Energy Access and Affordability Policy Research

FINAL REPORT 17 March 2017 Prepared by: Andrew Nance The Energy Project Pty Ltd andrew.nance@energyproject.com.au



This research report was commissioned by The Climate Institute, the Australian Council of Social Service and Brotherhood of St Laurence to inform their joint project *Empowering low income households through electricity decarbonisation*. This report argues for five policy outcomes that reflect the interaction between household energy bills and energy, climate and social policies: electricity priced efficiently (including integrated climate policy); informed and engaged consumers; energy consumed efficiently and productively; robust consumer protections; and all households have a capacity to pay their energy bills. These five outcomes, pursued in broadly equal measure, can help ensure effective decarbonisation of the electricity supply chain while preserving universal access to affordable energy services. The research report will be used to inform national consultations with Community and Environment sectors for the purpose of developing policies focused on the needs of vulnerable, low-income households through the transformation and decarbonisation of the electricity system. Recommendations from the consultations will be submitted to the Federal Government's 2017 review of climate policies.



Acknowledgements:

Thanks go out for the contributions, suggestions and guidance from the project partners:

- Olivia Kember (The Climate Institute)
- Damian Sullivan (Brotherhood of St Laurance)
 - Karen Grogan (ACOSS)
 - Kellie Caught (ACOSS)

And thanks also for invaluable feedback from the Reference Group: Ann Whitfield, Suzanne Harter, Dr Tim Nelson, Gavin Dufty, Amandine Denis, Denise Boyd, Chris Alexander.

This project was funded by Energy Consumers Australia Limited (<u>www.energyconsumersaustralia.com.au</u>) as part of its grants process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas.

The views expressed in this document do not necessarily reflect the views of the Energy Consumers Australia."

Summary

The political economy of electricity pricing in Australia has been charged by rapid price rises over the last decade. Average prices have increased 65% in real terms from the beginning of 2007 to the end of 2016. This has challenged the budgets of many households, and the expectation that climate policy measures may increase prices has led to resistance from many quarters.

However, climate policy is far from the only pressure on energy markets – a technology-driven transition is occurring anyway. The ability of the electricity system to deliver ongoing security and reliability through this transition has increased in importance over the last year. These three related issues – energy security, affordability, and decarbonisation - are the 'energy trilemma'. The interaction of the elements of the trilemma, and the balance of achievement across them, is receiving significant attention. The grand policy challenge is to solve for all three.

Research by the CSIRO and others has shown that a portfolio of measures can result in lower energy bills, deliver a more secure and reliable electricity supply, while taking strong action on reducing emissions from the energy sector. Policy processes such as COAG's Independent Review of the Future Security of the National Electricity Market, and the 2017 climate policy review, offer opportunities to improve the performance of the electricity system against all three elements of the trilemma.

This research report contributes by focusing on the needs of vulnerable, low-income households during the transition. The overall aim of the national electricity market has been stated as "... to provide a reliable, secure energy supply at the best price for consumers"¹. This report shows that 'the best price' is not only elusive but only one element of the public policy response to energy affordability and vulnerable households.

Following this summary, the report provides context in Chapter 1 and is then structured around five policy outcomes that reflect the interaction between household energy bills and energy, climate and social policies. These five outcomes, pursued in broadly equal measure can ensure effective decarbonisation of the electricity supply chain while preserving universal access to affordable energy services:

- Electricity priced efficiently AND
- Informed and engaged consumers AND
- Energy consumed efficiently and productively AND
- Robust consumer protections AND
- All households have a capacity to pay their energy bills

¹ AEMC Submission to the independent review of the future security of the national electricity market dated 07 March 2017 accessed 07 Mar 2017 at <u>http://aemc.gov.au/News-Center/What-s-New/Announcements/AEMC-submission-to-the-independent-review-on-the-f</u>

Chapter 2 presents the first outcome – **electricity priced efficiently**. This chapter introduces the components of a typical electricity bill in order to analyse the impacts of climate policies on household expenditure. The chapter includes a literature review of recent electricity market modelling of the impacts of climate and clean energy policies on residential electricity prices. The modelling reviewed indicates that most climate policy options, would add around 5c/kWh to electricity prices over the period from 2020 to 2030 (approximately 20%), assuming no changes to any of the other cost drivers discussed herein. However, recent analysis suggests that the uncertainty created for investment in the electricity system from the absence of clear climate policy is already driving up electricity prices by a similar amount. Further, as illustrated in work by the CSIRO in particular, other factors can put equivalent downward pressure on prices on prices and considers the recommendations put forward by various stakeholders.

Chapter 3 considers policies that seek to ensure consumers are **informed and engaged** in competitive energy markets. A comprehensive reform package known as *Power of Choice* is delivering a range of measures in order to unwind cross-subsidies and open up competition for metering, energy storage and other customer-side aspects of energy markets. However, it also clear that vulnerability is closely linked to barriers to this ongoing exercising of choice. Recommendations to overcome these barriers are taken from the literature and discussed.

Chapter 4 considers policies that affect the **energy consumption** of households. This chapter considers the energy performance of housing as well as the emergence of Distributed Energy Resources (DER) such as solar and storage. Access to these technologies is emerging as the key driver of a redistribution of electricity expenditure between households. The National Energy Productivity Plan (NEPP) represents the current national policy relevant to this outcome. A range of recommendations from the literature are presented in context.

Chapter 5 discusses the essential service nature of electricity and other utilities and presents the rationale for why **robust consumer protections** are a critical policy outcome. Disconnection of electricity or gas due to unpaid bills is a reality for an increasing number of households despite concerted efforts to make this a measure of 'last resort'. New technologies and financial products are challenging existing frameworks. This chapter reviews contemporary initiatives and presents recommendations from the literature.

Chapter 6 considers the social welfare policy objective of ensuring households have a **capacity to pay** for essential goods and services. This involves a combination of income measures from the tax and transfer system as well as jurisdiction-based measures that provide concessions and emergency assistance tied to energy bills. This discussion overlaps with broader issues of poverty and housing affordability and represents a very complex area of public policy. A range of recommendations from the literature are presented for further consideration by stakeholders.

Chapter 7 summarises the report and consolidates recommendations from the preceding chapters. All five policy outcomes will need to be pursued in broadly equal measure in order to achieve public policy objectives relevant to both energy markets and vulnerable households. It is also clear that understanding who is the most vulnerable, and then assisting them to

minimise their energy costs is a shared responsibility between governments, the community services sector, the energy industry, landlords and the suppliers of technologies that produce and consume energy. However, a focal point of policy leadership – a policy champion - is missing on most, if not all, of these issues.

Table of Contents

1	Context			7
	1.1	Bac	kground and Purpose	7
	1.2	Elec	ctricity in an essential service	8
	1.3	Australia's International Emissions Reduction Commitments		
	1.4	Aus	tralia's residential energy market	. 11
	1.4.1		Expenditure	. 11
	1.4.2		Greenhouse Emissions	. 11
	1.5 Cor		nponents of a typical electricity bill	. 13
	1.6	Historical trends in residential electricity prices		
	1.7	Beyond averages to understand vulnerability		. 17
	1.8	Und	lerstanding vulnerability to future prices and costs	. 22
	1.8.1		Access to technology and Capacity to invest	. 23
	1.8.2		Network pricing reform	. 24
	1.8.3		Increasing fixed charges in retail offers	. 25
	1.9	Cha	pter Summary	. 26
2	Policy or		utcome: Electricity priced efficiently	27
	2.1	Introduction		. 27
	2.2	Effic	cient pricing – the NEM approach	. 27
	2.3	Nati	onal Electricity Objective	. 28
	2.4	Governance		. 29
	2.5	Stat	e of Play	. 30
	2.5.1		Retailer controlled costs – approximately 38%	. 31
	2.5.2		Network costs – approximately 45%	. 32
	2.5.3		RET and State-based energy schemes – approximately 8%	. 33
	2.5.4		GST – 10%	. 33
	2.6	Wha	at impact from carbon policy from 2020? Inferences from recent modelling	. 34
	2.7	Inte	rnalise the costs of climate policy or go Around the Market?	. 39
	2.8	Sun	nmary of other key influences	. 39
	2.8.1		The role of natural gas	. 40
	2.8.2		Sudden closure of generation capacity	. 41
	2.8.3		Policy Uncertainty	. 41
	2.8.4		Jurisdictional Schemes	. 43
	2.8.5		Utilisation of the Grid	. 44
	2.8.6		Ongoing Energy Market Reform	. 45
	2.9	Rec	commendations by others	. 46
	2.10 Cha		pter Summary	. 47
3	Poli	су оι	utcome: Informed and engaged consumers	49

3	.1	Introduction	. 49				
3.2		Governance	. 50				
3.3		Shared Responsibilities and Relationships	. 51				
3	.4	Advanced Metering	. 51				
3	.5	Recommendations by others	. 51				
3	.6	Chapter Summary	. 52				
4	Policy outcome: Energy consumed efficiently and productively		53				
4.1		Introduction	. 53				
4	.2	Housing	. 53				
4	.3	Recent modelling of future electricity consumption	. 54				
4	.4	Governance	. 55				
4	.5	Jurisdictional Schemes	. 56				
4	.6	Distributed Energy Resources	. 56				
4	.7	Recommendations by others	. 56				
4	.8	Chapter Summary	. 57				
5	Poli	cy outcome: Robust Consumer Protection	59				
5	.1	Introduction	. 59				
5	.2	Governance	. 61				
5	.3	Recommendations by others	. 62				
5	.4	Chapter Summary	. 62				
6	Poli	cy outcome: All households have a capacity to pay	62				
6	5.1	Introduction	. 62				
6	.2	Role of income support	. 63				
6	.3	Role of Concessions	. 64				
6	.4	Housing	. 65				
6	.5	Connection to other research	. 65				
6	.6	Governance	. 66				
6	.7	Recommendations by others	. 66				
6	.8	Chapter Summary	. 67				
7	Cor	nclusions	68				
8	Ref	eferences					
9	Арр	endix A	77				
10 Appendix B – Summary of Studies seeking to estimate the impacts of different climate policies on electricity prices. 78							
11	11 Appendix C – Summary of Studies seeking to identify demographic attributes of						
hou	households considered most vulnerable to rising energy costs. 85						

1 Context

1.1 Background and Purpose

In December 2015, 195 countries, including Australia, adopted the first international climate deal to bind all countries to take action to reduce emissions, referred to as the Paris Agreement (UNFCCC 2015). The core element of the agreement is to limit global warming to well below 2°C above pre-industrial levels, and pursue efforts to limit warming to 1.5°C. The agreement also obliges signatories to consider children, persons with disabilities and other people in vulnerable situations when taking action to address climate change.

There is increasing recognition that people experiencing poverty and inequality, even in developed countries such as Australia, are more vulnerable to the adverse impacts of climate change (including increasingly frequent and intense extreme weather events) than the general community, having the least ability to cope, to adapt, to move and to recover (Mallon et al, 2013).

The impacts of climate change on people experiencing poverty and inequality in Australia also include the way that public policy responses influence the cost of essential services – especially household energy costs.

To achieve the objectives of the Paris Agreement the 195 countries are required to submit comprehensive national climate action plans and to review them every 5 years to enable more ambitious targets to be set as required. The Australian Government has a 2030 greenhouse gas emissions reduction target of 26-28% below 2005 levels and is undertaking a review of climate change policies in 2017 to ensure this target and the international commitments are achieved². Under the terms of the Paris Agreement Australia is required to update and resubmit its 2030 target by 2020.

Public policy tends to evolve in cycles (Althaus, Bridgman & Davis 2012) and, as will be evidenced throughout this report, the current cycle of climate change policy in Australia is aiming to ensure stronger alignment with energy policy. This research report considers how a social policy objective of *access to affordable energy services* might also be advanced during this policy cycle.

The electricity sector generates around one-third of Australia's total Greenhouse Gas Inventory and will be required to make a substantial contribution to Australia's international commitments to reduce emissions. Electricity sector emissions are dominated by the combustion of coal (around 62% of electricity generated and around 88% of emissions)³ but the majority of coal-fired electricity generators will be well past their design life by 2030 (Nelson et al 2014). Choices about refurbishment, replacement or closure of these generators will be critical to energy security, energy affordability and emissions reductions in the period to 2030 and beyond.

The Council of Australian Governments (COAG) held an extraordinary meeting on 7 October

² Terms of reference for the review are available from <u>http://www.environment.gov.au/climate-change/review-climate-change-policies</u> and attached as Appendix A

³ Climate Change Authority Policy options for Australia's Electricity Supply Sector, August 2016, p16

2016 and launched an Independent Review into the Future Security of the National Electricity Market⁴. The expert review panel is chaired by the Chief Scientist and has the task of addressing the so called 'energy trilemma' (Finkel 2016, p10):

"... policies that simultaneously provide a high level of energy security and reliability, universal access to affordable energy services, and reduced emissions."

This report considers existing and future policies related to energy access and affordability for low-income and vulnerable people in Australia in the context of needing to rapidly reduce electricity sector emissions. This is not an issue unique to Australia. In the UK, Europe and elsewhere, energy affordability for vulnerable households is generally referred to as *fuel poverty*. The 2012 Hills Fuel Poverty Review commissioned by the UK Government put a climate policy perspective to this quite succinctly (Hills, 2012)⁵:

[p2] "Some argue there is a tension between fuel poverty and climate change policies. Certainly, some people live in homes that are too cold and making them warmer could increase their carbon emissions. But any tension cuts both ways. The continuing existence of fuel poverty, especially on the potential scale we outline in this report, is an obstacle to delivery of our carbon objectives as well as a source of health problems and a compounding of the problem of poverty. This does not mean that low carbon efforts should be put on hold while fuel poverty is tackled. Quite the reverse. But it is clear that the impact of policies on those in fuel poverty must be considered so that they are not left behind as we make the changes needed to meet our carbon emission obligations."

[p8]: "... fuel poverty also acts as a barrier to the implementation of other policies to mitigate climate change, since those on low incomes are least able to afford any increase in prices that may result from them."

The purpose of this research report is to inform a project that brings the Community Services sector and the Environment sector together to find common ground and input into the Federal Government's 2017 review of climate policies.

1.2 Electricity in an essential service

It is worth acknowledging that public policy in Australia recognises electricity as an essential service. This is evidenced by the 'industry-specific' approach to energy consumer protection in Australia's Consumer Policy Framework. The framework was comprehensively overhauled in 2010 with the implementation of the Australian Consumer Law from January 2011. These reforms were informed by a preceding Productivity Commission Review of Australia's Consumer Policy Framework (PC, 2008)⁶. The Productivity Commission made specific reference to energy markets and reforms to the provision of other essential services in

⁴ <u>http://www.environment.gov.au/energy/national-electricity-market-review</u>

⁵ Professor John Hills, Director of the Centre for Analysis of Social Exclusion (CASE) at the London School of Economics, was appointed by the UK government in March 2011 to conduct an independent review from first principles of the fuel poverty definition and target.

⁶ Review of Australia's Consumer Policy Framework Productivity Commission Inquiry Report No. 45, 30 April 2008 www.pc.gov.au/inquiries/completed/consumer-policy/report

establishing the context for the Inquiry (PC, 2008, page 7):

The introduction of competition to the provision of energy, water and telecommunications services has delivered significant benefits for consumers. In particular, while the need to put provision on a commercial footing has sometimes led to upward pressure on prices, this pressure has often been more than offset by the productivity gains that have ensued from the more competitive market environment. Moreover, consumers now have much greater capacity to purchase service 'bundles' that meet their particular requirements.

However, these benefits have sometimes been diluted by high 'switching' costs, and complex customer contracts. And the corporatisation and privatisation of suppliers has raised issues about the best means of ensuring that vulnerable and disadvantaged consumers continue to have appropriate access to these services.

To explain why energy consumers warrant explicit protection beyond the generic provisions of the broader consumer policy framework, the Commission stated (PC, 2008, page 108):

"There are good reasons to supplement the generic consumer law with specific measures to protect and empower energy consumers. They are essential services, with disconnection having potential harmful effects; billing is lumpy increasing the risk of financial stress for low income households; price menus and product bundling can be complex; and some areas of supply are not yet fully competitive."

Reference was also made to the different pace of reform amongst the states and territories as being further reasons why national Consumer Law would not be appropriate for energy markets. Energy markets therefore featured in the Productivity Commission's considerations of *Industry specific* consumer regulation. The PC recommended: (Recommendation 5.3):

... Australian Governments should agree to the longer term goal of a national consumer protection regime for energy services, with a single set of requirements to apply in all jurisdictions participating in the national energy market. Those requirements should be enforced by the Australian Energy Regulator.

This recommendation precipitated the National Energy Customer Framework (NECF). The NECF complements the generic consumer protections provided by Australian Consumer Law. The NECF is a package of legal instruments centred on the National Energy Retail Law (NERL) and includes a set of Rules that complement the National Electricity Rules and National Gas Rules. Consumer Law is supplemented by state-specific provisions in Victoria, Western Australia and the NT.

For example, provisions specifically refer to marketing activities of energy retailers, minimum information on bills, access to independent dispute resolution, disconnection as a last resort etc.

1.3 Australia's International Emissions Reduction Commitments

In 2016 Australia ratified the Paris Agreement on climate change, which entered legal force on 4 November 2016. The objectives of the Paris Agreement are to limit global average

temperature rise to "well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"⁷. A further objective is to achieve global net zero emissions in the second half of this century⁸, with developed countries required to do more of the effort. The Agreement's temperature goals imply a deadline for net-zero emissions from developed countries of 2045-55.⁹ ¹⁰

Australia has committed to reduce emissions by 5% below 2000 levels by 2020 and 26-28% below 2005 levels by 2030. The Australian government is to consider a longer-term emission reduction target as part of its 2017 review of climate policies¹¹, and under the Paris Agreement is required to update and resubmit its target by 2020¹². It is important to note that many observers argue that Australia's current targets are inconsistent with the target of "well below 2°C" and achieving net-zero emission by between 2045 and 2055¹³. The potential implications for the cost of accelerated action in the period 2030 to 2050 are discussed elsewhere in this report.

Some of the modelled scenarios assessed in this report apply the national 2030 target proportionately to the electricity sector. Others are based on percentage targets that are more ambitious or are based on an emissions budget derived from the 2°C goal. The range of targets assessed illustrates both the relevance of the target to electricity price impacts and the range of uncertainty as to what the sector's eventual emission reduction requirements might be.

A range of public policy responses have been proposed to decarbonise Australia's electricity sector. Some have been modelled and their impact on electricity prices compared. The modelled options, even the option of 'no new measures', suggest there will be upward pressure on electricity prices as a result of:

- how and at what pace we respond to the risks of climate change;
- the technologies used to produce electricity;
- the market designs we use;
- how we manage significant increases in the price of natural gas;

However, the price of electricity is only part of the story. What really hurts vulnerable

http://www.climateinstitute.org.au/verve/_resources/ClimateAnalytics_Report_FINAL_23082016.pdf.

 ⁷ Source: <u>http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf</u> Article 2
 ⁸ Ibid, Article 4

⁹ B. Hare, N. Roming, M. Schaeffer, et al., 2016, *Implications of the 1.5*°C *limit in the Paris Agreement for climate policy: Report for the Climate Institute.* Climate Analytics, Potsdam:

¹⁰ N. Höhne, M. den Elzen, D. Escalante, 2014. "Regional GHG reduction targets based on effort sharing: a comparison of studies", Clim*ate Policy*, 14:1, 122-147, doi: 10.1080/14693062.2014.849452

¹¹ Terms of reference for the review are available from <u>http://www.environment.gov.au/climate-change/review-climate-change-policies</u> and attached as Appendix A

¹² Decision 1/CP.21 Adoption of the Paris Agreement, https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf

¹³ See Climate Action Tracker at <u>http://climateactiontracker.org/countries/australia.html</u>, Climate Change Authority Observations on Australia's 2030 target – Statement by the Chair August 2015 "However it is viewed, the reduction in emissions embodied in the government's target is substantially weaker than that recommended by the Authority." Available from <u>http://climatechangeauthority.gov.au/node/366</u>

households is the total cost of securing their energy needs, and this is influenced by;

- how much energy is consumed and when;
- other price pressures across the supply chain, including network and retail charges;
- fixed charges and eligibility for concessions;
- housing circumstance (including number of people in a dwelling, tenure, condition and design).

The following sections add to the context by giving a sense of scale to Australia's residential energy consumption.

1.4 Australia's residential energy market

1.4.1 Expenditure

The Australian Bureau of Statistics Survey of Income and Housing (SIH) 2013-14¹⁴ estimates total occupied dwellings with a mains electricity connection at 8,766,400.

The Australian Energy Market Commission publishes estimates of typical electricity bills in each National Electricity Market jurisdiction¹⁵. Applying these estimates to the household numbers provides an estimate of national market turnover of around \$12,500 million (\$12.5 billion) including an estimated \$1,135m in Goods and Services Tax (GST).

Residential gas consumption in Australia was 162PJ in 2014-15¹⁶. Average Residential Gas price has been estimated (Oakley Greenwood 2016) to be approximately \$28/GJ in 2015 (ex GST) indicating a total market spend of \$5 billion and raising approximately \$450m in GST receipts.

Combined, household expenditure on electricity and gas was approximately \$17,500 million and generated an estimated \$1,588 million in GST receipts in 2015-16.

1.4.2 Greenhouse Emissions

Australia's Greenhouse Emission Information System (AGEIS) data for inventory year 2014 allocates just over 180Mt CO2-e of greenhouse gas emissions in 2014 (latest data year in AGEIS) to the electricity sector. This is 34.5% of the National Inventory Total (523Mt) and the single largest sector of the inventory.

Household consumption is responsible for 23% of electricity sector emissions and therefore 8.1% of the National Inventory Total (42.5 Mt, 2014). Households are also responsible for direct emissions from stationary energy use (mainly natural gas for heating, hot water and cooking) and transport (mainly private cars). The trend in these emissions categories can be

¹⁴ See ABS Cat No. 4130.0 – Housing Occupancy and Costs, 2013-14 Data Cube: Household Sources of Energy and Water, 2013-14

¹⁵ AEMC, *2016 Residential* Electricity *Price Trends*, final report, 14 December 2016, Sydney. A combination of standing offer and market offer prices were used for each jurisdiction to estimate total market turnover.

¹⁶ Office of the Chief Economist, Australian Energy Statistics Table F <u>https://industry.gov.au/Office-of-the-Chief-</u> <u>Economist/Publications/Pages/Australian-energy-statistics.aspx</u>

seen from 1990 in Figure 1:



Figure 1: Total residential sector greenhouse emissions - 25 years from 1990 to 2014 (Source: AGEIS)

Stationary energy (labelled as Scope 1) and Transport can be seen to rise steadily. Emissions from electricity (labelled as Scope 2) peaked around 2009-10. The 2014 inventory year was the first time since 1990 that transport emissions exceeded electricity emissions, as shown in Figure 2:



Figure 2: Residential sub-sector emissions - 25 years from 1990 to 2014 (Source: AGEIS)

1.5 Components of a typical electricity bill

It is important to understand the 'building blocks' that comprise a typical electricity bill, as each block is subject to change in different ways and has different implications for affordability. Figure 3 provides estimates of the key components of the national average residential electricity bill in 2015-16.

- Network costs the transmission of electricity from large generators and distribution to and between customers represent around 45% of the average bill.
- Retailer controlled costs the cost of wholesale electricity including risk management and the costs of billing and administration of customer accounts – represent around 38% of costs. Of the total bill, around 20-25% is attributable to wholesale electricity costs – the cost of electricity generation. This is the component that will be most impacted by climate policies that seek to change the mix of generation sources.
- Australia's renewable energy target¹⁷, state-based feed-in tariffs and energy efficiency schemes represent around 8% of the average bill.



• GST adds 10% to the above costs and therefore represents around 9% of the final bill.

Figure 3 Breakdown of average national residential electricity price, 2015-16 (Source: Based on Climate Change Authority 2016 Figure 8, AEMC 2013, 2016)

¹⁷ More information is available here: <u>http://www.cleanenergyregulator.gov.au/</u>

1.6 Historical trends in residential electricity prices

Figure 4 is based on ABS Consumer Price Index data (Electricity Price Index) from the March Quarter of 2007 as an index number of 100 in each capital city as well as the national weighted average result. The results are presented in real terms (i.e. adjusted for movements in the All Groups Consumer Price Index in each capital city).



Figure 4 Real electricity price movements since 1998, Australian Capital Cities (Source: ABS Cat No. 6401.0 Table 9)

The chart illustrates that:

- Electricity prices have risen at rates well above inflation in most locations but there is significant differences between jurisdictions
- The period to mid-2012 saw the strongest growth in prices in all locations. The carbon pricing mechanism applied from July 2012 until June 2014 and is shown in the shaded area.
- Prices have been flat or fallen in real terms from mid-2012 to mid-2016 in most locations.
- Price growth has been markedly lower in Tasmania, WA, ACT and NT where there is effectively no retail competition and prices remain regulated by jurisdictional regulators and/or Governments. Government ownership prevails in each of these jurisdictions.
- Price growth has been lower in South Australia compared to other NEM jurisdictions although this still leaves SA with some of the nation's highest unit prices.

The largest single driver of higher electricity prices since 2009 was expenditure on distribution networks.¹⁸ State renewable energy schemes increased prices to varying degrees across different jurisdictions. For the two years that it was in place, the carbon price increased retail prices by 9 per cent on average.¹⁹

Projected near-term prices

From mid-2016 prices started rising in SA and NSW and, according to the AEMC's 2016 Residential Price Trends Report (AEMC 2016), are expected to outpace inflation in the years to 2018/19 in all jurisdictions except Queensland and Tasmania.





AEMC's analysis finds key price drivers in the period 2016-2020 are retirements of Northern and Hazelwood coal-fired power stations, the increased cost of gas and the increasing role of gas generators as price-setters, and an upward trend in network prices.

These and other factors, and their implications for vulnerable households, are discussed further in Chapter 2.

¹⁸ CSIRO Future Grid Forum *Change and Choice* (Dec 2013) available from <u>www.csiro.au/en/Research/Energy/Electricity-grids-and-systems</u>

¹⁹ The Climate Institute, 2013, The Carbon Laws: One year on. <u>http://www.climateinstitute.org.au/articles/media-briefs/the-</u> carbon-laws-one-year-on.html

1.7 Beyond averages to understand vulnerability

The previous section presented average residential electricity prices from across Australia's electricity sector. This section goes beyond average prices to consider the distribution of electricity costs between different households and then explains why changes in pricing structures and energy technologies are important to understanding vulnerability to future electricity prices.

A number of different presentations of energy related vulnerability are apparent; they include:

- Households who have difficulty paying their energy bills, accrue debt with their retailer and are subsequently on retailer energy hardship programs or are disconnected from supply.
- A small but significant proportion of these households that are unable to afford to pay the ongoing costs of the energy they need with no room to repay debt.
- Households who require emergency relief provided by governments and the Community Services sector.
- Households who may pay their energy bills but suffer detriment in other areas of their lives including rationing their energy usage in a way that is detrimental to their health or wellbeing, or trading off energy usage for other basic needs such as food or education (Chester 2013).

Chester and Morris produced an early study of the consequences of rising prices on low income and vulnerable households in the Australian context (Chester & Morris, 2012). That study concluded that Australia was yet to explicitly recognise energy poverty as a distinct social problem and was without a substantive evidence base to inform policy making. A number of studies have subsequently sought to identify demographic attributes of households considered most vulnerable to rising energy costs. Overall, these studies have painted a complex picture of measurement from which there is no universally accepted measure or indicator of household energy affordability in Australia. These have been summarised in Appendix C.

Analyses of historic income and expenditure suggest that a diverse range of household types are represented in the vulnerable household cohort although some are at much higher rates than their proportion of the wider community. Some of the groups more likely to be considered vulnerable are those living on unemployment or student allowances, single parent families, the working poor, indigenous households and those with someone having a disability. However, close relationships to the costs of other essentials – such as housing and transport – regularly recur. Housing circumstances are clearly a key indicator of vulnerability: the cost of housing determines how much room exists in household budgets to pay energy bills, tenure determines the scope of actions available to change consumption.

In 2014, 3 million people (13.3% of the population) including over 730,000 children (17.4% of all children under the age of 15) were living below the poverty line after taking account of housing costs (ACOSS 2016). Having such low incomes risks vulnerability in the energy market.

A summary perspective is that vulnerable households are very diverse, but two common

factors are:

- a. they need to respond to electricity cost pressures, and;
- b. they can't

Any measure of affordability would need to relate energy expenditure to a measure of capacity to pay. The ABS Household Expenditure Survey (HES) is a key source of information in this regard. The HES was last conducted in 2013-14 as part of the Survey of Income and Housing. The results of this survey are not yet available but expected to be published in the second half of 2017. At the time of writing the most recent results are from the 2009-10 survey – predating much of the price rises – so only a general discussion is possible.

Figure 6 illustrates that, in 2009-10, Domestic Fuel and Power represented 2.6% of the average Australian household's expenditure on goods and services.



Figure 6: Average Household goods and services expenditure (Source: ABS 6530.0 Household Expenditure Survey, Australia: Summary of Results 2009-10)

Figure 7 shows the relative proportion of expenditure on energy (*Domestic fuel and power*) by households based on their gross income from the 2009 HES. The proportion is clearly higher for those on lower incomes.



Figure 7: Average Household expenditure on stationary energy (Source: ABS 6530.0 Household Expenditure Survey, Australia: Summary of Results 2009-10)

The largest expenditure items for most households is housing costs – either rent or mortgage payments. The UK's official indicator of Fuel Poverty (the Low Income High Cost or LIHC indicator) uses an after housing cost income measure. The ACOSS Poverty in Australia series²⁰ uses after housing cost disposable income (i.e. after income tax and Medicare levy) in the consideration of capacity to pay for goods and services. Further, the methodologies in both of these take account of household size when considering income (Saunders et al 2016). Equivalisation provides a comparison of income that takes into account the economies of scale of household size²¹.

When considering capacity to pay electricity bills, it is therefore appropriate to consider not just gross income but housing costs and, where possible, household size as well. Figure 8 shows household expenditure on housing and energy as proportions of equivalised disposable income and illustrates the much greater incidence of these costs on those with the lowest incomes.

²⁰ http://www.acoss.org.au/poverty/

²¹ The modified OECD equivalence scale assigns a value of 1.0 to the first adult in the household, 0.5 to each additional adult and 0.3 to each dependent child. For example, a household with two adults and one child would need (1.0 + 0.5 + 0.3 =) 1.8 times the income to achieve the same material wellbeing of an adult living alone.



Figure 8: Average Household expenditure on housing and energy by Equivalised Disposable Income (Source: ABS 6530.0 Household Expenditure Survey, Australia: Summary of Results 2009-

10)

Recent research by Vinnies and Alviss Consulting (Vinnies 2016) analysed and mapped approximately 200,000 electricity disconnections for non-payment raised by AGL in South Australia, Victoria, NSW and South East Queensland between July 2012 and July 2015. This analysis identified 6 broad categories of households correlated to high disconnection rates. Four of the six categories were households in housing stress (spending more than 30% of income on housing costs) while the other two categories had lower housing costs but higher transport costs. In all cases though, disconnection rates were correlated with high expenditure on other key items in the household budget. Figure 9 reproduces Figure 16 and includes expenditure on transport, medical care and health. The relative capacity to pay for energy of these low-income households is clearly compromised by their expenditure on other necessities.



Figure 9: Average Household expenditure on housing, energy, transport and health by Equivalised Disposable Income (Source: ABS 6530.0 Household Expenditure Survey, Australia: Summary of Results 2009-10)

The following chart (Figure 10) has been derived from unit record files for the 2009-10 HES to illustrate the range of relative energy expenditures by households of different incomes. The horizontal axis divides the households into 5 equal-sized groups (quintiles) based on after-housing-cost disposable income (only households whose main source of income was reported as wages, salaries or benefits were included in the sample). The vertical bars show the median result (the central marker in each one) as well as the spread of the results with markers for the 5th and 95th percentile (i.e. 90% of individual results lie within these limits for each group).

The standout result is the 20% of households with the lowest disposable incomes. This group reported a median value of 7% of disposable income on energy. 25% of this group spent 11% or more, 5% spent 30% or more. A broad estimate then of the scale of vulnerable household is the 5-10% of households for which energy costs are 10% or more of after housing cost disposable income.



Figure 10: Average expenditure on household energy as a proportion of relative capacity to pay (after housing cost disposable income) by Equivalised Disposable Income (Source: ABS 6530.0 Household Expenditure Survey, Australia 2009-10)

1.8 Understanding vulnerability to future prices and costs

The Network Transformation Roadmap work by the CSIRO and Energy Networks Australia (2015, 2016) has provided a useful conception of the vulnerable consumer in their vision of the future grid. In this work, vulnerability is used to describe customers who are unable to take up opportunities that would enable them to save on electricity bills (2016, p11). Vulnerability is further characterised as being 'service dependent' and being at the opposite end of an empowerment spectrum to the autonomous, independent, tech-focussed and empowered customers sometimes referred to the 'pro-sumers' (see also Figure 11).



Source: Plausible 2027 customer segments were informed by an international literature review, commissioned expert papers and structured stakeholder workshops. In particular, Rosemary Sinclair of Energy Consumers Australia is acknowledged for employing the market curve device to graphically represent customer segments (adapted with permission).

Figure 11: Example of market segmentation curve for residential customers in 2027 Note: area under the curve is not necessarily indicative of actual proportions of customer segments (Source: CSIRO and ENA Network Transformation Roadmap 2015, 2016)

Newgate Research undertook segmentation analysis of the electricity market as part of the AEMCs 2016 Retail Competition Review. This research conceived of a spectrum of vulnerability from 'secure higher income' to 'vulnerable low income' as illustrated below:



Figure 12: Newgate Research market segmentation estimates (Source: Newgate Research 2016, AEMC 2016a)

Historically, expenditure on energy has been driven by a fairly simple combination of total consumption and average prices. Looking forward though, changes to the structures of electricity tariffs and the uptake of technologies such as solar, storage, efficient appliances and energy management systems are expected to drive a re-distribution of electricity costs. It is not yet clear whether this will introduce new households to the cohort of vulnerable customers or simply worsen the situation of those already considered vulnerable. If poorly managed, both outcomes could result. Neither outcome is inevitable but policy adjustments will be necessary to avoid them.

Three trends redistributing costs are identified and discussed below.

1.8.1 Access to technology and Capacity to invest

The ability to generate and store electricity is a defining characteristic of the energy market transition underway. It is therefore also worth distinguishing between expenditure on energy 'from the grid' versus energy generated 'behind the meter'. However, for the purposes of this analysis a more useful alternative may be to consider energy costs as either an operational expense (or 'opex') or a capital expense ('capex') for households.

Solar, with or without storage, is largely a capex item for households. This technology allows a household to purchase the capability to meet a part of their future energy needs (i.e. using capex to lower future opex). Other energy capex includes major appliances such as hot water systems and fixed heating and air-conditioning systems as well as structural elements of housing such as insulation and high-performance windows. These technologies are all long-lived and can generally be considered to be fixed to the dwelling rather than portable with the occupant.

Household energy opex refers to the more regular outgoings for electricity and gas – the fortnightly payment plan or the monthly or quarterly bills from the energy retailer.

There is usually a capex versus opex trade-off – this is where prudent capex can reduce opex. Examples include capex on a solar system, or more efficient air-conditioner to reduce grid electricity costs. Capex often also provides a degree of insurance against future electricity prices for many years whereas a household reliant on opex is often completely exposed to future prices (albeit able to fix prices for a period of time in some electricity market contracts).

Access to technology is clearly emerging as the key driver of a redistribution of electricity expenditure between households. And, clearly, the ability to take advantage of these developments pivots on access to and affordability of these technologies.

1.8.2 Network pricing reform

Historically, all households paid the same fixed and per-unit prices for their electricity. Substantial reforms to the National Electricity Market (NEM) are underway following recommendations to the state and federal governments in November 2012 by the AEMC's Power of Choice review – giving consumers options in the way they use electricity²². The AEMC has received a number of rule change requests from the COAG Energy Council and other parties in response to these recommendations. The *Distribution Network Pricing Arrangements Rule Change* (AEMC 2014) was a key one of these changes.

Network costs average 45% of the final electricity bill of households in the NEM²³. The *Distribution Network Pricing Arrangements Rule Change* requires the structure of electricity tariffs for residential and small business customers to commence a transition to better reflect the efficient costs of providing services to each consumer. This is often referred to as '*cost reflective pricing*'. In general terms this means pricing must start to reflect that future costs are related to providing network capacity at times when electricity demand peaks.

All other things being equal, the pursuit of cost-reflective pricing will mean that some consumers will be able to pay less than they currently are while others will pay more. The significance of these changes on individual customers has been acknowledged since the Ministerial Council responsible for Energy Policy (the Standing Council on Energy and Resources, SCER at the time has been replaced by the COAG Energy Council) initiated the tariff reform [SCER Rule Change Request (p3)]:

"The changes implied by this reform package point to a significant shift in the way customers use, purchase, interact with and are charged for, electricity. Electricity however is an essential service, and major changes to its provision are not to be taken lightly."

The diversity of consumption patterns amongst residential electricity consumers is what will drive the redistribution of costs foreshadowed in the originating Rule Change Request. The expanded use of advanced metering infrastructure (also referred to as smart meters) allows for segmentation of the market based on consumption patterns and can be expected to reveal even greater diversity in prices.

As at February 2017, the first round of tariff proposals from the NEM Distribution Businesses have been developed and all are to be offered as opt-in. Most have developed tariffs based

²² More information is available from <u>www.aemc.gov.au/Major-Pages/Power-of-choice</u>

²³ AEMC 2016 Residential Electricity Price Trends

on the maximum demand recorded in a half-hour interval during peak times. The majority of tariff structures include a peak demand charge window during the late afternoon / early evening peak consumption periods. The NSW businesses are the only ones not to propose an opt-in demand tariff, preferring to offer time-of-use or flat tariff structures.

1.8.3 Increasing fixed charges in retail offers

The Victorian Electricity Retail Market is considered to be at the forefront of market reforms in the National Electricity Market in many ways (the first to privatise, the first to de-regulate electricity prices, the first to mandate advanced metering, highest number of active retailers, highest switching rates). However, Figure 13, below, illustrates a trend of increasing fixed charges in residential retail electricity contracts since the deregulation of prices in 2009:



Figure 13: Average fixed supply charges, Victorian retail standing contracts (Source: Vinnies Tariff Tracker Project)

This trend is also cited as a symptom of a market that is not operating efficiently (Ben-David 2012, 2015, 2016, Mountain 2015, 2016) despite being judged as having effective competition by the Australian Energy Market Commission.²⁴

The critique of the retail energy market outlined in Mountain's (2015) report to the Brotherhood of St Laurence, posits that the market is failing to deliver lower prices for many consumers, rather the potential savings are being captured by the energy retailers. While there is limited data on the actual contracts households are on, research by Newgate (2016) for the AEMC found those on low incomes, older people and people with less internet access were overrepresented in those who reported they would not switch in the next year. The Victorian government initiated a review of the retail market in late 2016.

²⁴ Most recently in the 2016 Retail Competition Review available from <u>www.aemc.gov.au/Markets-Reviews-Advice/2016-</u> <u>Retail-Competition-Review</u>

1.9 Chapter Summary

This chapter set out the context for the research report.

Australia has recently committed to an emissions reduction target that is expected to require net-zero emissions from the electricity sector by mid-century. The current policy cycle is seeking to align energy policy and climate policy and pursue the energy trilemma of lower emissions and lower prices from a stable and secure market. Various mechanisms have been proposed.

Electricity is an essential service that warrants industry specific consumer protections. Household expenditure on electricity and gas in Australia is estimated at \$17,500 million in 2014-15. Historical trends in residential electricity prices are presented and show a rapid rise from around 2007 to 2012. Components of a typical electricity bill are discussed to highlight the different pressures on each of the building blocks of an electricity bill.

Simple analysis of results from the 2009-10 Household Expenditure Survey (HES) illustrates the potential for some low income households to have high relative expenditure on energy. Using after housing cost disposable income as a proxy for *capacity to pay*, some households are spending 10% or more of this capacity on energy bills. This expense is competing with other essentials such as transport and health care.

In 2014, 3 million people (13.3% of the population) including over 730,000 children (17.4% of all children under the age of 15) were living below the poverty line after taking account of housing costs (ACOSS 2016). Having such low incomes risks vulnerability in the energy market.

An overview of studies that have sought to identify demographic attributes of vulnerable households is presented. These studies tend to be based on quantitative assessment of income and expenditure, qualitative analysis of responses to surveys or both. Recent work by CSIRO and Newgate Research (for the AEMC) gives further insight into vulnerability in a changing market. A summary perspective is that vulnerable households are very diverse, but two common factors are:

- a. they need to respond to electricity cost pressures, and;
- b. they can't

Looking forward, changes to the structure of pricing enabled by the increasing prevalence of interval metering and rising fixed charges is expected to redistribute costs between consumers and generate winners and losers over coming years. Detailed impacts are not yet clear but access to capital is emerging as the defining attribute of those able to respond to new price signals and minimise their long-run costs.

With this as the context for a review of policies, the following chapters discuss the five policy outcomes required to pursue the notion of *universal access to affordable energy services*. The first of these relates to electricity pricing.

2 Policy outcome: Electricity priced efficiently

2.1 Introduction

This policy outcome contributes to access and affordability by ensuring consumers are paying no more than necessary for an electricity system that is viable in the short term and sustainable in the long term. This chapter introduces the components of a typical electricity bill in order to analyse the impacts of climate policies on household expenditure. The chapter includes a literature review of recent electricity market modelling of the impacts of climate and clean energy policies on residential electricity prices. The modelling reviewed indicates that most climate policy options, would add around 5c/kWh to electricity prices from 2020 to 2030 (approximately 20%), assuming no changes to any of the other cost drivers discussed herein. Moreover, analysis also suggests that even the absence of climate policy can drive up electricity prices because of the uncertainty created for investment in the electricity system. The Australian Energy Council has estimated that ongoing policy uncertainty is currently adding \$4-6c/kWh to wholesale costs. Further, as illustrated in work by the CSIRO in particular, other factors can put equivalent downward pressure on prices over the same timeframes. This chapter discusses key upward and downward pressures on prices and considers the recommendations put forward by various stakeholders.

2.2 Efficient pricing – the NEM approach

The approach of the National Electricity Market has been to regulate the natural monopoly elements (the network itself) and promote competition for the other elements of generation and customer interaction (wholesale and retail).

The NEM has deliberately pursued a separation of pricing and economic efficiency objectives and social policy objectives. At the introduction of the National Energy Law, the then Ministerial Council on Energy's (now the COAG Energy Council) Standing Committee of Officials stated²⁵:

The purpose of the NEL framework is to guide economic regulation, which should be guided by a unified objective of efficiency that is in the long-term interests of consumers. Environmental and social objectives are best dealt with through other legislative instruments and policies.

The Australian Energy Market Agreement (AEMA)²⁶ includes a National Framework for Distribution and Retail (Section 14). The AEMA makes explicit the allocation of various Distribution and Retail functions (Section 14.7 and Annexure 2) between the Commonwealth and the States and Territories. Of particular relevance to this research report are the inclusions:

States and Territories retain responsibility for "community service obligations ... which

²⁵ SCO 2007, *MCE SCO Response to issues on the NEL (Amendment) Exposure Draft* Standing Committee of Officials (SCO), representing the state and commonwealth public service agencies that support the Ministerial Council.
²⁶ www.coagenergycouncil.gov.au/publications/australian-energy-market-agreement-amended-december-2013 sect.14.14

are to be clearly specified and transparently publicly funded" [AEMA 14.7(a)]; ... existing distribution tariff equalisation schemes that do not impede competition such that retailers are unable to remove the effect of those measures [AEMA 14.7(b)];

and,

"... social welfare and equity objectives will be met through clearly specified and transparently funded State or Territory community service obligations that do not materially impede competition". [AEMA 14.11(b)]

2.3 National Electricity Objective

Electricity policy has been driven by the pursuit of economic efficiency as its primary objective since the 1990's. The National Electricity Objective (NEO) is found at section 7 of the National Electricity Law (A schedule to the National Electricity (South Australia) Act 1996)²⁷ and states:

7—National electricity objective

The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—

(a) price, quality, safety, reliability and security of supply of electricity; and

(b) the reliability, safety and security of the national electricity system.

The NEO is an economic efficiency objective. The regulatory literature has expanded on this to discuss static (productive and allocative) as well as dynamic efficiencies in the context of electricity markets.

The pursuit of **productive** efficiency in the network and generation / retail sectors should mean that consumers have their demands met at "least cost". Productive efficiency of electricity supply has been advanced through competitive markets for wholesale and retail activity²⁸ and pursued through national, incentive-based regulation of monopolies in the network sector. However, the effectiveness of wholesale and retail competition is being questioned as evidence of high margins emerges.

The pursuit of **allocative** efficiency should ensure that consumers face prices that inform an efficient choice between 'more supply' and 'managing demand'. The major reform program to advance allocative efficiencies is known as "Power of Choice – giving consumers options in the way they use electricity". Network tariff reform is progressing on an opt-in basis until at least 2020. The advanced metering required is to be deployed on a market-led basis.

The pursuit of **dynamic** efficiency through incentive regulation and wholesale market settings should mean that this "least cost" also takes account of future needs. The need to replace or refurbish ageing coal-fired generation assets and / or increase generation from renewables or

²⁷ A copy of the Act is available from <u>www.legislation.sa.gov.au</u>

²⁸ In the NEM, a majority of states have followed the lead of Victoria and de-regulated electricity pricing for households and small business.

natural gas is providing a test for the market's dynamic efficiency.

Due to its central role in the policy, legislative and regulatory frameworks, there have been a number of calls to change the NEO to reflect climate policy objectives in order to guide decarbonisation of the sector. A recent example is from the Senate Environment and Communications References Committee inquiry into the *Retirement of coal fired power stations*²⁹. The Committee's interim report of November 2016 included the following recommendation:

Recommendation 3

The committee recommends that the Australian Government, through representation on the COAG Energy Council, put in place a pollution reduction objective consistent with Australia's obligations under the Paris Agreement in the National Electricity Objectives.

Energy Consumers Australia on the other hand have called for a 'Statement of Policy Principles' to be supplied by the COAG Energy Council to require that the AEMC 'have regard to Australia's national emissions reduction policy'. The ECA view is that this is a more timely way of embedding the emissions reduction task than seeking to amend the NEO³⁰.

There are no current proposals to incorporate social policy objectives in the NEO; however, on 1 January 2016, Victoria's energy industry legislation was amended to include a new objective for the ESC³¹:

To promote protections for customers, including in relation to assisting customers who are facing payment difficulties.

The ECA submission to the Finkel Inquiry also articulates a vision for the energy market transition of:

"... ensure consumers pay no more than is necessary for the energy services they need as we transition to a cleaner economy, with no one left behind, while maintaining a secure and reliable system."

The reference to 'no one left behind' aims to reflect the risk that increased costs will be passed through to already vulnerable households or that access to technology results in a 'two-tier' energy market. The four other policy outcomes discussed in this report – besides 'efficient pricing' – could be considered as the policy outcomes required to achieve an objective of 'no one left behind'.

2.4 Governance

Constitutional responsibility for electricity lies with the states and territories. The Australian Energy Market Agreement (AEMA) provides the basis of a cooperative legislative framework

²⁹ www.aph.gov.au/Parliamentary Business/Committees/Senate/Environment and Communications/Coal fired power stations

³⁰ See ECA Submission to the Finkel Review at <u>http://energyconsumersaustralia.com.au/research/finkel-review-submission/</u> ³¹ http://www.esc.vic.gov.au/project/energy/35945-payment-difficulties-framework/

auspiced by the COAG Energy Council³².

The AEMA has led to the establishment of four key institutions:

- The Rule Maker (Australian Energy Markets Commission, AEMC)
- The Rule Enforcer (Australian Energy Regulator, AER)
- The Market Operator (Australian Energy Market Operator, AEMO)
- Energy Consumers Australia (ECA)

On 13 October 2016, the Senate referred an inquiry into the *Retirement of coal fired power stations* to the Senate Environment and Communications References Committee³³. The Committee's interim report of November 2016 included a recommendation to establish a new market institution to coordinate the transition of energy markets:

Recommendation 4

The committee recommends that the Australian Government establish an energy transition authority with sufficient powers and resources to plan and coordinate the transition in the energy sector, including a Just Transition for workers and communities.

2.5 State of Play

The ongoing energy market reform and development agenda led by COAG Energy Council is expansive and complex. For consumers, this program has elements aimed at lowering costs for all consumers as well as elements that will redistribute costs. For vulnerable consumers, there are opportunities for costs to reduce but also risks that redistributions could exacerbate existing vulnerabilities. Advanced metering is recognised as a critical component of pricing changes and efficiency pursuits for all households but the impact on vulnerable households is still being revealed (Vinnies 2016).

The State of Play is described below with reference to the four main categories of the 'cost stack' illustrated in Chapter 1 and reproduced here as Figure 14:

³² www.coagenergycouncil.gov.au

³³ www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Coal_fired_power_stations



Figure 14 Breakdown of average national residential electricity price, 2015-16 (Source: Based on Climate Change Authority 2016 Figure 8, AEMC 2013, 2016)

2.5.1 Retailer controlled costs – approximately 38%

This component refers to the competitive wholesale and retail electricity markets. More than 70% of electricity customers and 80% of gas customers are contracted to one of the 'Big 3' retailers: AGL, Origin and Energy Australia. These retailers and the majority of those with the balance of customers have significant interests in generation and are often referred to as 'gentailers'³⁴. The dominance of the 'gentail' model means it is difficult to separate the cost of wholesale purchases (often a combination of self-generation, forward contracting, other risk products and spot purchases) from the retail costs of marketing, customer acquisition and retention, billing etc.

The most direct impact of many climate policies is on the wholesale cost component. As mentioned, electricity sector emissions are dominated by the combustion of coal (around 62% of electricity generated and around 88% of emissions)³⁵ but the majority of coal-fired electricity generators will be well past their design life by 2030 (Nelson et al 2014). The closure of Northern Power Station (SA) in 2016 and Hazelwood (VIC) in 2017 with relatively short notice

³⁴ See AER State of the Energy Market 2015 s5.2.3 Vertical Integration (p126-)

³⁵ Climate Change Authority Policy options for Australia's Electricity Supply Sector, August 2016, p16

has already placed upward pressure on wholesale prices (AEMC 2016b).

The pressures on wholesale energy costs are discussed in more detail in Section 2.6 and 2.8 below. Section 2.6 discusses the potential uplift in wholesale prices projected by a range of modelling studies of different climate policies including: carbon pricing; an emissions intensity scheme, an expanded renewable energy target mechanism, contracts for difference and others. Section 2.8 discusses some of the other pressures on prices including: the cost of gas; the cost of policy uncertainty, and; the potential for productivity measures and other initiatives targeting network costs, to put downward pressure on prices.

The impact on wholesale prices is one thing. The bundling of wholesale costs with other components and turning theses into the bills of small customers is a job for retailers operating in the competitive market. Competition is the tool for keeping a lid on costs but respected analysts of the Victorian Retail market have identified signs of a market that is not operating efficiently (Ben-David 2012, 2015, 2016, Mountain 2015, 2016) despite being judged as having effective competition by the Australian Energy Market Commission³⁶. The Victorian Government has recently launched a Review of electricity and gas retail markets in Victoria³⁷. The AEMC 2017 Retail Competition review will be looking more closely at retailer profitability than previous annual reviews and intends to make recommendations to improve retail competition in electricity and gas markets across NEM jurisdictions³⁸.

Simshauser & Whish Wilson (2016) found price dispersion in Victoria's deregulated retail market meant many vulnerable customers were being priced at above efficient costs if they were on a standing offer contract or on a market contract whose benefit period had lapsed (and hence paying standing offer rates). They recommended policies to help firms shift vulnerable households onto more competitive pricing.

Relevant COAG Energy Council priorities³⁹ are:

- Energy Market Transformation
- Australian Gas Markets
- Energy and Carbon Policy
- Improving Institutional Performance
- Security, Sustainability and Stability of the National Energy Market
- 2.5.2 Network costs approximately 45%

The economic regulation of the monopoly businesses that operate the transmission and distribution networks continues to evolve and implement outcomes from the Australian Energy Regulator's Better Regulation program (2013-14). The decentralisation of electricity supply has triggered a review of the existing regulatory framework⁴⁰ and a 'Distribution Market Model'

³⁶ Most recently in the 2016 Retail Competition Review available from <u>www.aemc.gov.au/Markets-Reviews-Advice/2016-</u> <u>Retail-Competition-Review</u>

³⁷ <u>www.delwp.vic.gov.au/energy/about-energy/policy-and-strategy</u> and <u>www.premier.vic.gov.au/bipartisan-review-into-electricity-and-gas-retail-markets/</u>

³⁸ http://www.aemc.gov.au/Markets-Reviews-Advice/2017-Retail-Energy-Competition-Review

³⁹ www.coagenergycouncil.gov.au/council-priorities

⁴⁰ AEMC Electricity Netowrk Economic Regulatory Framework Review http://www.aemc.gov.au/Markets-Reviews-

project to explore how the operation and regulation of electricity distribution networks may need to adapt to increased uptake of distributed energy resources (DERs) such as rooftop solar, battery storage and electric vehicles⁴¹..

Elements of the AEMC's Power of Choice program directly affect existing network costs: Network Pricing and Competition in Metering Rule changes, Ring fencing guidelines. Relevant COAG Energy Council priorities⁴² are:

- Energy Market Transformation
- Improving Institutional Performance
- Security, Sustainability and Stability of the National Energy Market

Network pricing rule changes in particular will redistribute costs. These are currently proceeding on an opt-in basis, but research suggests that 'Opt-out' is more likely to achieve the potential economic benefits (CSIRO and ENA 2016). The *Network Transformation Roadmap* developed by the CSIRO and Energy Networks Australia represents the most comprehensive vision of the future grid and outlines the potential to lower costs. Simshauser and Downer (2014) outline how tariff reform can benefit many customers in hardship. An immediate challenge lies in identifying and supporting vulnerable customers for whom this is an opportunity.

2.5.3 RET and State-based energy schemes – approximately 8%

The funding of schemes such as the national Renewable Energy Target, state Energy Efficiency and Feed-in Tariff schemes as an uplift on retail prices is considered regressive by some (Nelson et al 2011), as vulnerable households who cannot access the schemes' benefits (such as renters) still pay the costs, while better-off households who were able to access the schemes also avoid some of the costs of the scheme by consuming less electricity from the grid. Choices about mechanisms to implement climate policy – such as carbon prices or renewable energy targets – will influence this element of prices into the future. Section 2.7 discusses emerging interest in schemes that take costs 'around the market'.

2.5.4 GST – 10%

Simshauser, Nelson and Doan (2010) forecast residential electricity price rises over the five years from 2010 that proved to be quite accurate. Analysis for their policy prescriptions (Simshauser et al 2011) included a view that the increase in revenue from GST on electricity bills over the period would, if strategically spent, be more than adequate to 'eliminate fuel poverty'.

The first section of this report estimated GST collections from household electricity bills in 2015-16 of almost \$1.6 billion - a sizeable revenue base that can be redistributed to alleviate the worst impacts on vulnerable households. Recent estimates of the costs of concessions from state and territory governments equate to 55% of this GST estimate

Advice/Electricity-Network-Economic-Regulatory-Framework

⁴¹ http://www.aemc.gov.au/Markets-Reviews-Advice/Distribution-Market-Model

⁴² www.coagenergycouncil.gov.au/council-priorities

2.6 What impact from carbon policy from 2020? Inferences from recent modelling.

In December 2015, 195 countries, including Australia, adopted the first-ever legally binding global climate deal. The core element of the agreement is to limit global warming to well below 2°C above pre-industrial levels, and pursue efforts to limit warming to 1.5 degrees C. To achieve the aims of the agreement the 195 countries are required to submit comprehensive national climate action plans and agreed to review them every 5 years to enable more ambitious targets to be set as required. The Australian Government has a 2030 emissions reduction target of 26-28% below 2005 levels and is undertaking a review of climate change policies in 2017 to ensure this target and the international commitments are achieved⁴³. Under the Paris Agreement Australia is required to update and resubmit its target by 2020⁴⁴.

The electricity sector generates around one-third of the National Greenhouse Gas Inventory and will inevitably be required to make a substantial contribution to Australia's international commitments to reduce greenhouse gas emissions.

A number of reports into the impact of different climate policy options on electricity markets were released in 2016 by CSIRO, Jacobs (for multiple clients) and Frontier Economics (see Appendix B for a discussion of each one). These modelling reports contrast a range of possible climate and energy policies against a range of emissions reduction targets between now and 2030 and on to 2050.

The modelling reviewed indicates that most climate policy options, would add around 5c/kWh to electricity prices over the period from 2020 to 2030 (approximately 20%), assuming no changes to any of the other cost drivers discussed herein. However, recent analysis suggests that the uncertainty created for investment in the electricity system from the absence of clear climate policy is already driving up electricity prices by a similar amount.

The policy options modelled can be categorised broadly as:

- market mechanisms (a price or limit is applied to carbon; the policy is technology neutral). Examples include a direct carbon price, an electricity sector specific emissions intensity scheme and variations on a 'cap and trade' mechanism;
- technology support programs (subsidised investments in renewable or 'low emissions' technologies). Examples include an expansion of the existing Renewable Energy Target scheme, modifications to the existing scheme to include support for other technologies below a defined emissions intensity limit and feed-in tariffs with contracts for difference (such as the ACT reverse auction mechanism), or;
- coal regulation (high-carbon generation is forced out of the market). Examples include forced closure based on age or emissions intensity.

⁴³ Terms of reference for the review are available from <u>http://www.environment.gov.au/climate-change/review-climate-change/review-climate-change-policies</u> and attached as Appendix A

⁴⁴ Decision 1/CP.21 Adoption of the Paris Agreement, https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf

Direct comparisons among the modelling reports are difficult. The studies have various purposes, use different assumptions and constraints and make different levels of data publicly available. However, it is possible to draw some conclusions relevant to the research topic:

- The majority of electricity consumed in the NEM is delivered via transmission and distribution networks from the fleet of large scale generation technologies that power the entire NEM, still predominately coal and gas. Much of this existing coal generation fleet will need to be refurbished or replaced by 2030⁴⁵. The choices made about what will replace them will largely determine the sector's greenhouse footprint and prices paid by consumers.
- All options deliver a shift away from coal as the dominant energy source for electricity generation in Australia to various combinations of gas and renewable energy sources

 particularly wind and solar. Assumptions about the future price of gas and the technology costs of renewables are therefore key variables in the forecasting of future prices. Given the uncertainty of these costs, all modelled price impacts should be treated with caution.
- All options considered come at an economic cost but the likely impact on wholesale prices varies considerably depending on the mechanism used, the extent and rate of emissions reductions targeted as well as the input assumptions noted above.
- Market mechanisms⁴⁶ were consistently found to have lower overall economic costs.
- Options that combined multiple mechanisms can achieve emissions reductions at a lower combined cost⁴⁷.
- Options that include the widest range of technology options have lower overall economic costs.
- Options that involve costs to government in lieu of costs to consumers can have lower direct impact on prices depending on how the cost of the scheme is recovered⁴⁸. See section 2.7 below for discussion of 'around the market' versus market mechanisms.
- Investment expenditure is expected to rise while fuel costs fall under many scenarios. The 'cost of capital' is therefore another key variable in the forecasting of future prices. Policy uncertainty puts upward pressure on the cost of capital leading to higher costs for consumers⁴⁹.

⁴⁵ Climate Council, *Australia's Electricity Sector: aging, inefficient and unprepared*, 2014, p. 70. Available at: http://www.climatecouncil.org.au/ (accessed 03 Feb 2016).

http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Coal_fired_power_ stations Interim Report, November 2016

⁴⁶ This was true for all three modellers

⁴⁷ Examples include the policy combinations modelled by Jacobs for the CCA

⁴⁸ An example is Feed-in tariffs with Contracts for Difference modelled by Jacobs for the Climate Change Authority

⁴⁹ The Finkel review preliminary report notes that "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 consistent with Australia's international commitments and will not change drastically in the future. There is evidence that investment in the electricity sector has stalled and investors have become less responsive to investment signals. This is due to policy instability and uncertainty driven by numerous reviews into the RET and a lack of clarity about the policies to reduce emissions after 2020." Page 22.

- All options exist alongside other drivers of change in the average price of electricity as well as the structure of prices⁵⁰. The assumptions made about these other drivers impact on the forecasts of future retail prices from each of the modelling exercises.
- Scenarios that optimised network pricing showed lower residential retail prices than some scenarios with less ambitious climate policies.
- Price structures are already on a path of higher fixed supply charges and charges that will increasingly reflect the cost of peak demand on the network. This is likely to deliver a redistribution of grid-supply costs amongst households⁵¹.
- Most future scenarios include an increasingly distributed energy system with solar, storage and electric vehicles. Uptake and use of these distributed energy resources is also likely to deliver a redistribution of grid-supply expenditure amongst households⁵².
- Besides higher prices for electricity generation, assumptions regarding productivity and efficiency of energy use are critical to how much consumers will need to spend on grid-supplied electricity over these future years. The National Energy Productivity Plan (NEPP) is therefore a critical complementary measure to the climate policies modelled as is the consumer response to changes in price (elasticity of electricity demand).

Appendix B summarises recent modelling from a range of sources that have sought to estimate either relative or absolute impacts on energy costs from proposed emissions reduction measures. For the purposes of this research report, a focus has been placed on work by Jacobs for the Climate Change Authority, CSIRO for Energy Networks Australia, Jacobs for The Climate Institute (TCI), and Frontier Economics for the AEMC. Key parameters of these four studies are summarised in the following table:

⁵⁰ The modelling by the CSIRO in particular demonstrates this

⁵¹ Analsyed in the ENA CSIRO Network Transformation Roadmap

⁵² Analsyed in the ENA CSIRO Network Transformation Roadmap
Key parameters of recent climate policy modelling

Study and purpose	Targeted & actual emissions reduction in 2030 (from 2005 levels)	Core policies modelled	Technology and fuel costs (central scenarios)	Approach to network costs	Wholesale prices 2030 (\$/MWh)	Retail prices 2030 (c/kWh)
Jacobs for CCA Special Review electricity research report August 2016 Compare policies' relative performance for environmental effectiveness, cost effectiveness, flexibility and scalability	70% based on carbon budget derived from carbon price trajectory of IPCC 2C scenario) Actual 65-78% (2C scenarios) 31% (based on carbon budget derived from carbon price trajectory of IPCC 3C scenario) Actual 31-54% (3C scenarios)	Absolute baselines Emission intensity scheme Carbon price (in 3C scenario \$60 in 2030) RET LET Regulated closure	TechnologyLearning rates sourced frominternational literature and adjustedfor 450 scenario from IEA WorldEnergy Outlook 2014 (2C scenarios)and New Policies scenario (3Cscenarios)GasRise in gas prices to \$8-9/GJ by2018-19 followed by slow decline toworld parity levels of IEA WEO 2014450 scenario (2C scenario) or NewPolicies (3C scenario)	Network tariffs move to 50% capacity/supply charges independent of energy use.	2C scenarios \$45-115/MWh 3C scenarios \$45-105/MWh	2C scenarios 27-33c/kWh 3C scenarios 27-30c/kWh
Frontier Economics for AEMC Market Review: Integration of energy and emissions reduction policy November 2016 Compare policies' relative performance for efficiency, price impacts impacts, flexibility, system security impacts	28% 50%	Emission intensity RET Regulated closure	Technology Proprietary, "based on a detailed database of actual project costs, international estimates and manufacturer list prices." Gas Proprietary projections – roughly \$5- 7/GJ High gas sensitivity of \$8-10/GJ	N/A, only wholesale prices are modelled	\$57-64/MWh	N/A, only wholesale prices are modelled

Study and purpose	Targeted & actual emissions reduction in 2030 (from 2005 levels)	Core policies modelled	Technology and fuel costs (central scenarios)	Approach to network costs	Wholesale prices 2030 (\$/MWh)	Retail prices 2030 (c/kWh)
CSIRO/ENA Electricity Network Transformation Roadmap December 2016 Explore contribution of network optimisation to energy security, affordability, emissions reduction	Roadmap 40% by 2030, net zero emissions by 2050 <i>Counterfactual</i> 35% by 2030 and 65% by 2050.	Roadmap Absolute baselines Baseline and credit Carbon price 50% RET by 2030 Counterfactual Ongoing carbon policy uncertainty and lack of coordination of resources	Technology costs mainly derived from data used for CO2CRC, <i>Australian Power Generation</i> <i>Technology Report</i> , 2015, with some data from BREE 2012 and 2013, <i>Australian Energy Technology</i> <i>Assessments</i> , and some internal CSIRO estimates Gas Derived from EIA 2015 oil price projections, reduced to be consistent with IEA climate action scenario methodology, \$8-10/GJ between 2020 and 2030	Roadmap Fast uptake of demand tariffs. Incentives for distributed generation/demand response based on contribution of grid support services as well as energy. Managed charging of EVs <i>Counterfactual</i> Slow and incomplete adoption of incentives for demand management. No adoption of electric vehicles, consistent with current national electricity system planning assumptions	Roadmap \$52/MWh Counterfactual \$47/MWh	Roadmap 24.5 c/kWh Counterfactual 24.4 c/kWh
Jacobs for TCI A Switch in Time: Enabling the electricity sector's transition to net zero emissions April 2016 Assess policy combinations against 2C carbon budget to identify risks to energy security, affordability and decarbonisation	Target 68% (based on 2C carbon budget as per CCA study) Actual 36-46%	Carbon price (\$40 in 2030) Carbon price as above + 50% Clean Energy Target As above + regulated coal station 45-year lifetime limit	As for CCA 2C scenarios	As for CCA study	\$65-100/MWh, jumping from 2031 to about \$130-140/MWh	26-30 c/kWh, jumping from 2031 to 33-34 c/kWh

2.7 Internalise the costs of climate policy or go Around the Market?

From the perspective of electricity users, the choice between climate policies that are most efficient overall and those that produce lower electricity prices is not obvious. Modelling consistently finds that market mechanisms have lowest total economic costs, but subsidy schemes can deliver lower electricity prices. A caveat to this is that the costs of the subsidy need to be recovered from somewhere; however, where incentives are provided out of government revenues rather than as a direct uplift in energy prices, consumer exposure to costs then aligns more with the progressive nature of Australia's tax and transfer system rather than electricity prices. Examples of such schemes include Australia's Emissions Reduction Fund⁵³ and a trend in the US where 'around the market' payments are being used to keep base-load plants open for longer than the market would other sustain⁵⁴.

A further caveat may be that while almost all modelling exercises tend to assume decisions are made with perfect foresight, this is far from likely to occur through the energy transition. A market mechanism which allows decision-making to be spread across more participants and to be made in response to price signals might be seen as more resilient to uncertainty. In practice, this requires price signals to be fairly clear and consistent over long periods of time, given the substantial capital expenditure required for new electricity infrastructure, but this may not be the case throughout the energy transition. An 'around the market' scheme like reverse auctions for Contracts for Difference can reduce investment costs significantly by providing clear and reliable price signals; however, this produces several other risks, including the diminution of the importance of price signals within the market, the reliance on the scheme parameters to provide sufficient taxpayer funds (if costs are recovered directly from government revenue), and the reallocation of costs if costs are recovered through levies on other retail bill components.

This report does not necessarily endorse either approach, but notes that each has advantages and drawbacks for vulnerable households that need to be accounted for in the development of decarbonisation strategies in the Australian energy sector.

2.8 Summary of other key influences

Decarbonisation commitments represent a substantial driver of future electricity prices but there are other strong drivers of higher prices. These include increases in the price of gas and the role of gas in the electricity market; the tighter supply resulting from the exit of coal-fired generators; and the impact on investment of climate policy uncertainty. Other price drivers are more ambiguous, and could increase or reduce prices. These include jurisdictional support schemes for renewable energy and energy efficiency; changes to utilisation of the grid; and ongoing energy market reform. These are discussed below.

⁵⁴ See, for example: Illinois providing direct financial support for Nuclear Plants at risk of closing

www.utilitydive.com/news/illinois-passes-sweeping-energy-bill-with-support-for-exelon-nuclear-plants/431521/ and Colorado www.utilitydive.com/news/re-regulation-vertically-integrated-utility/428639/ "One state is an anecdote; five or six states is a trend," said Ray Gifford, former chair of the Colorado Public Utilities Commission and author of a recent white paper on around market reforms."



⁵³ www.environment.gov.au/climate-change/emissions-reduction-fund

2.8.1 The role of natural gas

The development of an export industry for Australia's east coast natural gas resources as Liquefied Natural Gas (LNG) has delivered a substantial shift in the price and availability of gas for electricity generation⁵⁵. This was foreseen (Simshauser & Nelson 2015, 2015a). The role of gas-fired generation as marginal producer and new entrant means that wholesale electricity prices are strongly impacted by wholesale gas prices.

Figure 15 illustrates data from AEMO's 2016 National Gas Forecasting Report (NGFR). The relative scale of LNG development highlights why gas for electricity generation has become a price taker in the market. By 2018, gas for LNG exports are expected to be well over 10 times the consumption of gas for electricity generation and over twice as big as the entire domestic market:



Figure 15: Annual Natural Gas Consumption by sector, actual from 2010-2015, projections from 2016 (Source: NGFR 2016)

An Inquiry into East Coast Gas conducted by the Australian Competition and Consumer Commission ACCC highlighted an "unprecedented change" in the ability of domestic gas users to contract gas supplies⁵⁶. COAG Energy Council has recognised the major policy challenge⁵⁷ but has articulated a vision of a more efficient market rather than any prescription for

⁵⁵ For example: Australian Energy Council analysis at <u>www.energycouncil.com.au/analysis/short-term-trading-gas-prices/</u> accessed February 10 2017

 ⁵⁶ ACCC East Coast Gas Inquiry 2015 <u>www.accc.gov.au/regulated-infrastructure/energy/east-coast-gas-inquiry-2015</u>
 ⁵⁷ <u>www.coagenergycouncil.gov.au/publications/coag-energy-council-gas-market-reform-package</u>

affordability (COAG 2014)⁵⁸.

Recent analysis by the Australian Industry Group found wholesale gas prices have increased steeply from historic levels of \$3-4/gigajoule to \$11-12/GJ by the end of 2016. This translates into a short-run cost for gas-fired electricity generation more than \$120/MWh (roughly three times the average wholesale price of a few years ago). The electricity market's design means that gas generators often set the price for the whole market, resulting in significant increases in average wholesale electricity prices.⁵⁹

Significant debate exists around state-based moratoria on gas development and the need for more supply to be developed. The impact of this and international developments⁶⁰ on gas prices and electricity generation is unclear, but in the near term it is likely that gas prices will remain high⁶¹.

2.8.2 Sudden closure of generation capacity

The closure of South Australia's Northern Power Station in May 2016 and the closure of Victoria's Hazelwood Power Station in March 2017 have highlighted the impacts of withdrawing significant lumps of generation capacity from the NEM. Northern's 546MW of capacity represents 16% of SA's maximum demand of 3,397MW (Summer 2010/11). Hazelwood's 1600MW capacity represents 15% of Victoria's maximum demand of 10,490MW (Summer 2008/9).

The AEMC (2016b) projects that the impending retirement of Hazelwood power station will increase wholesale prices by 55 per cent in Victoria and Tasmania, and 40 per cent in South Australia. AEMO has projected that Victoria and South Australia may suffer energy shortages by summer 2017-18.⁶²

These two cases also illustrate the disruptive nature of sudden generation closure not only on the security and affordability of the electricity system but also on the communities that surround them⁶³.

2.8.3 Policy Uncertainty

The impact of climate policy uncertainty on the electricity sector has been recently highlighted by a range of organisations. The Preliminary Report for the Independent Review into the Future Security of the National Electricity Market (the Finkel Review)⁶⁴ noted that this

 ⁵⁸ www.coagenergycouncil.gov.au/publications/coag-energy-council-australian-gas-market-vision
 ⁵⁹ Ai Group, 2017 ENERGY SHOCK: NO GAS, NO POWER, NO FUTURE? http://cdn.aigroup.com.au/Reports/2017/Energy_shock_report_Feb2017.pdf

⁶⁰ For example: the support given to US exports of LNG under the Trump Administration's energy policy www.whitehouse.gov/america-first-energy

⁶¹ e.g. Dr Graeme Bethune EnergyQuest Quarterly Mar17 <u>www.energyquest.com.au/insightsandanalysis.php?id=278</u>

⁶² www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ESOO/2016/update/2016-ESOO-Update---Hazelwood-Retirement.pdf

⁶³ For example, refer to the VCOSS Latrobe Action Plan <u>http://vcoss.org.au/blog/help-latrobe/</u> and the SA Government's Leigh Creek Futures initiative <u>http://leighcreekfutures.sa.gov.au/</u>

⁶⁴ http://www.environment.gov.au/system/files/resources/97a4f50c-24ac-4fe5-b3e5-5f93066543a4/files/independent-reviewnational-elec-market-prelim.pdf

uncertainty presents a risk to the security and reliability of the electricity system:

Reducing emissions in the electricity sector and the need to replace the ageing coal and gas generation fleet will involve significant investment in long-lived assets. In order for businesses to invest in these assets with confidence, they need to be able to form long-term expectations from the investment signals they receive... If businesses do not invest when needed, this will impact on the security and reliability of electricity supply. There is evidence that investment in the electricity sector has stalled and investors have become less responsive to investment signals. This is due to policy instability and uncertainty driven by numerous reviews into the RET and a lack of clarity about the policies to reduce emissions after 2020.

A media release entitled 'No room for Partisan Politics in Energy' was issued on 13 February 2017 by 18 organisations representing industry, energy, consumer, environmental and social stakeholders warned that ongoing policy uncertainty also increased costs which would be felt by all energy users:

The status quo of policy uncertainty, lack of coordination and unreformed markets is increasing costs, undermining investment and worsening reliability risks. This impacts all Australians, including vulnerable low-income households, workers, regional communities and trade-exposed industries...More than a decade of this has made most energy investments impossibly risky. This has pushed prices higher while hindering transformational change of our energy system. The result is enduring dysfunction in the electricity sector.

In March 2017, the Australian Energy Council released an estimate of the costs of past climate policy uncertainty on current and forward prices.

Given the difference between forward average wholesale prices (\$100-120/MWh) and what the underlying cost of supply should be (\$57MWh based on a 10 year weighted average between 2020-2030 from the Climate Change Authority modelling), the electricity cost of sustained national policy inaction is effectively equivalent to a carbon price in excess of \$50 a tonne. This suggests that development of durable and efficient national energy and climate policies which return investment to the market are likely to reduce electricity prices⁶⁵.

The AEC considers the lack of investment in replacing the 5000 MW of generation capacity that exited the market since 2012 to be the result of climate policy uncertainty. Earlier analyses of climate policy uncertainty in Australia focused primarily on the impacts on the types of generation investors choose: under conditions of uncertainty investors are likely to pick options that are more resilient to different policy futures but which are less efficient, or to delay investment altogether. For example, papers by Nelson et al (2010), Frontier Economics (2010), Deloitte (2011), Sinclair Knight Merz (2011) and CSIRO (2013) find that climate policy uncertainty results in sub-optimal generation investment that in turn results in higher electricity

⁶⁵ AEC, 2017. Independent Review into the Future Security of the National Electricity Market – Australian Energy Council Submission, March.

prices, although the size of the price impact varies in each study due to different assumptions about the length of time that uncertainty persists and the need for new generation within that timeframe. CSIRO notes that uncertainty would also result in deferred investment in existing generation but did not assess the implications of this.

More recent analysis by McKibbin (2015) focuses on the increase in the cost of capital for energy projects and the macroeconomic consequences of climate policy uncertainty, noting that "[a] higher risk premium implies less investment in these [energy] sectors which reduces the supply of production capacity in this sector and causes electricity prices to rise. This raises the cost of production in each energy sector which feeds into higher input costs across the economy."

Analysis by The Climate Institute (2015) considers policy uncertain or unstable if it is inconsistent with the objectives of the Paris Agreement, and discussed risks of such policy (though only some price impacts were quantified). Identified risks included: impacts of abrupt or disorderly generator retirements on prices and on regional economic stability; impacts of abrupt major scale-up of clean energy - risks of labour and equipment shortages and regulatory incompatibility; risk of failing to meet emission reduction commitments and consequent reputational, diplomatic and economic damage; and conflicts between stakeholders as shareholder, investor and community activism tries to make up for policy and regulatory gaps.

Examples of some of these risks can be seen in the electricity system currently. For example, the lack of systemic readiness for the recent closure of Northern power station has created a range of short- and medium-term concerns about the security and stability of SA's electricity supply. While the Australian Energy Market Operator has developed a medium-term work program to understand how changes to the regulatory framework and market operations can improve system security, it is also struggling in the short term to manage recurring crises which have produced price and security shocks.⁶⁶

Interestingly, all the base cases of the climate policy modelling assessed in this report assumed that Hazelwood would only retire if required to by new climate policy. As indicated by the AEC's argument above, this strongly suggests that existing prices already include some of the costs of climate policy, so that the additional price impact of carbon policy would be less than modelled, and could potentially lower near-term electricity prices.

2.8.4 Jurisdictional Schemes

A number of states and territories are implementing or planning to implement schemes to promote decarbonisation of their electricity sector. The ACT has pioneered the Australian use of Feed-in tariffs with Contracts for Difference⁶⁷. A similar mechanism is proposed for Victoria's renewable energy target of 25 per cent by 2020 and 40 per cent by 2025⁶⁸ and is being

⁶⁶ <u>https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Reports/FPSS---Progress-Report-January-2017.pdf</u>

⁶⁷ www.environment.act.gov.au/energy/cleaner-energy/renewable-energy-target,-legislation-and-reporting

⁶⁸ <u>http://delwp.vic.gov.au/energy/renewable-energy/victorias-renewable-energy-targets</u>

considered for Queensland's 50% target⁶⁹. The costs of the ACT scheme are recovered from consumers via the ACT electricity distributor (ActewAGL Distribution). The ACT Government states that total costs per household of achieving 100% renewables are expected to peak in 2020 at around \$5.50 per household per week (\$286 pa). The AEMC projects the scheme will represent approximately 11% of a typical residential standing offer customers bill (inc GST) by 2018/19 (AEMC 2016).

The impact of these schemes on electricity prices is ambiguous. To some extent, the entry of new renewable generation may reduce wholesale electricity prices in these jurisdictions by increasing supply and competition; however, the costs of the scheme if recovered through other bill components may outweigh this impact for some or all residential consumers. Moreover, these schemes may be integrated into future national climate policies and their contribution to national targets remains unclear.

2.8.5 Utilisation of the Grid

Energy infrastructure is built to meet peaks in demand but this capacity is idle most of the time. The ratio of peak to average demand reflects the average utilisation of the infrastructure⁷⁰. The chart below from the Australian Energy Council shows that South Australia has the highest ratio of peak to average demand (and therefore the poorest utilisation) and that the ratio seems to be deteriorating (increasing) in each jurisdiction. This places upward pressure on unit prices and supply charges as fixed costs are recovered from lower energy sales.



⁶⁹ Queensland Renewable Energy Expert Panel 'Credible pathways to a 50% renewable energy target for Queensland' Draft Report <u>http://www.qldrepanel.com.au/</u>

⁷⁰ See Panos Priftakis (Australian Energy Council) *Peak to average demand: what does it tell us*? Feb 2017 at <u>www.energycouncil.com.au/analysis/continued-fluctuations-in-sa-vic-and-nsw/</u>

CSIRO highlights the impact of improving grid utilisation on average electricity unit prices in its work for the ENA (Network Transformation Roadmap) as well as in its 2015 National Outlook. Network Tariff reform also aims to incentivise greater utilisation of infrastructure away from peak times (AEMC 2014, p8):

Over the longer term, more efficient pricing of network services can minimise overall electricity network costs borne by consumers due to better utilisation of the network and deferral of peak demand driven network investment.

Numerous studies into reducing emissions from the transport sector have highlighted the potential for transport electrification to reduce emissions (ClimateWorks 2014, ClimateWorks 2016, CSIRO 2015). Under the right incentives, this can also improve grid utilisation and hence place downward pressure on electricity unit prices for all end-uses (CSIRO 2016, AEMC 2012)

This lowering of costs for consumers from better utilisation of infrastructure is an objective of the National Energy Productivity Plan⁷¹ and the successful implementation of plan is intended to place downward pressure on residential energy costs. The extent to which this benefits vulnerable consumers is considered later in this report.

2.8.6 Ongoing Energy Market Reform

COAG Energy Council operates an expansive work program that is categorised into a list of priorities⁷²:

- Empowering Consumers (including through the operation of Energy Consumers Australia)
- Energy Market Transformation including four key areas of: Enhanced Competition and Innovation; Consumer Protections for new products and services in the electricity market; Ongoing Power System Security, and; the Flexibility of Economic Regulation of Networks in a more decentralized system.
- Australian Gas Markets Reform Package
- Energy and Carbon Policy, including the National Energy Productivity Plan (NEPP)
- Improving Institutional Performance, including numerous projects under the Governance Review Implementation Plan (GRIP)
- Security, Sustainability and Stability of the National Energy Market, focused on the independent review being led by Australia's Chief Scientist Dr Alan Finkel.

The AEMC Strategic Priorities for Energy Market Development 2015 outlined three strategic priorities⁷³:

• <u>Consumer priority</u> – enabling consumers to make informed decisions in competitive retail markets.

⁷¹ COAG Energy Council National Energy Productivity Plan 2015-30 Boosting competitiveness, managing costs and reducing emissions, December 2015. <u>http://www.coagenergycouncil.gov.au/publications/national-energy-productivity-plan-2015-2030</u>
⁷² Refer to www.coagenergycouncil.gov.au

⁷³ Refer to http://aemc.gov.au/Markets-Reviews-Advice/Strategic-Priorities-for-Energy-Market-Develop-(2)

- <u>Gas priority</u> promoting the development of efficient gas markets.
- <u>Markets and network priority</u> market and network arrangements that encourage efficient investment and flexibility.

Each of these reform priorities is relevant to the efficiency of energy markets and, ultimately, the ability of these markets to contribute to national emissions reduction targets. Successful implementation can reasonably be expected to put downward pressure on costs for consumers.

2.9 Recommendations by others

The following is a summary of recommendations from the literature relevant to vulnerable households and the efficiency of pricing. The list does not claim to be comprehensive and is provided to encourage the development of targeted strategies. The recommendations for advancing this policy outcome are categorised into those that:

- Minimise upward pressure on energy prices; those that
- Maximise downward pressure on energy prices; and
- Influence the redistribution of costs by changing pricing

Minimise upward pressure on energy prices

- Irrespective of the mechanism(s) chosen, it is essential to minimise climate policy uncertainty. Stable climate policy is essential to efficient investment throughout the energy transition. This implies long-term consistency with Australia's international commitments.
- Manage the refurbishment, replacement or retirement of existing coal fired generators in ways that promote the consumer interest, public interest and the interests of affected communities.
- Reconsider the extent to which decarbonisation costs are taken 'off market'

Maximise downward pressure on energy prices

- Accelerate reform of Australia east coast gas markets
- More aggressively pursue the efficiency of retail markets
- Promote greater competition where possible
- Encourage shift of vulnerable households away from standing offer tariffs
- Promote improved grid utilisation to lower unit prices

Influence the redistribution of costs by changing pricing

- Carefully remove cross-subsidies with a focus on encouraging vulnerable consumers who would be better off to opt-in to smarter metering and more cost reflective tariffs.
- Consider incorporating broader policy objectives into the National Electricity Objective.
- Consider GST as a funding source for measures to support vulnerable consumers
- Implement agreed Consumer Impact Principles for tariff reform including a specific focus

on fixed charges`

• Support the development of a vibrant Community Energy sector in Australia

2.10 Chapter Summary

This chapter has covered a wide range of issues relevant to the pursuit of **energy priced efficiently**.

The NEM has a single market objective of pursuing economic efficiency in the long-term interests of consumers. The Market Institutions do this by promoting competition in wholesale and retail markets and by applying incentive based regulation to the monopoly transmission and distribution businesses.

The state of play in relation to pricing is presented in relation to the main components of a typical electricity bill. Retailer Controlled Costs – wholesale and retail market activity – is dominated by the 'gentailer' model of the 'Big 3' energy businesses: AGL, Origin and Energy Australia and represents around 38% of the typical bill.

Wholesale markets refer to the compulsory spot market for the output of electricity generators and the financial instruments that manage risk and aggregate demand. This is where climate policies have the most direct impact. The majority of Australia's existing fleet of coal fired electricity generators will need to be refurbished, replaced or retired by 2030. However, the way this occurs, what replaces those that retire and a range of other factors will determine how large and sudden the changes to prices.

The retail component of bills bundles up network charges and wholesale energy costs with other fees and charges. However, attention is increasingly being paid to the efficiency of these markets and on price dispersion within the residential customer group.

Network costs are the largest component of most bills at around 45%. These are regulated charges and are being slowly reformed to be more 'cost reflective'. This means that prices (in terms of levels and structures) should reflect the two key drivers of network costs: congestion from coincident peaks in demand and location. Most jurisdictions preclude small customer pricing based on location so most distributors will be introducing residential tariffs with a 'monthly peak demand component' from 2017 on an 'opt-in' basis.

Funding mechanisms for national and state/territory programs tend to be based on annual electricity consumption and comprise around 8% of the typical bill. GST adds 10% to all bills.

The chapter presented a literature review of recent electricity market modelling of the impacts of climate and clean energy policies on residential electricity prices. The modelling reviewed indicates that most climate policy options, would add around 5c/kWh to electricity prices from 2020 to 2030 (approximately 20%), assuming no changes to any of the other cost drivers discussed herein. Moreover, analysis also suggests that even the absence of climate policy can drive up electricity prices because of the uncertainty created for investment in the electricity system. The Australian Energy Council has estimated that ongoing policy

uncertainty is currently adding \$4-6c/kWh to wholesale costs. Further, as illustrated in work by the CSIRO in particular, other factors can put equivalent downward pressure on prices over the same timeframes.

An underlying policy question relates to choices over preferences for the cost of action on climate change being derived from energy bills or from consolidated revenue (i.e. contributions reflect the redistributive effects of the tax and transfer system) or in what balance of the two.

This chapter also discussed key upward and downward pressures on prices from a range of sources and considered the recommendations put forward by various stakeholders. Key factors include the cost of gas, policy uncertainty, sudden closures of generation capacity, jurisdictional renewable energy target schemes, declining utilisation of expensive network assets and a range of other priorities as part of the ongoing market reform agenda.

3 Policy outcome: Informed and engaged consumers

3.1 Introduction

Chapter 3 considers policies that seek to ensure consumers are **informed and engaged** in competitive energy markets. A comprehensive reform package from the Australian Energy Markets Commission (AEMC) known as *Power of Choice* is delivering a range of measures in order to unwind cross-subsidies and open up competition for metering, energy storage and other customer-side aspects of energy markets. However, it also clear that vulnerability is closely linked to barriers to this ongoing exercising of choice. Recommendations to overcome these barriers are taken from the literature and discussed.

This policy outcome contributes to affordability by encouraging consumers to find the best priced electricity and gas supply available to them. Residential electricity is supplied on a competitive basis in NSW, VIC, SA and SE QLD and households need to regularly engage with the market to ensure they are receiving a competitively priced supply. There is limited choice of retailer in the ACT and no effective choice in regional QLD, TAS, WA and NT.

Whether or not there is a choice of retailer, homeowners in all regions often have choices to be made about:

- Fuel switching to Gas (pipeline or bottled gas)
- Solar for electricity or hot water
- Battery Storage

The NEM reforms underway as a result of the AEMC's *Power of Choice review – giving consumers options in the way they use electricity*⁷⁴ underlines the ongoing role of consumer choice that necessitates this policy outcome.

"The package of reforms will support the electricity market in meeting consumer needs over the next 15-20 years.

It provides more opportunities for consumers to make informed choices about the way they use electricity based on the benefits that end use services provide. Ultimately, consumers will be in the best position to decide what works for them."

However, for those unable or unwilling to exercise the power of choice there is a risk of being 'left behind' and the emergence of a 'two tier energy market'⁷⁵. The high proportion of disengaged consumers was reported in AEMC's 2016 Retail Competition Review (AEMC 2016a):

"... there is still a need for a strategic and coordinated approach to enhance customers' awareness of energy use and costs, and the tools available to assist customers to

⁷⁴ More information is available from <u>www.aemc.gov.au/Major-Pages/Power-of-choice</u>

⁷⁵ See for example the ECA submission to the Finkel Review p11 <u>http://energyconsumersaustralia.com.au/research/finkel-review-submission/</u>

access competitive retail market offers and investigate new products and services."

The AEMC's Energy Consumer Research 2016 indicated that around 55% of all customers have not switched electricity retailer or plan in the last five years. This suggests that these households are paying significantly more – typically 15-20% more - than customers who actively pursue a better offer⁷⁶. Market segmentation analysis revealed similar results (approximately 50%) for the 20% of households considered vulnerable (Newgate Research 2016).

Simshauser & Whish Wilson (2016) found price dispersion in Victoria's deregulated retail market meant many vulnerable customers were being priced at above efficient costs if they were on a standing offer contract or on a market contract whose benefit period had lapsed (and hence paying standing offer rates). They recommended policies to help firms shift vulnerable households onto more competitive pricing.

The *Distribution Network Pricing Arrangements Rule Change* (AEMC 2014) is a key component of the Power of Choice reform package. The rule change compels network pricing to better reflect network congestion (peak demand). Research into the likely voluntary uptake of different pricing structures by CSIRO Behavioural Economics team (Stenner et al 2015) reinforced well-known cognitive biases away from "complexity, novelty and risk" and towards "simplicity, familiarity and certainty". The pursuit of this policy outcome will necessarily need to incorporate the science of human decision making⁷⁷.

3.2 Governance

This outcome is being pursued at national and jurisdictional levels. The formation of a new energy market institution, Energy Consumers Australia in January 2015 represents a key milestone in the pursuit of this outcome. The Australian Energy Regulator (AER) Energy Made Easy website⁷⁸ is a key resource and is complemented by jurisdictional initiatives such as Victoria's Energy Compare⁷⁹, NSW's Your Energy website⁸⁰ and SA's Utilities Literacy Program⁸¹ and 'The Guide' (a resource for community workers assisting households with utilities affordability)⁸².

AEMC's 2016 Retail Competition Review (AEMC 2016a) made a number of recommendations relevant to this policy outcome. The AEMC offered to assist a Jurisdiction-lead initiative to coordinate the development of NEM-wide awareness and engagement programs to make it easier for customers to access the best options for their circumstances and improve customer confidence in the energy markets. AEMC also supported the targeting of vulnerable

⁷⁶ Based on the differences between standing offers and market offers in each jurisdiction reported in AEMC 2016 Residential Price Trends Report.

⁷⁷ CSIRO <u>www.csiro.au/en/Research/LWF/Areas/Social-economic/Behavioural-economics</u>

⁷⁸ www.energymadeeasy.gov.au

⁷⁹ https://compare.switchon.vic.gov.au/

⁸⁰ <u>http://www.yourenergy.nsw.gov.au/</u>

⁸¹ http://ucwb.org.au/financial-health/utilities-literacy.html

⁸² Guide to electricity, gas and SA Water services For South Australian community workers v2 2017 available from <u>www.sa.gov.au/energy/resources</u>

consumers that are not engaged with government or community sector support services and, consistent with Chester (2013), to diversify the available information and engagement methodologies beyond purely online options.

Relevant COAG Energy Council priorities⁸³ are:

- Empowering Consumers
- Energy Market Transformation

3.3 Shared Responsibilities and Relationships

Expanding on the governance issues considered above, past recommendations (National Energy Affordability Roundtable 2013, SACOSS 2016) have reflected a desire to foster stronger relationships between community sector workers (Financial Counsellors, Housing Support Workers etc) and energy retailers (including their Hardship teams).

Community Energy initiatives are continuing to test and evolve governance models⁸⁴. A national Community Energy Strategy was released in 2015 to develop a shared agenda to grow the Community Energy Sector in Australia.

3.4 Advanced Metering

The ubiquitous electricity meter represents the physical interface of electricity supply between customers and 'the market' or 'the grid'. Advanced metering (or 'smart metering' as it is often referred to) also represents not just a billing interface but the ability to provide useful information to consumers in close to real time. The ability to avoid 'bill shock' through information available from such metering has significant potential to soften vulnerability. The evolving Victorian 'Payment Difficulties' framework recognises the potential for advanced metering to facilitate monthly billing and, through 'in home displays' and smart-phone interfaces, allow consumers to keep track of consumption (and hence future bills). This is almost impossible with the old-style accumulation meters installed in the vast majority of households outside of Victoria.

3.5 Recommendations by others

The following is a summary of recommendations from the literature relevant to vulnerable households and their knowledge of and engagement with the energy markets. The list does not claim to be comprehensive and is provided to encourage the development of targeted strategies.

The literature includes recommendations for policy to focus on:

- Jurisdictions coordinating the development of NEM-wide awareness and engagement programs to make it easier for customers to access the best options for their circumstances and improve customer confidence in the energy markets. (AEMC 2016a)
- Targetting vulnerable customers who are not engaged with the energy market or support

⁸³ www.coagenergycouncil.gov.au/council-priorities

⁸⁴ See for example Coalition for Community Energy at <u>http://c4ce.net.au/</u>

services (AEMC 2016a)

- The relationship between vulnerable consumers, their advocates (e.g. community workers, financial counsellors) and energy retailers. (National Energy Affordability Roundtable 2013, SACOSS 2016)
- The ability of advanced metering to provide more frequent billing and near real time consumption and cost information that can minimise bill shock.
- Diversity in the provision of information and engagement away from purely online resources (Chester 2013, National Energy Affordability Roundtable 2013, AEMC 2016a).
- Incorporating Behavioural Economics into policy considerations (Stenner et al 2015)
- Price & Product Information Statements and Bills that clearly separate market-based charges (retail and wholesale) from other charges, such as regulated network charges and policy costs that apply to all customers within a jurisdiction/network (Vinnies 2016a)

3.6 Chapter Summary

This chapter has considered policies that seek to ensure consumers are **informed and engaged** in competitive energy markets. Residential electricity is supplied on a competitive basis in NSW, VIC, SA and SE QLD and households need to regularly engage with the market to ensure they are receiving a competitively priced supply. This policy outcome therefore contributes to affordability by encouraging consumers to find the best priced electricity and gas supply available to them.

Recent research indicates that most households are quite disengaged with the energy market and are therefore likely to be paying more than necessary for their electricity and gas. However, for those unable or unwilling to exercise the '*Power of Choice*' there is a risk of being 'left behind' and the emergence of a 'two tier energy market'.

Initiatives in this category generally focus on online price comparator sites but other more interactive programs do exist in some jurisdictions. Community Energy initiatives provide opportunities for households to engage more personally in meeting their energy needs. Stakeholders have recommended a more coordinated and resourced awareness and engagement effort nationally. Behavioural economics is providing new insights into consumer decision making that are relevant to responding to these issues.

Smart meters and network tariff reform are adding a new layer of distinction between customers but are also adding new ways of engaging with households and managing consumption.

4 Policy outcome: Energy consumed efficiently and productively

4.1 Introduction

Chapter 4 considers policies that affect the **energy consumption** of households. This chapter considers the energy performance of housing as well as the emergence of Distributed Energy Resources (DER) such as solar and storage. Access to these technologies is emerging as the key driver of a redistribution of electricity expenditure between households. The National Energy Productivity Plan (NEPP) represents the current national policy relevant to this outcome. A range of recommendations from the literature are presented in context.

This policy outcome contributes to affordability by encouraging and supporting consumers to get the best 'value' from their energy expenditure. For a long time this has been referred to as *energy efficiency* but is now framed as *energy productivity*. It is not the same as encouraging consumers to use less energy (although this may be the outcome) but to aim for consuming as little energy as possible to achieve the 'energy services' they need or want. An example that illustrates this would be the installation of an efficient air-conditioner and insulation in the home of someone whose health is compromised by hot weather even if this increases consumption⁸⁵. The shift in focus from purely 'efficiency' to 'productivity' also reflects nascent changes in electricity tariff structure that ensure electricity savings have different 'value' depending when they occur. Savings at peak times will increasingly have greater value than off-peak times.

There is a long history of energy policy and program activity in this area with a recurring focus on low-income households. However, the short-term and discontinuous nature of government funding has frustrated many stakeholders.

4.2 Housing

Dwelling energy performance has been the focus of a number of policy recommendations in recent times. This includes disclosure for all residential buildings and the setting of minimum standards for rental properties (EEC 2016, Vinnies 2016, ACF/ACOSS/Choice 2007). A focus on overcoming the landlord-tenant split incentive in rental properties (public and private) has been a recurring theme (BSL/KPMG/Ecos 2008, ACF/ACOSS/Choice 2007, National Energy Affordability Roundtable 2013).

Following the introduction of mandatory standards for rental properties in the UK and New Zealand, resurgent interest in minimum energy performance standards for rental properties in particular is becoming evident in Australia⁸⁶. The NSW Government has recently consulted on options to improve energy performance of tenanted homes, including minimum standards and incentives for landlords⁸⁷. The current review of the Victorian Residential Tenancies Act has

⁸⁵ This was trialled by Uniting Communities in private rental properties in Adelaide a project called *Beat the Heat!* as part of the Low Income Energy Efficiency Program (LIEEP) - <u>www.unitingcommunities.org/find-a-service/services/beat-heat-project/</u> ⁸⁶ See Energy efficiency and the regulation of rental property conditions (A response to the Residential Tenancies Act 1997 (Vic) Review) by Brotherhood of St Laurance, Consumer Utilities Advocacy Centre, St Vincent de Paul Society Victoria and the Consumer Action Law Centre August 2016 available from

http://library.bsl.org.au/jspui/bitstream/1/9264/1/Joint_subm_Energy_efficiency_rental_standards_2016.pdf

⁸⁷ A Draft Plan to Save NSW Energy and Money November 2016 at <u>https://engage.environment.nsw.gov.au/Environmental-</u>

also seen support for minimum standards of energy and water efficiency⁸⁸.

The Clean Energy Finance Corporation Community Housing Program seeks to improve the energy performance of community housing⁸⁹.

4.3 Recent modelling of future electricity consumption

The AEMO National Electricity Forecasting Report 2016 was released in June 2016 to provide electricity consumption forecasts over the 20 years to 2036. The projections incorporate a directive from the Council of Australian Governments (COAG) Energy Council that the contribution of the electricity sector should be consistent with national emission reduction targets: a 28% reduction from 2005 levels by 2030. For the 2016 NEFR, AEMO assumed the achievement of this target will be supported by energy efficiency trends (driven by the 40% improvement in energy productivity between 2016 and 2030 targeted by the National Energy Productivity Plan (NEPP)), rising electricity prices and retirements of coal-fired generators.

The 2016 NEFR is the first to project residential demand as a separate category and reveal a period of unprecedented reduction in per capita consumption. The forecasts assume 27% more residential connections over the 20 year forecast period. However, overall residential consumption is forecast to reduce by 16% in the 20-year forecast period (0.9% average annual change). Population growth and appliance uptake continue to drive increased consumption but their effect is more than offset by the forecasts for continuing investment in rooftop PV and energy efficient appliances (See Figure 17, below).



Figure 17: Residential operational consumption 2016-36, all NEM regions (Source: AEMO NEFR 2016 Figure 3)

Future-Consultation-Plan-to-Save-NSW-Energy-and-Money

⁸⁸ See A summary of views on the Regulation of property conditions issues paper October 2016 at <u>http://fairersaferhousing.vic.gov.au/renting</u>

⁸⁹ www.cleanenergyfinancecorp.com.au/where-we-invest/a-better-built-environment/cefc-community-housing-program.aspx

4.4 Governance

The Australian Government's '*National Energy Productivity Plan 2015–2030*' (NEPP) was released in December 2015 and identifies a measure 'Support best practice services for vulnerable consumers':

"Vulnerable consumers (indigenous, low income earners, remote, elderly) need additional assistance beyond those in Measure 3 ["Make choice easier"]. Based on recent research, a best practice voluntary guideline for service providers will be developed with Energy Consumers Australia and stakeholders, which will seek to reduce the barriers to vulnerable consumers effectively engaging with energy productivity measures and services."

The accompanying Work Plan provides further detail:

"The Commonwealth is currently supporting a wide range of valuable research-based pilots on delivering better energy productivity services to support different vulnerable consumer groups. These include pilots with indigenous communities, refugees, remote and regional groups, the elderly and young consumers, and low income groups.

Building on these pilots, the Commonwealth commits to working with Energy Consumers Australia and stakeholders to develop a best practice voluntary guideline for service providers aimed at reducing the barriers to vulnerable consumers effectively engaging with energy productivity measures and services.

Note this work stream aims to focus on measures which can improve energy productivity opportunities for these consumers, rather than reviewing the wider range of energy related concessions or rebates or related assistance policies. These measures are delivered by jurisdictions and vary widely. The Council acknowledges that jurisdictions have a range of important programmes in this space."

The pilots referred to are the projects of the Low Income Efficiency Program (LIEEP). The review and complementary research by ECA is known as *Power Shift*⁹⁰. Intended outcomes include:

- Improved, evidence-based understanding of what really works in supporting vulnerable consumers to manage their energy bills.
- Identification of opportunities for market-led solutions and other initiatives to support vulnerable consumers to manage their energy bills.

Community sector support for the ECA's Power Shift initiative would build on practical experience in delivering energy programs (such as LIEEP and the Home Energy Savings Scheme, HESS). Overall though, a focus for leadership is missing. For example, there is no Australian equivalent of UK fuel poverty charity National Energy Action⁹¹.

The Energy Efficiency Council released a comprehensive Policy Handbook in support of the

⁹⁰ http://energyconsumersaustralia.com.au/projects/power-shift/

⁹¹ http://www.nea.org.uk/

NEPP in mid-2016 and has called for a National Energy Efficiency and Productivity Agency (EEC 2016).

Relevant COAG Energy Council priorities⁹² are:

- Empowering Consumers
- Energy and Carbon Policy

4.5 Jurisdictional Schemes

A number of jurisdictions have energy efficiency programs in place that include low-income households as a target audience such the NSW Home Energy Action Program⁹³ and the SA Retailer Energy Efficiency Scheme⁹⁴. Victoria has flagged an Energy Efficiency and Productivity Strategy⁹⁵ and held an Energy Efficiency and Productivity Summit in 2015⁹⁶.

The coordination of state-based programs, incorporation of the implications of tariff reform and the pursuit of best practice has been recommended by a number of stakeholders (Vinnies 2016, EEC 2016, Owen 2013, National Energy Affordability Roundtable 2013).

Recommendations have also been made to increase the support for vulnerable households to be able to access more efficient capital items such as large appliances (National Energy Affordability Roundtable 2013, Chester 2013, Simshauser and Nelson 2011).

4.6 Distributed Energy Resources

Energy Innovation thinktank the Rocky Mountain Institute cites Distributes Energy Resources for Low Income households as one of eight key electricity innovations to watch in 2017⁹⁷.

"In 2017, with the decrease in the costs of DERs coupled with smartphone-enabled engagement pathways (including pay-by-phone, electronic billing, and pre-pay), utilities, regulators, and others are revisiting whether they can serve these customers better with DERs than with subsidies."

Locally, the STUCCO Student Cooperative provides an example of a consumer-led solar plus storage embedded network that lowers the electricity bills of 40 student residents⁹⁸. Opportunities for low-income households have also been explored in the Renewables for All advocacy project by the Coalition for Community Energy⁹⁹.

4.7 Recommendations by others

The following is a summary of recommendations from the literature relevant to vulnerable

⁹² www.coagenergycouncil.gov.au/council-priorities

⁹³ www.environment.nsw.gov.au/households/government-programs.htm

⁹⁴ www.sa.gov.au/topics/energy-and-environment/using-saving-energy/retailer-energy-efficiency-scheme

⁹⁵ http://delwp.vic.gov.au/energy/energy-efficiency/energy-efficiency/energy-efficiency-and-productivity-statement

⁹⁶ <u>http://delwp.vic.gov.au/energy/energy-efficiency/energy-efficiency/energy-efficiency-and-productivity-statement/energy-efficiency-and-productivity-sta</u>

⁹⁷ http://blog.rmi.org/blog_2017_01_31_eight_areas_of_electricity_innovation_to_watch_in_2017

⁹⁸ See http://www.stucco.org.au/solar

⁹⁹ http://cpagency.org.au/renewables-for-all-resources/

households and energy consumption. The list does not claim to be comprehensive and is provided to encourage the development of targeted strategies.

The literature includes recommendations for policy to focus on:

- Overcoming landlord-tenant split incentives in rental properties (public and private).
- Regulation of dwelling energy performance minimum standards for rental properties
- Regulation of dwelling energy performance disclosure for all residential buildings at point of sale.
- Regulation of dwelling energy performance tougher minimum standards for all new properties.
- Supporting access to Distributed Energy Resources for vulnerable households.
- Jurisdictions coordinating the development of NEM-wide awareness and engagement programs to make it easier for customers to access the best options for their circumstances and improve customer confidence in the energy markets. (AEMC 2016a)
- Coordination of state-based programs, incorporation of the implications of tariff reform and the pursuit of best practice
- Increased support for vulnerable households to access more efficient capital items
- Pursuing best practice in energy efficiency and productivity programs for vulnerable customers (including supporting ECA's Power Shift project)
- On-going funding for effective energy programs that target vulnerable consumers.
- A National Energy Efficiency and Productivity Agency

4.8 Chapter Summary

This chapter has considered policies that affect the energy consumption of households. Australia's National Energy Productivity Plan is the centrepiece but activities occur at state and local government levels as well. Distributed Energy Resources (DER) are technologies such as solar power, batteries, electric vehicles, smart meters and home energy management systems that can be 'orchestrated' to shift demand and lower costs. These DERs are emerging as the potential driver of a 'two tier' electricity market.

Recommendations from the literatures include a focus on improving the energy performance of rental properties; improving access to high efficiency capital items (such as large appliances); improving access to DERs by vulnerable households; and, pursuing enduring funding for best-practice energy programs for vulnerable households. Governance of activities in this space tends to fall on state and territory energy or environment departments. Concerted policy leadership is missing: there is no obvious champion of energy productivity programs for low income and vulnerable households.

5 Policy outcome: Robust Consumer Protection

5.1 Introduction

Chapter 5 discusses the essential service nature of electricity and other utilities and presents the rationale for why **robust consumer protections** are a critical policy outcome. Disconnection of electricity or gas due to unpaid bills is a reality for an increasing number of households despite concerted efforts to make this a measure of 'last resort'. New technologies and financial products are challenging existing frameworks. This chapter reviews contemporary initiatives and presents recommendations from the literature.

This policy outcome reflects the essential service nature of energy and aims for some form of *universal access to energy services*. Chapter 2 confirms the recognition of this in Australian public policy through the establishment of *industry-specific* consumer protections that supplement those afforded consumers under the Australian Consumer Law. To explain why energy consumers warrant explicit protection beyond the generic provisions of the broader consumer policy framework, the Productivity Commission stated (PC 2008, p108):

"There are good reasons to supplement the generic consumer law with specific measures to protect and empower energy consumers. They are essential services, with disconnection having potential harmful effects; billing is lumpy increasing the risk of financial stress for low income households; price menus and product bundling can be complex; and some areas of supply are not yet fully competitive."

Reference was also made to the different pace of reform amongst the states and territories as being further reasons why national Consumer Law would not be appropriate for energy markets. Energy markets therefore featured in the Productivity Commission's considerations of *Industry specific* consumer regulation. The PC recommended: (Recommendation 5.3):

... Australian Governments should agree to the longer term goal of a national consumer protection regime for energy services, with a single set of requirements to apply in all jurisdictions participating in the national energy market. Those requirements should be enforced by the Australian Energy Regulator.

This recommendation precipitated the National Energy Customer Framework (NECF). The NECF complements the generic consumer protections provided by Australian Consumer Law in the jurisdictions that choose to adopt the framework. The NECF is a package of legal instruments that regulate the sale and supply of electricity and gas to retail customers¹⁰⁰. The framework is centered on the National Energy Retail Law (NERL) and includes a set of Rules and Regulations. The framework complements the National Electricity Rules and National Gas Rules.

The NECF currently applies in¹⁰¹:

¹⁰⁰ From AEMC Guide to application of the NECF at <u>www.aemc.gov.au/Energy-Rules/Retail-energy-rules/Guide-to-application-of-the-NECF</u>

¹⁰¹ From AEMC Guide to application of the NECF at <u>www.aemc.gov.au/Energy-Rules/Retail-energy-rules/Guide-to-application-of-the-NECF</u>

- the Australian Capital Territory (commenced 1 July 2012);
- Tasmania (commenced 1 July 2012);
- South Australia (commenced 1 February 2013);
- New South Wales (commenced 1 July 2013);
- Queensland (commenced 1 July 2015); and
- Victoria Chapter 5A¹⁰² of the National Electricity Rules only (commenced 1 July 2016).

The National Energy Customer Framework does not currently apply in Western Australia or the Northern Territory and, as above, only applies in a limited manner in Victoria.

The NECF is regulated by the Australian Energy Regulator (AER). The equivalent activity in Victoria is regulated by the Victorian Essential Services Commission (ESC) where the universal use of advanced metering provides a different context.

On 1 January 2016, Victoria's energy industry legislation was amended to include a new objective for the ESC¹⁰³:

To promote protections for customers, including in relation to assisting customers who are facing payment difficulties.

The Hardship Review conducted by the Victorian Essential Services Commission in 2016 and the subsequent development Payment Difficulties Safety Net project can be regarded as the frontier of policy development related to this outcome (robust consumer protection) as at the start of 2017. This sits alongside recent work by the Australian Energy Regulator under the NECF on a Sustainable Payment Plans Framework¹⁰⁴. Both initiatives are aiming for 'best practice' and in the way customers are treated.

Both approaches identify a cohort of customers who are unable to afford ongoing consumption let alone being able to repay existing debt. This group is considered particularly vulnerable.

Disconnection for unpaid bills is the 'last resort' of both frameworks and numerous studies have been conducted over many years on the impacts of disconnections on households, especially those with children¹⁰⁵. ECA is also pursuing a focus on disconnections¹⁰⁶. A study commissioned by ECA stated that there has been a large increase in the number of disconnections in recent years and that around 160,000 households were disconnected from electricity or gas each year (KPMG 2016). In 2013, PIAC reported research that showed people in paid employment were just as likely to be disconnected as those who were unemployed¹⁰⁷. This was a change from previous reports, where most people who were disconnected were receiving welfare payments. A recent study by Vinnies in Victoria revealed

¹⁰² Chapter 5A: Electricity Connection for Retail Customers available from <u>www.aemc.gov.au/Energy-Rules/National-electricity-rules/Current-Rules</u>

¹⁰³ http://www.esc.vic.gov.au/project/energy/35945-payment-difficulties-framework/

¹⁰⁴ AER Sustainable payment plans – A good practice framework for assessing customers' capacity to pay Ver.1 July 2016.

¹⁰⁵ For example see: PIAC EWCAP 'Cut Off' reports https://www.piac.asn.au/project-highlight/research/

¹⁰⁶ <u>http://energyconsumersaustralia.com.au/keeping-people-connected/</u>

¹⁰⁷ Cut Off III: the social impact of utility disconnection available from www.piac.asn.au/project-highlight/research/

the impact that advanced metering is having on disconnection patterns and raises concerns (Vinnies 2016).

In terms of the consumer protection issues raised by the changing electricity market, the Consumer Action Law Centre has outlined the issues that will need to be addressed in an updated framework¹⁰⁸. COAG Energy Council is inquiring into consumer protection issues as part of the Energy Market Transformation priority¹⁰⁹.

The Ombudsman schemes in each jurisdiction are also investigating options for providing dispute resolution services to customers in the transforming energy markets¹¹⁰.

5.2 Governance

This outcome sits between energy law and consumer law and governance arrangements are not always clear. The primary instrument is the National Energy Customer Framework (NECF) except for Victoria, and in WA and the NT where local arrangements apply.

Examples of penalties imposed on retailers include:

- \$325,000 by the ACCC on Origin Energy for contravening the *Australian Consumer Law* with misleading claims about price discounts¹¹¹.
- \$80,000 in 2015 and \$60,000 in 2017 by the AER on Simply Energy for contravening the *National Energy Retail Law* by failing to obtain the explicit informed consent of customers before switching them to Simply Energy contracts¹¹².

Reflecting the complex governance arrangements over this policy outcome, the 2016 Retail Competition Review (AEMC 2016a) recommended:

- The AEMC and Energy Consumers Australia (ECA) work alongside the COAG Energy Council to determine how the energy consumer protections framework needs to evolve.
- COAG Energy Council successfully complete its current review of the National Energy Customer Framework (NECF) in light of the changing business models facilitated by technological change and existing Australian Consumer Law protections.

The relevant COAG Energy Council priorities¹¹³ are:

- Empowering Consumers
- Energy Market Transformation

¹⁰⁸ Consumer Action Law Centre, *Power Transformed*, July 2016 <u>http://consumeraction.org.au/wp-content/uploads/2016/07/Power-Transformed-Consumer-Action-Law-Centre-July-2016.pdf</u>

http://www.coagenergycouncil.gov.au/publications/energy-market-transformation-%E2%80%93-consultation-processes
 ANZEWON, Consumer access to external dispute resolution in a changing energy market, 24 June 2016,
 www.ewon.com.au/content/Document/EDR%20Access%20Report Public.pdf

¹¹¹ <u>https://www.accc.gov.au/media-release/origin-companies-ordered-to-pay-penalties-of-325000-for-misleading-consumers-about-discounts-under-energy-plans</u>

¹¹² www.aer.gov.au/retail-markets/compliance/enforcement-matters

¹¹³ www.coagenergycouncil.gov.au/council-priorities

5.3 Recommendations by others

The following is a summary of recommendations from the literature relevant to consumer protections and vulnerable households. The list does not claim to be comprehensive and is provided to encourage the development of targeted strategies.

The literature includes recommendations for policy to focus on:

- The relationship between vulnerable consumers, their advocates (e.g. community workers, financial counsellors) and energy retailers. (National Energy Affordability Roundtable 2013, SACOSS 2016)
- The vulnerability of children to living in poverty as has been highlighted in ACOSS' Poverty in Australia 2016 Report consistent with many disconnection case studies.
- Expanded monitoring and consistent reporting of key indicators (Vinnies 2016, National Energy Affordability Roundtable 2013)
- Nationally consistent approach to life support equipment (National Energy Affordability Roundtable 2013)
- Pursuit of best practice at a national level (National Energy Affordability Roundtable 2013, Vinnies 2016).
- Policy focus on those customers identified through Payment Difficulties or Hardship initiatives that are unable to pay for ongoing consumption.

5.4 Chapter Summary

This chapter has considered the consumer protection issues relevant to vulnerable households and energy markets. The existing frameworks are under strain from rising prices and technology – particularly smart meters. A growing market 'behind the meter' for solar and storage as a service, embedded networks and so on is also testing the boundaries between Australian Consumer Law and Energy Retail Law. Relationships between community sector, government and energy industry stakeholders are critical to policy progress.

Household disconnection rates have grown and stakeholders have identified a cohort of households at risk of disconnection but that do not have the resources to pay for ongoing consumption let alone repay debt.

Developments in Victoria – where virtually all households have a smart meter – represent the policy frontier for this one of the five policy outcomes: a new regulatory objective, a Hardship Review and a draft Payments Difficulty Framework. However, a harmonised national scheme seems as far off as ever.

Recommendations from the literature include expanded monitoring and consistent reporting of key indicators; pursuit of best practice / continuous improvement at the customer interface. Collaboration between government, retailers, ombudsmen and community sector workers could be strengthened.

6 Policy outcome: All households have a capacity to pay

6.1 Introduction

Chapter 6 considers the social welfare policy objective of ensuring households have a **capacity to pay** for essential goods and services. This involves a combination of income measures from the tax and transfer system as well as jurisdiction-based measures that provide concessions and emergency assistance tied to energy bills. This discussion overlaps with broader issues of poverty and housing affordability and represents a very complex area of public policy. A range of recommendations from the literature are presented for further consideration by stakeholders.

With its strong focus on competitive markets, energy policy in Australia is explicitly reliant on the general social safety net to complement electricity market outcomes in order to preserve affordability. To quote the Australian Government's 2012 Energy White Paper (CoA, 2012a):

"Ensuring that consumers, particularly those who are most vulnerable, are able to manage energy costs effectively is also increasingly important. The continued provision of <u>adequate</u> assistance to vulnerable consumers through a sound general <u>safety net</u>, <u>well-targeted</u> jurisdictional concession regimes and appropriate community service obligations remains critical." (emphasis added)

6.2 Role of income support

According to *Poverty in Australia 2016* (ACOSS 2016), 13.3% of the Population (3 million people) lived below the poverty line in 2013-14¹¹⁴. Of those people, 57.3% relied on income support payments as their main source of income.

While the situation of poverty is in part due to the fact that most income support payments are set below the poverty line, the impact of indexation also contributes to this situation. In the main, income support payments are now indexed to price inflation rather than wage inflation, for example the Newstart allowance has not increased in real terms since 1994. Comparing the value of income support payments to the Average Weekly Ordinary Time Earnings (AWOTE) reveals quite startling gaps, not only in terms of the amounts but also in terms of the trajectory over time. The ongoing erosion of the adequacy of income support payments is having a compounding impact on the situation of poverty.

The graph below is taken from Poverty in Australia 2016 (their Figure 18). It can be seen that changes to the Aged Pension in 2009 had a significant and positive effect on this particular payment type compared to other income support payments. This increase of \$32.50 per week can be seen across the data to have improved the circumstance of this group over time, highlighting the core role that governments can play in preventing situations of poverty.

¹¹⁴ The poverty line is drawn at 50% of median after-tax income



Figure 18: Trends in payment rates compared with average wages (Source: ACOSS 2016 Poverty in Australia Figure 18)

6.3 Role of Concessions

A comprehensive report by KPMG for Energy Consumers Australia (KPMG 2016) estimates that the total cost to governments of energy concession schemes (electricity and gas) is forecast to be \$875m in the 2016/17 Financial Year. Total GST receipts from residential electricity and gas expenditure is estimated at approximately \$1,600m. Concession schemes can therefore be considered to return around 55% of the GST revenue raised. However, significant differences exist in concession payments between jurisdictions (KPMG 2016, Vinnies 2013) and hence the proportion of GST receipts returned will vary.

Calls for concessions reform appear frequently and the Victorian regime is usually held up as the most equitable and comprehensive. The shift towards monthly billing, promotion of payment plans and bill smoothing products all contribute towards the capacity to pay an electricity bill.

AEMC's 2016 Retail Competition Review recommends that jurisdictions review concession policies to assess opportunities to better target them to customers most in need and to harmonise their structure across jurisdictions, where substantive differences exist. (AEMC 2016a)

6.4 Housing

As the most significant fixed cost to the household budget¹¹⁵, housing has a direct impact on the affordability of all other costs. While various issues impact on housing costs, the core challenges include housing tenure, quality of residence, number of people in the home. Anglicare's 2016 Rental Affordability Snapshot¹¹⁶ stated:

"Over the first weekend in April, the Anglicare member network surveyed 75,410 rental properties across Australia and found just 21 properties were affordable for single adults living on Newstart, and only one was suitable for young people living on Youth Allowance. And despite the higher level of pensions compared to allowances, affordable rentals were extremely limited for a single person living on any government payment.

780 properties were affordable for those on a parenting payment and 389 for those on Disability Support Payment. Once the level of income reaches two people on the minimum wage in a household, they can access 26.2% or over 19,000 properties. This highlights the stark situation people on income support payments face even when compared to those on the lowest wages in the country.

A recent research report by Choice for National Shelter and the National Association of Tenant Organisations (NATO) called *Unsettled: Life in Australia's private rental market* provides examples of the tenuous housing arrangements many households are in¹¹⁷.

6.5 Connection to other research

An open question is whether there is merit in seeking to align understanding of the incidence of energy related hardship with the approach taken to measuring and reporting on Poverty in Australia more generally. The impending release of the results of the most recent Household Expenditure Survey may be an opportunity to align with the methodological approach of the ACOSS *Poverty and Inequality in Australia* series of reports.

ACOSS in association with the Social Policy and research Centre (SPRC) has produced a ten year series of research reports charting the path of poverty in Australia. The analysis is based on the ABS Survey of Income and Housing. The survey is conducted every two years but various elements are only surveyed in four or six year cycles – including the Household Expenditure Survey in 2009-10 and 2013-14.

The *Poverty and Inequality in Australia* series aims to provide a stable and independent evidence based picture of the situation of poverty and inequality. The data used is consistent, giving a longitudinal picture by which to chart the situation of those most vulnerable to poverty. Over time various aspects of data capture improve giving rise to more detailed analysis. For example in 2016 housing tenure was included in the reporting for the first time.

The issue of energy affordability has been topical for some time but the available data is still

¹¹⁵ Discussed in more detail in Chapter 1.

¹¹⁶ Available from <u>www.anglicare.asn.au/research-reports/the-rental-affordability-snapshot</u>

¹¹⁷ https://tenants.org.au/national-rental-research

not consistent and does not currently provide the same rich picture that we can see for other sub sets such as income, gender, age and family composition. It is felt that a more consistent and regular data capture for energy (as well as for disability and Aboriginal and Torres Strait Islander peoples) would significantly enrich the research reports and our understanding of the impact of energy on poverty in Australia.

6.6 Governance

Responsibility for this outcome is very much spread across different levels of government. The Australian Government is responsible for income adequacy while the states are assigned responsibility for concessions under the Australian Energy Market Agreement (AEMA)¹¹⁸. Housing affordability is a shared responsibility also managed under an intergovernmental agreement (National Affordable Housing Agreement)¹¹⁹.

Relevant COAG Energy Council priorities¹²⁰ are:

• Empowering Consumers

6.7 Recommendations by others

The following is a summary of recommendations from the literature relevant to consumer protections and vulnerable households. The list does not claim to be comprehensive and is provided to encourage the development of targeted strategies.

The literature includes recommendations for policy to focus on:

- A national review of energy concessions (National Energy Affordability Roundtable 2013, AEMC 2016a, Productivity Commission, Chester 2013, Owen 2013) to assess opportunities to better target them to customers most in need (including extending supports to the working poor) and to harmonise their structure across jurisdictions, where substantive differences exist.
- A national review of emergency payments (National Energy Affordability Roundtable 2013)
- Improving adequacy of some income payments such as Newstart and Youth Allowance. (Vinnies 2016, ACOSS 2016)
- Forging stronger links between concession payments and energy efficiency/productivity schemes (Chester 2013) and/or funding for Distributed Energy Resources.
- Aligning research into energy affordability and vulnerability with the methodologies and publication of the ACOSS Poverty in Australia series. Use the 2017 release of the 2013-14 Household Expenditure Survey for initial work.
- Align policy, advocacy and research initiatives with corresponding housing affordability initiatives. Expand scope to include stronger integration with understanding of transport costs.

¹¹⁸ <u>www.coagenergycouncil.gov.au/publications/australian-energy-market-agreement-amended-december-2013</u> sect.14.14 ¹¹⁹ www.federalfinancialrelations.gov.au/content/national_agreements.aspx

¹²⁰ www.coagenergycouncil.gov.au/council-priorities

6.8 Chapter Summary

This chapter has considered the social welfare policy objective of ensuring households have a capacity to pay for essential goods and services. In the energy context, this refers to income measures and energy-specific concessions applied at the jurisdictional level.

Income comparisons from ACOSS' Poverty in Australia 2016 illustrated the relative performance of salaries and wages compared to pensions and benefits over the last decade. Income inequality is magnified when the context is an essential service such as electricity.

Energy concessions vary from jurisdiction to jurisdiction and repeated calls have been made to improve and align these measures nationally and to improve targetting. Estimates of concession expenditure and GST revenue have been compared to illustrate that around 55% of GST revenue from energy bills is redistributed to eligible households.

This policy outcome has roles and responsibilities spread between Australian, State and Territory Governments and between Treasury/Finance, Human Services and Housing Portfolios.

Policy links to housing access and affordability are evident yet there is little evidence of institutional interaction with energy policy. Opportunities exist to align energy affordability research with housing and poverty research when the ABS release data from the most recent Household Expenditure Survey later in 2017.

Concession Reform is widely supported but no policy champion has been identified.

7 Conclusions

The energy trilemma of security, affordability and environmental impact presents a complex policy environment that is yet to give equal weight to the three components. The current cycle of climate change policy in Australia is aiming to ensure stronger alignment with energy policy. This research report considers how a social policy objective of *access to affordable energy services* might also be advanced during this policy cycle.

It is clear that no silver bullet exists for the energy policy challenges facing Australia. Research by the CSIRO and others has shown that a portfolio of measures can result in lower energy bills, deliver a more secure and reliable electricity supply, while taking strong action on reducing emissions from the energy sector.

This report has curated a diverse array of policy activity into a summary of issues and opportunities relevant to how vulnerable households will fare in a changing energy market. It is clear that, similarly, a portfolio of measures will be required to preserve affordability for vulnerable households. This will require policy coordination across the energy, social and environmental policy domains.

The chapter summaries have been consolidated below:

Chapter 1 set out the context for the research report.

Australia has recently committed to an emissions reduction target that is expected to require net-zero emissions from the electricity sector by mid-century. The current policy cycle is seeking to align energy policy and climate policy and pursue the energy trilemma of lower emissions and lower prices from a stable and secure market. Various mechanisms have been proposed.

Electricity is an essential service that warrants industry specific consumer protections. Household expenditure on electricity and gas in Australia is estimated at \$17,500 million in 2014-15. Historical trends in residential electricity prices are presented and show a rapid rise from around 2007 to 2012. Components of a typical electricity bill are discussed to highlight the different pressures on each of the building blocks of an electricity bill.

Simple analysis of results from the 2009-10 Household Expenditure Survey (HES) illustrates the potential for some low income households to have high relative expenditure on energy. Using after housing cost disposable income as a proxy for *capacity to pay*, some households are spending 10% or more of this capacity on energy bills. This expense is competing with other essentials such as transport and health care.

An overview of studies that have sought to identify demographic attributes of vulnerable households is presented. These studies tend to be based on quantitative assessment of income and expenditure, qualitative analysis of responses to surveys or both. Recent work by CSIRO and Newgate Research (for the AEMC) gives further insight into vulnerability in a changing market. A summary perspective is that vulnerable households are very diverse, but two common factors are:

- a. they need to respond to electricity cost pressures, and;
- b. they can't

Looking forward, changes to the structure of pricing enabled by the increasing prevalence of interval metering and rising fixed charges is expected to redistribute costs between consumers and generate winners and losers over coming years. Detailed impacts are not yet clear but access to capital is emerging as the defining attribute of those able to respond to new price signals and minimise their long-run costs.

With this as the context for a review of policies, the following chapters discussed the five policy outcomes required to pursue the notion of *universal access to affordable energy services*. The first of these relates to electricity pricing.

Chapter 2 covered a wide range of issues relevant to the pursuit of energy priced efficiently.

The NEM has a single market objective of pursuing economic efficiency in the long-term interests of consumers. The Market Institutions do this by promoting competition in wholesale and retail markets and by applying incentive based regulation to the monopoly transmission and distribution businesses.

The state of play in relation to pricing was presented in relation to the main components of a typical electricity bill. Retailer Controlled Costs – wholesale and retail market activity, representing around 38% of the typical bill – is dominated by the 'gentailer' model of the 'Big 3' energy businesses: AGL, Origin and Energy Australia.

Wholesale markets refer to the compulsory spot market for the output of electricity generators and the financial instruments that manage risk and aggregate demand. This is where climate policies have the most direct impact. The majority of Australia's existing fleet of coal fired electricity generators will need to be refurbished, replaced or retired by 2030. However, the way this occurs, what replaces those that retire and a range of other factors will determine how large and sudden the changes to prices.

The retail component of bills bundles up network charges and wholesale energy costs with other fees and charges. However, attention is increasingly being paid to the efficiency of these markets and the wide price dispersion within the residential customer group.

Network costs are the largest component of most bills at around 45%. These are regulated charges and are being slowly reformed to be more 'cost reflective'. This means that prices (in terms of levels and structures) should reflect the two key drivers of network costs: capacity for coincident peaks in demand and location. Most jurisdictions preclude small customer pricing based on location so most distributors will be introducing residential tariffs with a 'monthly peak demand component' from 2017 on an 'opt-in' basis.

Funding mechanisms for national and state/territory programs tend to be based on annual electricity consumption and comprise around 8% of the typical bill. GST adds 10% to all bills.

The chapter also presented a literature review of recent electricity market modelling of the impacts of climate and clean energy policies on residential electricity prices. The modelling reviewed indicates that most climate policy options, would add around 5c/kWh to electricity prices from 2020 to 2030 (approximately 20%), assuming no changes to any of the other cost drivers discussed herein. Moreover, analysis also suggests that even the absence of climate policy can drive up electricity prices because of the uncertainty created for investment in the electricity system. The Australian Energy Council has estimated that ongoing policy uncertainty is currently adding \$4-6c/kWh to wholesale costs. Further, as illustrated in work by the CSIRO in particular, other factors can put equivalent downward pressure on prices over the same timeframes.

An underlying policy question relates to choices over preferences for the cost of action on climate change being derived from energy bills or from consolidated revenue (i.e. contributions reflect the redistributive effects of the tax and transfer system) or in what balance of the two.

This chapter also discussed key upward and downward pressures on prices from a range of sources and considered the recommendations put forward by various stakeholders. Key factors include the cost of gas, policy uncertainty, sudden closures of generation capacity, jurisdictional renewable energy target schemes, declining utilisation of expensive network assets and a range of other priorities as part of the ongoing market reform agenda.

Chapter 3 considered policies that seek to ensure consumers are informed and engaged in competitive energy markets. Residential electricity is supplied on a competitive basis in NSW, VIC, SA and SE QLD and households need to regularly engage with the market to ensure they are receiving a competitively priced supply. This policy outcome therefore contributes to affordability by encouraging consumers to find the best priced electricity and gas supply available to them.

Recent research indicates that most households are quite disengaged with the energy market and are therefore likely to be paying more than necessary for their electricity and gas. However, for those unable or unwilling to exercise the '*Power of Choice*' there is a risk of being 'left behind' and the emergence of a 'two tier energy market'.

Initiatives in this category generally focus on online price comparator sites but other more interactive programs do exist in some jurisdictions. Community Energy initiatives provide opportunities for households to engage more personally in meeting their energy needs. Stakeholders have recommended a more coordinated and resourced awareness and engagement effort nationally. Behavioural economics is providing new insights into consumer decision making that are relevant to responding to these issues.

Smart meters and network tariff reform are adding a new layer of distinction between customers but are also adding new ways of engaging with households and managing consumption.

Chapter 4 considered policies that affect the energy consumption of households. Australia's

National Energy Productivity Plan is the centrepiece but activities occur at state and local government levels as well. Distributed Energy Resources (DER) are technologies such as solar power, batteries, electric vehicles, smart meters and home energy management systems that can be 'orchestrated' to shift demand and lower costs. These DERs are emerging as the potential driver of a 'two tier' electricity market.

Recommendations from the literatures include a focus on improving the energy performance of rental properties; improving access to high efficiency capital items (such as large appliances); improving access to DERs by vulnerable households; and, pursuing enduring funding for best-practice energy programs for vulnerable households.

Governance of activities in this space tends to fall on state and territory energy or environment departments. Concerted policy leadership is missing: there is no obvious champion of energy productivity programs for low income and vulnerable households.

Chapter 5 considered the consumer protection issues relevant to vulnerable households and energy markets. The existing frameworks are under strain from rising prices and technology – particularly smart meters. A growing market 'behind the meter' for solar and storage as a service, embedded networks and so on is also testing the boundaries between Australian Consumer Law and Energy Retail Law. Relationships between community sector, government and energy industry stakeholders are critical to policy progress.

Household disconnection rates have grown and stakeholders have identified a cohort of households at risk of disconnection but that do not have the resources to pay for ongoing consumption let alone repay debt.

Developments in Victoria – where virtually all households have a smart meter – represent the policy frontier for this one of the five policy outcomes: a new regulatory objective, a Hardship Review and a draft Payments Difficulty Framework. However, a harmonised national scheme seems as far off as ever.

Recommendations from the literature include expanded monitoring and consistent reporting of key indicators; pursuit of best practice / continuous improvement at the customer interface. Collaboration between government, retailers, ombudsmen and community sector workers could be strengthened.

Chapter 6 considered the social welfare policy objective of ensuring households have a capacity to pay for essential goods and services. In the energy context, this refers to income measures and energy-specific concessions applied at the jurisdictional level.

Income comparisons from ACOSS' Poverty in Australia 2016 illustrated the relative performance of salaries and wages compared to pensions and benefits over the last decade. Income inequality is magnified when the context is an essential service such as electricity.

Energy concessions vary from jurisdiction to jurisdiction and repeated calls have been made to improve and align these measures nationally and to improve targetting. Estimates of concession expenditure and GST revenue have been compared to illustrate that around 55% of GST revenue from energy bills is redistributed to eligible households.

This policy outcome has roles and responsibilities spread between Australian, State and Territory Governments and between Treasury/Finance, Human Services and Housing Portfolios.

Policy links to housing access and affordability are evident yet there is little evidence of institutional interaction with energy policy. Opportunities exist to align energy affordability research with housing and poverty research when the ABS release data from the most recent Household Expenditure Survey later in 2017.

Concession Reform is widely supported but no policy champion has been identified.
8 References

ACF ACOSS Choice 2007. Energy and Equity

http://web.archive.org/web/20140306015125/http:/acoss.org.au/images/uploads/4204_EnergyEquity_low_res.pdf

ACOSS 2016, Poverty in Australia 2016 – Australian Council of Social Service and the Social Policy Research Centre and the University of NSW <u>www.acoss.org.au/poverty</u>

AEMC 2012, Energy market arrangements for electric and natural gas vehicles, Final Advice, 11 December 2012, Sydney

AEMC 2014, Distribution Network Pricing Arrangements Rule Determination, 27 November 2014, Sydney

AEMC 2016, Integration of energy and emissions reduction policy, Report, 09 December 2016, Sydney

AEMC 2016a, Retail Competition Review, Final Report, 30 June 2016, Sydney <u>www.aemc.gov.au/Markets-Reviews-</u> <u>Advice/2016-Retail-Competition-Review</u>

AEMC 2016b, 2016 Residential electricity price trends Report, 14 December 2016, Sydney <u>www.aemc.gov.au/Markets-</u> <u>Reviews-Advice/2016-Residential-Electricity-Price-Trends</u>

AEMO (2016) Update: Electricity Statement of Opportunities for the National Electricity Market, November 2016 <u>https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ESOO/2016/update/2016-ESOO-Update---Hazelwood-Retirement.pdf</u>

AEMO 2017 Progress Report - Future Power System Security Program, January 2017. <u>https://www.aemo.com.au/-</u>/media/Files/Electricity/NEM/Security_and_Reliability/Reports/FPSS---Progress-Report-January-2017.pdf

AER 2014 Overview of the Better Regulation Reform Package www.aer.gov.au/networks-pipelines/better-regulation

AER 2016 Review of the Stakeholder Engagement Framework <u>www.aer.gov.au/communication/review-of-the-stakeholder-engagement-framework</u>

AER, 2016 Energy Retail Statistics 2016-17 Q1 Customers on a hardship program – by jurisdiction (<u>www.aer.gov.au/retail-markets/retail-statistics</u> accessed 19 January 2017)

Althaus C, Bridgman P & Davis G. 2012. The Australian Policy Handbook. Fifth ed, Allen and Unwin

Australian Energy Market Operator 2016, National Electricity Forecasting Report, June 2016, Available at: http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/-/media/080A47DA86C04BE0AF93812A548F722E.ashx

Azpitarte, F, Johnson, V & Sullivan, D 2015, Fuel poverty, household income and energy spending: an empirical analysis for Australia using HILDA data, Brotherhood of St Laurence, Fitzroy, Vic.

BCEC 2016, Bankwest Curtin Economics Centre Research Report No. 2/16 June 2016 Energy Poverty in Western Australia – A comparative Analysis of Drivers and Effects

Ben-David, Dr R 2012 *Retail Energy Markets: A case for Economic Redux* a presentation by Chairman of the Essential Services Commission of Victoria March 2012 available from http://www.esc.vic.gov.au/corporate/research/

Ben-David, Dr R 2015 *If the Retail Energy Market is ocompetitive then is Lara Bingle a Russian cosmonaut?* a presentation by Chairman of the Essential Services Commission of Victoria June 2015 available from http://www.esc.vic.gov.au/corporate/research/

Ben-David, Dr R 2016 Shock Therapy – Reviving retail competition in the energy market a paper by Chairman of the Essential Services Commission of Victoria August 2016 available from http://www.esc.vic.gov.au/corporate/research/

Brotherhood of St Laurence, KPMG and Ecos Corporation 2008. A national energy efficiency program to assist low-income households <u>http://library.bsl.org.au/jspui/bitstream/1/6014/1/KPMG_national_energy_efficiency_program_low-income_households.pdf</u>

Burke and Ralston 2015, *Household energy use: Consumption and expenditure patterns* 1993-2012, CRC for LCL Project Report for Project RP3001: Resource Consumption and Household Affordability – The changing nature of utility costs and the Distributional Implications among Australian households available from http://lowcarbonlivingcrc.com.au/resources/crclcl-publications

Chester, L. and A. Morris, 2012, A new form of energy poverty is the hallmark of liberalised electricity sectors. Australian

Journal of Social Issues, 46(4), 435-458.

Chester, L 2013, The impacts and consequences for low-income Australian households of rising energy prices, University of Sydney, available from

www.householdenergyuse.com/resources/Impacts Consequences Low Income Households Rising Energy-Bills_Oct2013.pdf

ClimateWorks Australia. 2014. Pathways to Deep Decarbonisation in 2050; How Australia CanProsper in a Low Carbon World. via http://climateworks.com.au/project/national-projects/pathways-deep-decarbonisation-2050-how-australia-can-prosper-low-carbon

ClimateWorks Australia 2016, The Path Forward for Electric Vehicles in Australia – Stakeholder Recommendations, April 2016

CoA, 2012, Energy White Paper 2012 Australia's energy transformation, Canberra

COAG 2014. COAG Energy Council Australian Gas Market vision December 2014 (www.coagenergycouncil.gov.au/publications/coag-energy-council-australian-gas-market-vision)

Consumer Groups 2016 [Alternative Technology Association, Community Information and Support Victoria, Consumer Action Law Centre, Consumer Utilities Advocacy Centre, Ethnic Communities Council NSW, Northern Alliance for Greenhouse Action, St Vincent de Paul, Uniting Care Australia, Victorian Council of Social Service] *Consumer Outcomes and Principles for Cost Reflective Network Pricing*

CSIRO, 2015. Australian National Outlook 2015: Economic activity, resource use, environmental performance and living standards, 1970–2050. <u>www.csiro.au/nationaloutlook/</u>

CSIRO and Energy Networks Association 2015, Electricity Network Transformation Roadmap: Interim Program Report. www.energynetworks.com.au/roadmap

CSIRO and Energy Networks Australia 2016, Electricity Network Transformation Roadmap: Key Concepts Report.

ENA, 2016. Energy Networks Association Australia's Climate Policy Options: Modelling of Alternate Policy Scenarios Final Report, 22 August 2016

Energy Efficiency Council 2016. Australian Energy Efficiency Policy Handbook www.eec.org.au/policy-advocacy/handbook

EU Energy Poverty Handbook 2016 http://meszerics.eu/pdf/energypovertyhandbook-online.pdf

Finkel et al 2016 Independent Review into the future security of the National Electricity Market - Preliminary Report, December 2016

Frontier Economics 2016. *Emissions reduction options – A report prepared for the Australian Energy Market Commission* November 2016

Frontier Economics 2016b 2016 Residential Electricity Price Trends (wholesale modelling report) www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends

Graham, P.W., T. Brinsmead, S. Hatfield-Dodds, (2015) Australian retail electricity prices: Can we avoid repeating the trend of the past? *Energy Policy*, 86, 456-469.

Hills, J., 2012, Getting the measure of fuel poverty. Final Report of the Fuel Poverty Review., UK Department of Energy and Climate Change. (DECC, London) <u>www.gov.uk/government/publications/final-report-of-the-fuel-poverty-review</u>

Jacobs, 2016a. Retail electricity price history and projections – Public. A report to AEMO v 1.2 23 May 2016 Melbourne.

Jacobs, 2016b. Modelling illustrative electricity sector emissions reduction policies. A report to the Climate Change Authority 25 August 2016 Melbourne.

Jacobs, 2016c. Australia's Climate Policy Options. A report to the Energy Networks Association 22 August 2016

KPMG 2016 Energy Consumers Australia, Quantifying the cost of energy disconnections 14 October 2016 available from http://www.energyconsumersaustralia.com.au/policy-and-advocacy/keeping-people-connected

Mallon, K, Hamilton, E, Black, M, Beem, B & Abs, J 2013, Adapting the community sector for climate extremes: Extreme weather, climate change & the community sector – Risks and adaptations, National Climate Change Adaptation Research Facility, Gold Coast, 286 pp. (www.nccarf.edu.au/publications/extreme-weather-climate-change-community-sector)

Mountain, B 2015 A critique of the Victorian retail electricity market – A report for the Brotherhood of St Laurence (available from http://cmeaustralia.com.au/public-reports/)

Mountain, B 2016 Australia's retail electricity markets: who is serving whom? A report for GetUp! (available from http://cmeaustralia.com.au/public-reports/)

Nance 2013, Relative Energy Poverty in Australia available from www.sacoss.org.au/relative-energy-poverty-australia

National Energy Affordability Roundtable 2013. Report to the Standing Council on Energy and Resources from Australian Energy Ombudsmen, Energy Retailers Association of Australia and ACOSS May 2013.

Nelson, T; Simshauser, P and Kelley, S. 2011 Australian residential solar feed-in tariffs: Industry stimulus or regressive form of taxation? <u>Economic Analysis and Policy</u>, Vol. 41, No. 2, Sep 2011: 113-129.

Nelson T, Reid, C and McNeill J, 2014. Energy-only markets and renewable energy targets: complementary policy or policy collision? AGL Working Paper No.43, <u>http://aglblog.com.au/wp-content/uploads/2014/08/No-43-energy-only-and-renewable-targets-FINAL.pdf</u>

Newgate Research 2016, AEMC 2016 Retail Competition Review: Understanding Vulnerable Customer Experiences and Needs – Consumer Research Report June 2016 (Hoye J, Partalis P, Wright B, Rich K)

Oakley Greenwood 2016 Gas Price Trends Review February 2016 Rev 1 available from https://industry.gov.au/Energy/Energy-information/Documents/Gas-Price-Trends-Report.pdf

Owen, G 2013. Addressing Peak Demand. The opportunities and risks for vulnerable households. Monash Sustainability Institute Report 13/3 April 2013.

Productivity Commission 2008, Review of Australia's Consumer Policy Framework, Final Report, Canberra www.pc.gov.au/inquiries/completed/consumer-policy/report

Saunders P, Wong M, Bradbury B Poverty in Australia: New Estimates and Recent Trends Research Methodology for the 2016 Report (available from http://www.acoss.org.au/wp-content/uploads/2016/10/PovertyMethods2016.pdf)

SACOSS 2016, Better Solutions for Helping Customers with Financial Difficulties: Energy and Water www.sacoss.org.au/better-solutions-helping-customers-financial-difficulties-energy-and-water

Simshauser, P., Downer. D., 2014 On the inequity of flat-rate electricity tariffs, AGL Applied Economic and Policy Research, Working Paper No. 41, June 2014 <u>http://aglblog.com.au/wp-content/uploads/2014/07/No.41-On-the-inequity-of-tariffs.pdf</u>

Simshauser, P., Nelson, T., Doan, T. The Boomerang Paradox, Part I: How a Nation's Wealth Is Creating Fuel Poverty. *Electricity Journal* Vol 24 Issue 1 72-91 2011.

Simshauser, P., Nelson, T., Doan, T. The Boomerang Paradox, Part II: Poverty Prescriptions for Reducing Fuel Poverty in Australia. *Electricity Journal* Vol 24 Issue 2 63-75 2011.

Simshauser, P., Nelson, T. (2015) The Australian east coast gas supply cliff. Economic Analysis and Policy 45 (2015) 69-88

Simshauser, P., Nelson, T. (2015a) Australia's coal seam gas boom and the LNG entry result. Australian Journal of Agricultural and Resource Economics, 59, pp. 1–22

Simshauser, P., Whish-Wilson, P. (2016) Price discrimination in Australia's retail electricity markets: An analysis of Victoria & Southeast Queensland. *Energy Economics* 62 (2017) 92-103

Stenner, K., Frederiks, E., Hobman, E. V., and Meikle, S. (2015) Australian Consumers' Likely Response to Cost-Reflective Electricity Pricing. CSIRO, Australia. <u>http://www.csiro.au/en/Research/EF/Areas/Electricity-grids-and-systems/Economic-modelling/Consumer-tariffs</u>

Teske, S., Dominish, E., Ison, N. and Maras, K. (2016) 100% Renewable Energy for Australia – Decarbonising Australia's Energy Sector within one Generation. Report prepared by ISF for GetUp! and Solar Citizens, March 2016.

The Climate Institute 2016 A switch in time: Enabling the electricity sector's transition to net zero emissions Policy Brief (www.climateinstitute.org.au/articles/publications/a-switch-in-time-report-page.html)

UNFCCC, 2015. 'Adoption of the Paris Agreement'. FCCC/CP/2015/L.9/Rev.1. (https://unfccc.int/resource/docs/2015/cop21/eng/I09r01.pdf)

Vinnies 2013 The Relative Value of Energy Concessions 2009-12 Parts 1 and 2 reports available from

www.vinnies.org.au/page/Our Impact/Incomes Support Cost of Living/Concessions/

Vinnies 2016. (St Vincent de Paul Society and Alviss Consulting) Households in the Dark

Vinnies 2016a. (St Vincent de Paul Society and Alviss Consulting) The NEM – A hazy retail maze, Melbourne, December 2016

9 Appendix A



Australian Government

* Department of the Environment and Energy

2017 Review of Climate Change Policies - Terms of Reference

The Government is committed to addressing climate change. Through effective policies, ambitious and responsible targets, and careful management, Australia is playing its role in global efforts to reduce emissions, while maintaining a strong economy and realising the benefits of the transition to a lower emissions future.

The Government's policies are working to reduce Australia's emissions. They have Australia on track to surpass its 2020 emissions reduction target and provide a framework for the longer term.

In setting its 2030 target of reducing emissions to 26-28 per cent below 2005 levels, the Government committed to reviewing its policies during 2017. The review will ensure the Government's policies remain effective in achieving Australia's 2030 target and Paris Agreement commitments. The review will look at:

- the opportunities and challenges of reducing emissions on a sector-by-sector basis;
- the impact of policies on jobs, investment, trade competitiveness, households and regional Australia;
- the integration of climate change and energy policy, including the impact of state-based policies on achieving an effective national approach;
- the role and operation of the Emissions Reduction Fund and its safeguard mechanism;
- complementary policies, including the National Energy Productivity Plan;
- the role of research and development and innovation;
- the potential role of credible international units in meeting Australia's emissions targets; and
- a potential long-term emissions reduction goal post-2030.

The review will involve close engagement with business and the community, beginning with consultation on a discussion paper.

The review will monitor and be informed by developments in international climate policy, and include a focus on electricity prices for end users. The review will build on parallel processes, including the Finkel review of the reliability and security of the National Electricity Market, and the work of the Ministerial Forum on Vehicle Emissions.

The review will commence in February 2017 and conclude by the end of 2017.

10 Appendix B – Summary of Studies seeking to estimate the impacts of different climate policies on electricity prices.

Four studies are selected for thorough analysis as they comprise a representative spectrum of approaches (Jacobs for the Climate Change Authority, CSIRO and the Energy Networks Association, Frontier Economics for the AEMC and Jacobs for The Climate Institute). Other studies which used a variant of one of these approaches are discussed more briefly.

10.1 Jacobs for the Climate Change Authority

In December 2014, the then Minister for the Environment asked the Climate Change Authority (CCA) to conduct a Special Review into Australia's policies and future targets for reducing greenhouse gas emissions. The CCA subsequently commissioned Jacobs to undertake electricity market modelling of 7 alternate climate policy options against a reference case (Jacobs 2016b) and Victoria University to model economy wide impacts.

The emissions reduction target is based on cumulative emissions derived from a target consistent with global efforts to limit warming to 2°C. An electricity sector emissions constraint of 1,580 Mt CO2-e over the period 2020 to 2050 is imposed in each case (Jacobs 2016b, p2). This results in electricity sector emissions of around 50Mt CO2-e by 2030 under most scenarios, down from 2005 electricity emissions of 197Mt CO2-e (AGEIS 2016) or a reduction in the order of 75% compared to the less aggressive 28% from 2005 of the current Australian government target.

The modelling by Jacobs illustrates the relative impacts of different targets¹²¹. Jacobs state that (p21) "... the reference cases for each set of results are not projections of the sector under 'business as usual' but designed so that differences between the policy cases are due specifically to the policies rather than the policies and other features." Their '3 degrees of warming' scenario increases projected residential retail prices by up to 15% relative to their reference case (Figure 19). Their '2 degrees of warming' scenario increases projected residential retail prices by around 12% to 23% relative to their reference case (Figure 20)

The CCA work also suggests that, depending on the policy tools applied, the impact on long run costs to consumers of stronger targets is not as pronounced as the price outcomes in the period to 2030. For example, Figure 21 illustrates how the price trajectory from an Emissions Intensity scheme is quite different under the two different emissions targets. By contrast, the modelling results for the 'technology pull' option similar to the reverse auctions used by the ACT to pursue their renewable energy target shows similar gradual increases in prices under the two different emissions targets (Figure 22).

¹²¹ The 3°C scenario includes a carbon budget of 2,800 Mt CO2-e by 2050 compared to 1,580 Mt for the 2°C.



Figure 19: Illustrative impacts on national average residential electricity prices – 3°C of warming scenario (Source: Jacobs 2016b)



Figure 20: Illustrative impacts on national average residential electricity prices – 2°C of warming scenario (Source: Jacobs 2016b)



Figure 21: Illustrative impacts on national average residential electricity prices from identical Emissions Intensity Schemes under different emissions reduction targets (Source: Jacobs 2016b)



Figure 22: Illustrative impacts on national average residential electricity prices from identical Feedin + Contract for Difference schemes under different emissions reduction targets (Source: Jacobs 2016b)

10.2 Electricity Network Transformation Roadmap: ENA and CSIRO

Energy Networks Australia (the peak body representing electricity transmission and distribution and gas distribution businesses) and the CSIRO have developed an Electricity Network Transformation Roadmap (*the Roadmap*). The Key Concepts Report was developed over 2 years and published in December 2016. It was described as "… *a comprehensive plan to keep the lights on, bills affordable and decarbonise electricity*." ¹²²

The report describes a transformation of the electricity system driven by customers taking control of their energy use, embracing new technologies and supporting action on climate change. The future described by *the Roadmap* – the *Whole of Roadmap* scenario – is contrasted with a counterfactual scenario in order to demonstrate the economic benefits available. The Whole of Roadmap scenario includes three key elements:

- Network tariff reform proceeds on an opt-out basis and distributed energy resources are harnessed to deliver reductions in peak demand and, consequently, reductions in capacity at individual substations. The counterfactual scenario relies on the current 'opt-in' approach to cost reflective pricing.
- Further improvements in the utilisation of existing network capacity through 20% adoption of electric vehicles by 2035 sharing fixed costs and reducing consumption charges for all consumers. The counterfactual scenario assumes that electric vehicles are not embraced by consumers.
- Electricity sector decarbonisation achieves a 40% reduction from 2005 levels by 2030 then accelerates to net zero emissions by 2050. Orchestration of distributed energy resources is a critical component. The counterfactual scenario delivers abatement of 35% by 2030 and 65% by 2050.

The *Whole of Roadmap* scenario delivers \$414 annual savings in average household electricity bills by 2050¹²³ compared to the counterfactual while retaining security and reliability.

10.3 Frontier Economics for AEMC

The AEMC report *Integration of energy and emissions reduction policy*¹²⁴ responds to a request from the COAG Energy Council to examine the potential impacts of alternate emissions reduction policies on the National Electricity Market. The focus is on the mechanisms rather than the targets and the AEMC concludes that an Emissions Intensity Target (EIT) has the lowest cost of abatement to meet a given emissions target than the alternatives considered: an expanded large-scale Renewable Energy Target (LRET) and a Regulated closure program for high-emissions generators (REG).

 ¹²² ENA/CSIRO Media release 6 Dec 2016 "No choice needed between Energy Security or Low Emissions – if we act now"
¹²³ More modest savings are also available by 2030

¹²⁴ AEMC 2016, Integration of energy and emissions reduction policy, Report, 09 December 2016, Sydney

Frontier Economics' Table 1 provides a high level summary of results for their base case:

Case	Consumer impact ¹ (NPV, Real2016\$m, 2020-2030): change on	Cost of abatement (Discounted), \$/tCO2 reduced	Resource cost (NPV, Real2016\$m, 2020-2030): change on	New investment (MW) to 2030			Retire- ments (MW) to 2030	Average Output mix (2020-2030 average, %)		
	BAU		DAG	Gas	Renew	Total		Coal	Gas	Renew
BAU	0	0	0	1,341	4,809	6,150	406	75%	5%	20%
EIT	(\$4,945m)	\$30.4/t	\$5,546m	7,590	5,441	13,031	<mark>6,852</mark>	60%	19%	21%
REG	\$10,843m	\$34.2/t	\$5,838m	7,212	5,266	12,478	6,406	62%	17%	21%
LRET	\$1,062m	\$75.7/t	\$11,248m	0	26,166	26,166	2,559	65%	2%	33%

Table 1: Summary of Base Case results

Source: Frontier Economics

The table illustrates that an EIT results in the least amount of costs being transferred to consumers. The modelling showed that consumers would in fact be better off over the period 2020-2030 as the costs of the transition are absorbed as losses by incumbent thermal generators (Frontier Economics 2016, page ii). The table also illustrates the significant retirement of capacity under both the EIT and REG options and how this is primarily replaced by Gas-fired generation.

The base case EIT certificate price (an implied carbon price since each certificate represents a tonne of CO2 equivalent) range from \$28 in 2020 to \$40 in 2030. This is comparable to the basis for AEMO's estimated residential price impacts (Jacobs 2016a). A scenario representing a higher abatement task (50% by 2030) delivers EIT certificate prices from \$35 (2020) to \$52 (2030).

10.4 The Climate Institute

A Switch in Time study commissioned modelling by Jacobs that provides guidance on the ability of various policy combinations to meet a "2°C carbon budget" over the study period. The carbon budget is derived in the same manner as that in the CCA's modelling. (The difference between them is the result of an extra year's electricity emissions in the TCI budget - 1,760 Mt CO2-e between 2020 and 2050 (TCI, p8) compared with 1,580 Mt between 2021 and 2050 in the modelling for the CCA.)

The work finds a carbon price rising to \$40 per tonne by 2030 would produce emission reductions similar to the government's current national 2030 target of 26-28 per cent below 2005 levels. This is consistent with the range of costs used in the modelling of residential prices by Jacobs for AEMO (Jacobs 2016a). TCI describes this as the 'Weak Start Carbon Price' scenario, noting that over 90% of the carbon budget is consumed by 2030, necessitating a major policy adjustment at that point that results in a carbon price of \$120 and a rapid and disruptive decarbonisation of the generation mix.

TCI recommend a number of measures complementary to a 'weak' carbon price including a structured closure of older power stations that would reduce electricity emissions by 45% below 2005 levels in 2030 and represent greater progress towards the stated carbon budget. Further measures are proposed in order to achieve deeper emissions cuts.

10.5 Jacobs for the Energy Networks Association

The Energy Networks Association also commissioned Jacobs to model alternate policies against two emissions reduction targets: Australia's current commitment of 26-28 percent below 2005 levels by 2030, and a 45% reduction, consistent with ALP pre-election policy. This study has all stationary energy consumption in its scope, not just electricity. Policy scenarios comprised 'Business as Usual' - existing policies with the federal safeguard mechanisms adjusted downward to meet the emissions reduction target and the extension of the RET in the 45% target scenarios; 'Technology Neutral' - the safeguard evolves into a baseline and credit scheme, existing renewable policies are adjusted to support gas as well, and a LET (low emissions target) is added in the 45% scenario; and "Carbon price' - a carbon pricing trajectory consistent with the emission reduction targets.

Emissions within the electricity sector fall by more than the overall target, declining by 35% below 2005 levels in the 26-28% scenarios, and 47-58% in the 45% scenarios. Electricity prices rise the least in the Technology Neutral scenarios. For the 28% target, residential retail prices rise by 5-10% over the 10 years to 2030; for the 45% target residential retail prices rise by 10-20%. By comparison, prices in the Business as Usual scenarios rise by 20% for the 28% target and 10-20% for the 45% target. This is an illustration of the fact that a more efficient policy can achieve a more ambitious emissions reduction target at less expense to households than a less ambitious target pursued via a less efficient policy.

10.6 CSIRO National Outlook

The National Outlook 2015 is the first release of its kind and aims to demonstrate that Australia is able to pursue economic growth with more sustainable resource use and environmental pressure. The study has a particular focus on the water-energy-food nexus. Of specific relevance, the study finds that (CSIRO 2015, p16):

"Despite rising unit prices and demand across all scenarios, energy affordability for Australian households changes only modestly, with greater energy efficiency more than offsetting higher electricity prices over the long term in most cases. ... Much larger improvements in the affordability of electricity could be achieved through better managing peak demand, and associated network infrastructure costs"

This was elaborated on by CSIRO researchers in an associated paper published in *Energy Policy* (Graham et al, 2015). As was the case for AEMO's price forecasting (Jacobs 2016a), the modelling employs a carbon price as a proxy for the impact of a range of potential climate policy measures. Emphasising the potential relative contributions to residential electricity unit prices, the medium carbon price, low peak demand scenario leads to a fairly similar outcome as the case with no carbon price and no management of peak demand growth.

10.7 Jacobs for AEMO

This modelling of future retail electricity prices (Jacobs 2016a) was performed for the Australian Energy Market Operator (AEMO) to inform AEMO's 2016 National Electricity Forecasting Report (NEFR). The modelling assumes a 28% reduction in greenhouse emissions from the National Electricity Market by 2030 in line with the current national target.

The modelling incorporates a carbon price in the wholesale electricity market as a proxy for a range of potential measures to achieve the target. The values chosen were a carbon price of \$25/t CO2-e in 2020 escalating in a linear fashion to \$50/t by 2030 (and remaining at this level thereafter). The abatement target is largely achieved through the closure of coal-fired power stations as a consequence of the rising carbon price and their replacement with lower emission generation.

The residential price findings show a significant diversity in price levels for the five NEM States after 2016 but similar trends: modest increases or falls from 2016 to 2020, steady growth to around 2030.

10.8 ClimateWorks Australia Pathways to Deep Decarbonisation in 2050

ClimateWorks Australia, ANU, CSIRO and CoPS produced a study of deep decarbonisation across the Australian economy. Within the electricity sector, three different decarbonisation pathways were explored (100% renewable energy, inclusion of nuclear, inclusion of carbon capture and storage), with shifts in generation driven by a strong and rising carbon price. The study notes that the three pathways all arrive at a similar long-run marginal cost of electricity supply of \$150/MWh. This increase in generation cost contributes to an increase in residential retail electricity unit costs to around 38c/kWh in 2012 dollars by 2050. However, by increasing energy efficiency in the home and car, the analysis found that overall household energy costs could be reduced by more than 11%.

10.9 ISF for GetUp! And Solar Citizens

The ISF Study was commissioned to inform the Home Grown Power Plan produced by GetUp! And Solar Citizens and presents a model for a transition to a renewable energy system. The study presents a Renewable scenario and an Advanced Renewable scenario as well as a reference scenario representing the status quo. The Renewables scenario is focused on renewable energy only in the stationary energy sector while the Advanced Renewable scenario presents a decarbonized electricity sector by 2030 and a fully renewable energy system (including transport and industry) by 2050. Scenarios include strong improvements in energy productivity.

The study does not present impacts on residential electricity prices but notes that longer term investment costs under the renewables scenarios is lower than the long term savings in fuel costs compared to the reference case. While such net present value comparisons are important insights, other studies that include a time series of price impacts are more directly relevant to this research topic.

11 Appendix C – Summary of Studies seeking to identify demographic attributes of households considered most vulnerable to rising energy costs.

Chester and Morris produced an early study of energy poverty in the Australian context (Chester & Morris, 2012) and concluded that Australia was yet to explicitly recognise energy poverty as a distinct social problem and was without a substantive evidence base to inform policy making of the consequences of rising prices on low income and vulnerable households. A number of studies have subsequently sought to identify demographic attributes of households considered most vulnerable to rising energy costs.

The Brotherhood of St Laurence study *Fuel poverty, household income and energy spending: an empirical analysis for Australia using HILDA data* (Azpitarte et al 2015) uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. This study tests alternative conceptions of fuel poverty based on analysing income and expenditure (such as low income - high energy expenditure) and self-reported financial stress indicators (such as couldn't pay their energy bills and couldn't afford to heat their home). Those who couldn't pay their bills tended to be renters and have children (this is in line with Simshauser and Nelson 2012). On the other hand those with low income and high expenditure tended to be pensioners, similarly those who couldn't heat their home were different again. The following groups came through as particularly vulnerable - people living with a disability, who were overrepresented in the 'fuel poor' across all definitions, single parents and renters. This is in line with some of the other work cited here.

Relative Energy Poverty in Australia (Nance 2013) applied lessons from the UK's approach to measuring fuel poverty to the Australian context. Unit record data from the 2009-10 HES was analysed in order to identify those with the biggest energy bills and least capacity to pay for them. This study considered five different definitions of 'relative energy poverty' and identified similar household characteristics in each case. The analysis considered after housing cost disposable income and identified significant proportions of those at risk relied on wage and salary incomes (often referred to as the *working poor*) and therefore generally ineligible for energy concessions and outside of the traditional safety nets of the welfare system. Other characteristics identified were single parent households, people living alone (particularly Aged and Disability pensioners), low-income renters and 'dual fuel' households – those reliant on mains or bottled gas.

The Cooperative Research Centre for Low Carbon Living report *Household energy use – Consumption and Expenditure Patterns 1993-2012* (Burke and Ralston 2015) argues that an understanding of the impacts of motor fuel prices on household budgets is required to better understand the distributional impacts of carbon policies on affordability. The study also considered income and expenditure measures to self-reported indicators of financial stress and, similar to *Azpitarte et al* (2015), found a rather poor correlation. The study also confirmed that families with large numbers of children and renters were more likely to experience an inability to pay bills. Further, a majority of households who reported an inability to pay had a housing affordability problem. Chester (2013) provides a substantial evidence base of the lived experience of low-income households as a result of rising energy bills and describes the trade-offs some households are forced to make between paying their energy bills and using the money to purchase food, pay the rent or meet the costs of raising children. Chester is critical of the common policy measures of concessions and temporary financial assistance as treating the symptoms and not the causes of energy costs.

Energy Poverty in Western Australia (BCEC 2016) draws on data gathered through face to face interviews and an online survey of over 4000 individuals. The report finds that single parent families and renters had the highest burden of energy spending. The WA context is relevant to consideration of the interaction with housing costs:

"The economic boom in WA has meant rising wages, but those in the lowest income brackets have seen the least benefit from the boom and have had to contend with rapidly increasing house prices and rents."

"Rising housing and utility costs are increasing the energy poverty challenge."

The report also states that low income households have often failed to benefit from improvements to energy efficiency or from solar power and highlights the relationship to income inequality:

"This has the potential to push low income households deeper into energy poverty if fuel prices rise and the income gap between the wealthiest and the poorest continues to grow."

In *The Energy Market Death Spiral – Rethinking Customer Hardship* (Simshauser and Nelson, 2012) the authors draw on the customer records of AGL Energy and from the 2009-10 HES and conclude that:

"... dominant thought on the primacy of customer hardship, aged pensioners, pales into insignificance by comparison to those of in the family formation cohort, and in particular, those known as Australia's 'working poor'."

Simshauser & Downer (2014) conducted analysis of consumption patterns for households on AGL Energy's hardship program and observed higher than average total consumption and consumption patterns that were less 'peaky' than the average (see p10-11). Recent analysis by ESC Victoria confirms that hardship customers tend to consume around twice the average volume of electricity¹²⁵. Customers on retailer hardship programs represent less than 1% of residential customers (AER, 2016) and are not necessarily representative of all customers considered vulnerable. It is also not possible to conclude whether higher than average number of people in the household. The Australian Energy Regulator's Energy Bill Benchmarking program commissioned research into the drivers of consumption from ACIL

¹²⁵ ESC Victorian Hardship Review, summarised in Essential Services Commission 2016, Safety Net for Victorian Energy Consumers Facing Difficulties – Customer Advice Manual – Amendments to the Energy Retail Code: Draft Decision, October 2016.

Allen Consulting in 2014¹²⁶. The results of a nationwide survey and matching billing data confirmed the findings of regression analyses by others that the strongest indicator of annual consumption is the number of people in the household¹²⁷.

Newgate Research were commissioned to prepare a report for the AEMC's 2016 annual review of retail competition in order to recommend how could be supported to benefit more from the retail energy market¹²⁸. This report summarised its market segmentation approach by stating:

"While there is diversity of demographics and circumstances within all segments, consumers with certain characteristics are more likely to be vulnerable. These include being female (especially single mothers), renting, not being in full-time employment, experiencing recent household stress (e.g. arrival of a baby or a death), living in regional areas, being Indigenous, being a recent immigrant, having special payment arrangements with one's energy provider, and having savings that would last less than three months."

Overall, these various studies paint a complex picture of measurement from which one can conclude that there is no universally accepted measure or indicator of household energy affordability in Australia. However, close relationships to the costs of other essentials – such as housing and transport – regularly recur. These analyses of historic income and expenditure suggest that a diverse range of household types are represented in the vulnerable household cohort although some are at much higher rates than their proportion of the wider community. Housing circumstances are clearly a key indicator of vulnerability – the cost of housing determines how much room exists in the household budget to pay energy bills and tenure determines the scope of actions available to change consumption.

¹²⁶ www.aer.gov.au/retail-markets/retail-guidelines/electricity-bill-benchmarks-for-residential-customers-2014

¹²⁷ "Modelling Household Energy Consumption Using ABS Survey Data", Kay Cao, Rosalynn Mathews and Summer Wang, Analytical Services Unit, Australian Bureau of Statistics (2014)

¹²⁸ Understanding Vulnerable Customer Experiences and Needs – Consumer Research Report June 2016 Available from <u>http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Retail-Competition-Review</u>