a virtuous cycle of increased jobs in new fields:

By improving the return on investment of energy storage systems, local energy trading would increase the frequency of purchase and installation of systems, thereby improving overall system resilience. Consequently, greater funding will be available for storage system installation and supply, research and development, and manufacturing. Further, peripheral industries which support energy storage systems such as control devices, Internet of Things solutions and smart-grid offerings would also benefit. The result is the creation of new jobs in each of these fields.⁷²

4.109 Meanwhile, the Australian Academy of Technology and Engineering argued that manufacturing jobs associated with battery technology are unlikely to arise without some form of government assistance:

Significant local job creation in energy storage manufacturing would be unlikely without government support to attract international partners...it will be next to impossible to compete with established battery manufacturers that all are located overseas...Even the more successful products developed from Australian intellectual property...are manufactured internationally.⁷³

Committee view

4.110 The committee consider that Australia is uniquely placed to capture substantial economic value from becoming a renewable energy superpower. It is clear from the evidence received by this committee that energy companies, both locally and globally, are moving out of coal. Coal is in structural decline and investors have now shunned any new investment in coal-fired electricity generation (see chapters two and three). As a consequence, there is an urgent need to replace Australia's ageing fleet of coal-fired power stations with electricity generated from renewable energy and with electricity storage.

4.111 The committee recognises that jobs will be lost in coal communities and therefore the transition to a clean energy economy requires careful planning that needs to begin immediately in order to avoid a chaotic and painful transition that would damage livelihoods and communities. The committee is of the view that a well-

71 University of New South Wales, School of Photovoltaic and Renewable Energy Engineering, *Submission 48*, p. 6.

72 Nexergy, *Submission 25*, p. 4.

73 Australian Academy of Technology and Engineering, *Submission 38*, p. 2.

planned transition will lead to far more jobs in the clean energy economy than are currently available in the coal economy, and that many of the skills that workers in the old energy economy possess will be valuable in the new energy economy.

Recommendation 10

4.112 The committee recommends that the Commonwealth government undertake a detailed review of policy and regulatory barriers to, or tariff structures that hinder the implementation of, energy storage technologies.

Recommendation 11

4.113 The committee notes that, despite the Prime Minister's rhetoric on battery storage, the Commonwealth government has failed to put in place any policies that support businesses or households to invest in energy storage. The committee recommends the Commonwealth government put in place policies to support businesses and households to invest in energy storage, new software services and encourage grid decentralisation, resilience and greater energy security.

**Senator Sarah Hanson-Young
Chair**