

Chapter 8

Demand-side participation and response to technological and market changes

8.1 This final chapter considers the response of the regulator, rule-maker and network businesses to emerging technologies, changes in how consumers use electricity and concerns about a 'death spiral'. After introducing these issues, the chapter examines in detail:

- embedded generation and the potential for local energy trading;
- whether the connection and pricing of network services is discriminating against households and businesses involved in their own electricity production;
- demand management; and
- calls for network tariff reform.

Introduction

8.2 As noted in Chapter 2, electricity prices, largely driven by network costs, have risen significantly while the demand for electricity has declined. This had led to concern about a death spiral; that is, high prices are causing demand to decline while also encouraging consumers and businesses to engage in their own generation activities. Remaining customers would be required to pay an increasing share of the network costs while network assets become under-utilised or stranded.

8.3 It is already evident that the ability to generate electricity through systems such as solar photovoltaic (PV) panels is changing how consumers are engaging with the electricity network. Emerging and future technologies, such as more effective battery storage, may change consumer behaviour more dramatically. This potential has gained some level of recognition at various levels of government, as evidenced by the following statement included in the Department of Industry's submission:

Emerging technologies will increase the range of methods for stakeholders across the sector to manage demand and address network constraints. This may begin to challenge the traditional concept of networks services being delivered by monopoly businesses. The Council of Australian Governments (COAG) Energy Council is looking into the economic regulatory frameworks to make sure it is well positioned for the future by 'stress-testing' its ability to efficiently adapt under a range of possible physical and technical changes.¹

1 Department of Industry, *Submission 34*, pp. 6–7.

8.4 The committee received evidence indicating that the energy industry has recognised the changes underway and that some network companies were considering how to respond. The chief executive officer of the Energy Supply Association of Australia (ESAA) noted that the 'energy supply system in Australia has already begun a rapid transformation to an unknown future, driven by new technologies and necessity'.²

8.5 Mr Alistair Parker, the general manager of asset management at AusNet Services, also commented that change to its network 'is happening fast [and]...it is happening now'. He explained that his company was already seeking to 'avoid investments that may prove to be regrettable in the future'. Mr Parker also discussed what was considered to be the worst-case scenario, where only half of the network was needed by 2050. He outlined his company's position on this potential outcome:

If we only need half our network in 2050, we are going to make sure we only have half the network left when we get there, if that makes sense. I do not think for our purposes we are assuming that we can continue to build and build and then one day it will be only one unfortunate person in paddock in Bendigo who is paying all our bills. We assume that we will wind down. We will have active asset management processes that will get us to the right size at the right time.³

8.6 Given the unpredicted decline in demand during previous regulatory control periods and the possible widespread deployment of disruptive technologies in the future, the committee was interested in whether modelling and forecasting of demand had improved. Of particular interest was whether network businesses and regulatory institutions would be more attuned to future market developments. Mr Terence Effenev, the chief executive officer of Energex, advised that his company has 'taken on board the fact that our previous econometric models did not match this new future'. He added:

...those matters have been reviewed and revised and I am pleased to say that our model now does appear to be giving us outcomes which were consistent with the summer which we have just had; whereas previously that was not the case. But it was not just our model. The reality of it is that we were using the AEMO models; we were using the AER models. Nobody's models were picking up some of those changes that were occurring across the last five years; that is true.⁴

2 Mr Matthew Warren, Chief Executive Officer, Energy Supply Association of Australia (ESAA), *Proof Committee Hansard*, 18 February 2015, p. 25.

3 Mr Alistair Parker, General Manager Asset Management, AusNet Services, *Proof Committee Hansard*, 18 February 2015, p. 36.

4 Mr Terence Effenev, Chief Executive Officer, Energex, *Proof Committee Hansard*, 16 February 2015, p. 9.

8.7 The remaining sections of this chapter examine some of the key areas of potential change. The focus of this chapter is to consider the implications of change for consumers overall, electricity network businesses and the regulatory system.

Decentralised energy

8.8 The traditional model of electricity supply is based on a limited number of large generators connected to local distribution networks by large transmission networks. Gradually, there has been a rise in 'embedded generation', which is also known as distributed generation.⁵ These terms refer to generators embedded in the distribution network, rather than connected to customers by transmission networks. Smaller embedded generators include rooftop solar PV units, wind generating units, battery storage and batteries in electric vehicles that export power to the grid. Cogeneration and trigeneration are other examples of embedded generators.⁶

8.9 The Australian Energy Market Commission (AEMC) has noted that there are a range of benefits associated with embedded generation. These include that:

- consumers who install embedded generation units may have reduced electricity costs or improved reliability outcomes;
- embedded generation may 'help reduce the cost of power system augmentation, helping to reduce the overall cost of supply faced by consumers'; and
- growth in embedded generation may displace other more emissions-intensive generation and in doing so help to reduce the overall emissions related to the National Electricity Market (NEM).⁷

8.10 Embedded generation presents challenges to the existing electricity networks that were built to cater for centralised generation. This follows the discussion in Chapter 2 that in response to high prices, consumers would seek to use embedded generation to move 'off-grid'. If such decisions were widespread, network companies would have vast, expensive infrastructure that was serving a declining number of

5 Australian Energy Market Commission (AEMC), 'Fact sheet: Distributed generation', www.aemc.gov.au/getattachment/9aac3077-50e9-41a6-bff6-09bc30a00182/Distributed-generation.aspx (accessed 27 March 2015).

6 Cogeneration and trigeneration involve the generation of electricity and the use of the other energy produced as a result of the generation process. Cogeneration involves the generation of electricity and the use of the heat that is produced. Trigeneration also includes the production of cooling. In Australia, the cogeneration or trigeneration facilities in buildings generally use either natural gas or a form of biomass, such as sugar cane waste. Clean Energy Council, 'Cogeneration and trigeneration', www.cleanenergycouncil.org.au/technologies/cogeneration-trigeneration.html (accessed 27 March 2015).

7 AEMC, 'Fact sheet: Distributed generation'.

customers. As EnergyAustralia observed, those fewer customers would be 'left to pay the same quantum of network costs'.⁸

8.11 Some of the evidence taken by the committee suggested a sense of inevitability about the rise of embedded generation, particularly solar. A representative of the Electrical Trades Union told the committee:

Coming from far North Queensland, I cannot understand why the whole of far North Queensland cannot be self-sufficient on renewable electricity. There is so much opportunity. You have the transmission lines that run and you have an impact there—it was only a few years ago that there was a major failure of the transmission network which took out the whole of regional Queensland because of bird droppings. There are significant opportunities, but it would take significant investment in the short term for long-term gain.⁹

8.12 The Electrical Trades Union went on to add that many communities in regional areas are already off-grid. In addition to existing changes to how electricity is generated, technological advances such as improved and more cost-effective battery technology, which could vastly improve the benefits of solar by enabling the storage of electricity for use at night, have the potential to further encourage consumers to move off-grid. A representative of the union stated:

...regardless of whether it is metropolitan or regional...people are getting more and more solar PV and there are wind farms coming on et cetera, the generation mix overall is changing quite significantly and there is a lot more embedded generation at a household level and perhaps, with the advent of things like battery storage et cetera, that will happen at a neighbourhood or block level or suburb level. It is absolutely inevitable that the energy industry is going to change over the next five to 10 years significantly. It is already happening in studies by scientific organisations et cetera. We will be really re-evaluating the premise of a centralised network.¹⁰

8 EnergyAustralia, *Submission 23*, pp. 2–3.

9 Mr Stuart Traill, Queensland State Organiser, Electrical Trades Union, *Proof Committee Hansard*, 16 February 2015, p. 44.

10 Mr Lance McCallum, National Policy Officer, Electrical Trades Union, *Proof Committee Hansard*, 16 February 2015, p. 44.

Potential challenges and benefits for network businesses

8.13 In considering the response to embedded generation, some witnesses argued there were opportunities for network businesses. For example, Mr Gavin McMahon from the Central Irrigation Trust suggested that embedded generation could benefit network businesses by allowing networks to be structured differently and, if such generation 'had some reasonable paybacks', industries may even consider co-investment.¹¹

8.14 The committee received evidence that some distributors are considering changes to their networks; Ergon Energy stated that it is:

...reshaping its business model to create an open access platform that will enable us to actively coordinate and integrate distributed energy resources in a way that optimises our existing network assets and provides dynamic incentives (choice and control) to consumers. Ergon Energy plans to facilitate two-way flows of energy linking buyers and sellers in a time and location manner that creates value for customers and Ergon Energy. Ergon Energy believes this will achieve the best outcome for us and our customers by providing new revenue opportunities and ultimately reducing network costs.¹²

8.15 Given that electricity supply is an essential service, it is likely that the rise of embedded generation will present challenges for the network businesses. For example, Mr Alistair Parker, a general manager at AusNet Services, a Victorian distributor, highlighted the implications of the guaranteed service obligations imposed on network companies:

...if five people in a small community want to go off grid but one person wants to stay, we still have the obligation to supply that one person and we still have the obligation to keep that line safe for the most horrific days.¹³

8.16 Mr Parker added that some consumers are resistant to the idea of moving off-grid and relying on embedded generation. Mr Parker noted that education and increased understanding among consumers of their options may be needed, but that will take time.¹⁴

11 Mr Gavin McMahon, Chief Executive Officer, Central Irrigation Trust, *Proof Committee Hansard*, 19 February 2015, p. 7.

12 Ergon Energy, *Submission 24*, p. 12.

13 Mr Alistair Parker, AusNet Services, *Proof Committee Hansard*, 18 February 2015, p. 39.

14 Mr Alistair Parker, AusNet Services, *Proof Committee Hansard*, 18 February 2015, p. 39.

Local energy trading

8.17 Stakeholders highlighted what they considered were flaws in the current treatment of embedded generation.

8.18 At present, the size of an embedded generator may be limited to meet the load needed by its owners as the excess energy is of little value. Mr Geoff Bragg, the New South Wales chairman of the Solar Energy Industries Association, explained that exported energy is currently 'worth next to nothing'. He explained that in New South Wales retailers are not obliged to pay anything for exported energy, and in other states only small amounts were paid.¹⁵

8.19 To illustrate how the system was not delivering the outcomes embedded generators wanted, Mr Bragg provided the following example of a PV system on a commercial property where the energy produced on the weekend when the factory is closed is effectively gifted to the retailer:

I can think of a 100-kilowatt PV installation we did on a furniture-manufacturing place. When you consume the energy on-site it is worth a lot to you—it is worth the full retail value of the energy: not the demand charges but the energy. However, if you cannot use that energy and you export it then in New South Wales it is up to the retailer if they pay you anything for that energy. What that means is that once you get into that small-to medium-commercial scale, energy retailers will pay nothing.

So all the energy that this factory's 100 kilowatts produces when it closes on Friday afternoon right through till Monday morning goes to the retailer for zilch—nothing. They get no credit whatsoever, because no commercial retailer—Origin, AGL; list them all—would offer them anything for the energy. It is a windfall for them as the retailers.¹⁶

8.20 In light of such outcomes, whether local energy trading could be facilitated was an issue explored in evidence. Mr Bragg concluded that there was an incentive to move toward a model where local electricity trading could take place, however, he observed that 'it requires the networks to go along with it'. Importantly, he explained that charges for the use of the network would need to be adjusted for a local network:

At the moment there is a distribution use of service [DUOS] charge...on the basis of the quantity of energy that moves through. That might change or be broken up into a local use of energy charge—so it is LUOS as opposed to DUOS—and it will be at a reduced rate. It is about calculating that rate—that is, the value—of just local energy trading. That is the tricky bit, and there are some very clever people working on it. It has been done in other countries, so it is not as if we are breaking new ground. It just has not been

15 Mr Geoff Bragg, New South Wales Chairman, Solar Energy Industries Association, *Proof Committee Hansard*, 17 February 2015, p. 33.

16 Mr Geoff Bragg, Solar Energy Industries Association, *Proof Committee Hansard*, 17 February 2015, p. 32.

done in our regulatory system. The sooner it happens the sooner you might have a vibrant distributed energy market where you actually encourage increasing demand rather than in what is otherwise a very shrinking market. If it is done renewably then it is not a negative thing. You can say that we have demand here and we can meet it with clean energy.¹⁷

8.21 In its submission, the City of Sydney argued that the 'current financial rewards for local electricity generation projects do not reflect their full value to electricity consumers or to society as a whole'. Potentially, the City of Sydney considered that changes to pricing to encourage embedded generation could result in lower prices for consumers by slowing the growth of expensive transmission and sub-transmission networks. The City also suggested that this outcome would reduce the 'tendency for overinvestment in network capacity upgrades (or for oversized replacement)'.¹⁸

8.22 The City of Sydney advised that it is working with other interested parties on a rule change request to introduce a system of reduced charges for sending electricity from local generators to local customers. The City expects to lodge this request to the AEMC in May 2015.¹⁹

Treatment of customers using solar photovoltaic systems

8.23 The terms of reference for inquiry included consideration of whether the arrangements for the connection and pricing of network services discriminate against households and businesses that are involved in their own electricity production. Submitters that addressed this issue generally focused on solar PV systems, although divergent views were received on whether the owners were being discriminated against. Responses addressed the prices and service received by PV customers; these issues are considered separately in the following paragraphs.

Price

8.24 The committee received many submissions and letters from consumers with solar PV systems. One document received by the committee as a submission was a collection of letters collected by Solar Citizens, which is a community-based organisation that aims to increase the use of solar power. These letters expressed concern about the level of, and changes to, feed-in-tariffs compared to the standard price of electricity. Some consumers who have installed solar panels also noted they were unsure about their rights in relation to changes in feed-in-tariffs.²⁰ For example, one consumer wrote that they receive:

17 Mr Geoff Bragg, Solar Energy Industries Association, *Proof Committee Hansard*, 17 February 2015, p. 33.

18 City of Sydney, *Submission 67*, p. 5.

19 City of Sydney, *Submission 67*, p. 5.

20 *Submission 65.1*, p. 1.

...eight cents per KW generated yet [are charged] four times that to use a KW. This is grossly unfair given it is these companies that failed to update their own infrastructure to cope with the increased use of solar. We should be on a gross feed in tariff or at best be paid a lot more for what we generate.²¹

8.25 Another example was provided by Mr Alan Wilson, who wrote:

As a pensioner I looked to means of reducing my electricity bills and I installed 3 kilowatt solar panels once the smart metres came to our street.

I am disappointed to find that with the ridiculously low payment of 8 cents per kilowatt for electricity I generate plus the supply fee of \$1.00 per day makes the repayment of my investment a very lengthy proposition. As the retailers have to pay a much higher figure to buy power from the wholesaler/producer, why is the power that I generate worth so much less?²²

8.26 Similarly, the City of Sydney noted that private and public buildings with solar PV systems are paying energy companies disproportionate prices for importing electricity compared to the price received from energy companies for exporting electricity. The City considered this is 'a major barrier inhibiting the uptake of solar PV', and that until this mismatch is addressed, the amount of installed solar PV 'will be well below what is theoretically possible'.²³

8.27 However, other stakeholders firmly rejected the presumption that PV consumers were discriminated against based on price. The ESAA wrote that the AEMC has confirmed that owners of embedded generators, such as PV systems, 'are in fact over compensated, receiving a subsidy from other electricity users'. To illustrate this, the ESAA provided the following example:

...a household that installs a 2.5kW PV system has its network costs reduced by around \$200 a year, but only provides a saving to other customers of \$80. Other households are left to cover the \$120 difference through higher prices. It should be noted that users with energy intensive appliances (airconditioners etc.) are also receiving a cross-subsidy.

The subsidy arises as prices are currently largely energy based (kWh), while network costs are largely due to capacity/maximum demand (kW). As a PV owner typically reduces their energy consumed without having a commensurate impact on their maximum demand, it results in their bills reducing by more than the value of the energy they produce.²⁴

21 *Submission 65.1*, p. 94.

22 Mr Alan Wilson, correspondence published in *Submission 65*, p. 229.

23 City of Sydney, *Submission 67*, p. 7.

24 ESAA, *Submission 25*, p. 3.

8.28 Mr Matthew Warren, the chief executive officer of the ESAA, advised that he has a solar PV system at his residence. He observed that 'solar households are often big users of the network':

While we think we do not use much electricity, we are exporting and importing electricity, and we are quite active users of the network, so we need to pay our fair share of that network. Then there is the capacity component. As I said, 30 per cent of network investment is to meet those summer peaks, and we saw those record levels last year in Victoria and South Australia. So it is appropriate to charge for capacity usage.²⁵

8.29 The Energy Networks Association (ENA) advised that the amount of the cross-subsidy solar PV customers receive has been estimated at between \$120 and \$163 a year. It added that these cross-subsidies 'are currently far less than, for instance, the cross-subsidies caused by the use of air conditioning units at peak times'.²⁶

8.30 The New South Wales Irrigators' Council (NSWIC) also did not consider that PV customers have been discriminated against. The NSWIC argued the large uptake of solar PV systems demonstrates that the demand for these units was underestimated and the feed-in-tariffs were too high. The NSWIC similarly noted the AEMC's analysis of cross-subsidies and suggested that the cost of solar generated energy being fed into the system is 'only partially paid by those who have installed solar PV units'. The NSWIC concluded:

These arguments show that a well-intended policy initiative has created significant distortions in the market and led to unintended cost implications for third parties.²⁷

8.31 The submission from the Department of Industry noted the tension between the position of embedded generators and other energy consumers. The department explained that COAG has agreed that:

- 'residential and small business consumers with grid connected micro generation should have the right to export energy to the electricity grid'; and
- payments for exported electricity should reflect 'the value of that energy to the market and network, taking into account the time of day during which energy is exported'.²⁸

25 Mr Matthew Warren, Chief Executive Officer, ESAA, *Proof Committee Hansard*, 18 February 2015, p. 30.

26 Energy Networks Association (ENA), *Submission 31*, p. 11. The cross-subsidy estimates were based on studies by the AEMC and Oakley Greenwood.

27 New South Wales Irrigators' Council, *Submission 5*, p. 11.

28 Department of Industry, *Submission 34*, p. 16.

8.32 The department noted that, as indicated by the AEMC analysis, there 'is a risk that current arrangements may provide a higher return to households and businesses engaged in self generation than envisaged by these principles'. The department advised that the AEMC 'is pursuing changes to these pricing rules to improve the reflection of these network cost signals to consumers considering grid connected self-generation'.²⁹

Service received by solar PV system customers

8.33 Another issue is the attitude of network companies to PV systems as evidenced by the service provided when consumers seek to install these systems.

8.34 The Solar Energy Industries Association explained that customers who have installed a solar system and need to upgrade and connect the necessary new meters have found it difficult to deal with distribution network service providers. Generally, it is claimed that the network business failed to specify the requirements or process for the meter upgrade and the process was drawn out over several months.³⁰ The Association added that the process of connecting an installed solar system to the electricity network 'is not clear and seems to change from case to case'. It concluded that delays of four to five months in connecting an already installed system 'are difficult to fathom unless the organisation responsible for approving the connection [the distribution network service provider]...is against a solar system being installed'.³¹

8.35 Ms Claire O'Rourke, the national director of Solar Citizens, noted the letters Solar Citizens compiled for the committee contained a number of common themes about mistakes made by energy businesses that financially disadvantaged customers with solar panels. These errors included:

- 'unfair or hidden charges' that the customer was not aware of at the time of installation;
- an increase in service charges following the installation of a solar PV system; and
- high quotes for the installation of poles and wires in rural areas.³²

29 Department of Industry, *Submission 34*, p. 16.

30 The Solar Energy Industries Association provided two recent examples where commercial customers who had installed a solar system had to wait over four and five months respectively for the metering upgrade. See Solar Energy Industries Association NSW, *Submission 15*, p. 3.

31 Solar Energy Industries Association NSW, *Submission 15*, p. 3.

32 Ms Claire O'Rourke, National Director, Solar Citizens, *Proof Committee Hansard*, 17 February 2015, p. 62.

8.36 Mr Geoff Bragg from the Solar Energy Industries Association acknowledged that there are technical issues with the connection of PV to the grid, and that often upgraded infrastructure is required. However, he emphasised that the cost of this upgraded infrastructure is imposed on the proponent of the PV project. Mr Bragg contrasted this with the attitude of network businesses when faced with the need to upgrade infrastructure when a customer wants to use more energy, rather than generate their own. Mr Bragg provided the following example:

I can think of a residential customer recently who would like to put a large PV system on, but their supply transformer in a rural location is not big enough. If they want to put in a bigger transformer they will have to pay for that, at considerable cost—\$20,000 or \$30,000—which would write off the viability of the PV project. However, if they go to the distribution network and say, 'I'd like to put two more air-conditioners on the other side of my house they will come out, at a very subsidised cost, and put in a bigger transformer to supply.' This is the way that it works in reality on the ground.³³

Recent changes and future options

8.37 The submissions from the AEMC and the Department of Industry highlighted changes intended to improve the standing of customers involved in embedded generation.

8.38 The department's submission considered the issue of potential discrimination that embedded generation customers may face. The department highlighted the COAG Energy Council's National Energy Customer Framework (NECF) that commenced progressively in certain states from July 2012. The department stated that under the NECF, 'residential and small business energy customers are supported by a range of robust customer protections'. These protections include measures that govern the interactions retailers and distributors have with customers, such as minimum terms and conditions for retail and connection contracts'.³⁴

8.39 The AEMC noted that two rule changes made in 2014 'established a new framework for the efficient connection of embedded generators to distribution networks'. The AEMC provided the following explanation of what the new rules seek to achieve:

The new rules provide a clearer, more transparent connection process with defined timeframes, and require distributors to publish information to assist embedded generators. They also provide embedded generator proponents with more choices about how to connect. The rules aim to reduce barriers that embedded generator proponents have faced in attempting to connect to distribution networks. Removal of such barriers is in the long-term interest

33 Mr Geoff Bragg, Solar Energy Industries Association, *Proof Committee Hansard*, 17 February 2015, p. 30.

34 Department of Industry, *Submission 34*, p. 16.

of consumers who benefit from efficient investment in embedded generation via reduced network requirements.³⁵

8.40 While the AEMC's rule changes received some support, the City of Sydney argued that several issues remained unresolved. The City argued:

- the option of applying as a wholesale connection will not benefit most small-scale connection applicants;
- there 'remains a very marked asymmetry of power in the relationship between connection applicants and electricity networks'; and
- the reasonableness of connection costs has not been addressed.³⁶

8.41 The City of Sydney considered that connection package offers from distribution network businesses should be standardised to cover major classes of embedded generation, such as reciprocating gas engines and solar installations. The City added that under these packages:

The cost of distributors 'learning on the job' or bringing network practices up to scratch should be borne by (or at least shared with) distribution networks. If necessary, distribution networks should allocate additional resources to the process and allow for this in the costs of operation for which they seek approval from AER.³⁷

8.42 The City of Sydney also considered that the costs imposed on applicants should be limited so that they did not exceed 'the costs that would be incurred by a network that was appropriately designed and reasonably equipped to meet current and emerging network challenges'. Finally, the City added that additional resolution mechanisms for connection applications are needed.³⁸

Demand management

8.43 An effective demand-side response to pressures on the network can be provided if consumers are provided with incentives to reduce their consumptions during critical peak periods. Demand management refers to arrangements that allow consumers to commit to doing this and where the customers are compensated for doing so. The Public Interest Advocacy Centre explained that critical peak demand events generally occur 'on hot days, when household air conditioner use is at its highest'. If demand management can reduce demand, potentially peak demand could be significantly reduced. It follows that, over time, increases in overall network costs

35 AEMC, *Submission 41*, p. 10.

36 City of Sydney, *Submission 67*, p. 7.

37 City of Sydney, *Submission 67*, p. 7.

38 City of Sydney, *Submission 67*, p. 7.

for consumers should be lower as 'network capacity to meet peak demand is the key driver of network expenditure'.³⁹

8.44 The Queensland Consumers' Association explained that it has advocated for many years, largely unsuccessfully, for demand management measures to be a high priority. The Association particularly focused on direct load control.⁴⁰ It argued that there are 'large potential benefits...from voluntary direct load control of household air conditioners', however, failure to adequately respond to this has resulted in higher electricity prices. It explained that the need for voluntary direct load control of household air conditioners:

...became apparent several years ago when the use of air conditioners began to expand very rapidly. Yet industry and governments failed to quickly develop and implement policies to overcome impediments to the use of direct load control of air conditioners. The Association considers that this was a major public policy failure.

The failure nationally to use direct load control sufficiently to address the problem has resulted in a massive increase in peak demand in many states, especially late in the afternoon on very hot days, and in the network augmentation and replacement investments needed to meet it. These investments have in turn substantially pushed up power prices to consumers.⁴¹

8.45 The Total Environment Centre noted that demand management is 'an obvious way to constrain retail prices in the future', given network building to 'meet projected (though often not actual) increases in peak demand' has been one of the major drivers of higher electricity prices. However, the Total Environment Centre argued that demand management has been 'poorly utilised by networks in Australia'.⁴² The Centre concluded that the poor uptake of demand management is due to:

- a lack of incentives in the National Electricity Rules (NER) for network businesses to undertake demand management as a profitable alternative to capital expenditure; and

39 Public Interest Advocacy Centre, *Submission 18*, p. 19.

40 Direct load control technologies allow remote control of electrical appliances in a home (or a business) to manage electricity demand. A common form is where a consumer agrees (as a result of taking up a product offer from a retailer or distribution business) for remote cycling or 'on-off' switching of certain appliances/equipment for short periods of time. Such technologies have been used for household hot water systems since the 1960s. AEMC, *Power of choice review—giving consumers options in the way they use electricity: Final Report*, November 2012, www.aemc.gov.au/Media/docs/Final-report-1b158644-c634-48bf-bb3a-e3f204beda30-0.pdf (accessed 30 March 2015), pp. 74–75.

41 Queensland Consumers' Association, *Submission 47*, p. 1.

42 The Centre explained that in other jurisdictions demand management can be used to reduce up to ten per cent of peak demand, however, in Australia the figure is around one per cent. Total Environment Centre, *Submission 43*, p. 4.

- the Australian Energy Regulator (AER) not exercising its discretion to encourage network businesses to give a greater focus to demand management in their regulatory proposals.⁴³

8.46 The ENA noted that network businesses have been undertaking demand management activities 'in the context of the network responsibilities to find the most cost effective and efficient solutions to address demand growth within the context of network investment'. The ENA explained that, for network augmentation to be offset by demand management, network security considerations require 'that the loads controlled are reliably removed from peak periods'. Despite this challenge, peak demand has been reduced by demand management 'through initiatives such as managing peak hot water systems, rebates for efficient air conditioners, direct load control of major appliances and pricing agreements with large customers'.⁴⁴

8.47 Demand management was considered by the AEMC in its 2012 'power of choice' review. That review 'was focused on improving consumer engagement in the market and facilitating more active consumer participation'.⁴⁵ The *Power of choice* report noted that the NER allow the AER to develop and apply a separate incentive scheme for demand management, referred to as the demand management and embedded generation connection incentive scheme (DMEGCIS). However, the AEMC concluded that a more comprehensive demand management incentive scheme needs to be applied to distribution network businesses. The *Power of choice* report recommended that amendments to the NER be developed to:

...reform the application of the current demand management and embedded generation connection incentive scheme so that it:

- (a) provides an appropriate return for [demand side participation] projects that deliver a net cost saving to consumers; and
- (b) better aligns network incentives with the objective of achieving efficient demand management.

This would include creating separate provisions for an innovation allowance.⁴⁶

8.48 The AEMC drafted a rule change that would add more principles and criteria to the DMEGCIS.⁴⁷ Public consultation on a rule change request related to the DMEGCIS commenced in February 2015.⁴⁸

43 Total Environment Centre, *Submission 43*, p. 4.

44 ENA, *Submission 31*, p. 16.

45 AEMC, *Submission 41*, p. 3.

46 AEMC, *Power of choice review—giving consumers options in the way they use electricity: Final Report*, November 2012, www.aemc.gov.au/Media/docs/Final-report-1b158644-c634-48bf-bb3a-e3f204beda30-0.pdf (accessed 30 March 2015), p. 205.

47 AEMC, *Power of choice review: Final Report*, pp. 205–06.

8.49 The ENA and specific network businesses, such as Ergon Energy, expressed their support for a review of demand management, as recommended by the AEMC.⁴⁹ However, some stakeholders expressed frustration at the delay in action being taken on demand management via the AEMC process. For example, Dr Gabrielle Kuiper from the Public Interest Advocacy Centre suggested that the AEMC was 'not performing its functions in a timely manner'. Dr Kuiper added that her organisation was disappointed the AER's recent draft determinations stated that the AER would not be proposing a new demand management incentive scheme until the AEMC process on demand management is completed.⁵⁰ The Total Environment Centre similarly noted that the AER has been unwilling to introduce an effective incentive scheme pending the AEMC's decision on a rule change.⁵¹

8.50 When asked why the AER is not going to set demand management performance targets for distribution network businesses, an AER officer confirmed that 'at least one of the New South Wales businesses wanted us to apply a stronger incentive regime for demand-side management'. However, the AER's position is that within 'the policy framework, those issues are still, at a broader level, being looked at'. The officer provided the following explanation:

We felt that it would be rather pre-emptive of us to support specific types of those things before the rule framework had been amended. I think the AEMC is just about to begin its processes to change the rules and to allow other types of incentive schemes to apply in this area. We agree with those things, however we felt that the rule framework needs to be enhanced first.⁵²

Network tariff reform

8.51 Tariff structures can influence consumers to consider their energy usage and to become involved in embedded generation, change their consumption patterns or undertake energy efficiency measures. This section considers the evidence received on moves toward higher fixed network charges before considering more general calls for network tariff reform.

48 The consultation follows rule change requests based on the AEMC report that were lodged by the Total Environment Centre (November 2013) and the COAG Energy Council (December 2013). AEMC, 'Rule changes: Demand Management Incentive Scheme', www.aemc.gov.au/Rule-Changes/Demand-Management-Embedded-Generation-Connection-I (accessed 30 March 2015).

49 Ergon Energy, *Submission 24*, p. 12; Energy Networks Association, *Submission 31*, p. 16.

50 Dr Gabrielle Kuiper, Senior Policy Officer, Energy and Water Consumers' Advocacy Program, Public Interest Advocacy Centre, *Proof Committee Hansard*, 17 February 2015, p. 16.

51 Total Environment Centre, *Submission 43*, p. 5.

52 Mr Chris Pattas, General Manager, Networks, Australian Energy Regulator, *Proof Committee Hansard*, 18 February 2015, p. 11.

Fixed charges

8.52 The committee received complaints about certain existing network tariffs. Changes to fixed or service charges was a common grievance, particularly for customers who had installed their own embedded generation such as a solar PV system. The Total Environment Centre argued that moves to increase fixed daily charges reflected the vested interest network businesses have in 'maintaining their status as protected monopolies, rather than being open to competition from new technologies and services'. The Centre argued that increases in fixed daily charges were occurring in the face of declining consumption and in an attempt to restrict competition from PV systems.⁵³

8.53 The rationale for increased fixed charges was provided by Mr Ian McLeod, the chief executive of Ergon Energy. Mr McLeod argued that tariffs structures have historically been largely based on volume, whereas the network 'is generally a fixed cost'. While expounding this argument, Mr McLeod compared household electricity costs to other regular costs a household faces:

It is like having your house. You go on holidays and you still have to pay for your loan, you still have to pay for the connections to it and all those sorts of things.⁵⁴

8.54 Increased fixed charges are also affecting agricultural businesses. Like other organisations representing energy users, the Agriculture Industries Electricity Taskforce expressed suspicion that higher fixed charges were intended to make it more difficult for people to reduce their electricity bills by reducing the amount of electricity they consume from the grid. However, the Taskforce also directly countered the argument that fixed costs should be recovered by fixed charges:

We believe they have confused sunk (historic) costs with (current) fixed charges. There is no basis in the theory of electricity pricing for sunk costs to be recovered through fixed charges.⁵⁵

Demand-based tariffs

8.55 Changes to demand-based tariffs for large businesses were also criticised, particularly by agricultural businesses. The Agriculture Industries Electricity Taskforce stated that demand charges are a 'major concern' for its members. It explained that there is:

...little that our members can do to reduce demand charges by moving their peak demands to times that are likely to be more advantageous to the system and hence beneficial for other energy consumers as well. This is

53 Total Environment Centre, *Submission 43*, p. 4.

54 Mr Ian McLeod, Chief Executive, Ergon Energy, *Proof Committee Hansard*, 16 February 2015, pp. 12–13.

55 Agriculture Industries Electricity Taskforce, *Submission 21*, p. 22.

completely contrary to the insistence of the networks that they are pursuing 'cost reflective' tariffs.⁵⁶

8.56 Mr Michael Murray from Cotton Australia explained that 'irrigators who rely on electricity to harvest in accordance with their licence conditions are particularly penalised by the move to demand-based tariffs'. He continued:

In New South Wales, many of our growers are already on these grossly inappropriate tariffs, while in Queensland a transition process is underway which will force many onto demand tariffs by 2020. We modelled the impact on irrigators in the St George district of Queensland, and demand-based tariffs for water harvesters will typically increase bills by 200 to 300 per cent. In one example, an irrigator currently on tariff 62 with a bill of around \$150,000 a year would have been slugged with a bill of \$450,000 for that same year while using exactly the same number of kilowatts of electricity—that is, with no change in usage—just in the way that the tariff is structured. Clearly our fibre producers cannot absorb such dramatic increases in costs. There desperately needs to be a reform in how network revenues and tariffs are determined.⁵⁷

8.57 In the absence of change, Mr Murray suggested that an irrigator facing an increase in an electricity bill from \$150,000 to \$450,000 is likely to 'simply replace his electric motors with diesel ones'.⁵⁸

8.58 The committee also heard that sugar mills in Queensland will be required to change to a new tariff over the next five years. It is expected that this tariff will result in tariffs for those businesses that are 40 per cent higher than the current tariffs. Ms Sharon Denny from the Australian Sugar Milling Council explained:

Currently, most of our members are on tariff 22. That tariff is being phased out over the next five years and they will be moved to tariff 48. Now, that tariff 48 has a range of additional charges inside it that our mills do not see under tariff 22, although we anticipate that some of those charges will start to flow through into tariff 22 as well. At today's prices, with QCA price determination, the difference between tariff 22 and tariff 48 for our mills would be a 40 per cent price increase; but in five years' time, obviously, that price increase will be higher again. That is just the best comparison we can do today with what we know of published figures.⁵⁹

56 Agriculture Industries Electricity Taskforce, *Submission 21*, p. 22.

57 Mr Michael Murray, Policy Manager, Cotton Australia, *Proof Committee Hansard*, 17 February 2015, p. 20.

58 Mr Michael Murray, Cotton Australia, *Proof Committee Hansard*, 17 February 2015, p. 20.

59 Ms Sharon Denny, Senior Executive Officer, Government and Business Development, Australian Sugar Milling Council, *Proof Committee Hansard*, 16 February 2015, p. 21.

8.59 Mr Warren Males of Canegrowers added that although some of these tariffs have been described as 'obsolete', they were only obsolete because the distributor has decided they do not support the continued existence of particular tariffs. Mr Males advised that efforts to engage with the distributor about a tariff appropriate for food and fibre production have been undertaken, however, the distributor (which in this case is Ergon) has not been receptive.⁶⁰

General calls for network tariff reform

8.60 There appeared to be general agreement that network tariff reform was desirable. The perspective of policymakers was provided by the Department of Industry, which argued that network tariff reform 'is crucial to drive behaviours that minimise network costs and support more efficient network utilisation'. The department noted that industry are driving reforms in this area, however, it suggested that governments can:

- encourage industry to take action on opportunities provided by new rules;
- support efforts to improve customer understanding of tariff reform; and
- ensure that appropriate consumer protections support vulnerable consumers.⁶¹

8.61 The Energy Users Association of Australia (EUAA) argued that current approaches to network pricing are 'not cost reflective'. In particular, the EUAA claimed that the current pricing methodologies used by networks 'lack transparency, produce highly variable outcomes for consumers, and do not reflect the increasing diversity in how consumers use energy'.⁶²

8.62 Electricity networks and their industry associations also desired network tariff reform. The ENA called for a 'comprehensive reform program for electricity distribution network tariffs and enabling metering'. The ENA explained that use of the networks varies due to 'increasingly diverse load profiles', depending on the use of air conditioning, energy efficient devices and practices, solar panels and other technologies. Despite this:

...most Australian electricity distribution network tariffs rely on volumetric charges (cents per kilowatt hour) which do not vary by time. They bear little relation to drivers of network cost, resulting in unfair cross-subsidies between customers today and a failure to signal the costs of increased network investment which would be required in the future.⁶³

60 Mr Warren Males, Head, Economics, Canegrowers; and Chairman, Sugarcane Gene Technology Group, Australian Sugar Industry Alliance, *Proof Committee Hansard*, 16 February 2015, p. 22.

61 Department of Industry, *Submission 34*, pp. 6–7.

62 Energy Users Association of Australia (EUAA), *Submission 17*, p. 16.

63 ENA, *Submission 31*, p. 11. See also Ergon Energy, *Submission 24*, p. 12.

8.63 The ENA envisaged that network tariff reform would result in customers paying tariffs that 'are more cost-reflective rather than paying a flat or "average" rate based on their electricity usage'. These tariffs would enable customers to make better informed decisions about their use of electricity network services and whether to invest in technology to help manage their consumption.⁶⁴ The ESAA noted tariffs that contained a 'capacity/demand' element will ensure that customers with embedded generation 'are appropriately paid for the services they provide' and that customers who 'impose significant costs on the grid pay for these costs'.⁶⁵

8.64 A submission from the president of the Hastings Branch of Climate Change Australia, Mr Harry Creamer, called for a shift from flat-rate tariffs to time-of-use tariffs. Mr Creamer noted this would enable households to be charged according to loads they impose on the network, although it would require a national roll-out of smart meters.⁶⁶ However, Mr Creamer added:

...it would be extremely unfair to charge consumers based on the single highest demand figure recorded per day, as some retailers are suggesting. Governments, businesses and regulators must be clear that the total amount of revenue will not change.⁶⁷

8.65 The City of Sydney supported network tariff reform that better reflects the contribution made by embedded generators. The City submitted that the setting of network tariffs and charges should 'take into account the relative use of system resources in an efficiently designed and managed system'. The City argued that 'using less system resources to supply energy to customers should be rewarded with a lower overall tariff'.⁶⁸

8.66 While many submitters expressed support for some type of tariff reform, at least one group had reservations given the nebulous nature of the concept. Based on the recent experiences of its members with changing tariffs, the Agriculture Industries Electricity Taskforce expressed concern that network companies may be calling for tariff reform as part of an effort to maintain their dominant position in the electricity market. The Taskforce stated:

64 ENA, *Submission 31*, p. 11.

65 ESAA, *Submission 25*, p. 3.

66 Smart meters are intended to allow customers to better understand and manage their electricity usage. Smart meters are the standard meter in Victoria, but are not common elsewhere in Australia. The ESAA noted that some of the pricing structures for reflecting the cost consumers impose on the network would require smart meters (ESAA, *Submission 25*, p. 3). The rollout of smart meters has not been without controversy, with some people concerned about their cost, safety and concern about adverse health effects (see Stop Smart Meters Australia, *Submission 52*).

67 Mr Harry Creamer, *Submission 29*, p. 3.

68 City of Sydney, *Submission 67*, p. 6.

We understand that the AEMC intends to make changes to the National Electricity Rules to mandate that tariffs should be 'cost reflective'. We do not know what this will mean in practice, but we are concerned that networks will use 'tariff reform' as an opportunity to undermine the prospects for energy efficiency and distributed generation, both of which are competitive threats to their business.⁶⁹

8.67 The Consumer Action Law Centre noted that the AEMC has recently worked on network tariff arrangements with the view to reducing existing cross-subsidies, so that 'those that create a burden on the system (i.e. those with high air conditioner use)...pay for that burden'. Under the changes, network tariffs must be based on long-run marginal cost. Network businesses must also consider the impact of changes on consumers and must develop price structures that consumers can understand. However, the Centre noted that the AEMC's decision on this issue limited the role of the AER in relation to network tariffs and left 'significant discretion to the network businesses'. The Centre pointed out that 'while each network tariff must be based on long-run marginal cost, network businesses will have flexibility about how they measure long run marginal cost'.⁷⁰

8.68 Although the Total Environment Centre is of the view that high fixed daily charges are inconsistent with the principle of long-run marginal cost, it warned that the rule change will not prevent network companies from seeking to maintain their revenue by increasing fixed charges.⁷¹

8.69 Finally, the EUAA noted that the benefits of more efficient cost-reflective pricing through tariff reform were dependant on other issues with electricity regulation being addressed. Mr Mark Grenning, a member of the EUAA board, explained that if the inefficient investment included in the asset base is not addressed, then regardless of the tariffs in place consumers will still be required to pay high prices because of past gold-plating and stranded assets.⁷²

Committee view

8.70 Australia has a large and expensive electricity network built as a result of decades of centralised generation. The evidence taken during this inquiry revealed that stakeholders are increasingly starting to consider whether the current system of networks, and the regulations governing it, can be sustained. In the coming years, this network arrangement may no longer effectively deal with how a significant amount of electricity is generated and distributed. Sustained high network costs and improvements in technology, such as advances in battery storage, may result in a

69 Agriculture Industries Electricity Taskforce, *Submission 21*, p. 22.

70 Consumer Action Law Centre, *Submission 20*, p. 7.

71 Total Environment Centre, *Submission 43*, p. 4.

72 Mr Mark Grenning, EUAA, *Proof Committee Hansard*, 18 February 2015, p. 17.

market that demands a smaller, more local, network rather than the expansive networks based on centralised generation.

8.71 The committee considers that, given the concern that electricity networks are entering a 'death spiral', policymakers and regulators need to closely monitor developments in the electricity market to ensure network businesses do not discriminate against customers who seek to engage in embedded generation. It is also important that the customers who continue to be supplied with electricity in the conventional manner, particularly customers who cannot afford to invest in their own electricity generation system, are not forced to pay an increasing share of network costs as a result of other customers going 'off-grid'.

8.72 Given the likely changes in the energy market, the committee considers it is important that the regulatory framework is flexible so it can respond quickly in a way that ensures networks operate in the long-term interests of consumers. Identifying and removing impediments to change must be a priority of energy policymakers and regulators. Developments in the market, particularly due to 'behind-the-meter' electricity generated by customers, need to be acted on in a timely manner once anticipated or identified.

Recommendation 15

8.73 The committee recommends that the Australian, state and territory governments increase and prioritise efforts to ensure that networks are prepared to efficiently respond to changes in the energy market, in light of:

- **the increased uptake of small-scale solar generation;**
- **emerging energy storage technologies;**
- **the anticipation of customers going 'off-grid';**
- **the anticipation of further disruptive technologies; and**
- **the certainty of value destruction as a result of current business models.**

Recommendation 16

8.74 The committee recommends that, as cost-reflective network pricing is introduced, the COAG Energy Council ensure appropriate steps are taken so network companies' tariff and non-tariff based demand management programs are strengthened to assist consumers to transition to cost-reflective tariffs.

Recommendation 17

8.75 The committee recommends that the Australian Energy Regulator expedite its implementation of the current demand management incentive scheme rule change in all open network revenue determinations.

Recommendation 18

8.76 The committee recommends that the COAG Energy Council remove any barriers to networks implementing cost-reflective network prices to ensure efficient use of demand management and embedded generation is rewarded.

**Senator Anne Urquhart
Chair**