# Rethinking water and energy affordability in Australia: an analysis of the efficiency, effectiveness and equity of current policy

By

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# Declaration of Authorship

I, (Noel) Wai Wah Chan, declare that this thesis and the work presented in it are my own, except where otherwise indicated. I declare that:

- the thesis comprises only my original work towards the PhD except where indicated,
- due acknowledgement has been made in the text to all other material uses;
- parts of Chapter 3 were published in a contributed chapter as 'Integrating social aspects into urban water pricing: Australian and international perspectives' in Grafton, R.Q., K.A. Daniell, C. Nauges, J.-D. Rinaudo and N.W.W. Chan (Eds), *Understanding and Managing Urban Water in Transition*, Springer Publishing, 2015.
- parts of this thesis were included in a submitted presentation paper entitled 'Water affordability and state water concessions in Australia' for the Australian Water Association (AWA) ACT Branch Postgraduate Water Prize Competition in 2014. The submitted paper was awarded a *Highly Recommended*.
- the thesis is less than 100,000 words in length, exclusive of tables, maps, figures, bibliographies, and appendices.

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# Abstract

The aim of this thesis is to investigate the challenge of 'affordability' in the delivery of critical utility services such as water and energy to Australian households. The experience of utility stress and hardship is not uncommon among many low-income households in contemporary Australian society. The causes and associated outcomes of utility affordability are multi-dimensional. My thesis provides both an analytical framework and a policy perspective to respond to household utility stress in energy and water in Australia.

The thesis is divided into discrete research studies guided in turn by their own research questions. In Chapter Two and Chapter Three, I explore the complexity of water and energy affordability problems from a time dimension and policy dimension. From a historical perspective, I critically analyse the social implications of urban water and energy sectors reform. Examining the changes in policy and governance regimes leads us to elucidate a variety of policy instruments to address utility affordability problems across sectors and stakeholders. I demonstrate that a clear responsibility across sectors and a collaborative policy framework is required to address this emerging social challenge.

Chapters Four to Chapter Six form a series of empirical research to explore the concept of water and energy affordability and its measurement in the Australian context, and to evaluate the efficiency, effectiveness, and social-equity implications of the major policy instruments – state water and energy concessions. My overarching conclusion of these chapters is that the current state water and energy concession schemes need reform towards a more equitable and efficient approach to target to those most in need assistance.

In summary, the problems of utility stress and hardship are multifaceted. A shared vision, a clear responsibility across sectors, a collaborative framework as well as a more equitable, efficient and effective policy design are required to successfully address utility affordability challenges in contemporary Australia.

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# List of Acronyms and Abbreviations

| | |
|---|---|
| ABS | Australian Bureau of Statistics |
| ACAT | ACT Civil and Administrate Tribunal |
| ACCC | Australian Competition and Consumer Council |
| ACOSS | Australian Council of Social Services |
| ACR | Air Conditioning Rebate (Western Australia) |
| ACT | Australian Capital Territory |
| ACTCOSS | ACT Council of Social Service |
| ADB | Asian Development Bank |
| AEC | Annual Electricity Concession |
| AEMC | Australian Energy Market Commission |
| AEMO | Australian Energy Market Operator |
| AEO | Australian Energy Ombudsmen |
| AER | Australian Energy Regulator |
| AIHW | Australian Institute of Health and Welfare |
| BSI | British Standard Institute |
| CALC | Consumer Action Law Centre |
| CCG | Customer Consultative Group |
| CCP | Consumer Challenge Panel |
| CCR | Child Care Rebate |
| CFELECTR | SEAS indicator - the inability to pay a utility bill on time due to lack of income in the last 12 months |
| CFNOHEAT | SEAS indicator - being unable to heat home due to shortage of money in the last 12 months |
| COAG | Council of Australian Governments |

| | |
|---|---|
| CPI | Consumer price index |
| CRA | Commonwealth Rent Assistance |
| CSHC | Commonwealth Seniors Health Card |
| CSIRO | Commonwealth Scientific and Industrial Research |
| CSO | Community Service Obligation |
| CSR | Corporate social responsibility |
| CUAC | Consumer Utilities Advocacy Centre |
| CURF | Confidentialised Unit Record File |
| CWO | Community welfare organisations |
| DBT | Decreasing block tariff |
| DCSI | Department of Communities and Social Inclusion (SA) |
| DCR | Dependent Child Rebate (Western Australia) |
| DECC | Department of Energy and Climate Change (UK) |
| DEFRA | Department for Environment, Food & Rural Affairs (UK) |
| DEPI | Department of Environment and Primary Industries (Victoria) |
| DEWHA | Department of Environment, Water, Heritage and the Arts |
| DFACS | Former Australian Government Department of Family and Community Services |
| DHS | Australian Government Department of Human Services |
| DIS | Australian Government Department of Industry and Science |
| DRET | Australian Government Department of Resources, Energy and Tourism |
| DSS | Australian Government Department of Social Security |
| DVA | Australian Government Department of Veterans' Affairs |
| EC | European Commission |
| EOT | Energy Ombudsman Tasmania |

| | |
|---|---|
| EQDIAHC | Equivalised disposable household income after housing cost |
| ERA | Economic Regulation Authority (Western Australia) |
| ERAA | Energy Retailer's Association of Australia |
| ESAA | Energy Supply Association of Australia |
| ESCOSA | Essential Services Commission of South Australia |
| ESCV | Essential Services Commission (Victoria) |
| EUI | European University Institute |
| EWON | Energy and Water Ombudsman NSW |
| EWOQ | Energy and Water Ombudsman Queensland |
| EWOSA | Energy and Water Ombudsman SA |
| EWOV | Energy and Water Ombudsman (Victoria) |
| EWOWA | Energy and Water Ombudsman WA |
| FaHCSIA | The former Australian Department of Families, Housing, Community Services and Indigenous Affairs |
| FER | Family Energy Rebate (NSW) |
| FINSTAH | SEAS indicator - Received or sought assistance from electricity or gas company with paying bills due to short of money |
| FINSTDWH | SEAS indicator - Received a disconnection warning from electricity or gas company due to short of money |
| FINSTERH | SEAS indicator - Choose to restrict heating/cooling because household could not afford extra costs due to short of money |
| FINSTLH | SEAS indicator - Entered into a loan arrangement or used a credit card to pay electricity bill due to short of money |
| FINSTNBH | SEAS indicator - Could not pay utility bill on time due to short of money |
| FINSTNBH | SEAS indicator - Unable to heat or cool home due to short of money |
| FINSTWGH | SEAS indicator - Could not afford to repair a major household whitegoods due to short of money |

| | |
|---|---|
| FIT | Feed-in-tariff |
| FTB-A | Family Tax Benefit – Part A |
| FTB-B | Family Tax Benefit – Part B |
| GBE | Government Business Enterprises |
| GST | Goods and Services Tax |
| GTEs | Government Trading Enterprises |
| GWI | Global Water Intelligence |
| HBEAS | High burden energy affordability stress |
| HBUAS | High burden utility affordability stress |
| HBWAS | High burden water affordability stress |
| HCC | Commonwealth Health Care Card |
| HEC | Household Energy Consumption Survey, Australia |
| HES | Household Expenditure Survey, Australia |
| HFINSTB | SEAS indicator - Often or always could not pay utility bill on time due to short of money |
| HIIDS | Household Income and Income Distribution Survey |
| HPL | Henderson Poverty Line |
| HRC | House of Representative Committee - Standing Committee on Family and Community Affairs |
| IBNET | International Benchmarking Network for Water and Sanitation |
| IBT | Increasing block tariffs |
| ICB | Inadequate concession benefits |
| ICESCR | International Covenant on Economic, Social and Cultural Rights |
| ICL | Income contingent loan |
| IEE | Inefficiency due to exclusion errors |
| IIE | Inefficiency due to inclusion errors |

| | |
|---|---|
| IMO | Independent Market Operator (Western Australia) |
| IPART | Independent Pricing and Regulatory Tribunal NSW |
| IUWM | Integrated Urban Water Management |
| LCBS | Low cost budget standard |
| LER | Low economic resources |
| LGA SA | Local Government Association of South Australia |
| LIHB | Low Income and High Burden |
| LPG | liquefied petroleum gas |
| LRET | Large-scale Renewable Energy Target |
| MCBS | Modest cost budget standard |
| MCE | COAG Ministerial Council on Energy |
| MDGs | UN Millenniums Development Goals |
| MFP | Multifactor productivity |
| MIS | Minimum Income Standard |
| MOU | Memoranda of understanding |
| NCC | National Competition Council |
| NCP | National Competition Policy |
| NECF | National Energy Customer Framework |
| NEM | National Electricity Market |
| NGM | National Gas Market |
| NPA | COAG National Partnership Agreement on Certain Concessions for Pensioners Concession Card and Seniors Card Holders |
| NPM | New public management |
| NSEE | National Strategy for Energy Efficiency |
| NSW | The state of New South Wales |
| NT | Northern Territory |

| | |
|---|---|
| NTPCCS | Northern Territory Pensioner and Carer Concession Schemes |
| NWC | National Water Commission |
| NWI | National Water Initiative |
| OECD | Organisation for Economic Cooperation and Development |
| OFGEM | The Office of Gas and Electricity Markets (Great Britain) |
| OTTER | Office of the Tasmania Economic Regulator |
| ORG | Victorian Office of the Regulator-General |
| PAA | Potential Affordability Approach |
| PC | Productivity Commission |
| PCC | Commonwealth Pensioner Concession Card |
| PHB | Pensioner Health Benefit |
| PRE | Poverty reduction efficiency |
| Q1 | Households in the lowest income quintile (the poorest 20 per cent) |
| Q2 | Households in the second lowest income quintile |
| Q3 | Households in the third income quintile |
| Q4 | Households in the fourth income quintile |
| Q5 | Households in the fifth income quintile (the richest 20 per cent) |
| QCOSS | Queensland Council of Social Service |
| QLD | The state of Queensland |
| REAS | Relative energy affordability stress |
| RET | Renewable Energy Target |
| RIM | Residual income method |
| RLIHC | Relative Low Income and High Cost |
| ROI | Return on investment |
| ROR | Rate of return |

| | |
|---|---|
| RWAS | Relative water affordability stress |
| SA | South Australia |
| SCA | Sydney Water Catchment Authority |
| SCER | Standing Council on Energy and Resources |
| SEAS | Subjective energy affordability stress |
| SEB | Spill-over on excess benefits |
| SPRC | Social Policy Research Centre |
| SRET | Small-scale Renewable Energy Scheme |
| SSC | State Seniors Card |
| STC | Small-scale Technology Certificates |
| SWIS | South West Interconnected System |
| TAS | The state of Tasmania |
| TBL | Triple bottom line |
| TPT | Two-part tariff |
| UK | United Kingdom |
| UNECE | United Nations Economic Commission for Europe |
| URGS | Utility Relief Grant Scheme (Victoria) |
| VCOSS | Victorian Council of Social Service |
| VEE | Vertical expenditure efficiency |
| VEET | Victorian Energy Efficiency Target |
| VIC | The state of Victoria |
| Vic DHS | Department of Human Services (Victoria) |
| W&S | Water and sewerage |
| WA | Western Australia |
| WAS | Water affordability stress |
| WEC | Winter Energy Concession |

| | |
|---|---|
| WGC | Winter Gas Concession |
| WHECA | *Warm Homes and Energy Conservation Act of 2000* |
| WHO | World Health Organisation |
| WSAA | Water Services Association of Australia |
| Zone 1 | Climate Zone 1 - High humid summer, warm winter |
| Zone 2 | Climate Zone 2 - Warm humid summer, mild winter |
| Zone 3/4 | Climate Zone 3 or 4 - Hot dry summer, cool or warm winter |
| Zone 5 | Climate Zone 5 - Warm temperate |
| Zone 6 | Climate Zone 6 - Mild temperate |
| Zone 7/8 | Climate Zone 7 or 8 - Cool temperate/Alpine |

# Chapter 1

# Introduction

*"The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have too little."*

— Franklin D. Roosevelt

## 1.1 Water and energy affordability: does it matter?

The subject of energy and water affordability in Australia has gained significance in recent years. The impacts of not being able to afford these essential public utility services[1] among low-income and vulnerable households are multifaceted. Rapid rises in urban water and energy prices in recent years have seen the number of low-income and vulnerable households with utility affordability problems increase (EWON 2013, 2014; EWOV 2013, 2014). The symptoms include the inability to pay utility bill on time, experiencing utility services disconnected or potentially disconnected, entering utility debts, or unable to afford for heating or cooling home to a comfortable temperature. Overall, I classified these households are experiencing 'utility stress and hardship'.

Tackling household utility stress and hardship is a difficult policy problem because of its multi-dimensional nature. From a health perspective, there is a strong association between ambient temperature and mortality rates in the evidence of health research in Australia and internationally (Basu and Smet 2002;

[1] In general, public utilities refer to a boarder range of public goods, such as telecommunication, transport infrastructure, council services, provided by the government. In the context of this paper, public utility sector is referred to domestic water and sewerage, electricity and gas services.

Bi et al. 2011; Nicholls et al. 2008; Nitschke et al. 2007; Donaldson and Keating 2002; Vaneckova et al. 2008). Furthermore, the inability to afford adequate water and energy for domestic use could increase health vulnerability, mental stress, and social deprivation (Hills 2011, 2012; Chester 2013, 2014). The inability to pay for essential utility bills on time could likely lead to potential restriction or disconnection of services. Increase in household utility debts will lower their credit ratings and exacerbate mental stress and financial stress among low-income or vulnerable households (Hills 2012; Hall and Partners 2011). The cumulative effects of utility affordability problem are significant and should not be under-estimated, even in a modern and wealthy society such as Australia (Chester 2013). Thus, it is timely and important to rethink the affordability of these essential services and the policy strategies to address this emerging social challenge.

### 1.1.1 Socio-economic characteristics of urban water and energy sectors

The urban water and energy sectors are widely regarded as ‘essential’ infrastructure industries. These industries are traditionally referred as public utility sector. They were typically government owned and operated due to their social and economic characteristics, and the tendency for these industries to develop into monopolies (Ernst 1994). (see Table 1.1). In some societies, public utility tariffs were considered as a form of government tax to achieve social policy and redistributive functions. Social objectives such as social equity, fairness, universal access and affordability would be considered in energy and water price setting (Bonbright et al. 1988; Agthe and Billing 1987; Griffin 2006). These objectives have contributed to a social expectation in relation to government provision of affordable 'essential services' to her citizens.

**Table 1.1** Social and economic characteristics of water and energy sectors

| | Traditional social obligations |
|---|---|
| ***Social characteristics*** | |
| Human rights (essentiality, low substitutability) | Universal access, affordability utility services |
| Public health concern | Universal access, government investment in piped water and sewerage services, service quality standard and reliability |
| Utility affordability | Government sets utility tariffs at low rates |
| Horizontal equity | Cross-subsidy among different customer classes and regions even where there are different marginal costs of services |
| Vertical equity | Utility tariff design that favours low-income households to trade off efficiency and environment objectives, e.g. water rates as a percentage of property values, increasing block tariffs, free water allowance |
| ***Economic characteristics*** | |
| Natural monopoly technology | Operated as Government Trading Enterprises (GTEs) |
| Large sunk investment costs | Government funded for water infrastructure (e.g. dam construction, desalination plants), pipelines, electricity networks |
| Economies of scale | Inefficient to duplicate infrastructure provision |
| Low price elasticity of demand among utility customers | Government regulated utility prices to prevent monopoly pricing |
| Potential very high profits earned by monopoly | Government capped profit level or rates of return from assets/investment |
| As major factors of production in the economy | Justify governments' investment to support economic growth |
| Significant as percentage of national capital and labour/employment | Governments' spending on infrastructure investment or replacement serves as fiscal policy during economic downturn |

Table 1.1 summarises the social and economic characteristics of the urban water and energy sectors. From a social policy perspective, universal access to affordable water and energy services is regarded as a human right (Smets 1999, 2000; Modi et al. 2005). Availability of these essential services are necessary conditions to achieve a basic quality-of-life, and ultimately, to achieve social and economic development and poverty reduction (United Nations 2014). In addition,

access to affordable, clean, and safe drinking water and sewerage services is vital to achieving public health and provides considerable direct and indirect benefits to the society as a whole (Haller et al. 2007). Besides, water can have a special role in culture and tradition and can contribute to social participation and social cohesion, in particular among Indigenous communities (Jackson 2006, 2013; Nikolakis et al. 2013). These social attributes have provided strong justification for government involvement to provide water to the wider communities.

In terms of energy sector, access to electricity service is regarded as essential to attaining basic living standards, to enhance economic development, and to achieve the UN Millennium Development Goals (MDGs) (Modi et al. 2005). At a domestic household level, the non-discretionary use of energy services includes cooking, cleaning, lighting, heating, and cooling (Bradbrook et al. 2008). With technology improvements and changes in social expectations, the use of goods that require electricity, and of internet services, is increasingly regarded as a basic necessity in terms of economic opportunity and social participation (Birol 2007; Pachauri and Spreng 2004). Nonetheless, it is argued that the non-discriminatory access to energy network is a human right (Tully 2006), but the quantity consumed is not (Simshauser and Whish-Wilson 2015). Energy suppliers have the duty to provide access to electricity services, while consumers have the obligation to pay for the quantity they use. On the other hand, Simshauser and Whish-Wilson (2015) argues that using 'discriminatory pricing' to assist low income household to manage their utility consumption in an affordable manner aligns to the notion of fairness.

From an economic perspective, urban water and energy sectors are essential services that characterised by ‘natural monopoly technology’ (King and Maddock 1996a, 1996b). A facility has a natural monopoly technology when production is characterised by declining average costs. That is, at all levels of output, it is more efficient to be undertaken by a single producer than multiple producers (King and Maddock 1996a, 1996b; Panzer 1989; Waterson 1994). This natural monopoly characteristic is particularly prominent in the urban water and energy sectors.

Economies of scale and high sunk costs are a major contributor that impedes competition within urban water and energy sectors. Sunk costs in energy sectors include generators and the distribution network for the supply of electricity and gas. In the urban water sector, sunk costs include the construction of large dams for water storage, pipelines for water distribution, and infrastructure and sewage treatment facilities for wastewater disposal. The significant fixed and sunk cost and low marginal cost of production allows these industries to exercise economics of scale. These characteristics become natural ‘barriers to entry’ for potential competitors within the urban water and energy industries in the early days (Schmalensee 1981). In Australia, competition in energy generation and energy retailing were gradually introduced via microeconomic reform and National Competition Policy (see Chapter 2 for more detailed discussion).

Low substitutability and price-inelastic demand are additional economic characteristics that are associated with the unique nature of water and energy services (Michael 2006). Low substitutability means that it is difficult to replace domestic water or energy services through other products or services. This concept is closely linked to the price inelasticity of demand. For the demand of a product is price-inelastic, it means that if there is a price change (i.e. price rise), the percentage change (reduction) in consumption is less than the percentage change (increase) in price. In that case, in an unregulated industry with little or no competition, monopoly can increase the product price significantly in order to gain very high revenue because there is only small reduction in consumption. To prevent private entities from imposing monopolistic prices, urban water and energy tariffs were typically regulated.

Due to the above socio and economic characteristics of urban water and energy services, some researchers, such as Ernst (1994) and Opschoor (2006), argued that these public utility services to be regarded as 'merit goods'. Merit goods are defined as goods that ‘society believes should be supplied to - and where appropriate actually consumed by - everybody, perhaps only to certain minimum levels, whether they like it or not and whether they can pay for it or not'

(Beckerman 1986: 17). In addition, as argued by Ahdar (1995, p.112), these monopolistic utility services should be provided in reasonable prices from the doctrine of 'prime necessity'. In alignment with these principles, it was believed that publicly owned water and energy sectors have had a strong social obligation to provide accessible and affordable services for the public.

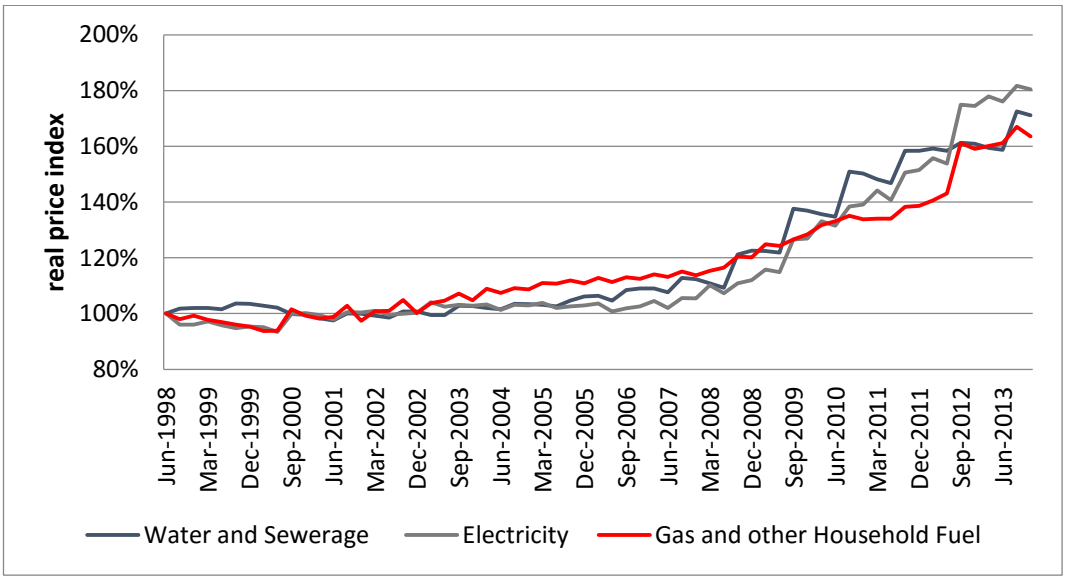
### 1.1.2 Rising utility costs in Australia

Reform of the urban water and energy sectors over the last thirty years has changed the modes of governance and roles of public utility sectors. Provision of low cost water and energy services is no longer the preferred option to address utility affordability. Instead, new objectives of public utility pricing aim to achieve full cost recovery, environmental imperatives and financial sustainability.

Since 2003, both water and energy prices have been increasing at a higher rate than the consumer price index (CPI). Figure 1.1 shows the change of water and sewerage, electricity, and main gas consumer price index in Australia from 1998 to 2013. The presented price indexes has been adjusted with the consumer price index of all goods in Australia and readjusted to June 1998 - as the base period.

The figure shows that energy and water price have changed in three distinct periods. From the period 1998 to 2000, both electricity and main gas prices have decreased, and the prices have remained quite stable until 2003. Over the period 2003 to 2007, there was a slight increase of real electricity price between 2 to 6 per cent. Since 2007, real electricity price has risen gradually and then increased rapidly by 80 per cent in 2013. Similarly, since 2003 the real main gas price has increased gradually, and in 2013 the real price was almost 60 per cent higher than in 1998. In terms of water and sewerage prices, there was less than 10 per cent increase of real price between 2003 and 2007. Since 2007, the real water price has risen by 70 per cent in 2014.

**Figure 1.1** Trend of real utility price indexes in Australia from 1998 to 2013




Note: Consumer price index – water and sewerage, electricity and gas series, deflated by the consumer price index for all groups. Source: ABS (2013a), *Consumer price index, Cat. No. 6401.0*

Water and energy services are regarded as basic living costs. Low-income households, typically, spend disproportionally more on non-discretionary consumption than those of high income households (PC 2011a, 2011b; Agthe and Billings 1987). In a recent costs of living research by Phillips (2013), the report found that for many low-income households, their disposable incomes have not increased as fast as the CPI and the costs of essential goods and services such as water and energy utility expenses, food expenses, and housing costs. In considering the rapid rise in real utility prices and other essential costs of living in recent years, low-income households are more vulnerable to encounter utility affordability problem.

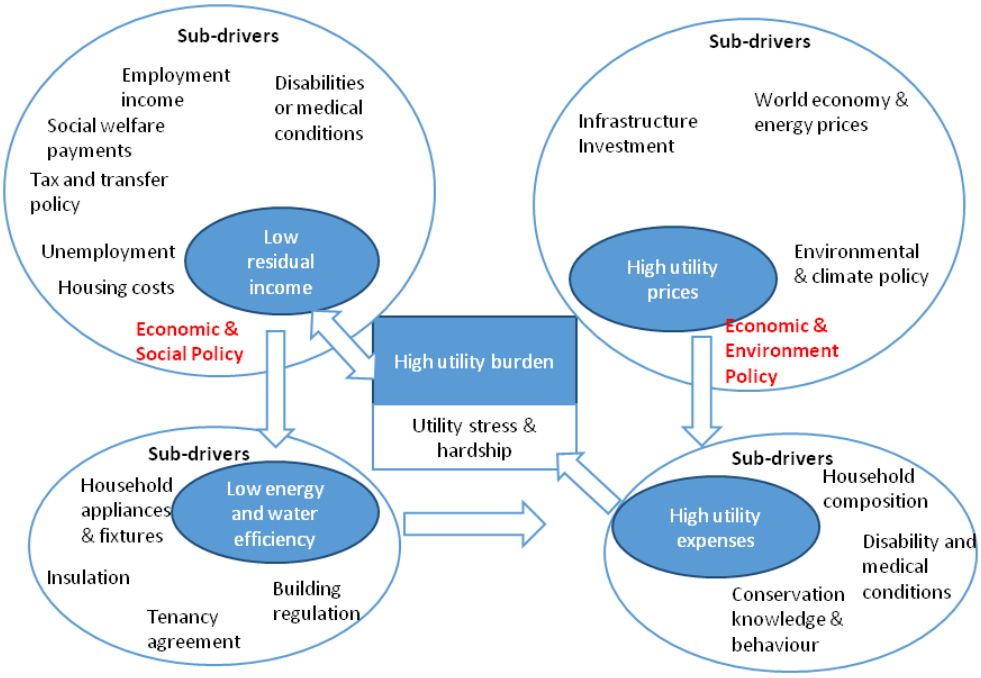
According to the Energy and Water Ombudsman NSW (EWON), more than 9,400 complaints were registered with the EWON during that period in relation to utility debt, households facing disconnections, dealings with debt collectors, or credit rating issue in 2012-13 (EWON 2013: 5). There were 1,293 households living in

NSW have their energy services disconnected due to non-payment of utility bills and 2,056 NSW households have received disconnection warnings. In a survey conducted by Chester (2013), the experience of 'energy poverty' is not uncommon among Australian low-income households.

### 1.1.3 Drivers of utility stress and hardship

There are many factors contributing to households facing utility affordability problem. As shown in Figure 1.2, there are three primary drivers, which are (i) high utility expenditure; (ii) low residual household income; and (iii) low water and energy efficiency of the housing stocks and household appliances. The figure illustrates the direct and indirect linkages and feedback relationship among different drivers of utility stress and hardship.

**Figure 1.2** Drivers and sub-drivers of utility stress and hardship




**Note:** The blue circles indicate the main drivers of utility stress and hardship

For example, low income households, in general, are more likely to live in properties with poor insulation and use household appliances which are less water and energy efficient. Inefficient building fabric will cause higher energy costs for heating and cooling, while inefficient household appliances such as portable heater, refrigerator, and washing machine, consume more energy and/or water. Under budget constraint, paying for higher utility costs means that households have less financial capacity, or 'residual income', to invest in home insulation, and/or to replace household appliances with more efficient models (Boardman 2010, 2012; Hong et al. 2006). Without improving energy and water efficiency, low-income households have limited capacity to further reduce their domestic water and energy consumption (Milne and Boardman 2000; Dillon et al. 2010). This feedback loop increases their risk of encountering utility affordability problem and other material hardships.

Another important contributing factor is billing issues for household utility services such as large quarterly bills, and sometimes, inaccurate bills resulting in re-billing. Low income households may have limited budget capacity to manage unexpected large utility bills . The inability to pay utility bills on time would accumulate utility debts, and this becomes an obstacle for low-income households in attempts to bargain for a better deal with utility retailers.

Within each socio-economic and environmental system, there are policy drivers that can lead low-income households to be more likely to be trapped in the ‘primary drivers’ circumstances. Identified macro-economic policy drivers include public utility reform agendas, national water and energy policies, climate change policy, social welfare policy, housing policy, and economic and employment conditions. These macro-drivers are diverse and beyond the control of one particular sector, one government agency, or one policy arena. Understanding these drivers and impacts of utility affordability problems and associated hardship assists in policy design and develop strategies that tackle the causes and symptoms of the problem.

### 1.1.4 Impacts of utility stress and hardship

The inability to afford for energy and water services among low income households can be perceived as a distinct problem beyond income poverty that has multifaceted causes and implications. The associated symptoms can be a contributing factor to other personal issues such as health vulnerability, mental health problems, and experiencing housing stress, other financial stress, and material hardship. This conclusion has been validated through both local and international research, both qualitatively and quantitatively, on water and energy affordability, water poverty, and fuel poverty in recent years. For instance:

- Some low-income Australian households are facing unforeseeable financial stress and utility debts due to the unmanageable quarterly utility bills (Halls and Partners 2011; Chester 2013)

- Low-income and vulnerable Australian households were found to experience distress and make trade-offs between utility consumption and other essential expenditure on food, health, or education (Chester 2013; Anglicare Australia 2010)

- Although low-income households engaged in significant efforts to reduce utility consumption, quarterly utility bills were not reduced (Chester 2013)

- Some vulnerable households, such as those with members in poor health, old age, and with young children, encounter increased health vulnerability when they limit energy use for heating and cooling during very cold or very hot weather conditions (Chester 2013; Hills 2011; Bi et al. 2011; Curriero et al. 2002; Curwen and Davis 1998)

- Money saved from ‘sanctioning’ utility expenses has been converted to higher medical costs or reduced casual employment income among low-income households (Chester 2013)

- Households that are unable to afford to keep their home at a comfortable temperature encounter a higher risk of social deprivation (Salvation Army 2010; COTA NSW 2011; Palmer et al. 2008)

- Evidence suggests that rising costs for essential water and energy services have contributed to significant mental stress among Australian Indigenous communities (Willis et al. 2006)

- Utility stress was found to be a social determinant of health vulnerability among remote Indigenous communities (Willis et al. 2006)

- With the essential nature of water and energy domestic services, service disconnections may cause public health concerns

- From a socio-economic system perspective, rising health vulnerability caused by utility stress and hardship may contribute to declining productivity and economic participation of affected individuals and their family members.

The above arguments from qualitative research articulate that the impact of utility stress and hardship on vulnerable consumers is multi-dimensional, and the causes and impacts are associated with health, income poverty, and social issues. From the experience in the UK, with increased competition in the energy market and the diverse energy products, OFGEM (2013) suggests that some vulnerable customers lack the knowledge and confidence to choose the best priced services that suit their consumption needs and budget constraints. In Australia, the recent National Energy Affordability Roundtable Report to the Standing Council on Energy and Resources (SCER) advocated that tackling energy affordability is a challenge and a shared responsibility of all sectors, including state and territory governments,

federal governments, industry, community, ombudsmen and regulators. (AEO, ERAA and ACOSS 2013: 2-3).

## 1.2 Literature contribution and research gaps

An international body of knowledge demonstrates that utility stress and hardship is a concept that extends beyond income poverty (e.g. Boardman 1991, 2010; Fitch and Price 2002; Hills 2011, 2012; Chester 2013). Since the causes and outcomes of utility affordability problems are complex and multifaceted, I apply a diverse approaches to further understand the problems and identify any research gaps from existing literature.

### 1.2.1 Public utility reform and social functions

The business of providing affordable and low cost water and energy utility services to domestic households has traditionally been perceived as the social responsibility of a government's public policy. As the objectives of public utility sectors across the world have moved in recent years to embrace market-based principles, there is a shift of responsibility for public good outcomes from the government to the private sector. Therefore, the social and utilitarian aspirations of public utility pricing have diminished. As this transformation requires the achievement of economic, financial and environmental objectives, the associated cost burden is indirectly transferred to consumers.

The bottom line derived from the analysis of public utility reforms around the world is that the real price of domestic water and energy services has increased significantly in many OECD countries, and Australia is no exception. Reforms to corporatise or privatise public utility sectors seems to be a continuing trend. Concurrently, international agencies exert a thrust for more progressive pricing

and financial reforms within urban water and energy sectors in both developed and transitional economies (OECD 2001b, 2007, 2009, 2010b; ADB 2010; Fankhauser and Tepic 2007; Fankhauser et al. 2008). Substantial research and energy and water sectors forecast seem to indicate an increase in utility prices over the next five to ten years is necessary to achieve financial sustainability of the sectors (Fanhauser and Tepic 2007; Fankhauser et al. 2008; ADB 2010; GWI 2014). However, the direct and indirect impacts of utility affordability problems among low income and vulnerable households are becoming increasingly important in public policy discussions.

Historically, Australian societies have relied on governments rather than private enterprise to provide public utilities such as transport, education, health, and welfare (King and Maddock 1996a). This 'state paternalism' paradigm was entrenched within the Australian economic and policy framework since settlement (Maddison and Denniss 2009: 37). Provision of affordable water and energy services constituted part of traditional social policy goals.

An increasing emphasis on economic efficiency and full cost recovery resulted in the introduction of the National Competition Policy (NCP) in 1995. Since that time, the public sector urban water and energy utilities, known as Government Trading Enterprises (GTEs), have progressed extensive reforms (King and Maddock 1996a; Harman 2010). The intent of market reform was to promote economic efficiency and market competition, and achieve increased value for utility customers. Despite these goals, the real prices of urban water and energy utility services, which are the prices after adjusted with consumer price index (CPI) have increased. Refers to Figure 1.1, the real prices of water and sewerage services, and electricity and gas services, have increased by 60 to 80 per cent from 1998 to 2013 across all major Australian capital cities. An increasing number of scholars, such as Chester and Morris (2011), Chester (2014), and Willis et. al. (2006), are questioning the implications of public utility sector reform and have suggested that the restructuring of the urban water and energy sectors has resulted in new forms of 'energy poverty', that I called utility stress and hardship.

In the Australia's electricity demand analysis by Saddler (2015), he found that the electricity demand has declined since 2010, which is attributed to a number of factors. Factors include: improved insulation of new buildings mandated by national regulations, improved energy efficiency of household appliances, changing household electricity consumption behaviour, increased use of rooftop solar systems, and closure of a number of electricity-consuming manufacturing facilities. This reduced demand drives up the investment cost of electricity infrastructure, and increases per unit electricity prices in the near future.

In most cases, the impact of price rise on essential goods and services is regressive. Simshauser and Nelson's (2014) analysis of Australia's electricity market established that fuel poverty[2] would be made more severe under 'the energy market death spiral'. The energy market death spiral is a phenomenon where Australian households with improved living standards would increase their overall electricity consumption, in particular during periods of peak demand, which require further investment in energy infrastructure. At the same time, there is more affluent customers drastically cut down consumption by implementing energy efficiency and installing solar PV system. However, low income households may not have the financial capacity to pay for better insulated home, install rooftop solar system, or replace more efficient appliances. Therefore, the impact of increase per unit electricity price rise has been unevenly distributed to the poorest customers. These diverging trends will lead to polarization of energy inequality - those who are rich are paying relatively less for electricity while poor households are paying relatively more because of their limited capacity to reduce energy use (ESAA 2013a, 2013b, 2014a, 2014b; Macintoch and Wilkinson 2011).

Researchers argue that the general trend of decreasing social objectives and increasing privatization of formerly public services, for instance, financial sector, education sector, health services and public utilities, leads to greater inequality in modern societies such as the United States (US) (Stiglitz 2013). The experience of public utility privatisation within the United Kingdom (UK) supports this claim

[2] In Simshauser and Nelson's (2014), fuel poverty is referred to the situation when expenditure on electricity services accounts for more than 10 per cent of households' income.

(Ernst 1994; Bakker 2008; Bakker et al. 2008). It leads us to ask what social implications have arisen from urban water and energy sector reform in Australia over the last two decades.

Public utility reform over time has changed the policy landscape and increased the number of stakeholders involved in addressing the problem of energy and water affordability. However, without consideration of the broader policy landscape, a narrow or sectoral approach to utility affordability may not be the best approach to tackle utility stress and hardship. There is no one-size-fits-all policy because of the climatic variations that have different impact on water and energy demand among households residing in different climatic zone in Australia. From a policy and governance perspective, there is institutional variation and a wide spectrum of public utility regulations, utility pricing policy, institutional arrangements, and socio-economic conditions across Australian jurisdictions (Alford and O'Flynn 2012). Further, Australia has a complex and highly means-tested social welfare system (Harmer 2009; McClure et al. 2014, 2015) and tax and transfer system (Henry 2009). Some income support payments specifically respond to essential utility services while others do not. As yet, an adequate assessment of policy instruments and stakeholder responsibilities has not been undertaken.

### 1.2.2 Measuring utility affordability

Public concerns regarding utility affordability have become increasingly salient and have influenced legislation in some countries (Smets 2000; DEFRA 2012). In the United Kingdom (UK), the notion of fuel poverty was introduced within the *Warm Homes and Energy Conservation Act of 2000* (WHECA). WHECA specified a maximum target term of 15 years to eliminate fuel poverty following the publication of the *UK Fuel Poverty Strategy* (Hills 2011: 6). Besides, water and sewerage businesses in the UK are mandated to provide social tariffs to identified low-income and vulnerable households to assist with water affordability (DEFRA 2012). Internationally, affordability benchmarks are among the key

criteria for project outcomes within the large international funding agencies such as the OECD, the Asian Development Bank and the World Bank (Fankhauser and Tepic 2007).

The concept of fuel poverty has recently gained attention in Australia as energy prices in many jurisdictions, such as NSW, Queensland, Victoria and SA, have increased significantly. Concurrently, the number of energy and water utility customers who experience payment difficulties or service disconnections has continued to increase (EWON 2013).

In this thesis, utility stress and hardship is referred as the nature of the challenges experienced by households affected by the high costs of water and energy utility services. Different terminologies have been applied in previous literature, including ‘public utility affordability’ (e.g. Kessides et al. 2009; Gawel et al. 2011; Fankhauser et al. 2008), ‘fuel poverty’, (e.g. Boardman 1991, 2010; Bradshaw 1983; Hills 2011, 2012; Moore 2012a; Price et al. 2012), 'energy poverty' (Chester 2013; Nance 2013), and ‘water poverty’ (Bradshaw and Huby 2013; Fitch and Price 2002; Sawkins and Dickie 2005). No matter the terminology, facing utility stress and hardship is a real experience for many low-income and vulnerable Australian households (Chester 2013).

Developing appropriate affordability indicators can support policy maker to understand the trends in households' ability to afford these essential services and their social consequences. Meaningful indicators assist in identifying vulnerable households that need extra assistance, and inform the development of targeted social policy (Dubois 2012). A number of researchers have measured water and energy affordability, such as the Australian Bureau of Statistics (ABS) Household Expenditure Surveys (HES), Richardson and Travers (2002), Productivity Commission (2011a, 2011b), Simshauser et al. (2010a, 2010b), Price et al. (2012) and Nance (2013).

In Australia, there is a number of literature published on the concepts of energy and water utility affordability, and strategies to combat their effects. The burden

ratio method is the most commonly used method to measure utility affordability. Nonetheless, using this indicator alone to identify households in utility stress is imperfect because it would wrongly include non-poor households who over-consume, or it misses out on those which under-consumed (Kessides et al. 2009). An arbitrary burden benchmark is also debatable in a political context. Such problems have been widely discussed in both housing affordability literature (e.g. Hancock 1993; Heylen and Haffner 2013; Stone 2006; Nepal et al. 2010) and fuel poverty literature (e.g. Moore 2012a, 2012b; Hills 2011, 2012; Price et al. 2012). In addition, demand for water and energy depends on many factors and a single benchmark may not fit all circumstances and climatic conditions. Deriving meaningful utility benchmarks is the foundation for identifying vulnerable households and developing effective and efficient targeted policy. As yet, there are no agreed benchmarks for water and energy affordability to aid in the identification of Australian households who are at risk of utility stress. The objective of this thesis is to address this knowledge and policy gap.

### 1.2.3 Policy instruments to address utility affordability

There is an urgent need to establish more robust and rigorous ways to measuring utility affordability, to identify households at risk of utility stress, and to develop coherent, sustainable, and practical strategies to address affordability in the Australian context. What kind of policy instruments can help households at risk of utility stress and hardship?

There are commonly two approaches of government policies to address utility affordability: (i) tariff-based policy; and (ii) targeted social policy (OECD 2003). Both approaches have their advantages and challenges. Tariff-based policy refers to situations where water or energy prices are regulated or subsidised, or the tariff structure is designed in a way that ensures utility services are affordable to all customers. A key challenge is that providing universal low tariffs generates insufficient revenue for public utility business to finance their services and

potential infrastructure expansion. Therefore, two-part tariff and increasing block tariff (IBT), which is also called inclining block tariffs (Bonbright et al. 1988) has been widely adopted in many domestic water and energy utilities around the world (IBNET 2012; Billings and Agthe 1980). IBT is the common tariff structure in the Australian urban water and energy sectors for pricing household consumption.

Despite the potential benefits of IBT for low consumption users, there are increasing criticisms that IBT puts unfairly high burdens on households with genuinely high needs (Sibly 2006a, 2006b). The reasons for high consumption are many, including large family size, families with infants or young children, households that have members with medical conditions, households residing in old and uninsulated homes, and those use inefficient appliances and products. Thus, applying tariff-based pricing for affordability can be regressive to low-income families that have high levels of consumption. A possible exception is if social tariffs are targeted to vulnerable customers only. For instance, water and sewerage businesses in the UK are allowed to cross-subsidise social tariffs by charging higher prices to other customers (DEFRA 2012). Alternatively, utility tariff can be structured in a way that accounts for households size and equity concern (see example: Barberán and Arbuós 2009; García-Valiňas 2005).

Targeted assistance can be provided in various forms, such as concessions and rebates tied to the purchase of water and energy services, income support and supplementary payments in the social welfare system, or tax exemptions or benefits in the tax and transfer system. From an economic perspective, targeted assistance is more efficient than tariff-based policy to address utility affordability. This is because targeted assistance allows public utility businesses to price their services efficiently and to achieve financial sustainability. Providing financial transfers to targeted customers, rather than using universal subsidized tariff, assist to correct the market failures or inequality outcomes from pricing policy.

In Australia, a mixture of policy instruments has been applied. Water and energy concessions provided by the state and territory governments (hereafter called ‘state utility concessions’) are the main social policy instruments to address households' utility affordability. A utility concession is a social transfer tied to the purchase of goods and services (Henry 2009). Water and energy utility concessions are largely funded by the state and territory governments and customers receive rebates at the point of sales through utility bill reduction. Since the NCP reforms, provision of concession services is part of the Community Service Obligations (CSOs) for Government Business Enterprises (GBEs) and corporatised or privatised public utilities (Industry Commission 1997). In accordance with Industry Commission (1997), CSOs should be delivered in a cost efficient manner. The intent is that state or territory governments should transfer the CSO payments, including the total value of water and energy rebates and the associated administration costs, to utility retailers to compensate for social obligation expenses. Given the large and recent increases in water and energy prices, the adequacy and efficiency of state utility concessions has become an important public policy issue (ACOSS 2014; AEO, ERAA and ACOSS 2013).

Good or smart design of state utility concession schemes can reduce the risk of vulnerable households experiencing utility stress and hardship. In Australia, there is a three-tiered system of government – the Australian Government, state and territory governments, and local governments (Michael 2006: 121). Eligibility criteria and entitlements of state concessions vary widely across jurisdictions. In most cases, the Commonwealth Concession Card acts as the gateway to access the state-level water and energy concession benefits. In some jurisdictions, other card categories are also eligible for concessions.

Previous reviews find that there is inadequacy, inefficiency, inequality and inconsistency of state utility concessions (ACOSS 2014; Deloitte 2013, Johnston 2013a, 2013b, Simshauser and Nelson 2014). A key policy question is whether the state concession schemes are the best way to address the problem of utility stress and hardship. Much of the existing literature recommends reform of state

utility concession schemes and argues for a nationally consistent approach (PC 2011, Deloitte 2013, Johnston 2013a, 2013b, ACOSS 2014). To date, and despite the importance of concessions to vulnerable households, there is limited research using empirical data to evaluate the equity, efficiency, and effectiveness of state water concession and energy concession schemes, and implications for alternative policy design.

## 1.3 Research questions and analytical framework

Much work remains, to understand water and energy utility affordability, and to evaluate the equity, efficiency and effectiveness of various policy incentives that were designed to ease affordability. Unlike in the United States, or the United Kingdom, Ireland, and other European countries, Australia does not have a national strategy or collaborative approach to address utility affordability problems at the present time. The aim of this thesis is to investigate the utility affordability problem and various policy approaches in the Australian context. The key research question is:

Are utility affordability problems addressed effectively, efficiently and equitably in the governance regimes of Australia's urban water and energy sectors?

A subsequent research question arises from this overarching question, namely:

How could those governance regimes be reformed or improved so as to ensure greater effectiveness, efficiency and equity in dealing with problems of utility affordability?

In this thesis, I respond to the key questions through various policy lenses and using different methodological approaches. Table 1.2 articulates the sub-questions which form the basis of my analysis, as well as the theoretical framework and methodologies applied in different chapters to answer those questions.

## 1.4 Outline of the thesis, key results and contributions

This thesis examines the context of utility stress and hardship, and the strategies used in Australia to address it, from different perspectives. Chapters Two to Six contribute to the core of the thesis from different disciplines and perspectives. Each chapter is an independent essay, but the main findings and conclusions are inter-related and contribute to the overarching aim of the thesis: to assess the efficiency, effectiveness and equity of alternative policies to respond to the utility affordability problem in Australia. The thesis is organised as a journey to explore the concept of water and energy affordability, to assess the contemporary policy landscape specifically addressing this social problem, and, to analyse the instruments that have been adopted hitherto to tackle the utility affordability problem in an equitable and efficient way.

Chapter Two sets the scene of the thesis by providing an historical overview of the reforms in the Australian urban water and energy sectors and their social implications. I describe how the Australian urban water and energy sectors have both undergone significant reform since the 1990s. To date, the majority of research has focused on efficiency and productivity gains from sector reforms. I contend that insufficient research has been undertaken in relation to unpacking the social implications of utility sector reform processes, and the associated outcomes of these reforms. To fill this research gap, I critically analyse four dimensions of social transformation through the examination of reforms undertaken within the urban water and energy sectors. The dimensions considered are: (i) sector objectives; (ii) modes of governance; (iii) 'state-utility-citizen' relationships; and (iv) the contemporary policy settings to address utility affordability in Australia. Furthermore, I critically assess the respective roles and functions of key actors in responding to utility affordability problems in Australia. My analysis identifies redundancy of policy functions and policy gaps among actors so as to inform the pathway for a collaborative utility affordability policy framework.

**Table 1.2** Theoretical framework for different chapters in the thesis

| Chapter | Research questions | Contributing theory underpinning analysis |
|---|---|---|
| 2 | *What have the consequences of reforms in the urban water and energy sectors been on the sector objectives, models of governance, policy settings, and roles and responsibilities employed by key actors in those sectors to address utility affordability?* | Using the theory of governance (Bell and Hindmoor 2009) and comparison of the reform processes of the urban water and energy sectors, I critically assess:<br>• the social transformation undertaken in terms of: (i) sector objectives; (ii) modes of governance; (iii) 'citizen-state-utility' relationships; and (iv) the new policy settings and, under these, the responsibility of different key actors to address this policy challenge |
| 3 | *How can social aspirations be integrated into public utility pricing frameworks?* | I use the urban water sector as an example to discuss a framework to integrate social aspiration and affordability objectives into public utility pricing (OECD 2003) to provide:<br>• An overview of how social equity can be built into water pricing principles, processes, and outcomes<br>• Examples and analyses of water affordability in Australian capital cities from 1995-96 to 2011-12, and comparisons of the values of water concessions given to disadvantaged people by state governments. |
| 4 | *How should utility affordability standards be defined so that* | Using the theoretical framework of public utility affordability (Kessides et al. 2009; Hills 2012) and housing affordability (Stone 2006; Bramley 2012), I examine: |

| | | |
|---|---|---|
| | *households in need of assistance with utility affordability can be identified?* | • the trends in utility affordability under the Low Income and High Burden (LIHB) method, the relative Low Income and High Cost (RLIHC) method, and the subjective method<br>• the strengths and weakness of different methods to define affordability<br>• the characteristics of households with utility stress under different measurements<br>• the association of utility stress and other material hardships. |
| 5 | *How efficient and effective are current state water and energy concession schemes in targeting those consumers most in need?* | Using the theory of targeting (Sen 1995; Atkinson 1995; Hoddinott 1999; Besley and Kanbur 1990; Oorschot 2002) and the theory of utility affordability, I examine:<br>• the targeting efficiency and effectiveness of category-based concession targeting in respect of need-based assistance<br>• the 'vertical expenditure efficiency' (Beckerman 1979) of state concession schemes. |
| 6 | *What are the social equity implications of current state concession schemes vis- à-vis alternative scenarios?* | Using the principles of horizontal equity and vertical equity (Herscovitch and Stanton 2008), I evaluate:<br>• the equity implications of water and energy concession entitlements across different jurisdictions<br>• the equity implications of concession eligibility criteria across jurisdictions<br>• the targeting and fiscal implications of alternative concession policies. |

In Chapter Three, I examine the broader context of public utility sector and pricing reform in the context of the urban water sector. In particular, I develop a framework to demonstrate how social objectives can be integrated into public utility pricing policies, and how social equity can be built into water pricing principles, processes, and outcomes. Although the emphasis of the recent urban water reforms in Australia has been to improve economic efficiency , some urban water retailers and independent economic regulators still retain an 'affordability' principle when designing and determining water prices. Examples are given, and analyses are made of water affordability in Australian capital cities from 1995-96 to 2011-12, and comparisons made of the 'values' of water concessions given to disadvantaged people by state governments. I show that state concession policy alone cannot effectively alleviate the affordability problem while the existing state concession schemes generate an inequitable outcome. To successfully tackle the affordability problem needs to consider the interaction effects of multiple factors, such as water demand under various climatic conditions, different income levels across cities or regions, and differences in water prices. If all these factors were to be considered, it could generate a more flexible, adaptable, and integrated strategy for water affordability. This chapter was originally published in Grafton et al. *Understanding and Managing Urban Water in Transition* by Springer Publishing in 2015.

Chapter Four is a key chapter that joins the debate on defining and measuring utility affordability, which is the basis for developing effective targeted policy and programs to tackle utility stress and hardship. To capture the multi-dimensional nature of utility affordability problems, I employ three methods to measure utility affordability and identify households at risk of utility stress: (i) the Low Income and High Burden (LIHB) method; (ii) the Relative Low Income and High Cost (RLIHC) approach; and (iii) a subjective method. Using these approaches, the trends in utility affordability across different jurisdictions between 1988-89 and 2011-12 in Australia are compared. I find that these three methods yield different outcomes in terms of trend in utility affordability across Australian jurisdictions. The strengths and weaknesses of different methods are compared and discussed. I

also evaluate the prevalence of water and energy affordability stress among different households and dwelling characteristics, and analyse if there is any relationship between utility stress and material hardships.

Chapter Five offers an insight into the differences between outcomes associated with categorical-based targeting and need-based targeting. In this chapter, I evaluate the efficiency and effectiveness of state concession schemes using Victorian water and energy concessions as a case study. The analysis is based on the data from the 2007 Victorian Household Utility Consumption survey. The Victorian utility concession scheme is recognised as the most comprehensive, equitable, and generous among all jurisdictions (Deloitte 2013). I find that the design of the Winter Energy Concession (WEC), as of 2007, effectively reduced energy affordability stress among vulnerable households, but water concession entitlements with a maximum cap resulted in poor seasonal targeting for summer period. My results from the target efficiency analysis show that the Victorian utility concessions have a very low exclusion error rate, but a very high inclusion error rate. A key contribution is to calculate the 'vertical expenditure efficiency' of the state concession schemes. The analytical framework is modified from the Beckerman model applied in evaluating targeted income maintenance programs to reduce poverty in developed countries (Beckerman 1979). My analysis suggests that reforming the existing Victorian utility concession towards households at risk of utility stress could generate fiscal savings for the state government.

Achieving social equity is a key objective of designing any social policy. In Chapter Six, I evaluate the equity implications of state water and energy concession schemes using the Confidentialised Unit Record File (CURF) data from the ABS HEC 2012. This chapter applies the principle of horizontal equity and vertical equity. Using a horizontal equity perspective, households with similar circumstances should be treated equally, while households with different circumstances should be treated differently if a vertical equity perspective is adopted. Although provision of water and energy concessions is widely adopted by state and territory governments to assist eligible households to afford essential services, inequity arises due to inconsistency of eligibility criteria and entitlement

design across Australian jurisdictions. Based on the survey data and modelled concession benefits, I find that the current state concession schemes have deviated from these two equity principles in both eligibility criteria and concession entitlements. To tackle the problem of utility stress and hardship with a consistent and equity approach, I develop three alternative scenarios and compare their targeting and expenditure outcomes to the current concession schemes. I conclude that if reform to a more nationally consistent and equitable scheme was possible, an improved targeting efficiency and reduced fiscal expenditure would be observed. In Chapter Seven, I summarise my key contributions and also review directions for future research.

I acknowledge that there are limitations and delimitations of this thesis. A limitation is a possible weakness of the research, particularly the research methodology, which might question the validity of research findings, but are impossible to avoid or minimise. A delimitation refers to the limits of, or boundaries around a research project.

In terms of limitations, the analysis of this thesis relies heavily on previously published research, public documents and data collected for other purposes. For instance, the ABS Household Expenditure Surveys, ABS Energy Consumption Survey, and the Victorian Utility Consumption Survey were not designed for the purpose of analysing water and energy utility affordability. These sources may not be neutral reports of events or data collected because their production is shaped by a context. Therefore, the analyses and discussions in the subsequent chapters will account for the limitations of the selected data and documents.

In terms of delimitations, some of the documents and data applied in this thesis are up to eight years old. As discussed in Chapter 2, the Australian energy and water sector has been subject to considerable political debate and sector reform, changes to governance arrangements and other regulatory changes are still unfolding at the time of writing this thesis. It is important to understand the time

period of events and policies in their context in each analysis. For instance, the Victorian Utility Consumption Survey was conducted in 2007 during the period of severe drought and prior to the construction of Victorian desalination plant, implementation of energy retail sector reform and energy retail pricing deregulation. Therefore, the analysis in Chapter 5 represents the efficiency and effectiveness of the Victorian concession scheme at that time only. Nonetheless, the developed analytical framework - the adapted Beckerman model - to analysis vertical expenditure efficiency in state concession targeting is a useful framework to evaluate any other targeted utility affordability assistance programs if more comprehensive data is available.

Overall, the complexity of addressing water and energy affordability problem in Australia arises from the fact that existing policies involve multiple stakeholders (i.e. utility retailers, governments, community organisations) and multiple levels of government (i.e. state level government administer the concession scheme but draw on the Commonwealth provisions in both eligibility criteria and funding issue). Considerable variation in utility pricing policies and state concession policies between jurisdictions make it difficult to provide a neat summaries and solutions to the problem. Nonetheless, by using multiple theoretical frameworks and a pluralist approach, this thesis provides a much richer analysis than the reliance on a single theoretical perspective that has been previously used to discuss or analyse utility affordability policy in Australia.

# Chapter 2

# Urban water and energy sector reforms in Australia: an evolving policy landscape and modes of governance to address water and energy affordability

*The spirit of humanity works in one way, the market economy in quite another.*

(Henry Phelps Brown 1988, p.512)

## 2.1 Introduction

In order to understand why water and energy affordability problems have become an emerging social concern, this chapter reviews the reforms happened among the Australian urban water and energy sectors over the last two decades. From which it has given to the effects on governance, sector objectives, and policies relevant to addressing utility affordability among low income and vulnerable households.

Over the past two decades, there has been a global trend in implementing market-oriented reforms across public utility sectors, and Australia is no exception. Traditionally, infrastructure services for water, sewerage, energy, transport, and telecommunication services were classified as 'public goods' because of the social and economic importance of these services and, the natural monopolies that these technologies tended to engender (King and Maddock 1996a). State ownership and the provision of these infrastructure services were regarded as a social responsibility of a government towards its citizens. Utility tariffs were commonly controlled by governments and were designed to achieve social objectives such as universal access, affordability, social equity, fairness, and the reduction of poverty

(Ernst 1994). Since the 1980s, developed nations, including Australia, the United Kingdom, United States, and New Zealand, have progressed significant public utility reforms as a means of reducing government and public expenditure. The reforms were based on the principle of neo-liberalism – market economy under the rule of state (Cahill and Bader 2005; Chester 2010a), and New Public Management (NPM) – integrating private sector models in public sector management and service delivery (Lane 1997, 2000; Hughes 2012; Dunleavy and Hood 1994). Subsequently, privatisation occurred in a broad range of public services including water, energy, transport, telecommunications, finance, and even health and education (King and Maddock 1996a; Bakker 2003; O'Flynn 2007). These industrial reforms have fundamentally challenged the notion of ingrained social responsibilities within public utility sectors.

In Australia, the public provision of essential infrastructure services has been the responsibility of state and local governments since early European settlement (Michael 2006). In the early 1990s, the Australian Government initiated considerable microeconomic reform within public infrastructure industries including telecommunication, water and energy sectors. These reforms served to improve efficiencies and resource allocation within the sectors, and to deliver better value for money in the provision of public services (PC 2002). Subsequent pricing and regulatory reforms were progressed in response to the introduction of the NCP Review and numerous environmental stewardship practices. Although public utility reforms have delivered significant productivity and efficiency gains within the sector (PC 2002), new social challenges have emerged as a result of these developments (Willis 2006; Chester and Morris 2011).

The purpose of this chapter is to critically assess the social consequences of urban water and energy reform processes from a policy and governance perspective. Through the comparison of reforms within these two sectors, I critically analyse four dimensions of social transformation undertaken, which include: (i) sector objectives; (ii) modes of governance employed; (iii) ‘citizen-state-utility’ relationships; and (iv) the new policy landscape to address utility affordability across different sectors.

Section 2.2 provides an overview of the major reforms undertaken within the two sectors with particular reference to the drivers of reforms, and the associated social implications. Section 2.3 analyses the transformation of modes of governance in these sectors and relationships between the state, citizens, and public utility sectors. In Sections 2.4 and 2.5, I assess the strengths and weaknesses of the current policy landscape to address utility affordability and the respective roles and responsibilities of different stakeholders in Australia.

## 2.2 Development of urban water and energy sector reforms

In the urban water sector, a fundamental objective has been to provide safe and reliable water supplies. In Australia, urban water infrastructure has been owned and operated by state and local governments with the intent to maintain public health and the wider social benefits derived from urban water infrastructure. Post World War II, significant investments were made by governments to expand urban water systems to meet the growing demands of the Australian population (Smith 1998; Troy 2008, 2011; Byrne 2013). Urban water and sewerage charges, also called 'water tariffs', were collected by state and local governments as to recover the cost of water storage, treatment and distribution. Sometimes, social objective is considered when determining water tariff (OCED 2003).

By the 1980s, property rate-based water tariffs were established on attributes that provided revenue stability and predictability for water businesses (PC 2011a). In addition, there were strong elements of cross-subsidization between business and residential customers (Cox 2010; King and Maddock 1996a; NWC 2011a). Over time, population growth in Australian urban centres has led to the increase demand of urban water use and required infrastructure expansion in both storage and distribution networks. Further, there has been an increased environmental concerns of drawing more water from the catchment among competing

agricultural and industrial users and discharging sewage back to catchment system. As a result of these concerns, reforms of the urban water sector strongly focused on framing environmental standards and regulation. In sum, early development of urban water systems was engineering-focused to achieve social and environmental goals (Reinhardt and Guerin-Schneider 2015; Barraqué 2015).

In the Australian energy sector, the generation, transmission, and distribution of electricity was owned and operated through franchises within local government areas prior to World War II (King and Maddock 1996a). As the demand for electricity increased due to economic growth, technology advancement, and changing socio-economic conditions, electricity generation and network infrastructure expanded together with sector agglomeration. This expansion of the electricity sector was gradually dominated by public sector monopolies (King and Maddock 1996a). Electricity is a factor input for production and also an essential service for modern households. In the 1970s, governments sought to use universal access to affordable energy services and to achieve economic and social requirements. Electricity tariffs were regulated in the early development.

During the era when water and energy prices were regulated, in many cases state government could not recovered sufficient funds to cover the cost of operations and infrastructure investments. This led to questions about the efficiency of the public service delivery model. During the 20th century there was a global trend to adopt a neo-liberalism approach of economic development - to increase the role of markets in public service delivery among ‘liberalised-market based economies’ such as Australia, Canada and New Zealand, the United States, United Kingdom, (Chester 2010a; Amable 2003; Crouch 2005; Hall and Soskice 2001). In these countries, market mechanisms have played an important role for coordinating the economy.  Despite the differences within the approaches to reform, privatisation and liberalisation policies were dominant features during the early reform periods in the 1980s and 1990s (Warner 2012; King and Maddock 1996al Bognetti and Obermann 2008). Over the last two decades, the trend within public utility sector towards privatisation has extended to many other countries such as Argentina, Bolivia, Brazil, Chile and Mexico (Estache et al. 2001).

In the 1990s, Australia initiated a series of microeconomic reforms across a wide range of infrastructure industries (PC 2002; Banks 2005). The purpose of infrastructure reform in Australia was to introduce market competition so as to increase efficiency, resource allocation, and also productivity gains in service delivery. Many economic infrastructure industries, such as telecommunications, transport, postage, energy, water and sewerage, underwent significant structural and institutional changes to accommodate these objectives (PC 2002; King and Maddock 1996a). These reforms can be categorised into six stages: commercialisation, corporatisation, factor market principles, competition and privatisation, environmental imperatives, and market liberalisation. The rationale, process and social outcomes of each stage are summarised in Table 2.1.

### Stage I: Commercialisation (early 1990s)

The early 1990s initiated the commercialisation of both the urban water and energy sectors. The commercialisation of these utility sectors served to clarify the objectives of economic infrastructure industries, and to adopt a commercial approach towards pricing decisions and service provision. The significant transformations to practice during this period were: (i) the introduction of users-pay pricing structures that focused on full cost recovery; (ii) tendering and contracting out to increase private participation in utility services provision; and (iii) the introduction of direct and transparent funding mechanisms - Community Service Obligations (CSOs) - to address social objectives of the public utilities (PC 2002). According to Industrial Commission (1997), CSO is defined as:

> *A Community Service Obligation arises when a government specifically requires a public enterprise to carry out activities relating to outputs or inputs which it would not elect to do on a commercial basis, and which the government does not require other business in the public or private sectors to generally undertake, or which it would only do commercially at higher price. (SCNPMGTE 1994, p.xi in Industrial Commission 1997:7)*

**Table 2.1** Stages of public utility reform

| Stage | Purpose | Process | Social outcomes<br>Urban water sector | Social outcomes<br>Energy sector |
|---|---|---|---|---|
| **Commercialisation** | Resolving the conflicting objectives and competing demands on GTEs | Clarify objectives of GTEs, adopt more commercial approaches to service provision and pricing decisions | Pricing reform with user-pays policies and to achieve full cost recovery; competing tenders and contracting; transparent funding of CSOs to support social obligations of utilities | |
| **Corporatisation** | To increase responsibility and accountability for financial performance; to reduce political interference in utility pricing decisions; to avoid perceptions of government using utility prices as a taxing mechanism | Increase autonomy of GTEs; reduce ministerial interference in day-to-day management; separate price regulation from Ministerial control | Establish commercial-oriented boards; establish regimes for performance and accountability; introduce independent price regulation to minimise interference of ministers in utility pricing | |
| **Factor market principles** | To ensure GTEs compete fairly with private sector competitors in the capital market | Requiring GTEs to earn a 'commercial' rate of return on their assets and pay dividends to their owner governments | Establish requirement of 'commercial' rate of return to shareholders | |
| **Competition & privatisation** | Governments agreed to NCP in 1995, to facilitate the entry of new private sector providers to | Introduction of NCP has resulted in a more national focused and systematic approach to ongoing regulatory | Investigate water trading between rural and urban market | Establishment of National Electricity Market and NGM; extensive privatisation; new regulatory frameworks and |

| | | | | |
|---|---|---|---|---|
| | traditional public infrastructure | review and infrastructure reform | | institutions to energy markets and energy prices |
| **Environmental imperatives** | Climate variability; periodic severe droughts; concern about climate change and greenhouse gas emissions | Demand side management on water consumption; government investment in water supply augmentation; policies and incentives to reduce greenhouse gas emissions and stimulate investment in renewable energy | National Water Initiative (NWI); water sensitive city design; water restrictions; water recycling; rainwater tank rebates; infrastructure investment; rapid water price rises | Renewable Energy Target (RET), government incentives for green energy investments; rapid energy price rises; distributive inequity of renewable energy subsidies |
| **Market liberalisation and deregulation** | To promote competition among retail utility sectors and to increase consumer choice among different service products and pricing | Introducing retail market rules and regulations; customers can sign market contracts with energy retailers that operate in their jurisdictions; AER introduced the National Energy Customer Framework (NECF) | | Full retail energy competition; price deregulation; national retail rules and regulations; NECF |

**Source:** PC (2002: 3-5); AER (2014a); NWC (2014).

Following this change, property-based water pricing systems were gradually replaced by consumption-based pricing where areas with water meters installed. Electricity and gas prices were also augmented to reflect full cost recovery and financial sustainability. Cross-subsidisation between commercial customers and domestic customers became less prevalent and the traditional social obligations were addressed by more transparent CSO policies (Industry Commission 1997). I will further discuss the role of CSO in section 2.4.2.

### Stage II: Corporatisation (1990s)

The urban water sector and energy sector commenced corporatisation by initially establishing commercially-oriented director boards. This served to shift government trading enterprises (GTEs) towards increased autonomy with greater responsibilities and accountability (PC 2002). A national reform of the urban water sector was coordinated in 1994 when the Council of Australian Governments (COAG) agreed to implement a framework to achieve an efficient and sustainable water industry (COAG 1994). In addition, to avert conflicts of interest and the public perception that governments may use utility pricing as a taxing mechanism, independent pricing regulators were gradually introduced in some jurisdictions, such as NSW and Victoria, to circumvent possible ministerial control on utility pricing decisions. Introducing independently regulated pricing meant that government no longer had direct control over pricing. Nonetheless, state governments retained ownership and continued to be the primary shareholders of corporatised public utilities and maintained control of water and energy infrastructure at that time.

### Stage III: Introduction of factor market principles

After a period of extensive corporatisation within the urban water and energy sectors, factor market principles were to introduce commercial management practices so as to increase efficiency and productivity. Government-owned GTEs were required to earn a 'commercial' rate of return (ROR) on assets that paid dividends to their shareholders. Defined ROR was intended to create a 'fair playing field' between private sector competitors and the public sector. Despite this reform, not all urban water utilities had achieved a positive economic ROR by 2009-10 (PC 2011a: 38-39).

### Stage IV: National Competition Policy (1995)

In 1995, state and commonwealth governments agreed to adopt the principles of the National Competition Policy (NCP). The NCP was Australia's landmark microeconomic reform program (Banks 2005) The NCP was underpinned by the principle that 'the engine which drives efficiency is free and open competition' while '[c]ompetition is also a positive driving force that assists economic growth and job creation' (Hilmer 1993: XV). The broader NCP reform transformed the state-based public utility reforms towards an increased national and systematic approach to infrastructure and regulatory process. The National Electricity Market was regarded as a successful microeconomic reform in Australia (Bank 2005; KPMG 2013).

In the urban water sector, further national water reform agendas were incorporated into the 1994 COAG water reform framework (COAG 1994). COAG agreed that jurisdictions would implement water reforms congruent with the principles of the NCP as described in the Hilmer report (1993) (NCC 2014). Under this COAG water reform framework, the Commonwealth Government agreed to provide incentive payments to the state and territory governments as a reward for achieving specified water reform milestones (WSAA 2005). The developments

within the urban water industry included: (i) the introduction of consumption-based pricing in water charges to discourage overconsumption; (ii) the implementation of financial cost recovery models by utility service providers so as to improve incentives and signals for new investments; and (iii) the implementation of institutional changes to increase commercial oriented principles and improve accountability in the urban water sectors. The Intergovernmental Agreement on a National Water Initiative (NWI) refreshed the NCP water reform program and created the National Water Commission (NWC). The NWI guided state and territory governments in terms of regulatory and pricing reform in the urban water sector. The national agency NWC was responsible to assess the water sector reform implementation relevant to the NCP and NWI principles (NCC 2014; Byrnes et al. 2006).

Over time, a mixture of structural changes has occurred in the urban water sector. Vertical institutional separation has occurred in several jurisdictions where wholesale and retail water divisions have been separated into distinct entities to improve accountability and transparency. In NSW, for instance, the Sydney Water Catchment Authority was established in 1999 to manage dams and catchment areas while Sydney Water Corporation provides water and sewerage services in metropolitan areas (Sydney Water 2014). In South Australia (SA), the management of the state's water supply has been contracted out to private sector operators (PC 2005a, 2005b).

Despite the introduction of NCP principles, there has been limited competition in urban water and sewerage services. One exception was the introduction of the *Water Industry Competition Act 2006* by the NSW government. This Act aims to improve competition between water utility providers (Sydney Water 2014). For instance, alternative and decentralised reticulated recycled systems have been introduced in a number of residential properties in Sydney by private water utilities (Water Factory Company 2011). Nevertheless, the private provision in urban water use is in relatively small scale and competition is limited. Majority of the urban water utilities in Australia remain state owned.

In the energy sector, market-oriented reform has advanced further than in the urban water sector. As part of the NCP reform, the National Electricity Market (NEM) and National Gas Market (NGM) were established. The NEM is a wholesale electricity market which covers across six jurisdictions - Queensland, NSW, Tasmania, Victoria, SA, and the ACT. Within the NEM, energy can be traded across jurisdictions in the wholesale energy spot market.

A key feature of NCP reform was to facilitate the entry of new private competitors into the traditional government monopoly market system. Regulatory frameworks and institutions were established at both national and state levels to promote and regulate price competition. In the national level, this included the National Competition Council (NCC) and Australian Competition and Consumer Council (ACCC). At the state and territory government levels, the Independent Pricing and Regulatory Tribunal (IPART) was established in NSW and the Office of the Regulator-General (ORG) (now Essential Service Commission) was formed in the Victoria (PC 2002). By the mid-2000s, these measures supported private energy providers and a high degree of competition within the energy wholesale market emerged.

In 2003, the COAG Ministerial Council on Energy agreed on an Energy Market Reform Program (MCE 2003), that further strengthened the national electricity and gas markets by replacing some of the existing state-based provision of energy services and the mixed federal and state level regulatory structures. The establishment of a competitive national energy framework was designed to reduce the transaction costs for business to operate across jurisdictions by 'harmonising regulatory arrangements, removing inconsistencies and integrating networks' (MCE 2003: 3). At the national level, the Australian Energy Market Commission (AEMC), Australian Energy Market Operator (AEMO) and Australian Energy Regulator (AER) were established as the rule maker, to operate, to monitor and enforce the market regulations respectively.

At the household level, the situation of monopolistic energy retail service remained in many jurisdictions during the early reform. In the early privatised

energy market, only one incumbent energy company was licensed to provide electricity and gas services to domestic households within a designated area. Energy prices were under state government control, in some cases regulated by independent economic regulators. At this time, state economic regulators were responsible for balancing various conflicting objectives, such as energy affordability and fair return to energy retailers. Although there has been a growing number of new entrant retailers since the implementation of price deregulation in different jurisdictions, major incumbent retailers still retain 70 to 80 per cent of the market share among domestic energy consumers (AER 2014b: 124; AER 2014c). Overall, the microeconomic reform has led to a period of strong positive productivity growth for both urban water and energy sectors from mid 1980s to late 1990s (Topp and Kulys 2012).

### Stage V: Increasing environmental imperatives

From 2000 onwards, both the urban water and energy industries faced increasing regulations that focused on environmental protection and addressing climate change, as part of broader national strategies on the environment. The drivers for these environmental imperatives within the urban water and energy sectors were resulted from both internal and external socio-economic and political factors. For instance, in the ACT, water abstraction charge (WAC) - a statutory fee is payable by licensed water holder that take water from the environment. It is claimed WAC represents a sustainable price for water in the long term, including costs of catchment maintenance, water scarcity, and environmental impact (ICRC 2003). In 2016, the WAC is set at $0.55 per kilolitre for Icon Water to take water for urban water system. The cost of WAC is passed to water customers as part of the water bill component (Icon Water 2016).

The urban water sector has encountered the challenge of water supply security resulting from population growth and unanticipated prolonged drought during 2000-2010. As a consequence of reduced water inflows over a number of years,

the available supply of water diminished in many major urban water systems (PC 2008: 4; CSIRO 2007: 21). Growing urban populations have increased the demand for domestic water supplies which, in turn, contributed to an increased tension with other competing demands for water such as agricultural production, industry use, and environmental health requirements. To better align these competing demands, a coordinated and national strategy across both rural and urban water sectors was required. The endorsement of the National Water Initiative (NWI) by COAG in 2004 has played a big part in addressing the environmental challenge of the water use and various water reform from a national perspective.

To assist in the implementation of NWI, an independent statutory body, the National Water Commission (NWC), was established in 2004 to be accountable for the responsible management of water at a national level. The NWI initiated major structural changes within the urban water sector across all major jurisdictions in Australia. NWI principles extended pricing adjustments to all water products and services as a means to promote efficient water use (see Appendix 2.1).

Since then, all major urban water utilities have been corporatised and the functions of water wholesaling and water retailing has been separated in most jurisdictions. Water reform in Melbourne area (Victoria) was even more pronounced. In addition to vertically separate bulk water supply and retail services, retail water services were horizontally separated into three water retailers (Yarra Valley Water, City West Water and South West Water) across three broader Melbourne regions as a mean to promote yardstick competition. Further institutional reforms across states and territories were progressed such as the establishment of independent economic regulators to minimise political influence on water pricing decisions (NWC 2014). In all cases there was a movement towards a pricing model to achieve full cost recovery which was a stated outcome under the NWI (NWC 2014).

Concomitant with reform has been an increased emphasis on demand side management and consumer education. In particular, water rationing was implemented in all major cities over the severe drought period in the 2000s (PC 2011a). In 2004, almost 90 per cent of Australian households expressed that they had participated in water conservation behaviour or had used a water saving device (ABS 2005). The combination of conservation education and water rationing has resulted a relatively long lasting behaviour change among water consumers and a reduction in average household water use and aggregate water demand. It was found that, despite the easing of water restrictions since 2007-08, more than 90 per cent of the surveyed households claimed to have either maintained or reduced their personal water use compared to prior water restriction period (ABS 2015a).

The proposition to 'drought-proof' cities required state and territory governments to implement water security strategies have contributed to the rapid increase of water prices across many jurisdictions. All major cities have invested in expansive supply augmentation infrastructures, for instance: desalination plants in Sydney, Melbourne, Adelaide and Perth, water recycling facilities in Queensland, and dam expansion in Canberra (PC 2011a). In the household level, installation of rainwater tanks was encouraged with the provision of government subsidies (PricewaterhouseCoopers 2010). The requirement for full cost recovery and the high costs of infrastructure, together with decreasing aggregate consumption, have contributed to significant water price rises. As indicated by the Water Services Association of Australia (WSAA) (2014a), 'there is a sense in the community that they are using less but paying more' (NWC 2014: 11).

The Australian energy sector, on the other hand, faced increasing external pressure to take a bigger part to combat climate change because the sector is a major contributor of greenhouse gas emissions. Almost 70% of the principal fuel source was brown coal and black coal in electricity generation, even in 2012-13 (ESAA 2014a). Coal-fired power plants is classified as the single largest source of emissions, which accounts for approximately 33 per cent of Australia's greenhouse gas emissions (ESAA 2014a). With increasing public awareness and

demand for climate change mitigation strategies, the energy sector has become a major target for implementing climate change policies.

A combination of both hard and soft strategies was introduced within the Australian energy sector to assist with the reduction of greenhouse gas emissions. One of the main instruments was the introduction of a Renewable Energy Target (RET) scheme by the Australian Government since 2002. The scheme was designed to ensure that a fifth of the country's electricity would be generated from renewable sources by 2020 (Department of the Environment 2014).

In 2011, the Australian government introduced the *Clean Energy Future* package of legislation that included: (i) introducing a carbon price; (ii) promoting innovation and investment in renewable energy and encouraging energy efficiency; and (iii) action on the land to cut pollution and improve productivity, sustainability and resilience (Australian Government 2011). The package sought to reduce Australia's carbon emissions by 5 to 25 per cent from the year 2000 level by the year 2020, and an 80 per cent reduction from the year 2000 level by the year 2050[3].

The RET scheme was amended in 2011 to operate in two separate constituents - the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES). The LRET is a 'hard policy' and includes legislated annual targets that the Australian energy sector is required to meet for dedicated investment in renewable energy generation capacity, such as large scale wind farms, solar facilities, or hydropower infrastructure. The SRES is a 'soft policy' and employs financial incentives to encourage households and communities to install smaller scale renewable energy systems, such as solar water heaters, heat pumps, solar panel systems, scaled down wind farms or hydro systems. The scheme also administers Small-scale Technology Certificates (STCs) that energy providers are obligated, by law, to buy from participating SRES households or businesses. In addition, electricity buy-back prices were determined by state

[3] That policy has now been rolled back, as at February 2015

governments as premium 'Feed-in-Tariffs' (FIT). The premium residential solar FIT scheme is a payment to households or businesses which generate electricity from a renewable energy source and feed it into the supply grid, and the electricity buyback payment rate was offered in above market level (ESAA 2015).

It is important to note that benefits from SRES subsidies and the premium FIT rebates were not distributed evenly across society as only high income home owners possessed the financial capacity to invest in roof top solar panels (Macintoch and Wilkinson 2011; Zahedi 2010). Nelson et al. (2011: 113) argued that 'the current FITs are a regressive form of taxation'. According to ABS (2013b), households that do not have a solar system installed spent on average AU$40 per week on energy while households with solar electricity and/or hot water systems spent on average AU$33 per week, as indicated in the recent household energy consumption survey. These findings have led to concerns that less privileged households are bearing a disproportionally higher burden from the costs of solar power incentives and increased network costs than the richer households that have solar system installed. Indirectly, electricity customers without household solar power are currently subsidising those with solar system installed (DIS 2015a: 12). In response to the community concern on the unfair outcome of the premium FIT, the scheme was abandoned by different state and territory governments by 2012 (Nelson, Simshauser and Nelson 2012).

Overall, there were discernible economic and social implications related to the RET schemes and associated climate change policies. The SRES was successful in reducing the average household demand on the power supply grid, but peak demand remains resilient (Wood et al. 2015: 17). To compensate for the reduced aggregate demand, the energy sector has had to increase electricity prices to maintain revenue and satisfy their various environmental obligations. It was estimated that the direct cost of the RET on the current annual household electricity bill was around 4 per cent (Warburton et al. 2014: i). The Australian Energy Market Commission (AEMC) estimated that if all the policies are considered, including the carbon pricing mechanism, RET, premium FIT schemes, and energy efficiency schemes, these climate change initiatives have

contributed approximately 17 per cent of the national average residential electricity price rise (AEMC 2013a: ii). In sum, the benefits and costs of these policy interventions are disproportionally distributed, that may lead to more low-income and vulnerable households have to pay higher electricity costs (Nelson et al. 2011, 2012).

### Phase VI: Current and future reforms (post 2014)

In the urban water sector, a number of state and territory governments have progressed the pricing and institutional reforms identified in the 1994 water reform agreement and the NWI commitments. An assessment undertaken by the NWC (2014) noted that: (i) there is still limited competition within the urban water sector; (ii) state economic regulators have unclear and conflicting objectives relating to the water sector; (iii) urban water consumers have limited tariff options (except Yarra Valley Water); and (iv) consumer engagement with pricing policies and economic regulations is relatively weak. It is recommended that future reforms within the urban water sector would require a focus on customer engagement and consumer protection, as well as efficient regulatory and institutional arrangements and to deliver 'liveability' outcomes as the contemporary reform direction (Appendix 2.1).

Overall, the progress of urban water sector reform has been limited in many aspects compared to the energy sector. Over time, community expectation on the urban sector may have changed, thus regulating water pricing or imposing water rationing may not be the best strategies to address both water security and affordability. It will be worthwhile to engage the Australian community to understand their expectations of the industry while balancing the social, economic and environmental outcomes. Enhancing competition within the urban water sector may not happen in the near future, and the use of smart metering and diverse pricing options might be considered. Smart metering allows water customers to have a better understanding of how they use water, and, ultimately,

to make decision to manage their water use, and their water bill, wisely. Provision of different pricing options also allows water customers to choose the tariff that is most suitable to their needs. All these will assist low income households to manage their water use and water bill better.

Nonetheless, the NWC was abolished by the Australian Government in December 2014. Removal of the national stewardship of the NWC means that future reform in the urban water sector, that requires the initiative and collaboration of state and territory governments, will be a more difficult journey.

In the energy sector, retail market competition gradually emerged in Victoria, then SA, and then NSW, Queensland and the ACT. Full retail contestability enabled energy customers to choose their energy retailers. Victoria is the jurisdiction within Australia that has gone the furthest in terms of deregulation of the energy sector since 2002. By 2013, there were 13 electricity retailers and 12 gas retailers operated in Victoria, even though the privatised incumbent energy retailers were the dominant providers in the energy market (ESCV 2014). Furthermore, removal of price control via energy pricing deregulation has further enhanced competition between retailers by offering a variety of market tariffs targeted to different customers' need. Energy retailers in Victoria, NSW and SA can charge variable rates and offer customers a diverse range of discounts and benefits associated with a particular tariff type defined in a contract. Queensland is scheduled to implement price deregulation in July 2016. In other jurisdictions, energy tariffs caps are set by state economic regulators. Such arrangements are referred to as ‘regulated tariffs’ or ‘standard offers’. Within these arrangements, each energy retailer can offer various discounts on a regulated tariff stated within a ‘market contract’ as part of a strategy to attract new customers. The assumption behind energy retail market reform has been that enhancing consumer choice can promote competition and innovation in energy markets, and thus, be beneficial to customers (AEMC 2012a, 2013b). Analysis from Simshauser and Whish-Wilson (2015) found that by removing price cap and enabling retailers to introduce discriminatory pricing, by which cheaper tariffs could be offered to low income households, would assist to address affordability.

Nonetheless, not all government policies have necessarily delivered more equitable outcomes. As mentioned earlier, government interventions on renewable energy installations and the RET scheme appear to have further polarised energy inequality between the rich (those who can afford household solar systems) and the poor (those who cannot afford to install household solar systems). The impact may be even worse for low income renters. For rental home, renters do not have the right to install solar PV system without the landlord' agreement. In addition, landlord would likely to refuse renters' request due to little financial incentive to do so or in the fears of revealing faulty wiring or other problems in the property. The split incentive between landlords and renters may contribute to the situation that low income renters would be vulnerable to live in fuel poverty.

## 2.3 The social implications of changing modes of governance

### 2.3.1 Transformation to new modes of governance

Past and current developments within the urban water and energy sectors have precipitated the emergence of new modes of governance and social imperatives. A number of diverse perspectives presently exist in relation to the role of the government and governance settings within the realm of public utility provisions. Much of the existing literature on governance applies a ‘society-centred’ approach that asserts that state itself has undergone a fundamental transformation (Salamon 2002: 1-2) and have been ‘hollowed out’ (lost power) in the process of neo-liberalism and globalisation.

On the other hand, Bell and Hindmoor (2009: 2-3) proposed a ‘state-centric rational’ perspective and defined governance as 'the tools, strategies and relationships used by governments to help govern'. This approach, in contrast to much of the literature, suggests that 'the state remains the pivotal player' in

governance in many areas, including the utility sectors. The state would determine the administration of a diverse range of governance arrangements, such as hierarchy, persuasion, markets, community engagement, and associative governance (see Table 2.2), dependant on state preferences and strategies. These arrangements also necessitate the development of strategic relationships or partnerships between state governments and other non-state collaborators.

**Table 2.2** Modes of governance in state-centric relational approach

| Mode of governance | Description |
|---|---|
| **Governance via hierarchy** | Top-down governance occurs when governments or agencies of the state act authoritatively to bring about an outcome |
| **Governance via persuasion** | A mode of governance achieved through inculcating modes of 'self-discipline' or compliance in target subjects, in particular, when governments persuade people to change their behaviour |
| **Governance via markets** | Governance through commercialisation of government, use of markets, and contracts in governance process |
| **Governance via community engagement** | Participation of citizens and their opinions in the governance process |
| **Governance via associations** | In associative or network governance arrangements, the state works with firms, private associations and interest-groups to develop and implement policy |

**Source:** Bell and Hindmoor (2009: 16-19)

In specific to the public utility sector, Afouxendis and Lampropoulou (2013) analysed 'modes of governance' in reference to the processes of interaction, relationship, and decision making among the authorities. The strength of this method is to assist the analysis of stakeholder relationship and decision make process in relation to utility affordability among different stages of reform. To assist with an understanding of governance settings, the state-centred relational perspective of governance by Bell and Hindmoor (2009) and the conceptual

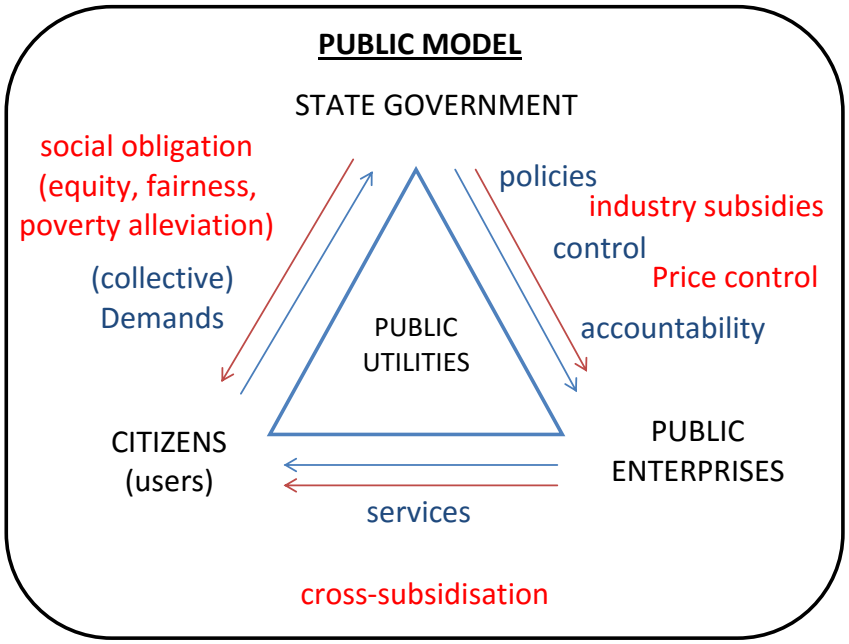
framework 'state-utility-citizen' relationship models within public utility sector described by Afouxenidis and Lampropoulou (2013) have been adopted.

### Modes of governance prior to reform

The sector reforms that were progressed before the 1990s had both the urban water and energy sectors administered through a public mode of governance structure via the hierarchy model. Figure 2.1 illustrates the relationship between state government, that was the owner and operator of the public utility enterprise, and its citizens, who were the consumers of the utility service.

Both the urban water and energy sectors were government owned and operated such that the issue of potential monopolistic pricing by public utility sector could be addressed. At this stage, the public utility sector could be considered as part of the state. Public expenditure, in principle, was directed towards the purpose of improving economic development and employment (Chester 2010a). State governments had the means to directly intervene with public enterprise through infrastructure investment, subsidies, and pricing decisions. Public utility pricing was under government control. As a result of this mechanism, utility service delivery and utility prices were considered as public policy instruments that aimed to achieve multiple economic and social objectives for its citizen. Such objectives included to enhance economic growth and to achieve full employment, equity and fairness across social strata and poverty alleviation. Nonetheless, it had also caused fiscal crisis such as the case of overconstruction in the Victorian state-owned energy sector during the time of government budget deficit (Kellow 1996).

**Figure 2.1** Mode of goverance prior-reform public utility sector




*Remarks: Blue arrows represent policy process on utility service provision; Red arrows represent policies to address traditional social functions of public utilities*

**Source:** Adapted from Afouxenidis and Lampropoulou (2013)

## Contemporary modes of governance in the urban water sector

In the urban water sector, a combination of incremental changes, through microeconomic reforms and strategies implemented under the NWI, have transformed the sector into a mixed governance setting of market approaches, but with strong hierarchy characteristics. Relationships between the state or local government, urban water utilities, and water consumers were illustrated in Figure 2.2. Governance through market mechanisms can be viewed as a result of market-oriented reforms that were progressed in the 1990s. In particular, the establishment of management functions such as director boards, state economic regulators, and pricing regulations, have diminished direct intervention capacities of the states (or government ministers). In this mode of governance, urban water utilities are supposed to operate as if they are commercial entities and at arm's

length from the state. Private sector participation in water infrastructure investment and contractual arrangements for the provision of water projects and service deliveries have become increasingly popular within the urban water sector. In addition, water pricing reforms have transformed the objectives of water tariffs towards full cost recovery, economic efficiency, and financial viability. Within this market oriented model, the role of the state is to enhance sector productivity and economic efficiency.

Despite the progression towards more market oriented governance regimes, competition is limited within the urban water sector (LECG 2011). ‘Governance through hierarchy’ remains a strong component in the current urban water governance model. This can be seen in a number of ways. First, there are strict regulations on public health and safety and environmental protection. Second, despite the repositioning of state governments as shareholders in the new corporatised regime, ownership of water utilities has remained with the state (NWC 2014).

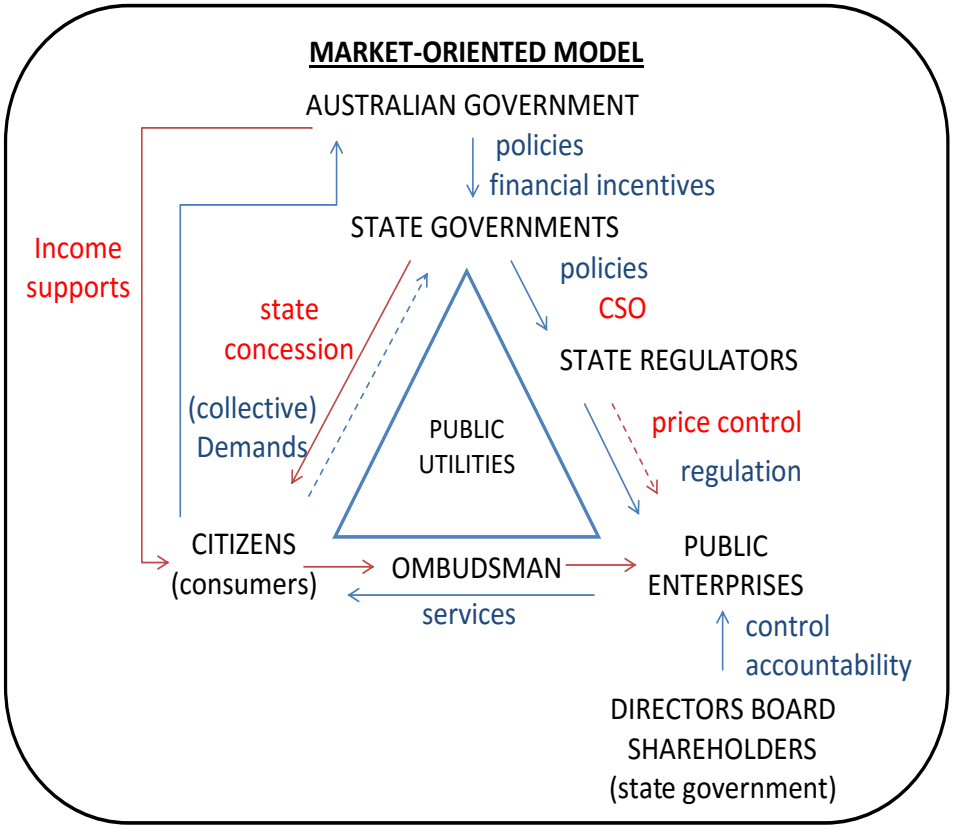
Third, while corporation has diminished direct state intervention, it has not disappeared. Some state governments retain the ability to issue Ministerial Directions or via policies to interfere commercialised entities. While some state governments set prices despite independent economic regulators have been established in those jurisdictions. For instance, in 2014, pricing decisions in Queensland, Western Australia (WA) and the Northern Territory (NT) were still retained by state government ministers or cabinets.

Fourth, rather than using market prices as a signal of water supply and demand, all state and territory governments applied a 'command-and-control' approach, imposing water restrictions to manage household water consumption during the period of drought between 2000 and 2010. Water rationing policy has resulted in a significant welfare cost (Hensher et al. 2006; Grafton and Ward 2008). Lastly, most of the investments in water supply augmentation infrastructure in recent years were not founded on market decisions relating to the urban water sector

(Grafton and Kompas 2007; Grafton et al. 2014, 2015); rather, these were political driven by state government ministers.

As an overarching observation, within the urban water sector, state and territory governments have multiple roles - as owners, as policy setters and as regulators - within the new governance framework (NWC 2014: 14). 'Many governments have intervened directly in price-setting processes and attempted to achieve multiple distributional, affordability, conservation and efficiency objectives' (NWC 2011a: 45). Thus, addressing water affordability and community concern remains a consideration in urban water pricing decision by the government.

**Figure 2.2** New modes of governance in the urban water sector




*Remarks: Blue arrows represent policy process on utility service provision; Red arrows represent policies to address traditional social functions of public utilities*

**Source:** Adapted from Afouxenidis and Lampropoulou (2013).

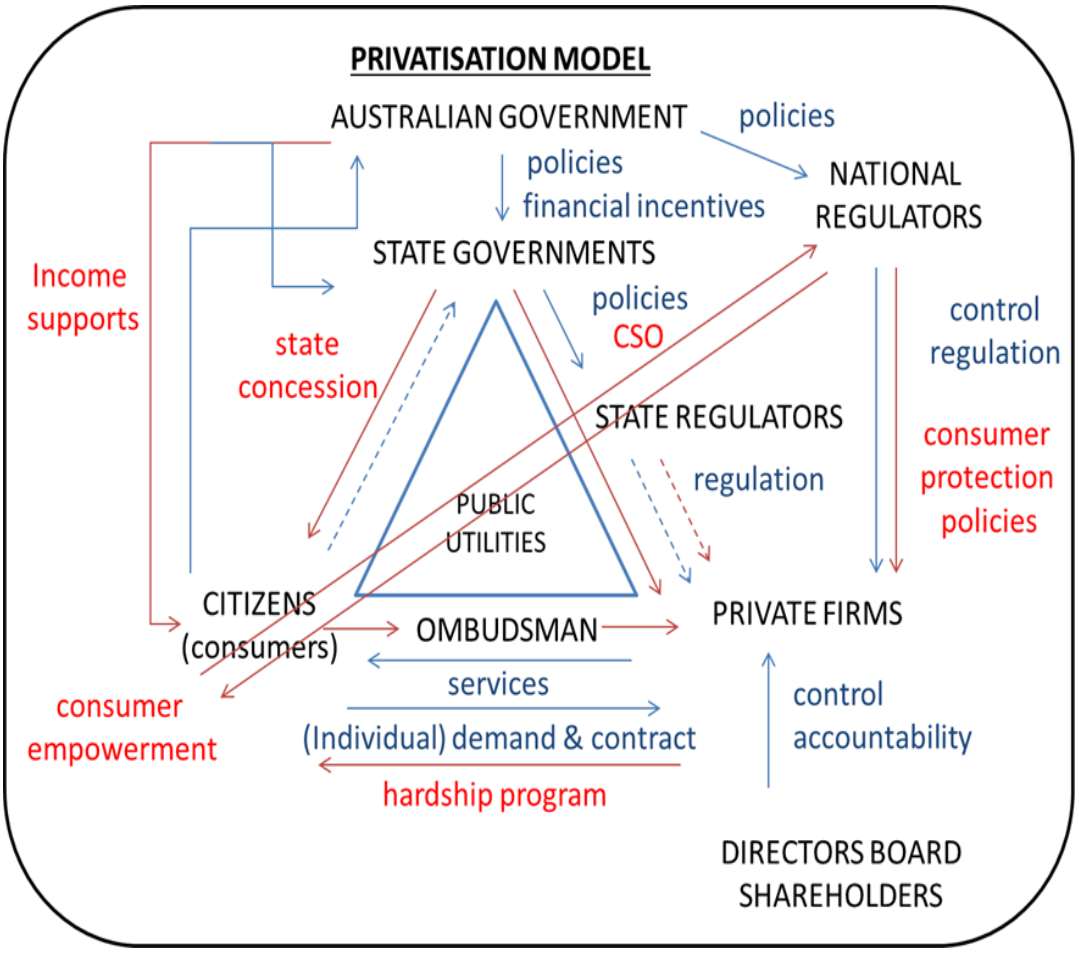
### Contemporary modes of governance in the energy sector

The Australian energy sector has undergone a more extensive market-oriented reform process than the urban water sector. Governance within the energy sector has evolved towards a complex privatisation models. Figure 2.3 illustrates that, the new governance model is a combination of 'governance via the market', 'governance via hierarchy', and, increasingly, 'governance via community engagement'.

In the contemporary energy market in Australia, many of the energy retail companies are privatised, except in Tasmania, regional Queensland, WA and the NT. State governments are no longer the main shareholders in many energy firms and, in fact, many energy companies are owned by multinational companies (Chester 2007). Over the process of microeconomic reform, we see that the role of governments is no longer 'owners and operators' but 'rules makers and regulators'. The role of the state has transformed from ‘rowing’ to ‘steering’ (Osborne 1993) in the privatised and liberalised energy market.

In the early stage of retail energy market competition, incumbent energy retailers originally provided energy services within designated areas, and household energy prices were largely regulated by state regulators via regulated tariff. Regulated tariff is the default energy tariff set by the government. Energy customers are charged with the regulated tariff unless they enter into a market contract with a retail energy company. Following the application of greater levels of competition, market liberalisation and price deregulations, there has been an increased number of new entrants in the energy retail market. From 2015, regulated tariffs for electricity and gas services have been removed in Victoria, SA, and NSW. In other jurisdictions, 'regulated tariffs' set by the state regulators remain an option for energy customers.

**Figure 2.3** New modes of governance in the energy sector




Remarks: Blue arrows represent policy process on utility service provision; Red arrows represent policies to address traditional social functions of public utilities

**Source:** Adapted from Afouxenidis and Lampropoulou (2013).

Nonetheless, research found that for all levels of energy consumption, there would be savings in energy bills if customers switch from regulated tariffs to market tariffs (Nelson and Reid 2014). To combat fuel poverty, it is recommended that low income energy customers should be encouraged to shift to a market offer that suitable to their energy use while government can reduce regulation on differential pricing (Simshauser and Whilsh-Wilson 2015). Overall, within the liberalised energy market environment, direct state intervention on energy utility prices to

ensure affordability and social equity has diminished. Nonetheless, innovative and collaborative market solution could be encouraged and this would be further discussed in Section 2.5.

The use of the 'governance through hierarchy' model has intensified during this period as the energy market has evolved towards liberalisation and deregulation. At the national level, three agencies (the Australian Energy Regulator (AER), Australian Energy Market Operator (AEMO) and AEMC) have been established within the NEM and the NGM to assist with the administration of the utility sector. It is observed that both the creation of a national wholesale energy market and the deregulation of retail energy markets have shifted the regulatory responsibility from the state and territory governments to the federal government. AEMC is the rule maker within the NEM and NGM. Since July 2012, the AER became the regulator and rule enforcer of the National Energy Customer Framework (NEFR). Under the NECF, the AER bears responsibility for monitoring and enforcing compliance with obligations in retail law and the application of other rules and regulations. In addition, all energy retailers within the NEM are required to develop and implement energy customer hardship policies approved by the AER. The governance framework with increased rules and regulations is established within a more liberal energy market. As concluded by Vogel (1996), the creation of 'freer markets' has resulted in the imposition of more rules. Some researchers refer to this phenomenon as the emergence of the 'regulatory state' (Majone 1997, 2007), regulatory governance (Stern and Holder 1999), reintegrating governance (Halligan 2007: 219; Ramesh 2008), and 'rebalancing government reform' (Warner 2008).

When compared with the urban water sector, the energy sector has a higher level of consumer engagement in its governance structure. Nonetheless, Biggar (2011:42) argues that consumer involvement in regulatory processes has remained relatively weak and under-developed in Australia's public utility regulation. I will further discuss community engagement and consumer empowerment as employed in the contemporary urban water and energy sectors in Section 2.4.5.

### 2.3.2 Utility sector objectives

Reforms to the sector initiated in the early 1980s have extended the primary objectives of urban water sector to include concerns about efficiency and environmental impacts (PC 2005a, 2008). To separate multiple objectives traditionally embedded in urban water utilities, the responsibilities for water resource management, sewage disposal, water regulations and standards, regulatory enforcement, and pricing regulation and determination, have now been transferred to different agencies in the respective jurisdictions. The requirements to achieve these provisions are explicit conditions of licensing. The prevailing objective of the urban water sector has become:

> *... to provide water, sewerage and stormwater services in an economically efficient manner so as to maximise net benefits to the community'* (PC 2011a: 69)

The urban water pricing reforms that focused on full cost recovery, consumption-based pricing, and the removal of cross-subsidization have changed the traditional way to address water affordability within the urban water sector. The duties of assisting water affordability among low income households and other social obligations has now been required by the government as part of the CSOs among the retail water business.

In the contemporary energy sector, both the electricity sector and the gas sector must focus on efficiency, safety, reliability, energy security, and long term customer interests. The national electricity sector aims:

> *… 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 – price, quality, safety, reliability, and security of supply of*

> *electricity; and the reliability, safety and security of the national electricity system.* (AEMC 2014a)

While the national gas sector seeks:

> *… to promote efficient investment in, and efficient operation and use of, natural gas services for the long-term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.* (AEMC 2014b)

Despite the fact that the long-term interests of utility customers are cited within the objectives of both the national electricity and gas sectors, the primary goals are sector efficiency, energy security, and reliability. This indicates that the traditional social objectives of energy affordability have become the responsibilities of other agencies, or as parts of the government funded CSOs.

### 2.3.3 Transforming the 'state-utility-citizen' relationship

One of the notable effects of the urban water and energy sector reforms is a re-evaluation of the role of citizens to ‘citizen-consumers’. Prior to the period of public sector and microeconomic reform, the urban water and energy public enterprises were considered as part of the government. The state-owned utilities and utility users were subject to a direct 'state-citizen' relationship (see Figure 2.1). Water and energy utility service delivery and utility prices were perceived as public policy instruments to achieve multiple economic and social objectives.

State Electricity Commissions primarily sought to set efficient prices, but price determination was subject to political determinations based on perceived economic development and social impacts. At that time when water and energy prices were set at below market prices, it could be argued that such utility pricing policy was a type of 'across-the-board price subsidy' (Komives et al. 2005). A

universal subsidised tariff was considered as a channel to redistribute income among citizens according to the notion of ‘fairness’, though the distributional outcome may not necessarily be fair (Cox 1996). As argued by Ernst (1994), these social imperatives were used to address the collective demand for state provision of affordable essential utilities services towards its citizens. However, through public utility reform, the relationship between utility service providers and utility users developed into a 'company-customer' relationship dependant on service provision and monetary transactions. Water and energy tariffs are no longer considered as a social policy tool.

Nonetheless, there have been differences in these ‘state-utility-citizen’ relations between the urban water and energy sectors, as can be seen in Figure 2.2 and 2.3. Within the contemporary urban water sector, there are strong elements of state intervention in water pricing decisions, water infrastructure investments, water planning, and water rationing policies during the period of drought. These intervention policies signal that citizen-customers still expect that state governments, in an certain extent, to have the final responsibility to ensure water security, affordability, and 'share the pain of water shortage' throughout the community (Cooper et al. 2011).

By contrast, direct state intervention in establishing energy tariffs has gradually diminished except for the provision of optional 'regulated energy offers' in some jurisdictions. Over time, the role of the 'regulatory state' has become more prominent in the liberalised energy market with the creation of new institutions to promote competition through regulation-*for*-competition (Chester 2007). In the majority of instances, energy companies and energy customers are able to establish individual contracts with agreed prices, terms and conditions. Furthermore, a reverse relationship has emerged where some residential energy customers have become small scale electricity producers - those customers who have installed solar roof top generators and export the solar power back to the electricity grid with a payback of premium Feed-in-Tariffs. This has engendered a 'bi-directional' relationship between energy suppliers and some energy customers.

The practice of considering people as 'customers' rather than 'citizens' in public service delivery has been criticised by some scholars in the view of socialism. Week and Pittard (2007) argued that the public utility provider's treatment of customers 'as a means to an end (profits)' rather than 'as the proprietors of government (the owners)' may not be ‘appropriate' if services are regarded as 'merit goods'[4]. They argued that the market solution to promoting citizen choice and empowering citizens in market-based bargaining has indirectly reduced citizens’ rights to basic services (Miraftab  2004; Warner 2008). In addition, the practice of a user-charge may create an economic barrier so that not all citizens may be able to afford to basic and essential services (Bishop and Wanner 2004), though this has rarely occurred in Australia.

On the contrary, some scholars argue that low income energy customers can be beneficial from market based solution. For instance, this analogy is supported by Nelson and Reid (2014)'s findings that there would be substantial cost savings for the same energy usage levels if customers shift from regulated offers to market offers. Provided with different tariff options, low income energy customers can choose to shift their energy use profile to take advantage of cheaper non-peak consumption charge. Simshauser and Whish-Wilson (2015) argue that using 'discriminatory pricing' can assist low income household to manage their utility consumption in an affordable manner, which aligns to the notion of fairness.

Despite there is progressive liberalisation of the energy market, community concern on rising energy prices and vulnerable households suffer in fuel poverty has increased (Chester 2013; ACOSS 2014). The reported consumer complaints regarding household energy service disconnections and credit issues have increased in the recent years (AER 2014b, AER 2014c).

[4] A merit good is a commodity which is regarded as basic need and should be provided on the basis of need rather than individual's ability and willingness to pay (Musgrave 1959). It is noted that access to energy and water services is regarded as necessary, however, what consumption level is regarded as non-discretionary is debatable.

## 2.4 Tackling utility affordability: current policy landscape

While urban water and energy sector objectives have changed and new governance approaches have been adopted, not all of the traditional social functions have been abandoned by governments. Rather, new social imperatives and policy settings have emerged to respond to citizens demands for utility affordability and social equity. The new social policy settings are illustrated in the red paths indicated in Figures 2.1, 2.2 and 2.3. As argued by Keating (2004: 6), 'the shift to marketisation largely represents an attempt by government to enhance or restore their power to achieve their economic and social objectives, while minimising any loss of efficiency'.

Strategies that can successfully tackle utility stress and hardship need to be directed at the drivers and impacts of the problems identified in Chapter 1 - Section 1.1.3. There are five broad types of policy currently applied: (i) price-based policy; (ii) state concessions; (iii) income support; (iv) energy and water efficiency; and (iv) customer protection and empowerment. In this section I critically analyse the strengths and weaknesses of current policies that have been implemented to manage issues relating to utility affordability and affordability outcomes in Australia.

### 2.4.1 Price-based policy

In the pre-reform urban water sector, universal tariff subsidies were the predominant method for ensuring water and energy services were affordable to all. After a series of public utility reforms, addressing affordability and social equity is no longer a focus of utility pricing. Nowadays, utility pricing determinations emphasise economic efficiency, full cost recovery, and environmental sustainability.

For United Kingdom which has undergone similar public utility sector reform, their practice to address water affordability is to allow cross-subsidisation between different customer classes. In 2010, the Water Services Regulation Authority (OFWAT) announced that urban water retailers are required to provide social tariffs to identified vulnerable customers, and that they are allowed to charge higher prices to other customers (DEFRA 2012). However, the Australian model encourages utility business to implement full cost pricing as an overarching pricing objective. Extra costs associated with specified social obligations should be funded by governments' CSO payments (Industry Commission 1997).

**Table 2.3** Price setting in urban water and energy sectors

| Jurisdiction | Urban water sector | Energy sector |
|---|---|---|
| NSW | Independent Pricing and Regulatory Tribunal (IPART) reviews and determines water tariffs, except for rural and regional areas | Three year price path set by IPART; AEMC review in 2013 recommended a move to deregulation |
| Victoria | Essential Service Commission Victoria (ESCV) reviews and determines water tariffs | Price deregulation in place; price monitoring since 1 January 2009 |
| South Australia | Essential Services Commission SA (ESCSA) reviews and determines water tariff, except for rural areas | Price deregulation in place; price monitoring since 1 February 2013 |
| Queensland | Queensland Competition Authority (QCA) monitors and determines water tariffs | One year price path set by state regulator; commitment to deregulation in 2015 if certain conditions are met |
| Tasmania | Office of Tasmanian Economic Regulator (OTTER) reviews and determines water tariffs | Full retail competition from 1 July 2014; government still maintains price regulation |
| ACT | Independent Competition and Regulatory Commission (ICRC) reviews and determines water tariffs | Government still maintains price regulation, although in 2011the AEMC recommended the removal of regulation of retail electricity tariffs |
| WA | Economic Regulation Authority reviews and recommends water tariffs to Cabinet Minister | Economic Regulation Authority review and recommends energy tariffs to Cabinet Minister |
| NT | Utilities Commission reviews and recommends water tariffs to Regulatory Minister to decide final tariffs | Economic Regulation Authority reviews and recommends retail energy tariffs to Regulatory Minister to decide final tariffs. |

**Source:** Deloitte (2014); ERAA (2014); NWC (2014:14)

In Australia, the use of tariff-based policy to support disadvantaged households has been reduced since the implementation of urban water pricing reform. Table 2.3 summarises the agencies that are responsible for utility pricing setting in different jurisdictions. In SA, WA, and the NT, urban water pricing decisions still remain the responsibility of the state government ministers. In the ACT, NSW, Victoria, and Tasmania, some residual impacts of state intervention can be found because water and sewerage pricing are determined by state economic regulators. In these jurisdictions, the approved water and sewerage prices are based on economic rates of return for water service providers (PC 2011a). The intent of water pricing regulations is to ensure a reasonable rate of return to the owners as well as to prevent monopoly profits.

However, one major concern noted by Grafton et al. (2015) is that Australian water businesses have historically set prices at below the optimal level for management of demand and supply. During the prolonged period of drought in 2000, household water prices were not increased to reflect reduced water supply and to manage water demand. Instead, mandatory water restrictions were in place and expensive supply augmentation investments occurred in many jurisdictions. Consequently, in the recent post-drought period, water businesses charged higher prices to achieve full cost recovery even though these additional infrastructures are not necessary in the current water storage level. Therefore, using cost-of-service regulation and pricing model would result in premature or inefficient water supply augmentation (Grafton et al. 2015). One of the examples is the case of Sydney desalination plant which was built in 2010. The plant was shut down after two years of operation because precipitation and water inflow has increased and, thus, the marginal cost of water provision from Sydney dams is lower than the marginal cost of water supplied from the plant. The construction of the desalination plant has costed Sydney water consumers AUD$1920 million. It is a dilemma that the original intention to maintain water affordability through low pricing and water rationing has resulted in inefficient and expensive investment and large increase in water price afterward. In this case, keeping the water price

low in times of drought have addressed water affordability in the short term, but have resulted in a higher welfare cost and higher water price to recover investment cost in the long run.

In the Australian energy sector, energy price setting mechanisms vary across jurisdictions (Table 2.3). Within the NEM and NGM in eastern and southern Australia, the AER is responsible for enforcing energy markets regulations. Since energy market liberalisation, there are no regulated tariffs in Victoria, SA, or NSW (from 1 July 2014) (AER 2014a, 2014b; IPART 2015). That means economic regulators in these jurisdictions no longer set regulated prices for energy customers. Energy retailers establish energy contracts with customers with agreed market tariffs, and possibly with other fees and discounts, called 'market offers'. In Queensland, the ACT and Tasmania, state economic regulators still maintain and set tariff caps via 'regulated tariffs'. In these jurisdictions, any market offers should be set below the regulated tariff caps. As mentioned earlier, using market offers can be effectively address affordability issues of low income customers (Nelson and Reid 2014; Simshauser and Whish-Wilson 2015).

In WA, a stand-alone market – the Wholesale Electricity Market – is administered by the Independent Market Operator and regulated by the WA Economic Regulation Authority (ERA). The WA government partially regulates the electricity prices offered by Synergy and the Horizon Power Corporation (WA Department of Finance 2015). To address energy affordability in remote areas, a Uniform Tariff Policy is applied to ensure electricity consumers in small and remote communities are all charged the same rate. The Uniform Tariff Policy is funded by the electricity network charges in the South West Interconnected System and a WA government subsidy. However, it is arguable whether Uniform Tariff Policy is an efficient policy instrument to address utility affordability. In 2014-15, a total subsidy of AU$616 million was provided by the WA government to the WA electricity sector (WA Department of Treasury 2014). Similarly, as part of the CSO payment to Ergon Energy in Queensland, the Uniform Tariff Policy costed the taxpayers $615 million in 2013-14 (Queensland Competition Authority 2014, p.10-11).

In the Northern Territory (NT), an integrated electricity utility network is establish, which comprises several independent power producers and remote generators. Despite the establishment of the Utilities Commission, the NT government minister retains the power on the electricity, water, and sewerage tariffs decision (Power and Water Corporation 2015).

Overall, there is a mixed approach to government intervention in energy pricing across jurisdictions. In WA and the NT, despite the establishment of state economic regulators, government ministers still retain the power to decide electricity tariffs. In these jurisdictions, ministers apply varied strategies such as industry subsidies or Uniform Tariff Policy to address energy affordability and social equity. For those jurisdictions within the national energy market, the influence of government ministers on energy pricing determination is weak. State economic regulators still set regulated tariffs in the ACT and Queensland, but not in other jurisdictions that have undergone complete market deregulation. Thus, addressing energy affordability via tariff-based policy is becoming increasingly difficult in a fully contestable retail energy market.

### 2.4.2 State concession schemes

Over time, the responsibility to address utility affordability has been redirected from the public utility sectors towards the state and territory governments through the provision of state water and energy concessions (state utility concessions). Water concession schemes are funded and administered by governments and delivered via water retailers as part of their CSOs. In general, CSOs were non-commercial requirements on government business enterprises (GBEs) for identified social purposes (Industry Commission 1997).

As part of the CSO requirement, urban water and energy retailers need to provide water and energy concessions on behalf of state governments to pensioners and concession card holders is explicitly stated in the licensing arrangements of the

urban water and energy retail sectors'. For some remote communities in Australia, water and energy service providers are required to charge prices lower than full cost recovery levels (NWC 2014). Under a CSO arrangement that was reformed in 1997, governments increasingly provide direct funding for CSO activities, and request CSO activities be administered in an efficient manner (Industry Commission 1997). The majority of the CSO expense is funded by state and territory governments. The federal government contributes to concession funding under the *National Partnership Agreement on Certain Concessions for Pensioner Concession Card and Senior Card Holders* (NPA) (COAG 2008, 2013). In additional to state concession scheme, Victorian Government also provides Utility Relief Grant Scheme (URGS) while NSW Government provides a Family Energy Rebate, which are fully funded by the respective state governments.

To assist with water affordability, there are two types of water concession schemes available across jurisdictions: (i) water and sewerage concession; and (ii) life support concession such as for water use for kidney dialysis machines. State energy concessions have been recognised as one of the major social policy initiatives to assist energy affordability among low-income and vulnerable households (Deloitte 2013; ACOSS 2014; Johnston 2013a, 2013b; AEO, ERAA, ACOSS 2013). A variety of energy concessions are available, including: electricity concessions, gas concessions, life support rebates, and medical cooling/heating concessions.

At present, there is no consistency of eligibility criteria and entitlement to state utility concession schemes across jurisdictions. The majority of water and energy concession recipients are Pensioner Concession Card holders. With the rapid rise in energy prices, there has been an urgent requirement to further develop energy concessions to create a more adequate, equitable, and nationally consistent approach (Chester and Morris 2011; ACOSS 2014). Additionally, the majority of current concession card holders are age pensioners and there are significant financial challenges in providing sufficient water and energy concessions to an increasingly ageing population. These concerns will be further discussed in Chapters Five and Six.

Overall, concessions are regarded as targeted social policy, provided to particular groups assessed as being in need. When compared with universal tariff subsidies, provision of concessions has the benefits of imposing less economic efficiency than through price distortions (PC 2011a). However, there are weakness to the current state concession policies identified by previous reviews (Deloitte 2013; Henry 2009; PC 2011a). I have summarised those relevant to addressing water and energy affordability problems.

(i) The category based concession scheme has resulted some types of low income and vulnerable households have fallen through the crack in the current system. For example, Deloitte (2013) identifies that family formation group, single renters with low incomes, regional customers with low incomes, and new home buyers with low after-housing-cost income , some types of households are ineligible for energy concessions in most jurisdictions.

(ii) Eligible concession customers may find the concession scheme too complex to understand. In some jurisdictions, there are a variety of water and energy rebates. Consumers may be confused as to which concessions are available and which they are eligible for. In some cases, eligible consumers may be required to lodge multiple applications. Administering multiple rebates increases costs for both governments and utility retailers. Further, Baker (2010, 2011) found that the complexity and red tape involved in state concession schemes have increased barriers to, and possibly the stigma of, eligible households accessing concession benefits.

(iii) In economic perspective, concessions that apply to the volumetric component of energy and water bills may prevent consumers from facing efficient price signals and result in efficiency costs.

(iv) Concessions may fail to promote horizontal equity if they are targeted toward some low-income groups (e.g. pensioners) and not other groups

(e.g. unemployed), even though they may have similar economic circumstances (HRC 1997).

(v) The current state utility concession systems based on the Commonwealth concession cards may favour asset rich, but income poor retired households. This group may in fact not be low income or low net worth, or facing utility stress and hardship.

(vi) Concessions can be regressive with income, particular in cases where eligibility for concessions is relatively relaxed. Those eligible non-poor households can receive benefits but those poor ineligible households are excluded from concession.

(vii) For concession arrangements that do not take account of the number of occupants in a household, for instance, lump sum water or energy rebates, these concession arrangements would be more generous for small households and potentially inadequate to alleviate utility stress for large households. I will further discuss the equity implication of the current concession scheme in Chapter 6.

(viii) Using Commonwealth concession card eligibility to set eligibility for state utility concessions will indirectly increase the perceived value of the concession card among social security recipients. Eligibility for concession cards is often based on an income threshold, and this can create a strong incentive to reduce or under-report incomes (Henry 2009).

Lastly, the current concession scheme that targets age pensioners has raised the concern of achieving utility affordability and fiscal sustainability when considering the trends in rising utility prices and population aging. In 2012-13, over 25 per cent of Australian households were Commonwealth concession card holders (McClure et al. 2014). Almost 35 per cent of Victorian households received water concessions in 2006-07 (Vic DHS 2007a). In some jurisdictions, households with members who are state seniors card holders or Commonwealth

Seniors Health Card (CSHC) holders are also eligible for state utility concessions. Thus, the proportion of households receiving energy concession households was almost 40 per cent and 30 per cent in Tasmania and SA, respectively in 2013-14 (AER 2014a, 2014b). Australia's population is ageing: it is estimated that almost a quarter of Australians will be 65 or older by 2050 (FaHCSIA 2014: 61). Current state concession schemes partly rely on funding from the federal government. Such funding arrangements will be subject to the Australian policy cycle (Everett 2003; Howlett et al. 2003) and the federalism debate (Brown 2006; Bligh 2009; Brumby 2009; Swan 2009; Gillespie 1994). Overall, to maintain the financial sustainability of the state concession schemes and the federal social welfare system in view of ageing population, further reform may be necessary (Henry 2009; Harmer 2009; McClure et al. 2014; 2015; Podger et al. 2015; Borowski et al. 1997).

### 2.4.3 Income support system

Improving the financial capacity of low-income households and vulnerable groups is an alternative strategy to address utility affordability and hardship. The Australian welfare system is strongly integrated with the Australian taxation system (Henry 2009). This dual welfare redistribution system – the Australian tax-transfer system – allows assistance to be targeted towards the poor through both income payments and the progressive taxation system so as to maximise vertical equity (Whiteford 2010; Spies-Butcher and Stebbing 2011). In Australia, the progressive taxation framework requires higher income earners to pay higher taxes so as to achieve vertical equity. The transfer system, on the other hand, includes income support payments (e.g. pensions, Newstart Allowance, family tax benefits) and supplementary payments (e.g. Utilities Allowance, Pension Supplement, Seniors Supplement, Commonwealth Rent Assistance) administered by the Australian Department of Social Services (DSS) and Centrelink.

The social welfare system has been focused on both poverty alleviation and on protecting those who are unable to participate in the workforce due to old age, disability, or other circumstances (Herscovitch and Stanton 2008). Over time, the Australian welfare system has become integral for the welfare of individuals and families, and it has increasingly focused on income maintenance (Podger et al. 2014). Provision of pensions and allowances are subject to a means test, and sometimes activity tests, and thus the Australian system is regarded as highly targeted among OECD countries (Whiteford 2010).

In 2014, there were 20 income support payments and 55 supplementary payments provided by the federal government (McClure et al. 2014). Pension payments are provided as long-term support to meet basic costs of living because it is perceived that 'there is no real prospect of these recipients improving their circumstances through employment' (McClure et al. 2014: 26). Allowances are provided as transition payment 'to support recipients through a period between jobs, the transition from education to work, a period of re-skilling or temporary incapacity' (McClure et al. 2014: 26). Supplementary payments, such as Commonwealth Rent Assistance (CRA) and Family Tax Benefit - Part A (FTB-A) and Part B (FTB-B), are designed to address specific needs. Income support payments are expected to be sufficient to support the basic cost of living (DHS 2015d). For example, low-income families with children can apply for Family Tax Benefits (Part A and/or Part B) to assist the costs of raising children. Based on this principle, water and energy utility services should be included in the base payment rate for income support payments.

In the current national welfare system, some supplementary payments are specifically targeted to address essential costs of living including water and energy expenses (Appendix 2.3). For instance, Utilities Allowance is provided to help recipients 'to meet the costs of regular bills such as gas, electricity and water when they are on certain Centrelink payments' (DHS 2015a). This utility payment was provided as a separate payment to eligible recipients prior to the Harmer review in 2009. The system was simplified by combining Utilities Allowance and other payments (Pharmaceutical Allowance, GST Supplement, Telephone

Allowance) into a single payment for pensioners as the Pension Supplement (DHS 2015a) and for CSHC card holders as the Seniors Supplement (DHS 2015b).

In 2014, the Department of Human Services introduced an Essential Medical Equipment Payment to assist eligible households (that is, Commonwealth concession card holders and those with members with specific medical conditions and medical equipment requirements[5]) with the additional costs of running essential medical equipment, medically required heating or cooling, or both (DHS 2015c).

There are several advantages of using federal income support systems over price-based policy to address utility affordability. First, cash transfers do not change the price signal faced by utility consumers and will not affect consumers' incentive to conserve water or energy (PC 2011a). According to this principle, cash transfers are likely to have less efficiency loss than state utility concession schemes or tariff-based policy. Second, provision of a lump sum payment allows flexibility for the assisted household to decide how to spend the money in their best interests. Third, it reduces complexity and administrative costs for the various layers of government and agencies that currently provide similar types of assistance. Fourth, direct transfers are usually provided on a sliding scale and their use will allow lower effective marginal tax rates than the concession card system, and therefore have less impact on work incentives (Henry 2009).

However, there are several weaknesses of the current national welfare system. First, the income support system is highly complex with multiple payments, supplements and required means tests. Too many supplementary payments creates confusion, duplications and complexity (McClure et al. 2014). Both recipients and administrators find the system hard to understand and manage. Recipients may need to compare various payment options due to different eligibility and payment rates. Second, the requirements for work participation among income recipients

[5] List of medical equipment and conditions to be eligible to Essential Medical Equipment Payment can be referred to http://www.humanservices.gov.au/customer/services/centrelink/essential-medical-equipment-payment

are not aligned with changing social expectations (McClure et al. 2014). Third, interaction between multiple means tests and the tax and transfer system have resulted in high effective marginal tax rates for income recipients who earn extra income, thus providing a disincentive to work.

Fourth, the financial sustainability of the current welfare system, which is financed via general revenue, may be at risk due to the trends of an ageing population and declining workforce participation (McClure et al. 2015; Podger et al. 2014). Fifth, inequity exists between various types of income support recipients, such as between pensioners and unemployed, or between urban and rural residents (Henry 2009). Finally, the current indexation and benchmarking arrangements for pensions and allowances are different and, thus, this creates horizontal inequality among different recipients – people in similar circumstances are treated differently. In the 2014-15 Budget, the Australian Government decided that the CPI would be applied as the common form of indexation across all future payments (McClure et al. 2014: 28). Given that many essential costs of living, including water and energy prices, have been rising much faster than CPI, it is questionable whether payments indexed with CPI will be adequate to address the affordability of utility and other essential services for disadvantaged households.

Overall, the principles of fairness and ability to pay are important elements in the tax and transfer system (Stewart et al. 2015: 6-8). The Productivity Commission (PC) (2011a) advised that the application of the federal government's tax and transfer system should be regarded as the most efficient and equitable way to address water affordability. Given there are strengths and weaknesses of both federal tax and transfers system and state concession scheme, it would be worthwhile to examine the equity, efficiency and effectiveness of schemes in relation to addressing water and energy affordability in Australia.

### 2.4.4 Energy and water efficiency measures

Improving the energy and water efficiency of housing stock and household appliances among low-income households is a long term strategy to tackle fuel poverty and water poverty (Boardman 2004, 2010, 2012; Deloitte 2013; Fitch and Price 2002; Hills 2011, 2012). Policies to improve water and energy efficiency align to with policies to reduce greenhouse gas emissions (Owen 2000; Hussey and Pittock 2012).

In Australia, COAG agreed to a comprehensive, 10-year National Strategy for Energy Efficiency (NSEE) across all sectors of the Australian economy in July 2009 (DIS 2015b). At present, all sectors are involved in energy and water efficiency and conservation measures (Appendix 2.4). For instance, utility retailers operating in jurisdictions with customer hardship policy frameworks are required to provide water and energy efficiency advice, or even free home water and/or energy audits (Ali et al. 2014; AER 2011). Both the federal government and state governments have in place building regulations with higher water and energy efficiency requirements. Federal and state governments also provide various subsidies and rebates as incentives for households to install new or replacement appliances that are more energy efficient, such as the Victorian Energy Efficiency Target rebates (Appendix 2.4).

Government-funded water efficiency and conservation programs were initially implemented in response to the prolonged drought as demand side management (Randolph and Troy 2008) and Integrated Urban Water Management (Mitchell 2006). Over the last 10 years, government subsidies or rebates have been provided as incentives for households to upgrade their household appliances or water fixtures to more water efficient ones, such as dual flush toilets or more water efficient washing machines, and to fix water leakages, install rainwater tanks, and change garden landscaping to more drought proof vegetation. The most widespread programs have been various rainwater tank rebates provided by state and territory governments (Marsden Jacob 2009), and implementation of mandatory building regulations requiring water efficiency measures for new

dwellings (ABS 2013c; Gregory 2012). According to the ABS (2013c), the proportion of Australian households who have rainwater tanks installed has increased from 17 per cent in 2004 to 26 per cent in 2010. The main purpose of these programs is to reduce water consumption.

Over time, untargeted water and energy efficiency programs can be regressive and may widen the water and energy affordability gap between the rich and the poor. This is because poor households which do not have the financial capacity to improve efficiency of housing stock or to replace household appliances are unable to receive these subsidies.

Increasingly, there are state government funded programs partnering with the community sector to provide water and energy efficiency advice and audits to low-income and vulnerable households (Dillon et al. 2010). In addition, there has been increased funding to improve water and energy efficiency in state-owned public housing (Deloitte 2013).

### 2.4.5 Customer protection and empowerment

Within the emerging paradigm of social responsibility, there has been an increased emphasis on customer protection, consumer choice, and consumer empowerment . In the current policy settings, there are four areas of customer protection and empowerment: (i) independent dispute resolution mechanisms; (ii) customer hardship policies; (iii) consumer participation in public utility regulation; and (iv) consumer education. The first two areas are reactive approaches that require utility customers who encounter affordability problems and hardship to take the initiative to engage with the relevant agencies for assistance.

### *Independent dispute resolution mechanisms*

Ombudsman schemes are the main form of independent dispute resolution mechanism for energy and water customers with their utility providers. When utility customers encounter an issue related to service quality, billing, or disconnection or restriction of services, they can choose to engage with the suppliers directly to resolve the problem and/or to engage with the energy and water ombudsman in their jurisdictions to seek redress in the dispute.

Utility customers are increasingly engaging with energy and water ombudsmen. In 2011-12 and 2012-13, EWON recorded a 40 per cent increase in complaints in NSW over the previous years (EWON 2014). Since the implementation of energy market liberalisation, the AER has coordinated national data on customer complaints and energy hardship within the national energy market (AER 2014c).

At present, there is no consistency between or within jurisdictions in the form of independent dispute resolution used (Table 2.4). In NSW, Victoria, WA, SA, and Queensland, specialist industry-based energy and water ombudsmen are established. They operate under memoranda of understanding with the relevant state and territory government ombudsmen to resolve disputes between utilities providers and their customers (PC 2011a: 231). In the ACT, NT, Tasmania, and regional NSW, no industry-based ombudsman scheme is available. Utility customers must lodge complaints with the relevant government departments or local councils.

Using industry-based ombudsmen model is preferred to the state government model for several reasons (PC 2011a: 231). Firstly, industry-based energy and water ombudsmen are empowered by their member utilities to make binding decisions. Secondly, specialist energy and water ombudsmen have greater expertise to deal with energy and water customers and be able to resolve their disputes more efficiently. Thirdly, industry-based ombudsmen are funded via levies on their member utilities retailers on a case-by-case basis. This provides incentives for utility providers to work towards an agreeable solution in the

shortest time possible to reduce costs. Overall, the ombudsman schemes provide a low cost and effective mechanism to deal with utility customer complaints.

**Table 2.4** Independent dispute resolution mechanisms, January 2015

| | Water | Energy |
|---|---|---|
| **NSW** | Energy & Water Ombudsman NSW (EWON) | EWON |
| **Victoria** | Energy & Water Ombudsman Victoria (EWOV) | EWOV |
| **Queensland** | Energy & Water Ombudsman Queensland (EWOQ) | EWOQ |
| **Western Australia** | Energy & Water Ombudsman WA (EWOWA) | EWOWA |
| **South Australia** | Energy & Water Ombudsman SA (EWOSA) | EWOSA |
| **Tasmania** | TasWater or Local councils | Energy Ombudsman of Tasmania |
| **Northern Territory** | Ombudsman NT | Ombudsman NT |
| **ACT** | ACT Civil and Administrative Tribunal | ACT Civil and Administrative Tribunal |

### *Customer hardship policy*

The purpose of a utility retailer's customer hardship policy is 'to identify customers experiencing payment difficulties due to hardship and to assist those customers to better manage their [utility] bills on an ongoing basis' (AER 2011: 6). A customer in financial hardship can be defined as:

> *A customer in hardship is someone who has the intention but not the financial capacity to make the required payments within the timeframe set out in the business's payment term. (ESCV 2006)*

Key features of customer protection policies in the urban water and energy sectors include: (i) specifying the rights and responsibilities of customers and retailers; (ii) conditions for restriction or disconnection of services; (iii) approaches for

identifying customers experiencing payment difficulties; (iv) the requirement for early responses by retailers for hardship customers; (v) the provision of flexible payment options for hardship customers; (vi) providing customers with appropriate information about government concession and financial counselling services; (vii) arrangements for enrolling customers in hardship program; (viii) procedures for reviewing the appropriateness of existing market contract; and (ix) the provision of water or energy efficiency advice (Ali et al. 2014).

At present, there is no consistent customer protection framework in both urban water and energy sectors across jurisdictions (see Appendix 2.5). In the energy sector covered by the NEM and NGM, a National Energy Customer Framework (NECF) was established in 2012. Within the NECF, National Energy Retail Law, Rules and Regulations for electricity and gas (energy) distribution and retail services have been developed. All energy retailers within the NECF are required to develop and put in place customer hardship policies that are approved by the AER. The AER has developed a guideline for retailers on the information required in their customer hardship policies and the minimum requirements and obligations specified in the Retail Law and Rules (AER 2011). As such, the NECF provides a consistent framework and minimum requirements for customer protection policies.

The Victorian government is regarded the pioneer in energy customer hardship polices due to the early implementation of electricity market liberalisation in the jurisdiction (ESCV 2006). The state economic regulator (Essential Services Commission) and Energy and Water Ombudsman Victoria (EWOV) are actively monitoring the energy market and customer hardship statistics. In addition, many civil societies such as Consumer Utilities Advocacy Centre (CUAC), Consumer Action Law Centre (CALC), St Vincent de Paul, Victorian Council of Social Service (VCOSS), have been actively participating in shaping customer protection polices in Victoria over the last decade. Compared to other jurisdictions, major utility retailers operated in Victoria have developed best practice customer hardship policies (for example, Yarra Valley Water) and innovative solutions (for example, peer utility networks) (Hall and Partners 2011). Thus, Victoria already

has in place a relatively advanced customer protection framework when AER advocate for a nationally consistent NECF. Therefore, the Victorian Government has announced to defer its transitioning to the NECF and to maintain its own retail laws and the existing customer protection mechanisms.

WA and the NT will continue to operate under separate frameworks. In 2014, WA implemented electricity retail market competition. The WA Economic Regulation Authority (ERA) has developed a customer hardship policy guideline for the energy sector. The retailers' hardship policy is not required to be approved by the ERA, but to be reviewed if requested by ERA (ERA 2012a). In the NT, there is no energy customer hardship policy guideline available from the state economic regulator, the Utilities Commission. The utility retailer, Power and Water Corporation, has an in-house customer hardship program.

As there is no national water customer framework, there is no unified policy and regulatory approach on water customer hardship policy (Appendix 2.5). As of the end of 2014, almost all the major water utilities had customer hardship policies. This development is aligned with the recommendations of the National Water Commission (2011b) and the Productivity Commission (2011a). There is no statutory requirement for water retailers to develop a hardship policy in the ACT, the NT, or NSW (Ali et al 2014: 29-35). For instance, the *Stay Connected* policy provided by the NT Power and Water Corporation only provides protections for customers experiencing hardship, but no other mechanisms such as identifying hardship customers, early response by retailers, or assistance to improve water efficiency. In NSW, water retailers are only required to develop codes of practice for debt recovery or managing payment deferral. At present, more comprehensive customer protection frameworks are in place in the ACT, Queensland, SA, Tasmania, Victoria and WA (Ali et al 2014: 29-35).

Overall, the benefits of implementing customer hardship polices go beyond protecting customers in hardship. From a retailer perspective, such policies can reduce the cost to retailers of dispute resolution, debt collections, and even legal expenses. In fact, in a competitive energy retail market, incentives such as

offering a variety of payment options (for example, waiving fees, making co-payments, bill smoothing, and tailored payment plans) and a high standard of customer service (for example, provision of water and energy audits, engaging hardship customers with compassion and respect, referral to peer utility networks) would be a marketing strategy to retain or attract customers. Including inclusive principles in service delivery assists to build the reputation of utility retailers as socially responsible businesses (BSI 2010; OFGEM 2013).

Despite recent developments, there are several shortcomings of the existing utility customer policy framework. First, there is no nationally consistent customer hardship policy framework or guideline for both the urban water and energy sectors. The NECF and AER guideline is a good starting point. More needs to be done to encourage the non-participating jurisdictions and the urban water sector to develop similar guidelines and frameworks. Second, there is no agreed definition of hardship indicators for either sector. In the energy sector, the guideline suggests retailers should respond early and take a proactive approach to identifying customers in hardship. Developments of national hardship indicators are an essential element of the NECF (AER 2010). Development of a more proactive approach to identifying customers in hardship could be informed by the Customer Vulnerability Strategy (OFGEM 2013; Baker 2005). Third, a protocol that allows the sharing of information among peer utilities, community organisations, and government agencies which administer social policy, would enhance collaborative strategies to deal with customers in complex circumstance and situations involving multiple hardships (Committee for Melbourne 2004).

### *Consumer participation in public utility regulation*

Improving customer participation in public utility regulation has been advocated in Littlechild (2008) and Biggar (2009, 2011). There are two levels of consumer participation in energy utility regulation in the energy sector in Australia. Under the NECF, the AER established a Customer Consultative Group (CCG) in 2009.

The purpose of the CCG 'is to provide advice to the AER in relation to its functions under the energy laws affecting energy consumers across participating jurisdictions' (AER 2014b). As highlighted in Table 2.5, the majority of CCG members are non-government organisations. These organisations represent the views of the most vulnerable and disadvantaged groups. The CCG was established so as to increase ‘procedural justice’ (Lukasiewicz and Baldwin 2014) in energy sector regulation and consumer protection (Sanja and Gordon 2008).

**Table 2.5** Current members of the CCG **(as at April 2014)**

| Organisation | Area of interests |
|---|---|
| Australian Federation of Disability Organisations | Disability policy and services |
| Consumer Action Law Centre | Consumer protection |
| Consumer Utilities Advocacy Centre | Utility consumer protection |
| Council of Small Business Organisations of Australia | Small business sector |
| COTA Australia | Age pensioners and seniors |
| Ethic Communities Council of NSW | Policy affecting culturally and linguistically diverse communities |
| National Retail Association | Business/Retail sector |
| Public Interest Advocacy Centre | Public policy, consumer protection |
| Queensland Council of Social Service | Social policy |
| St Vincent de Paul Society | Social policy |
| Tasmanian Council of Social Service | Social policy |
| Uniting Care Australia | Community services, social policy |

Source: Adapted from AER (2014b)

Following the experience of the UK energy sector, the AER established a Consumer Challenge Panel (CCP) in 2013 as part of the Better Regulation Reforms. Unlike the CCG, the members of the CCP are appointed in their capacity as individual experts. The selection of CCP members is based on their

background, knowledge, and experience with the energy industry and consumer advocacy (AER 2014b). CCP experts are consulted on energy infrastructure investment decisions, and regulation.

Littlechild (2008: 33-36) argued that there should be a larger role for customers in utility regulatory processes. By allowing consumer needs to be better reflected in regulatory decisions, a more constructive relationship between customers and the regulated firm could be established. In that sense, consumers would take greater responsibility for regulatory outcomes, such as trade-offs between investment and prices, or trade-offs between prices and service quality (Biggar 2011: 42). By engaging with consumers, in this case through the CCP, a utility regulator may be able to address both the notion of fairness and economic efficiency in public utility pricing by promoting and protecting sunk investments (Biggar 2009, 2010).

### *Consumer education and information*

The Australian Government has focused on empowering energy consumers through consumer education and information provision. Within the contemporary energy market regime, energy customers can choose from a variety of energy suppliers and pricing options. It is widely accepted that ‘the power of choice’ can promote competition and innovative markets (AEMC 2012a, 2013b). In fact, Nelson and Reid (2014) estimated that energy consumers would gain substantial savings if they chose the right market offers rather than using regulated offers. However, this task is more challenging than it seems as choosing the right offers from a variety of complex energy pricing options is an unfamiliar concept to Australia’s energy consumers, and particularly difficult for vulnerable customers. Schwartz (2004) found that too many choices can create anxiety and psychological stress among consumers. Consumer empowerment and customer protection regulations have been regarded as the main approach to tackling customer vulnerability in the energy market in the United Kingdom (OFGEM 2013). To simplify the choice dilemma, the AER launched an energy price

comparison website, <www.energymadeeasy.gov.au>, to assist customers with the comparison of energy products and prices.

Over all, the customer protection framework is better established in the energy sector than the urban water sector. Under Australian law, all energy retailers are required to develop customer hardship policies under the NECF. A relatively high proportion of urban water retailers have developed in-house customer hardship policies; however, there is no national regulatory framework to protect domestic water customers (Ali et al. 2014: 17). State energy and water ombudsmen have been established to deal with utility customer complaints and disputes in most jurisdictions. In NSW, Victoria and SA, these ombudsmen are co-funded by water and energy retailers. Consumer engagement and empowerment is now regarded as one of the most important elements of future urban water and energy sector reforms (NWC 2014; DIS 2014).

## 2.5 Respective roles of key actors in the contemporary utility affordability policy landscape

The Australia Government, the state and territory governments, utility regulators, water and energy utility retailers, and the community sector all play a role in supporting households who are financially disadvantaged and encountering utility stress and hardship (Henry 2008). A concern is that the traditional government approaches, including concessional support for households with their utility bills, may be unable to cope with affordability problem that arise from the reformed water and energy utility sectors. In assessing the policy landscape for addressing the utility affordability challenge, it is clear there are a wide range of stakeholders involved from different sectors and different levels of government. Table 2.6 summarises the division of responsibilities among different sectors related to different policy activities to tackle water and energy affordability and hardship.

**Table 2.6** Current policy settings to address utility affordability

| **Activity/Function** | Federal government | State/territory/local government | Utility sector | Community sector |
|---|---|---|---|---|
| ***Utility Tariffs*** | | | | |
| ***Urban water sector*** | | | | |
| Urban water sector reform | *** | *** | *** | - |
| Urban water pricing reform | *** | * | *** | - |
| Bulk water charges | - | *** | - | - |
| Retail water tariff structure | - | - | *** | |
| Retail water tariff determination | - | *** | ** | * |
| Water retail rules and regulation | - | *** | - | - |
| Infrastructure planning & investment decisions | * | *** | ** | - |
| ***Energy sector*** | | | | |
| Energy sector reform | *** | ** | *** | - |
| Energy pricing reform | *** | *** | *** | * |
| Energy wholesale charges | *** | *** (WA, NT) | - | - |
| Energy retail tariff determination | - | *** | *** (Vic, SA, NSW) | - |
| Energy retail pricing options | - | - | *** (Vic, SA, NSW) | ** (Vic, SA, NSW) |
| Energy market rules and regulation | *** | *** (WA, NT) | - | - |
| Infrastructure planning & investment decisions | ** | * | *** | * |

| Activity / Function | Federal government | State/Local government | Utility sector | Community sector |
|---|---|---|---|---|
| Renewable Energy Target (RET) obligations | *** | * | *** | - |
| ***Concessions and rebates*** | | | | |
| Water concessions | * | *** | ** | - |
| Energy concessions | * | *** | ** | - |
| Costs of living rebates | - | *** | - | - |
| Emergency utility grants & assistance | - | *** | - | *** |
| ***General income support*** | | | | |
| Utility allowance/supplements | *** | - | - | - |
| Clean Energy Advance | *** | - | - | - |
| Age Pension | *** | - | - | - |
| Non-Age Pensions and Allowances | *** | - | - | - |
| Family Assistance | *** | - | - | - |
| Remote Area Allowance | *** | - | - | - |
| Rent assistance/low-cost accommodation | *** | ** | - | - |
| ***Customer protection & empowerment*** | | | | |
| Customer hardship policy – Water | - | - | ** | - |
| Customer hardship policy - Energy | *** | *** | *** | * |
| Alternative payment plans | * | - | *** | ** |
| Financial advice | - | - | * | *** |

| Activity / Function | Federal government | State/Local government | Utility sector | Community sector |
|---|---|---|---|---|
| Independent dispute resolution | - | *** | ** | * |
| Tenant & utility payment arrangement | - | ** | - | ** |
| Consumer participation – Water | - | - | - | * |
| Consumer participation - Energy | ** | - | * | *** |
| Energy pricing comparison | *** | ** | - | ** |
| Smart metering & flexible pricing options | - | *** (Vic) | ** (Vic) | * |
| ***Water and energy efficiency*** | | | | |
| Home water and energy audits & advice | - | ** | * | *** |
| Rebates for efficiency improvement measures | - | *** | * | - |
| Home insulation rebates | ** | ** | - | - |
| Solar panel rebate & feed-in-tariff | *** | *** | * | - |

**Remark:** Level of responsibility - Not relevant; * Low; ** Medium; *** High

**Source:** Adapted from the 'adaptive governance' framework in Bellamy (2007)

### 2.5.1 Role of utility service providers

Tackling water and energy affordability via charging universal low utility tariffs was traditionally the social function of government-owned and operated public utility sectors. Since the implementation of market-oriented reform, this social function has been shifted away from mostly corporatized urban water retailers and privatised energy retailers. Nonetheless both the urban water and energy utility service sectors aim to provide efficient and effective utility services to the long term benefit of their customers. To support disadvantaged households, public utility sector has the obligation to implement government social policies and initiatives described in the CSOs. At present, all energy retailers within the NEM and NGM are required to develop and implement customer hardship policies.

### 2.5.2 Role of federal government

The role of redistributing income or provision of welfare to targeted recipients is primarily the responsibility of the federal government. Herscovitch and Stanton (2008) argue that it is the role of the elected federal government to determine national social policies, and to set up institutions and arrangements to fund and implement various social policies, including policies to protect vulnerable people in the society. This perspective was strongly supported by the recent welfare review chaired by Professor Patrick McClure which stated that:

> *Income support payments and associated services are intended to help people meet daily living costs, increase participation in work and social activities, and build individual and family functioning. (McClure et al. 2014: 24)*

Accessing water, sewerage, and electricity utility services is necessary to maintain a basic standard of living for domestic households. If the intent of welfare payments is to assist with people's daily living costs, it offers a strong argument

that these payments should be adequate to cover the affordability gap of water and energy services for vulnerable households.

Since the drivers and outcomes of utility affordability interact with wider macro-economic climate and policies, the federal government is expected to take a stewardship role to coordinate national strategies across different areas and disciplines in the long term interest of its citizens and the economy. These include national water policy (for example, the National Water Initiative), national energy policy (for example, the Energy White Paper), climate change policy (for example, the earlier *Clean Energy Future* program), population and labour policy (for example, migration policy and paid parental leave schemes), national welfare policy, taxation policy, other microeconomic reform, and macroeconomic policy. Australia has a progressive tax and transfers system which is administered by the federal government, it can serve as a efficient and effective social policy tool to help offset the market-based inequality (Harding 1997).

### 2.5.3 Role of state and territory governments

Currently, state utility concession schemes play an important role in addressing utility affordability problems. It can be an additional layer of social protection to the Commonwealth welfare system, in particular, for those individuals or households with fixed and low incomes (Harmer 2009: 100). Applying state-based concessions would have the advantage of offering flexibility and innovative design to address needs according to local socio-economic and climatic conditions. For instance, the Victorian Department of Human Services provides a Winter Energy Rebate to eligible households during the winter period, between 1 May and 31 October, to assist with higher winter energy costs (Vic DHS 2013a, 2013b). The WA government offers an Air Conditioning Rebate (ACR) to eligible households living in 'areas of high heat discomfort'[6] (WA Government 2014a).

[6] Area of high heat discomfort have been identified as locations north of the 26th Parallel of South Latitude and/or north of the 50-day Relative Strain Index line (WA Government 2014a).

With proper design, state-based utility concessions can provide extra assistance to local communities who have higher needs.

However, the design, funding and administration of state-based concessions may not be the most equitable and efficient approach to tackling utility stress and hardship. The initial provision of state concession schemes was funded and administrated by the state and territory governments to assist with the essential costs of living among low-income groups (Temple 2005). However, under the COAG NPAs, all pensioners are entitled to the same concession benefits in the same jurisdictions in regardless whether they receive full pensions or part pensions (COAG 2013). Some jurisdictions, such as the NT, SA and WA provide water and energy concessions to state seniors card holders. This category-based targeting with Commonwealth concession cards as eligibility criterion would create disincentive to work among eligible households due to the high effective marginal tax rate incurred on increased employment income (Henry 2009). Furthermore, this category-based targeting has generated a high inclusive error and low vertical expenditure efficiency (Chapters Five and Six). Inconsistency of eligibility criteria and concession entitlements across jurisdictions have resulted in inequitable and inefficient targeting and have left some vulnerable groups excluded from the current system (Deloitte 2013; ACOSS 2014).

Overall, there is no clear division of responsibility between the federal and state and territory governments in tackling utility affordability. In the federal government's welfare system, Utility Allowance is included as part of the supplementary payments provided to pensioners and senior concession card holders(for example, Commonwealth Pensioner Concession Card (PCC) and CSHC holders). Commonwealth Family Tax Benefits are paid to address the extra cost of raising children, including the extra utility costs associated with having children. However, state level water and energy concessions are provided to PCC holders, and sometimes to CSHC and Commonwealth Health Care Card (HCC) holders. That means some low-income households receive payments or rebates related to utility affordability from both federal and state governments, while some receive none of them.

Furthermore, there is weakness in the current funding arrangements and the respective roles of Commonwealth and state governments (Kewley 1961). At present, the estimated Commonwealth contribution towards the Queensland water and energy concession scheme is valued at AU$50.4 million, about 15 per cent of total Queensland concessions expenditure in 2014-15 (Queensland Government 2014a). The 2014 Australian Government Budget Papers revealed that the federal government planned to terminate the NPA by lowering its contribution towards state concession schemes (Australian Government 2014a). Although the proposed change did not pass the Senate, some state governments have announced reductions to concessions and rebates, for example, the WA government has announced a reduction of the Seniors Cost of Living Rebate (WA Government 2014b). Most jurisdictions have kept the full pensioner concession entitlements even under state budget shortfalls (NSW Government 2014; LGA SA 2014; Queensland Government 2014). The Australian policy cycle (Everett 2003) and potential cost-shifting policy from 'fiscal federalism' poses a challenge for state and territory governments to continue delivering various concessions to pensioners and seniors when facing budget uncertainty.

### 2.5.4 Role of utility regulators

Despite the variation in urban water and energy sector operations across jurisdictions, many jurisdictions have established independent economic regulators to regulate the urban water and energy sector. Under traditional policy settings, economic regulators act as rule makers and regulatory enforcers for the public utility sectors. They have played an important role in reducing the political interference of governments in utility tariff determinations.

**Table 2.7** Roles and functions of regulators to address utility affordability

| Current roles and functions |
|---|
| • To advise governments on impacts of proposed policy changes on particular vulnerable customer groups<br>• To develop, implement, and enforce regulatory obligations to ensure regulated utility providers have in place systems, procedures, and incentives to deliver the required social outcomes<br>• To monitor and inform governments of emerging trends related to utility affordability and hardship, such as statistics of customers in hardship programs, disconnections, or credit issues<br>• To set up customer protection frameworks and guidelines to protect vulnerable customers in the utility market<br>• To enhance consumer participation in the energy market process |
| **Reform direction in a regulated market** |
| • Approving a utility tariff that is fair to both disadvantaged customers and utility providers (Biggar 2009, 2011)<br>• Preventing price shocks or sharp rise in tariffs for disadvantage households (Griffin 2006; Bonbricht et al. 1961; ACOSS 2014)<br>• Conducting regular tariff and concession framework reviews to examine ways to make essential utility tariffs affordable to all customers (Office of Energy WA 2011) |
| **Reform direction in a competitive liberalised utility market** |
| • To engage customers in utility regulation and infrastructure investment decisions (Biggar 2010, 2011, AER 2014b)<br>• To promote competition and approve infrastructure investment that aligns to long term interests of customers (NWC 2014, AER 2014a; Biggar 2009, 2011)<br>• To enhance customers' knowledge and confidence to enable participation in the utility market (AEMC 2012a; OFGEM 2013)<br>• To facilitate utility customers to make informed choice and to prevent 'decision fatigue'[7] (Tierney 2011, Baumeister 2003) in the liberalised utility market<br>• To conduct research and develop strategies and guiding principles to tackle customer vulnerability in utility markets (OFGEM 2013) and implement inclusive service principles in BSI 18477: 2010<br>• To prevent potential adverse selection and competitive screening due to asymmetric information in the competitive retail market (Joskow and Tirole 2006; Hyland et al. 2013) |

**Source:** Committee for Melbourne (2004); AER (2014b); OFGEM (2013); DRET (2012: 171)

[7] Decision fatigue refers to the tendency for an individual's ability to make quality decisions to deteriorate after a long session of decision making, which causes irrational and poor choices with their purchases.

With the energy sector reformed towards privatisation and price deregulation in many jurisdictions, the respective roles of state and national utility regulators have also transformed (Table 2.7). Utility regulators could have a larger role to play in a competitive liberalised utility market, such as in the NEM and NGM. Biggar (2009, 2010, 2011) suggests that regulators can balance customer affordability and investment decisions by increasing customer participation in public utility regulation. In addition, utility regulators can enhance customers' knowledge and confidence to enable them to actively participate in the utility market (AEMC 2012a; OFGEM 2013). Utility regulators may also to develop customer vulnerability strategies (OFGEM 2013; Hoogeveen et al. 2014) and inclusive service principles in BSI (2010)[8] for a liberalised energy market.

By contrast, the role of regulators is different in regulated utility markets, such as the urban water sector and the WA and NT energy sectors which are outside the national energy markets. They can enhance utility affordability outcomes by approving a utility tariff that is fair to both disadvantaged customers and utility providers (Biggar 2009, 2011); by setting tariffs to prevent disadvantage households experiencing price shocks (Griffin 2006; Bonbright et al. 1988; ACOSS 2014); and by conducting simultaneous utility tariffs and concessions reviews regularly.

### 2.5.5 Role of community organisations

The role of the community sector has increasing importance in the emerging forms of social governance within Australia's social policy regime (Smyth 2008). Bowles and Gintis (2002) suggested that the community sector, because of its local reputation, respect and connectedness, could act as the initiator of

[8] The British Standard for Inclusive Service Provision sets guidelines to help organisations provide a fair, flexible service that can be used by all consumers equally, regardless of their health, age or personal circumstances (BSI 2010). See http://www.bsigroup.com/LocalFiles/en-GB/consumer-guides/resources/BSI-Consumer-Brochure-Inclusive-Services-UK-EN.pdf

community-based economic activity. The community sector has and can contribute to tackling utility affordability and hardship problems in a variety of ways. At present, the unique role of the community sector includes:

- Providing financial advice and assistance to people experiencing financial crisis
- Providing one-off water or energy vouchers to households who are in exceptional financial hardship
- Building partnerships with utility retailers on the development of customer hardship programs
- Providing training to utility customer service staff in engaging with vulnerable customers (Hall and Partners 2011)
- Providing assistance with essential costs of living, such as supported accommodations, food, clothing, furniture, counselling, and other goods and services
- Providing free or low cost energy and water efficiency audits and advice to low-income and vulnerable households

In addition, the community sector engages governments and utility sectors on matters related to social policy development such as state utility concession policies and utility customer protection frameworks (Kernaghan 2009). Furthermore, they can contribute to building capacity and resilience in the community by engaging with, and providing resources to, individuals and community leaders (McClure et al. 2014), in particular in remote indigenous communities. However, provision of financial resources from governments and utility sectors is essential to support these unique functions in the community.

### 2.5.6 Cross-sector policy coordination

The previous sections discussed the complexity of the water and energy affordability problem and the respective roles of different sectors. Table 2.8

summarises the identified problems in the current policy landscape and opportunities for future reforms. Declining utility affordability has implications for the social and economic performance of society such as social cohesion, reducing workforce participation due to sickness, health costs, and polarisation of the societies. Thus, policy recognition of this emerging social problem is the first step in engaging all parts of Australian society to work collaboratively to tackle this challenge. That requires a clarification of roles and responsibilities among different sectors.

At present, many sectors are involved in addressing utility affordability. Greater coordination of the different players in the system is required around the responses to the drivers and impacts of utility stress and hardship. Most of the existing strategies to address utility affordability and hardship are short-term, reactive, and uncoordinated. For instance, state water and energy concessions, which provide bill discounts for eligible households, are short term solutions. Concessions fail to address underlying contributing factors, such as energy and water efficiency. Educating households on reducing energy water use, and providing financial assistance to improve energy and water efficiency of the dwellings, would be longer term solutions. In addition, some customers who experience utility stress and hardship suffer from long term unemployment and other social problems. They require a wider range of social supports. As public utility sectors are reforming towards a market-oriented approach, a more nationally-consistent customer protection framework in both urban water and energy sectors is required (AEO, ESAA, ACOSS 2013). Developing a strategic framework to tackle utility affordability can guide the actions and priorities of different players to reduce fragmentation and redundancy of policy responses.

**Table 2.8** Assessment of current policy settings and reform directions

| Identified problems | Potential reform directions |
|---|---|
| **Policy recognition** | |
| Challenge of addressing water and energy affordability has increased importance and complexity in Australia | Additional policies will be needed to offset growing utility affordability problems under the sector reform direction |
| Water and energy prices will be unpredictable in the foreseeable future | Proactive policy approach is required to prevent the impacts of utility price rises reducing affordability among low-income and vulnerable households |
| Affordability problems have specific spatial and seasonal dimensions in terms of spatial climatic variability, rural-urban income inequality, and state government policies | Policy responses need to be tailored to different local climatic conditions in different geographical locations, local utility prices and local socio-economic conditions |
| **Short term strategy** | |
| Households that are most at risk of facing utility stress and hardship include both concession card holders and non-concession card holders. Category-based concession targeting is not effective and efficient in targeting households in most need | Policy responses need to change the category-based state concession targeting towards need-based assistance that tailors to individual households' circumstance and targets those who are most vulnerable to utility price changes |
| Current state utility concession policies are inequitable, inadequate and inefficient, and in some cases, duplicate other welfare policies | Review and reform of state utility concessions needs to be considered together with the federal social welfare system to achieve equity, efficiency, and effectiveness. Clarification of roles and responsibilities between federal and state |

| | |
|---|---|
| | governments is required |
| **Long term strategy** | |
| Current approaches to address utility affordability do not tackle long term affordability problems and outcome | Policy responses need to refocus from tackling immediate affordability problems towards managing risks faced by vulnerable households |
| With the ageing population, significant challenges are ahead for ensuring financial sustainable for state utility concessions and social welfare | Policy responses need to consider sustainable sources of income to finance concession and welfare payments in the market-oriented utility sector |
| **Urban water and energy utility sectors** | |
| Individual households experience and address utility affordability problems in different ways | Providing a range of utility services and products and pricing options to meet different household needs and circumstances |
| No consistent customer hardship policy is in place in the urban water sector and energy sector outside the national electricity and gas markets | A national customer hardship framework needs to be in place for the urban water and energy sectors across Australian jurisdictions |
| The majority of urban water utilities do not provide tariff options to residential water customers. Relatively high fixed supply charges reduce incentive to reduce water use | Policy responses would focus on increasing customer choice in water pricing options and reducing fixed supply charges so that consumers can increase control of their utility bill and affordability outcome. |
| In a liberalised utility market, retailers may disfavour vulnerable customers who have low credit ratings and are ineligible for discounts and incur higher penalty fees in | Policy responses to protect vulnerable customers from possible adverse selection in the deregulated energy market. |

| | |
|---|---|
| market contracts | |
| Utility customers do not have sufficient information and knowledge to choose the best pricing options | Policy responses to increase customer protection and provide price comparison information to customers |
| Vulnerable customers may not have the confidence to engage in the liberalised utility market and to negotiate for a better deal | Policy responses to enhance consumer empowerment so they can understand their rights and obligations in the liberalised energy market |
| **Cross-sectoral and whole of government approaches** | |
| Households who are facing water or energy affordability problems are usually at risk of other financial stress and hardship | Policy responses requires cross-sectoral cooperation and coordination to tackle multiple hardships faced by vulnerable households |
| Causes of utility affordability problems are complex and diverse. Major driving factors can be found within and beyond the utility sector | An integrated and cross-sectoral policy response such as establishing a *Charter of Affordability* among different essential services to address the range of factors that contribute to affordability problems and outcomes |
| The problems of utility affordability stress and hardship have resulted in trade-offs with other household expenses and financial stress that contributes to secondary socio-economic impacts on individual households such as social deprivation and health vulnerability | The goals of improving utility affordability need to align with other relevant government policy objectives |

The macro drivers of utility affordability outcomes are diverse and beyond the control of one particular sector, one government agency, or one policy arena. To successfully address this social challenge requires shared responsibility and a collaborative approach among different levels of government, utility sectors, and the community sector (O'Flynn and Wanna 2008; Shegold 2008). An example of using cross-sectoral approaches to address affordability among low-income and vulnerable households is the establishment of the *SA Government Charter of Affordability - An Affordable Place to Live* (SA Government 2015a, 2015b). The *Charter* is a partnership between government and key organisations whose services have most influence on household budgets and daily life, such as banks, energy companies, local governments, and state government organisations. Public utilities such as SA Water, EnergyAustralia, Origin Energy, and Red Energy have signed the *Charter* as a commitment to address customer affordability collaboratively and proactively, and to assist customers experiencing hardship in a compassionate and respectful manner.

Another collaborative approach to addressing customer utility affordability and hardship is the development of peer utility networks (ESCV 2012a: 12). An example of a pilot peer utility network was initiated within the Victorian utility retailer businesses - Western Water, Yarra Valley Water, and AGL. In the peer utility network, utilities mutually refer hardship customers to the hardship support group of other peer utilities, with the customer's consent. In addition, retail utilities sector can take a proactive approach to assist vulnerable energy customers with the collaboration with community organisations. For example, AGL has established a $6 million Affordability Initiatives in 2014. With the assistance of community organisations, they identify customers in financial hardship at an earlier stage and provide early intervention such as payment incentives, independent financial counselling services and energy audits (AGL 2014).

In this assessment, another risk of the current policy settings is that it heavily relies on the federal government welfare system to address utility affordability

and hardship. With the population ageing, the number of concession recipients, and thus the fiscal burden, will be increased. Thus, more innovative approaches should be considered, such as income contingent loans (Chapman et al. 2014a) or the concept of 'housing lifeline' (Gans and King 2004), to address utility affordability problems while maintaining fiscal sustainability. With a housing lifeline, a low-income household that is unable to meet short-term commitments for housing payments could be able to drawn down a loan fund from the federal government to manage the short-term crisis, and the households would incur a future tax liability to repay the loan. With a similar concept, assistance could be provided as a loan to the household to improve household energy or water efficiency or to install a solar panel system to reduce energy bills, and the loan is then repaid as a future tax liability (Chapman et al. 2014b).

Another strategy to empower low-income and vulnerable households to be more resilient in the utility market is the availability of more flexible and innovative pricing options. Flexibility in both water and energy service products and pricing options is expected to give customers more control of their water and energy demand. Reducing fixed supply charges and increasing consumption charges can provide financial incentives for customers to reduce usage. However, lower fixed charge reduce stable revenue and thus increase financial risks of firms. Further, low supply charge means higher consumption charge is required that would be unfavour to large households in hardship. Thus, bill smoothing, Centrepay, and reward pricing discounts are preferred options among low-income and vulnerable households (Deloitte 2012; Budlus 2013). Bill smoothing is payment service by which utility retailers convert the quarterly household utility bill payment to a more frequent and regular payment plan, such as a fortnight payment, as to reduce the risk of low-income household facing payment difficulty. Centrepay is free and voluntarily bill paying service for income support recipients to pay bills directly from their Centrelink payments. Reward pricing discount is a program to encourage households to reduce electricity consumption when energy demand is high. Successful reward program can ease the burden on the electricity systems during peak demand.

The current policy settings have failed to tackle the multi-dimensional problems of utility stress and hardship. The problems of utility stress and hardship have resulted in trade-offs with other household expenses and in financial stress and these contribute to secondary socio-economic impacts on individual households such as social deprivation and health vulnerability (Chester 2013). Households who are facing water or energy affordability problems will, typically, face other financial stress and hardship. Thus, policy responses require cross-sectoral cooperation and coordination to tackle multiple hardships faced by vulnerable households. However, in the first instance, policy-makers need more robust information and the following chapters of this thesis contribute to that knowledge-base.

## 2.6 Conclusions

The urban water and energy sectors in Australia have undergone significant change over the last three decades. These two sectors are classified as public utilities because of their social and economic importance and natural monopoly technology (King and Maddock 1996a). Water and energy tariffs were initially under state control and were intended to achieve a number of economic and social objectives such as universal access, affordability, social equity, fairness, and the reduction of poverty. Over time, public utility sector reforms have challenged the traditional ideologies of ‘state-utilities-citizen’ relationships and achieving social equity. New social challenges in the form of water poverty, fuel poverty, utility stress, and utility debt, have emerged in recent years (Willis et al. 2006; Chester and Morris 2011; Simshauser et al. 2010a, 2010b).

In this chapter, I have described a number of different market-oriented reformation measures that have occurred in the two sectors. Despite the fact that these two sectors share common social and economic characteristics, the extent of reforms are different. As a consequence, different modes of governance have emerged among the two utility sectors. Strong state intervention was required

within the urban water sector to achieve water security during the prolonged drought in the 2000s. In some state-owned urban water utilities, water affordability objectives still exist as part of company visions or mission statements (Chapter Three). In contrast, the energy sector, at least within the NEM and NGM, has undergone extensive privatisation and price deregulation. Within the energy sector, the role of government has transformed from owner and operator to that of a regulator within the national energy market.

The urban water and energy sectors have adopted different approaches to governance at various stages of the sectors' evolution. A mixed-mode of governance, governance via market and governance via hierarchy, has been employed in both sectors. Nevertheless, the energy sector has placed an increasing emphasis on governance through community engagement within the latest market liberalisation process. As a consequence of reform, new sector objectives have deviated away from social responsibilities towards the realisation of economic efficiency, quality of service, and the long-term interests of utility sector stakeholders.

In sum, the role of citizens has been recast as consumers in the contemporary urban water and energy sectors. Nevertheless, despite the increasing emphasis on customer-centred water and sewerage services, the state-citizen relationship still remains dominant within the urban water sector. This is evidenced by strong state intervention in water tariff determination, water rationing, and infrastructure investment decisions. The energy sector, on the other hand, has engendered a bidirectional utility-consumer relationship model with a focus on regulation, consumer protection, and community engagement.

New policy frameworks have emerged to address the new social challenges within both the urban water and energy sectors. A variety of policies and programs have been initiated and implemented by different sectors and government agencies to address utility affordability and hardship. However, these policies and programs are largely uncoordinated, reactive, and short-sighted. There is no national consistent and collaborative approach to design and deliver utility affordability

policies and programs. The contemporary governance landscape for addressing utility affordability has become a complex policy challenge that requires the collaborative efforts of multiple stakeholders. This chapter concludes with a discussion of possible reform directions and the areas in which further research is required.

## Appendix 2.1 Major policy reforms in the Australian urban water sector

### (a) National Competition Policy (NCP)

The NCP principles relevant to the water industry include (WSAA 2005: 9):

- pricing oversight of water businesses as government business enterprises;
- competitive neutrality, e.g. tax equivalent regimes and removal of anti-competitive practices as defined in the Trade Practices Act 1974;
- structural reform of public monopolies;
- review of legislation, to identify anti-competitive elements; and
- access to infrastructure of national significance.

### (b) National Water Initiative (NWI)

Under the NWI, signatory governments have agreed to a number of urban water reforms. The COAG has adopted the National Urban Water Planning Principles. The agreed reforms includes:

- The development of pricing policies for the full suite of products and services provided by urban water utilities to stimulate efficient water use;
- The use of independent price regulators to set or review prices or price setting processes;
- The provision of customer accounts providing relative water use information;
- Increased water use efficiency in domestic and commercial settings;
- Cost reflective wastewater recycling;
- Water trading between and within the urban and rural sectors; and
- Encouraging innovation to improve urban water efficiency (WSAA 2005: 9)

On 23 April 2010, the National Resource Management Ministerial Council endorsed the NWI pricing principles. The pricing principles are comprised of four sets of principles:

(i) recovery of capital expenditure;

(ii) setting urban water tariffs;

(iii) cost recovery for water planning and management activities; and

(iv) pricing for recycled water and stormwater reuse.

**(c) Urban water futures 2014**

Future reform direction in urban water industry recommended by the NWC (2014), include:

- State and territory governments *clarify their expectations of utilities and recommit to separate policy, regulatory and service delivery functions*. Governments should actively engage with the community in the development of these statements of expectation.
- State and territory governments, regulators and service providers give a greater voice to customers through exploring opportunities for customer choice in pricing and service delivery, improved engagement in objective setting and the determination of trade-offs and improved customer protection frameworks.
- State and territory governments allow economic regulators the degree of independence they require to ensure that pricing and revenue determinations drive efficient service delivery and are focused on customer and community values.
- That regulatory and policy structures should be reviewed and reformed so as to allow new, competitive entry or potential private capital investment in existing utilities.
- The principles of good economic, health and environmental regulation should be applied through regional and remote services delivery.
- Greater transparency and reporting is required to shed light on the nature of public health and supply security issues in regional and remote areas highlighted in stakeholder submissions to the Commission.

Source: WSAA (2005); NWC (2014)

## Appendix 2.2: State water and energy concession schemes, 2013-14

| | Energy concession | | Water concessions | |
|---|---|---|---|---|
| Jurisdictions | **Eligibility** | **Concession entitlement** | **Eligibility** | **Concession entitlements** |
| **NSW (metropolitan)** | LIHR: Electricity account holder with PCC, HCC, DVA Gold Card<br>LFR: family receiving FTB-A or FTB-B<br>LSR: Medical certificate with certain medical equipment<br>MER: medical diagnosed inability to self-regulate body temperature, and PCC, HCC, or DVA Card holder | Low Income Household Rebate (LIHR) - $225 (exl. GST) a year<br>Large Family Rebate - $125 per year<br>Life Support Rebate – various rates<br>Medical Energy Rebate - $225 (exl. GST) per year | Owner occupiers with PCC, DVD Gold Card | 100% of water services charge to a maximum of $31.34 per quarter and 83% of wastewater service charge |
| **NSW (other/Hunter Water) – no info** | | | Owner occupiers with PPC, DVA Gold Card | $87.50 on water rates or charges and the same again on wastewater rates or charges |
| **VIC** | PCC, HCC, DVA Gold Card | Annual Electricity Concession (AEC) – 17.5% discount off electricity bill (excl. $171.60) to max. $2763 per year | PCC, HCC, DVA Gold Card | 50% of the total bill capped at $283.90 for customers with water and sewerage services |

| | | |
|---|---|---|
| | Winter Gas Concession (WGC) – 17.5% discount off main gas bills during winter period (1 May to 31 Oct) to max. $1462 (excl. $62.4)<br><br>Service to Property Concession - reduction of supply charge to the same price as the electricity usage cost<br><br>Non-Mains Energy Concession – various rebate amount to max cap $484<br><br>Medical Cooling Concession – 17.5% discount on summer electricity costs for family member with medical conditions<br><br>Controlled Load Electricity Concession – 13% discount of controlled load usage charge<br><br>Life Support Concession – discount the cost of 1,880 kW hours of electricity per year<br><br>Electricity Transfer Fee Waiver<br><br>Excess Electricity Concession – 17.5% discount | 50% of the total bill capped at $141.90 for customers with a single service<br><br>Life support concession – discount the cost of 168 kL of water used each year |

| | | | | |
|---|---|---|---|---|
| | | after $2763 cap on AEC<br>Excess Gas Concession – 17.5% discount after reaching $1462 cap in WGC | | |
| **Qld (south-east)** | PCC, DVA Gold Card, Qld Seniors Card | Electricity Rebate - $284.54 per year (incl. GST)<br>Reticulated Natural Gas Rebate - $65.58 per year<br>Medical Cooling and Heating Electricity Concession - $282.54 (incl. GST) per year<br>Home Energy Emergency Assistance Scheme | Owner occupiers or life tenant with PCC, DVA Gold Card | Max $120 on water service and usage charges<br>Additional council concessions might also apply<br>Haemodialysis Rebate – free water allowance of 200kL of water per annum |
| **Qld (other) – no info** | | | Owner occupiers with PCC, DVA Gold Card | 20% on gross local government rates and charges including water and sewerage charges capped at $200 per year |
| **SA** | EBC: Electricity account holder, and must not live with anyone with income >$3000 per year (except Centrelink payment), also holder of PCC, DVA Gold Card, Low Income HCC, CSHC, SA State Concession Card, or one of the following Centrelink | Energy bill concessions (EBC) – rebate $165 per year cover both electricity and gas payments (incl. LPG bottle gas)<br>Medical heating and cooling concession (MHCC) (introduced in 1 January 2012) – rebate $165 per year | PCC, DVA, HCC, or meet low income provisions | 30% on total water bills ($185 minimum, $295 maximum per year) for owner occupiers<br>30% on the total water bills ($120 minimum, $230 maximum per year), for tenants<br>Sewerage concession |

| | | | | |
|---|---|---|---|---|
| | recipients (Newstart allowance, Sickness allowance, Widow allowance, Youth allowance, Partner allowance, Parenting Payment Partnered, Bereavement allowance, Special benefit, Community Development Employment Project, New Enterprise Incentive Scheme, ABSTUDY, Austudy)<br><br>MHCC: same as EBC except State Concession Card, and no income test | | | $110 |
| **WA** | HPER: Electricity account holder with WA Seniors Card holders and also hold PCC or CSHC and live in areas of the state that experience prolonged period of heat discomfort<br><br>SER: electricity account holder with WA Seniors Card<br><br>ECE: concession card holders who do not | Horizon Power Electricity Rebates (HPER) – Horizon Power provides rebate the cost of 200 kW of electricity per applicable month to offset the electricity costs associated with operating air conditioner<br><br>Synergy Electricity Rebate (SER) – Supply Charge Rebate<br><br>Supply Charge Rebate – was replaced with a Cost of Living | PCC, State Concession Card, State Seniors Card, Commonwealth Seniors Card | 50% of annual service charges and water usage up to a maximum of 150 kL in Perth, 400 kL in the south of the state and 600kL in the north, for PCC, State Concession Card holders<br><br>25% of annual service charge capped at $46.65 for water charges and $175.75 |

| | | | | |
|---|---|---|---|---|
| | connect to Synergy or Horizon Power | Assistance in 1 Oct 2012 with payment of $200<br>Energy Concession Extension Scheme (ECES) – the payment include Cost of Living Assistance Payment of $200 per annum, potentially with Dependent Child Rebate and/or the Air Conditioning Rebate | | for sewerage charges for State Seniors Card holders<br>50% of annual service charges, for holders of both a State Seniors Card and CSHC |
| **TAS** | AEC: PCC, DVA PCC, HCC, ImmiCard (Bridging Visa E), Tasmanian Concession Card<br>HA: DHS or DVA PCC, and mean tested (cash assets less than $1750 for single pensioner and $2750 for couple pensioners) | Annual Electricity Concession (AEC) – daily discount $125.71 cents per day<br>Heating Allowance (HA) - $56 per year (that is, $28 in May, $28 in September)<br>Life Support Concession – varied according to medical conditions<br>Medical Cooling Concession – rebate $37.653 cents per day | PCC, HCC, DVA Gold Card | $84.50 on water service charge and $84.50 on wastewater service charge |
| **NT** | Eligible to NT Pensioner and Carer Concession Scheme (NTPCCS), includes PCC, HCC, CSHC, DVA Card, or Carers in receipt of the Commonwealth Carer's Allowance | Electricity Concession – up to 50% off the cost of electricity bill (the highest electricity subsidies in Australia) | Owner occupiers with NT Pensioner and Concession Card | Concessional water service charge of $0.725 per day and usage charge of $0.407 per kL is applied<br>Concessional wastewater service |

| | | | | |
|---|---|---|---|---|
| | | | | charge of $0.754 per day is applied |
| **ACT** | Energy account holder with HCC, PCC, DVA Gold Card | Energy and Utility Concession – Summer daily rate $0.524 per day from 1 Nov to 31 May, and Winter daily rate $1.928 from 1 July to 31 Oct, Electricity concession covers both electricity and gas to max annual rebate of $322.10, and Utility Concession provide an additional $84.05 to offset the rise of basic utility costs, including water bills<br><br>Life Support and Medical Heating and Cooling Concession - $121.84 per annum | PCC, Low Income HCC, DVA Gold Card, Asylum seekers | 68% of water and sewerage supply charge, for PCC and DVA Gold Card<br><br>68% rebate on water charges only, for HCC |

## Appendix 2.3: Income support and supplementary payments related to utility affordability

| Payment type | Description |
|---|---|
| **Pension Supplement** | This payment is paid automatically as part of certain regularly fortnightly income support payments to help eligible people 'to meet the costs of daily household and living expenses' (DHS 2015b).<br>Minimum fortnight payment rate: $34.1 for single; $51.4 for couple combined<br>Maximum fortnight payment rate: $63.5 for single; $95.8 for couple combined<br>(Payment rate per year (approximately): $1655.5 for single; $2497 for couple combined) |
| **Seniors Supplement** | This payment is paid automatically to Commonwealth Seniors Health Card holder to help 'pay regular bills such as energy, rates, phone and motor vehicle registration' (DHS 2015c). It is not taxable, nor income or asset tested.<br>Payment rate per year: $886.6 for single; $1336.4 for couple combined |
| **Utilities Allowance** | This allowance is to help to meet the costs of regular bills such as gas, electricity and water when they are on certain Centreline payments. It is a non-taxable payment paid quarterly to recipients<br>Payment rate per year: $594.4 per annum, same for single and couple combined (as in September 2014) |
| **Essential Medical Equipment Payment (introduced in 2014)** | This is an annual $147 payment to people who experience increase in home energy costs from the use of essential medical equipment to manage their disability or medical condition. * |
| **Family Tax Benefits** | A means tested two part payment that helps with the cost of raising children.<br>Family Tax Benefit Part A – payment rate depends on actual family income, number of children and their ages.<br>Family Tax Benefit Part B – payment rate depends on the age of the youngest child. |
| **Household Assistance Package on Carbon Tax scheme** | |
| **Energy** | This payment is paid automatically as regular payment for those who receive income support payment or Family Tax |

| | |
|---|---|
| **Supplement** | Benefit. The amount of Energy Supplement depends on circumstances and payment received. |
| **Clean Energy Advance** | This is a tax free payment, paid automatically as a lump sum to eligible pensioner, other income support recipients (including youth and most students), families receiving FTB and Seniors Supplement recipients. The rates of payment received depends on individual's or family's circumstances, and the payment they regularly received. |
| **Low Income Supplement** | This is a lump sum $300 payment that can be claimed annually. This payment is to assist low-income households who have income below certain threshold ($30,000 for singles, $45,000 combined for couple, or $60,000 for couples or singles with a dependent child) in previous years, and they did not receive a pension or benefits from the Australian Government for more than 39 weeks in the previous financial year. |
| **Low Income Family Supplement** | This supplement is a $300 payment which can be claimed annually. This payment is specially for those families who received FTB for 39 weeks or more in the previous financial year. |
| **Single Income Family Supplement** | This supplement of up to $300 for families with at least one dependent child and with one primary earner whose income is between $68,000 and $150,000. If there is a secondary income earner in the family, their income needs to be below $18,000. |
| **Tax Reforms** | From 1 July 2012, the government has changed the tax free threshold from $600 to $18,200. In addition, most of the Australians with taxable incomes up to $80,000 received a tax cut. |

Source: DHS (2015e).

## Appendix 2.4: Government funded water and energy efficiency measures, January 2015

| | Water | Energy |
|---|---|---|
| **NSW** | NSW Rainwater Tank Rebate (closed 30 June 2011)<br><br>NSW Home Savers Rebates - available for rainwater tanks, climate-friendly hot water systems, hot water circulators, water efficient washing machines and dual flush toilets<br><br>WaterFix - $96 rebate for installing water saving devices by qualified plumber that reduce 21,000 liters of water a year | Low Income Household Refit Program, administered by Department of Environment & Climate Change NSW - $63 million, target 220,000 low-income households, provision of energy audits and energy efficiency kits |
| **Victoria** | DEPI Water Rebate Program<br><br>Living Victoria Water Rebate Program 2012-2015 (State of Victoria 2015):<br><br>- water conservation audit rebate $50<br>- dual-flush toilet rebate $100<br>- hot water recirculator rebate $100<br>- Water efficiency showerhead rebate $10-20<br>- Permanent greywater system rebate $500<br>- Rainwater tank rebate $500-1500<br>- Pool cover with roller/reel rebate $200<br>- Washing machine rebate $150<br>- Basket offer rebate $30 | Victorian Energy Efficiency Target (VEET) scheme (2009-present)<br><br>Electric feed-in-tariff<br><br>Home appliance rebate |

| | | |
|---|---|---|
| **Queensland** | Home and Garden WaterWise and ClimateSmart Rebate (closed) | Solar Bonus Scheme<br><br>Electric hot water tariff incentive: $100 (by Energex)<br><br>Pool Reward Program $250 (by Energex) |
| **Western Australia** | H2O Assist (by Water Corporation) | Solar hot water rebate<br><br>Electricity feed-in-tariff (by Horizon Power) |
| **South Australia** | Rainwater Tank Rebate (finished on 30 June 2014)<br><br>Stand Alone Rainwater Tank rebate (up to $200) (closed 31 March 2014) | Solar hotwater rebate $500<br><br>Retailer Energy Efficiency Scheme (REES) administered by Essential Services Commission SA * - households and businesses may be able to access discounted or free energy efficiency activities from energy retailers participating in the REES. Low-income households may also be able to receive an energy audit. |
| **Tasmania** | | Electricity feed-in-tariff |
| **Northern Territory** | | Solar electricity feed-in-tariff ; solar hot water installation rebate |
| **ACT** | Outreach Energy and Water Efficiency Program targeted to low-income households. The program is funded by the ACT government and delivered by community organisations.<br><br>ACTSmart Programs - for water and energy savings and climate change initiatives<br><br>ToiletSmart - subsidies to replace to dual flush toilet, program closed September 2014<br><br>WaterRight Gardens Webtool - specific watering | Outreach Energy and Water Efficiency Program targeted to low-income households.<br><br>- home visit and energy audit<br><br>- provide advice and education on energy saving measures<br><br>- provide energy saving kits (e.g. energy saving tips, thermometer, draught excluders)<br><br>Home Energy Workshops - free workshop to advice on reducing energy use at homes |

| | | |
|---|---|---|
| | advice for garden water needs | Wood heater & fireplace replacement (up to $800) to replace wold wood heater or open fireplace with a new mains-supplied gas heater |
| **Australian Government** | Water Efficiency and Labelling Standards (WELS)<br><br>Rainwater Tanks & Greywater System Rebates (closed 10 May 2011) | $100 million Low Income Energy Efficiency Program (2012-13) |

Sources: ESCOSA (2015); Department of Sustainability and Environment (Victoria) (2015);

## Appendix 2.5: Utility customer protection policy and guideline (as of 2015)

| | Water | Energy | Hardship indicators |
|---|---|---|---|
| **NSW** | By July 2010, as required under the Operating Licenses, water suppliers (Hunter Water, Sydney Water, Shoalhaven Water) must have in place and comply with procedures relating to customer hardship, debt, water flow restriction and disconnection [1] | Electricity and gas retailers are required by law to have a published hardship charter and to operate a customer assistance program, while the AER is developing guidelines for National Hardship Indicators [2] | IPART Hardship Performance Indicator; AER Indicator |
| **Victoria** | Water business must have a hardship policy in place under the Customer Service Code for Victorian urban water business (ESCV 2014)<br><br>Victorian Water Industry have developed a Guideline for Unexplained High Usage and Undetected Leak Enquiries (October 2010) | Since 2006, electricity and gas retailers operating in Victoria are required by law to have a hardship policy in place. A framework on Energy Retailers' financial hardship polices has been developed by ESCV in 2006 (ESC 2006). | In progress [3] |
| **Queensland** | Financial Hardship Policy framework is in place by Queensland Urban Utilities in 2012 | Guidance on AER Approval of Customer Hardship Policies | AER Hardship Indicators |
| **Western Australia** | All water providers must have a financial hardship policy approved by WA Economic Regulation Authority (ERA). ERA (2013) has published Financial Hardship Policy for Guidelines for water services | Gas retailers must have a financial hardship policy (not required for ERA approval). ERA (2012a) has provided a Energy Financial Hardship Policy Guidelines | List of objective hardship indicators were included in the guidelines |
| **South Australia** | Financial hardship policy need to be in line with the Minister's residential customer hardship policy developed in February 2013 (DCSI 2013a)*; SA Government Charter of | Guidance on AER Approval of Customer Hardship Policies; SA Government Charter of Affordability | AER Hardship Indicators |

| | Affordability | | |
|---|---|---|---|
| **Tasmania** | Financial Hardship Policy is required under Customer Service Code developed by OTTER (2010) | Guidance on AER Approval of Customer Hardship Policies | Office of the Tasmania Economic Regulator Hardship Indicator |
| **Northern Territory** | No customer hardship policy guideline required by NT Utilities Commission. Power and Water Corporation has an in-house Stay Connected (hardship) program | No customer hardship policy guideline by NT Utilities Commission. Power and Water Corporation has an in-house Stay Connected (hardship) program | |
| **ACT** | A Customer Protection Code (developed by ICRC) applies to consumer rights, including consumer protection, in relation to water and sewerage utilities services. The legislation was enforced from 1 July 2012) (ICRC 2015) | Guidance on AER Approval of Customer Hardship Policies; Energy retailers and distributors are also required to comply with the Minimum Service Standards set out in section 11 and schedule 1 of the Customer Service Code (ACT). | AER Hardship Indicators |

Sources: Public Interest Advocacy Centre (2015); EWON (2015); ESCV (2013); Queensland Urban Utilities (2012).

# Chapter 3

# Integrating social aspects into urban water pricing: Australian and international perspectives

## 3.1 Introduction

The previous chapter shows that reform undertaken in the urban water and energy sectors were at a different pace, and thus, the governance framework and policy settings to address utility affordability have differed. In Australia's variable climate and periodic drought events, the provision of water among competing water demand across domestic water use and other sectors, such as agricultural, industrial, and environmental needs, has made water security and water affordability a unique challenge. This chapter reviews how social aspirations and water affordability are integrated in urban water pricing framework internationally and in Australia.

The notion of water as an economic good has been widely accepted among water resource managers (Savenije and van der Zaag 2002). Like other commodities, water can be scarce, competed for, placed on or excluded from a market, and its ownership transferred. It is an important input for agricultural and industrial production as well as for human consumption. With the increasing incidence of water scarcity and increasing demand for water to fulfil competing demands, the price of water is becoming an important demand management tool (Griffin 2006).

Water is also an essential good for drinking, food preparation, hygiene, and sanitation. Cost-benefit studies also demonstrate that significant economic and

social benefits flow from providing quality water and sanitation services (Hutton et al. 2007; Haller et al. 2007). The average cost of water around the world increased by 4.3 per cent in 2014, according to the 2014 Global Water Tariff Survey (GWI 2014). Taking a global perspective, the OECD has suggested that higher water prices are necessary in order to increase awareness of water scarcity, to conserve precious water resources, to reduce pollution, and to provide financial stability for the water sector.

Over recent years, urban water reform has tended to place increasing emphasis on economic efficiency, environmental conservation, and financial sustainability. The challenge is to achieve economic objectives while keeping the cost of water equitable[9] and affordable. Instead of relegating social concerns to secondary consideration, I argue that it is possible to integrate social dimensions into urban water pricing policy. I use examples from various countries to show how social aspirations can be integrated into urban water pricing. I contend that the social aspect of water pricing policy has four major considerations: principles; processes; outcomes; and existing social policies for the disadvantaged. I use these to provide a comparative analysis of water affordability for urban water and sewerage services across major Australian cities. Finally I compare the benefits and pricing discounts of government-offered water concessions in different jurisdictions.

## 3.2 Overview of social equity aspects in urban water policy

The right to water has been explicitly recognised in several human rights conventions (COHRE 2007) and is also implicitly recognised in the International Covenant on Economic, Social and Cultural Rights (ICESCR) General Comment 15). Estimates of minimum water requirements have been given as 20 litres per person per day (L/p/d) (Chenoweth 2008), 50 L/p/d (Gleick 1996), or

[9] In this thesis, equitable means that 'treating everyone fairly and in the same way' (Cambridge Dictionary).

100 L/p/d (Howard and Batram 2003), depending on geographical location, abundance of water, gender, economic activity, and cultural setting. When urban water prices are set, the expectation is that individuals and households in the society can afford the minimum amount of safe potable water for drinking, food preparation, and hygiene needs, regardless of their social status, income, or ability to pay. Smets (2009) suggests that the right to affordable water should be incorporated in all urban water pricing principles and objectives.

Setting a water price typically involves multiple objectives, these include: revenue sufficiency and stability; economic efficiency; resource conservation; administrative simplicity; and legality, as well as equity and fairness (Griffin 2006, p.251; Boland 1993; Whittington 2003). These factors can be distilled down to four sustainability dimensions: financial; economic; environmental; and social sustainability (OECD 2010a, p.24; Martins et al. 2010), the last being crucial to the discussion in this chapter. If the social dimension of water pricing is not given due weight, water sector reform is likely to lead to price shock, a label which encapsulates the twin issues of affordability and public acceptability.

**Figure 3.1** Four levels by which social concerns can be integrated into urban water pricing

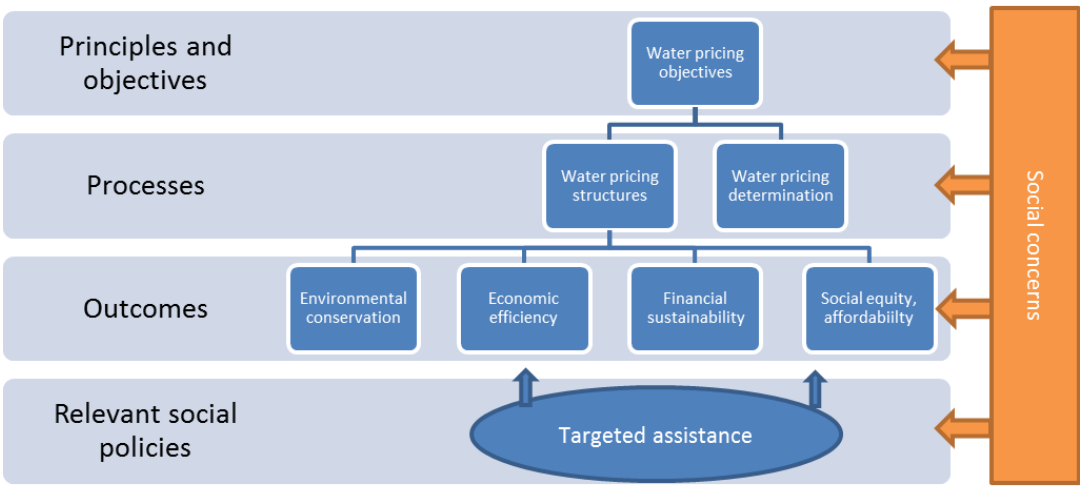


Figure 3.1 depicts a suggested framework by which social principles can be incorporated into urban water pricing. Social concerns enter through four separate layers: principles and objectives; processes; outcomes; and relevant social policies. If the principles of social justice and equity can be successfully integrated into urban water pricing, it should make the public more accepting of proposed water pricing reforms.

### 3.3.1 Water pricing principles and objectives

Social concerns and other sustainability objectives can sometimes contradict each other, although sometimes they can be complementary. For instance, some argue that, for equity reasons, water should be provided free or at a very low price. By contrast, the OECD (2001a) suggests that low-cost water not only fails to achieve full cost recovery and meet conservation objectives, it also causes social inequality—because it provides insufficient capital for maintaining or expanding water infrastructure to remote communities. Today, free domestic water is only available in a few cities—such as Ashgabat (Turkmenistan), Dublin (Ireland), Cork (Ireland), Belfast (UK), and Tripoli (Libya) (GWI 2010). Bithas (2008) proposes that, in the long run, water should be priced at full cost so as to achieve the four dimensions of sustainability.

Social equity remains an important consideration in water pricing and one way to give more weight to it is via the top level of Figure 3.1. For example, social objectives can be built into a water company's vision through developing a corporate social responsibility (CSR) strategy. CSR involves four main responsibility components: financial; economic; environmental; and social. CSR promotes stakeholder engagement, such that investors, board of directors, and employees at one end become engaged with customers or communities at the receiving end of the services. For instance, Manila Water have devised a CSR vision in which they commit to the idea of empowering people, building community capacity, and providing water and sewerage service at an affordable rate (Manila Water 2012). In Cambridge, UK, 'protecting vulnerable customers'

is one of Cambridge Water's commitments (Cambridge Water 2012). Water businesses can also develop a residential customer charter, such as in the case of Yarra Valley Water (Melbourne, Australia), in which their customer service commitments and the rights and obligations of their customers are clearly stated (Yarra Valley Water 2012). To reflect their CSR commitments, companies usually provide sustainability or triple bottom line (TBL) reports annually. Much research has discussed the concept and practice of CSR in the business sector (e.g. Wood 2010, Carroll and Shabana 2010); however, there is only limited research on CSR for what is an essential utility, the urban water provider.

### 3.3.2 Process: water tariff structure and design

Among all strategies, a low water tariff is the most popular tool to address water affordability among the poor. The form of the water tariff usually depends on the prevalence of metering infrastructure. For non-metered environments, a flat rate is standard, although differential rates can be applied according to customer type, dwelling type, location, and property size. Even in developed countries, not all households have water meters installed, especially in areas with relatively abundant water resources. For example, the proportion of metered customers in England and Wales was just over 30% in 2008 (Godley et al. 2008, p.iv). In Iceland, Ireland, Norway, and Scotland, meter penetration is very low (ABS Energy Research 2006). In Canada and New Zealand, only 55% and 25%, respectively, of single dwellings have meters installed. Although a fixed charge provides stable and predictable revenue for the water utility, the drawback is that customers have no incentive to conserve water or be aware of their water consumption behaviour.

Some countries have 95–100 per cent meter penetration, such as Japan, Korea, Hong Kong, Greece, Latvia, Estonia, Spain, and Turkey (ABS Energy Research 2006). In Australia, Austria, France, Finland, Germany, and the United States, almost all single dwellings have meters installed (although not individual apartments). When a metering system is in place, a two-part tariff is usually

applied. It includes a fixed supply charge and a volumetric usage charge. The fixed supply charge provides revenue stability and allows sunk costs to be recovered. In addition, customers are also charged according to the amount of water consumed. The International Benchmarking Network for Water and Sanitation has provided a performance and tariff database which contains information from 2,000 utilities from 85 countries (IBNET 2012). Some of the popular tariff structures are described below:

***Two-part tariff (TPT):*** A two part-tariff involves a fixed charge and variable volumetric charge(s) component. Generally, a single volumetric rate is considered economically efficient, easy to administer, and understandable by customers. Most of the major cities in China (for example, Tianjin, Beijing, Shanghai, Guangzhou), Russia (for example, Novosibirsk, Krasnoyarsk, Omsk), Canada (Ottawa, Vancouver), Mongolia (Ulaanbaatar), the United Kingdom (for example, Newcastle, London, Birmingham, Manchester), and some cities in the United States (for example, Washington, DC, New York, Memphis) use a single volumetric rate (IBNET 2012). Sibly (2006a, 2006b) suggested that applying a single volumetric rate is consistent with the economic equity principle in which everyone pays the same marginal price regardless of consumption.

***Decreasing block tariff (DBT):*** A DBT, which is also called declining block tariff (Bonbridge et al.1988), is an extension of TPT where the volumetric rates decrease with successive consumption blocks. Typically, water and sanitation services involve a significant sunk investment. Because of economies of scale, the average cost of supplying water decreases as consumption increases, subject to resource constraints. DBTs provide stable revenue to water utilities, but also offer a lower per capita water charge for large users. Currently, DBT is applied to industrial water charges in OECD countries such as Belgium, Canada, France, and the United Kingdom (OECD 2010a, pp.56–57). It is seldom applied to residential water charges due to water conservation concerns.

***Increasing block tariff (IBT):*** IBT is also called inclining block tariff (Bonbridge et al. 1988) is another extension of TPT where the volumetric rates increase with

successive consumption blocks. In most cases, the size of the first block represents a basic, essential amount of water and this rate is usually very low and subsidised. The subsequent block rates are usually much higher and provide stronger conservation incentives. Recently, there has been increasing criticism of IBT in regard to economic inefficiency, administrative complexity, and unfairness to large households (Crase et al. 2007; Sibly 2006a), and thus questions regarding its social equity. Most countries in Asia apply IBT (e.g. Hong Kong, Taiwan, Korea, Philippines, Japan, Indonesia, Vietnam), as do some in Europe (e.g. Italy, Spain, Turkey, Portugal), and some cities in the United States (e.g. Denver, Atlanta, Columbus, Las Vegas) (IBNET 2012).

***Scarcity pricing***: Scarcity pricing, or dynamic efficient water pricing, was proposed by Grafton and Kompas (2007) and Grafton et al. (2014) in their analysis of water pricing, water rationing, and investment decisions in response to the drought in Sydney from 2006 to 2008. They suggested that pricing water depending on both the availability of water and household demand (that is, the rate depends on the dynamic, day-by-day dam level) could sensitively reflect the marginal cost of water and would be an efficient way to balance water supply and demand. While pricing and investment policies primarily aim to achieve efficiency while social equity could be achieved via targeted social program or income distribution policy (Ng 1987; Grafton et al. 2014).

***Adapted IBT:*** To address fairness and equity issues, some cities have adjusted their IBT water rates according to household characteristics. There are several aspects of social equity, including horizontal, vertical, life-cycle and inter-generational equity (Herscovitch and Stanton 2008). Horizontal equity means people with similar circumstances, such as economic resources, should be treated equally. On the other hand, people with different circumstances, such as people in their old age, people with disability, people caring of young children of members with disability, should be treated differently in vertical equity perspective. Horizontal and vertical equity is also relevant to individual or family lifecycle in which a individual/family's ability to pay and resource consumption demand would vary across different stages of life. From an inter-generational equity

perspective, the impacts of our future generations should be considered on the use of resources today. These social equity concepts will be further discussed in Chapter 6. In some cities, the charge of IBT water rates are adjusted to consider household circumstances. I here called this pricing approach adapted IBT.

Examples of adapted IBT in urban water tariff is summarised in Table 3.1. For instance, in some cities in Spain (for example, Barcelona, Madrid, Seville) the size of the first block of the IBT increases when household size is larger than four. In Los Angeles, there is a two-tiered IBT system for residential water rates. The rates for the first tier is adjusted based on location (temperature zones), lot size, household size, season, and consumption, and the rate for the second tier is much higher and universal for all. In Malta, there is also a two-tiered IBT water rate which is calculated on a per person basis, and the price is different depending on whether the consumer is registered as a Maltese resident or not. In Belgium, the first block (15 $m^3$/person/year) is free and any additional use is charged at full price. In Murcia (Spain) and several Greek cities (Athens, Thessaloniki, Larissa), volumetric water rates are adjusted according to the number of children.

Adapted IBT systems can address equity and fairness concerns across different types of households. If the adjusted IBT has a very large first block which is either free or very low in price, utilities find it difficult to recover the costs of operation and maintenance, and generate sufficient revenue. Solving these problems requires increasing the fixed supply charge, increasing the price of the second tier or subsequent blocks, or applying cross-subsidisation between residential and industrial customers. In addition, adapted IBTs are complex and increase administration costs because they require an accurate social reporting system to adjust for different household characteristics. Inevitably, there is revenue loss from misreporting of household size. Despite its limitations, adapted IBT has been successfully adopted by a range of countries. It provides an alternative way of achieving social equity and other objectives by modifying the popular and publicly acceptable IBT structure.

**Table 3.1** Example of adapted IBTs

| City/country | Year | Description |
|---|---|---|
| **Adjusted by household size (*H*)** | | |
| **Barcelona[d] (Spain)** | 2002 | *H*>4: for each extra person, 1st and 2nd blocks each increase by 4.5 $m^3$/quarter on basic 18 $m^3$/quarter |
| **Madrid[d] (Spain)** | 2002 | *H*>4: if consumption less than 30 $m^3$/quarter, 1st block extended from 15 $m^3$/qtr to actual consumption<br>*H*>5: if consumption less than 40 $m^3$/quarter, 2nd block extended from 30 $m^3$/qtr to actual consumption |
| **Seville[d] (Spain)** | 2002 | *H*>4: for each extra person, 1st block increased by 4 $m^3$/month on basic 16 $m^3$/month |
| **Los Angeles[e] (USA)** | 2012 | 2-block system: 1st block is based on location/temperature zone, season, lot size, household size, and consumption<br>*H*≥6: household can apply for first-tier allowance increase |
| **Malta[f]** | 2010 | Tariffs are calculated per person and whether the person is registered on the premises (NoP>0) or not (NoP=0)<br>Domestic (NoP =0): 0–33$m^3$, **€**2.30/$m^3$; >33$m^3$, **€**5.41/$m^3$<br>Domestic (NoP>0): 0–33$m^3$, **€**1.47/$m^3$; >33$m^3$, **€**5.41/$m^3$.<br>Registered residents are usually Maltese passport holders and are charged cheaper rates |
| **Flanders[g] (Belgium)** | 1997 | First 15 $m^3$/person/year is free, all other use is charged at full price |
| **Adjusted by number of children (*C*)** | | |
| **Murcia[d] (Spain)** | 2002 | In 5-block systems, adjustment of 1st block size for<br>*C*<3: 0–20 $m^3$/bi-monthly<br>*C*=3: 0–45 $m^3$/bi-monthly<br>*C*=4: 0–54 $m^3$/bi-monthly<br>*C*=5: 0–63 $m^3$/bi-monthly<br>*C*=6: 0–72 $m^3$/bi-monthly<br>*C*>6: all consumption blocks equal to the price of 1st block |
| **Athens[h] (Greece)** | 1993 | 5 block system: adjustment of 1st block<br>*C*=0,1,2: 0–15 $m^3$/qtr<br>*C*=3: 0–45 $m^3$/qtr<br>Each extra child, extra 9 $m^3$/qtr |
| **Thessaloniki[h]** | n.a. | *C*=0,1,2: normal tariff<br>*C*>2: 1st block increases by 50% (?) |
| **Larissa[h]** | n.a. | *C*=3,4: 0–50 $m^3$/qtr, only half is charged<br>*C*=5,6,7: 0–80$m^3$/qtr, only half is charged<br>*C*>7: 0–100 $m^3$/qtr, only half is charged |

[d] Garrido (2002) in OECD (2003); [e]www.ladwp.com; [f]http://www.wsc.com.mt

[g]OECD (2001a) ; [h]Ninou (2002) in OECD (2003).

### 3.3.3 Outcomes: water affordability analysis

Assessing the social outcomes of various water pricing policies can provide useful inputs to designing water tariffs and determining rates. Key social indicators that can be built into the price structure are: (i) the percentage of population with piped water and sewerage services; (ii) the number of households unable to pay their bills on time; (iii) the number of disconnections; and (iv) water affordability. The proportion of households with a connection to main water supply and sewerage services is an important indicator of 'water access poverty', which is a number usually reported in a water utility's annual report. The reason it reflects poverty is that, among very poor households, saving enough money to pay for a water connection is a significant challenge (Hutton 2012). The indicator, is, therefore a measure of the proportion of households who can afford water and sanitation services.

A commonly used water affordability indicator is the ratio of expenditure on water and sanitation services to household income or expenditure. There are some international guidelines about the limits to water affordability. According to the World Bank's guidelines for funding water projects, water should not cost more than 3–5 per cent of disposable income or household expenditure (OECD 2010a). The UNDP uses 3 per cent, the OECD 4 per cent, while the Asian Development Bank (ADB) and the African Development Bank use a 5 per cent figure (Smets 2009; Fankhauser and Tepic 2007). Some countries also set affordability limits in their national laws. For both water and sanitation, the limits are: Lithuania (2 per cent), Northern Ireland and France (3 per cent), Venezuela (4 per cent), Chile and Kenya (5 per cent), and Mongolia (6 per cent). For water only, the figures are: United States (2 per cent), Argentina, Venezuela, and the United Kingdom (3 per cent), and Indonesia and Mongolia (4 per cent) (Smets 2009). Although the threshold varies by country, comparing water affordability across time and across regions provides a quantitative indication of how water pricing affects social outcomes.

There are a number of international studies comparing water affordability (for example, OECD 2003; OECD 2010a; Fankhauser and Tepic 2007; Smets 1999, 2000). The OECD (2003) survey showed that in most OECD countries water and sewerage (W&S) charges ranged from 0.5 per cent to 2.4 per cent of household income or expenditure. In a later study in 2008 (OECD 2010), water affordability was found to range from 0.2 per cent to 1.2 per cent. In the case of transitional European economies, Fankhauser and Tepic (2007) found that water expenditure accounted for less than 3 per cent of income in most countries, except in Hungary (4.1 per cent), Romania (3.1 per cent), and Russia (3.5 per cent). In some transitional economies, if the water price were required to generate enough revenue for full cost recovery, the estimated water affordability index would be considerably higher, even over 10 per cent in certain countries (Fankhauser and Tepic 2007).

Cross-country comparisons provide measures of macroaffordability, a broad analysis which uses a statistical mean to compare water affordability at national and international levels. The drawback of such an aggregate indicator is that it does not reflect the burden of water charges across different income groups, geographical locations, or household types.

Microaffordability analysis seeks to break down the macroaffordability indicator into various factors of interest such as income group, region, and family type, or even over time (OECD 2003, p.37). The OECD (2003) survey found that, as income goes down, the proportion of expenditure spent on water increases. Thus, for the highest income households, expenditure on water is usually less than 1 per cent of total expenditure, but for the lowest quintile it accounts for more than 3 per cent, as shown from surveys in Mexico and England and Wales. The updated 2008 survey (OECD 2010a) also found that for the poorest of Polish households, W&S expenditure accounted for 7.9 per cent of household expenditure.

In measuring the level of water poverty, Smets (2009) found that 1 per cent of French households spent more than 4.8 per cent of their income on W&S bills, and 2 per cent of UK households spent more than 8 per cent of their income on

W&S. Concerns about water affordability is more pronounced among the median income and lowest income households in Poland, Romania, Armenia, El Salvador, Argentina, Jamaica, and across Africa (Smets 2009). In general, the main factors contributing to water affordability problems are poverty, water scarcity, and inadequate water infrastructure (OECD 2003, p.32–33). The dilemma is that poor water infrastructure requires significant investment, and improvements can cause a rapid increase in water prices. Thus, the poor would face a significant financial burden when investments are made in water infrastructure from which they would benefit.

### 3.3.4 Relevant social policies

Instead of having a price structure that applies to all water consumers, it is possible for governments to address water affordability and social equity through approaches outside the tariff scheme, such as targeted welfare and social policies (Reynaud 2007). Governments or water utilities identify certain target group(s), and provide them with one or more forms of assistance such as free water allowances, output-based water concessions or subsidies, income support payments, or debt relief for their water bills. Measures such as these have been used in a variety of ways in different countries to assist water affordability. Types of targeted measures include:

**(i) Free water allowance.** Instead of providing a universal free water quota, such as happens in South Africa (GWI 2009; Muller 2008), an alternative is a free water allowance that is only allocated to identified households which have a low income or specific need. For instance, in Uruguay, free water and sanitation services are provided to the elderly who consume less than 10 $m^3$ per month; in Niger, indigent households with especially low-incomes receive 6 $m^3$ of water per month for free (Smet 2009).

**(ii) Price reduction with conditions.** Targeted households can be provided with price reductions under certain conditions. For example, in Porto Alegre, Brazil,

low-income water users who consume less than 10 $m^3$ per month receive a 60 per cent reduction in their water bill (Smets 2009). In Gabon (Libreville), subscribers who consume less than 15 $m^3$ per month can apply for a 50 per cent discount on their water tariff. These measures balance both social equity and conservation objectives.

**(iii) Cross-subsidisation and price differentiation.** Utility subsidies can be provided to poor households to relieve financial hardship using a system of cross-subsidisation, such as in the case of Colombia (Gómez-Lobo and Meléndez 2007, p.17). The poorest Colombian households pay for water at below-average cost, while higher income households, businesses, and industries pay a surcharge as a contribution to finance the subsidy (if there is deficit, the government pays). The amount of subsidy that a household receives depends on the dwelling type and the amount of water consumed. Recently, the UK government introduced a policy that water companies need to provide social tariffs to target households (DEFRA 2012). To generate sufficient revenue, companies are allowed to charge differential tariffs among their different customer classes in order to subsidise the scheme.

**(iv) Debt aid.** Households experiencing financial hardship due to water and sewerage bills can sometimes seek assistance from governments or social organisations. In the Walloon region of Belgium, a social fund for water has been established through a tax on water consumption of €1.25 cents/$m^3$ to assist households having payment difficulties. Assistance is delivered via municipal social assistance centres (Smets 2009). Similarly, in France a housing solidarity fund is co-financed by the government and private water utilities to assist households which have trouble paying their water bills (Smets 2009). In Australia, households encountering financial hardship can approach community organisations, such as St Vincent de Paul, to obtain water vouchers. Some water utilities also provide assistance to households in financial difficulty by providing alternative payment plans and hardship programs, such as happens in Australia and in some parts of the United States (e.g. San Antonio).

**(v) Output-based subsidies.** Governments can implement an output-based consumption subsidy to make water more affordable for the poor. For example, Chilean water consumers in the lowest income quintile who spend more than 5 per cent of their income on water and sanitation are entitled to a discount on their water bills (Gómez-Lobo 2001). To be eligible for the subsidy, households have to apply to the municipality on a scoring system, called Comités Comunales de Acción Social or CAS, which produces a score for each household based on a personal interview at their dwelling. The process identifies household members, living conditions, health conditions, occupations, income and assets, and other socio-economic variables. It is the main target instrument in Chile for distributing means-tested subsidies, pensioner payments, and other benefits. Eligible households can apply for their water bills to be partially or totally paid for by the government, with a cap of 15 $m^3$ of water a month. In 1998, 13 per cent of households received an average of US$10 per month at a total cost of US$33.6 million. The subsidies represent almost 8 per cent of the income of the lowest income group (Gómez-Lobo 2001).

**(vi) Water concessions.** Provision of water concessions can be integrated with other utility allowances and the existing social security system. For instance, in Australia most of the water concession schemes are funded by both Commonwealth and state and territory governments, although administered by the latter and delivered by utility companies. In 2010-11, the total expenditure on water and sewerage concessions in the State of Victoria was AU$135.3 million, and 6.7 million (35 per cent of) Victorian households benefited from the water concession (Vic DHS 2012, p.32).

When comparing the Australian concession scheme and Chilean output-based systems for assisting households pay for water, the output-based system in Chile is more comprehensive, fairer, and targeted to those in need. The value of water subsidies provided to eligible Chilean households is based on their socio-economic characteristics and consumption levels. In Australia, by contrast, eligibility to receive water concession largely relies on possessing Commonwealth

concession cards. Possession of these cards in Australia does not fully reflect the true mix of household characteristics, economic status, and consumption level.

In summary, social measures can be devised to give households relief from financial hardship or to assist them in paying for essential water and sanitation services. This improves affordability and reduces social inequity. Unlike tariff-based solutions, targeted measures can be means-tested and directed to households or individuals with specific needs. Targeted assistance will not result in direct distortion of water price, thus consumers remain responsive to water price signals, leading to economic efficiencies. Collectively, in these approaches, a disadvantaged group is helped to meet financial, social, and other objectives.

## 3.3 Australian urban water pricing and concession policy

Water affordability analysis can be applied to a range of major Australian cities to investigate the impacts of concession policies. The cities under comparison are Sydney (NSW), Melbourne (Victoria), Canberra (ACT), Brisbane (Queensland), Adelaide (SA), Perth (WA), and Darwin (NT). These cities are located in various climatic zones, are under different jurisdictions, administrations, and institutions, and their regulatory frameworks for urban water pricing and concession policies vary.

Table 3.2 summarises the average maximum temperature, average rainfall, average household water consumption, median household income, and average water and sewerage bills in 2011-12. Across different cities, Darwin had the highest average maximum temperature and average rainfall while Canberra had the lowest. In terms of water use, Darwin had the highest average water consumption per property and average water and sewerage bill while Melbourne had the lowest across cities.

**Table 3.2** Summary of water utility and residential consumption (2011-12)

| City | Average max. temperature (°C)[1] | Average rainfall (mm)[1] | Av water use (kL/property)[2] | Av water & sewerage bill (AU$)[2] | Median household gross weekly income (AU$)[3] | Median equivalised household disposable weekly income (AU$)[3] |
|---|---|---|---|---|---|---|
| **Sydney** | 22.3 | 1 276.5 | 193 | 1090 | 1726 | 851 |
| **Melbourne[4]** | 20.1 | 654.4 | 144 | 910 | 1568 | 816 |
| **Canberra** | 19.7 | 630.0 | 180 | 1073 | 2124 | 1,065 |
| **Brisbane** | 25.3 | 1 194.0 | 139 | 1013 | 1534 | 858 |
| **Adelaide** | 22.1 | 563.0 | 179 | 1148 | 1308 | 765 |
| **Perth** | 24.5 | 745.3 | 250 | 1128 | 1695 | 882 |
| **Darwin** | 32.1 | 1 847.1 | 471 | 1417 | 1969 | 962 |

**Data sources:**
[1] ABS (2012b). ABS Year Book Australia 2012, Cat. 1301.0
[2] NWC (2013) National Performance Report 2011/12: Urban water utilities
[3] ABS(2013d). Household Income and Income Distribution, Australia, 2011-12, Cat. 6523.0
[4] Melbourne water consumption and billing data those reported by Yarra Valley Water

When comparing income level across cities, Canberra had the highest median gross household income, while Adelaide had the lowest. To account for the implication of government taxes and economic needs of different household structures, I use the individual income tax rates from the Australian Tax Office (ATO) and the OECD modified scale to derive the median equivalised disposable household income (EDY) for different cities. The OECD modified scale is chosen because it is commonly applied in international studies. The OECD modified scale assigns a value of 1 to the household head, and 0.5 to each additional adult member whose age is 15 or above, and 0.3 to each child whose age is under 15. The adjustment accounts for the growth of a household's needs with each additional member. The following analysis and comparison is based on the median household income and average residential water consumption of each city for the period 1995-96 to 2011-12.

### 3.3.1 Urban water regulatory and pricing framework

With one exception, all retail water utility companies in Australian major cities are state-owned companies. Except in Melbourne, all the cities have only one main retail water operator. In the case of Melbourne, the city went through a phase of devolving its water business in a reform of the urban water sector in the 1990s (Godden 2008). Melbourne Water manages the water resources and bulk water supply infrastructure, while three retail water companies, Yarra Valley Water, City West Water, and South East Water, purchase water from Melbourne Water and resell it to residential and business customers. Because the three retailers service customers in distinct geographical locations, there is no direct competition between the companies. The Productivity Commission (2011a, p.333) recognised that the horizontal segregation of water businesses could encourage benchmarking and comparative best practices, ultimately benefitting customers.

Queensland, by way of contrast, went through urban water sector reform by horizontal integration in 2008, leading to a South East Queensland (SEQ) Water Grid. Under the SEQ Water Grid arrangement, the water retail business for the Brisbane region was transferred from Brisbane City Council to a single company, Queensland Urban Utilities.

The differences in the water business models in Australia can be explained by the different approaches by the independent economic regulators that manage the licensing of the water utilities in different jurisdictions (Table 3.3). As of 2015, the independent regulators set water and sewerage prices only in Sydney (NSW), Melbourne (Victoria), Brisbane (Queensland), and Canberra (ACT). In these cities, water utilities submit proposed tariffs for the next 3–5 years, with supporting evidence of forecast water consumption, revenue, expenditure, and costs for infrastructure investment or upgrades.

The relevant independent regulators assess the proposed pricing and then announce their final price determination, which takes into consideration cost recovery, financial sustainability, environmental conservation, and affordability impacts on water customers. A common view, as expressed by the Productivity Commission (2011a), is that the urban water sector is able to contribute to the social objective of universal and affordable access to water and wastewater services “by ensuring that service delivery costs are no higher than necessary” (p.53).

**Table 3.3** Who determines residential water pricing in Australia (as of January 2015)

| State (city) | Urban water retailers | Economic regulator | Water price setting authority |
|---|---|---|---|
| **NSW (Sydney)** | Sydney Water | Independent Pricing and Regulatory Tribunal (IPART) | IPART |
| **Victoria (Melbourne)** | Yarra Valley Water, City West Water, South East Water | Essential Services Commission (ESC) | ESC |
| **ACT (Canberra)** | ActewAGL | Independent Competition and Regulatory Commission (ICRC) | ICRC |
| **QLD (Brisbane)** | Brisbane Water/Queensland Urban Utilities | Queensland Competition Authority (QCA) | QCA |
| **NT (Darwin)** | Power and Water Authority | Utilities Commission | W&S tariffs are regulated by the government via a Water and Sewerage Pricing Order issued by the Regulatory Minister [a] |
| **SA (Adelaide)** | SA Water | Essential Services Commission of SA (ESCSA) | ESCSA makes price determination, SA Treasurer issues a pricing order [b] |
| **WA (Perth)** | Water Corporation – Perth | Economic Regulation Authority (ERA) | WA Minister for Water |

[a] NT Utilities Commission (2012). [b] ESCOSA (2014).

### 3.3.2 Urban water tariffs in major cities

In terms of water tariff structure, two-part tariffs (TPTs) and increasing block tariffs (IBTs) were introduced between 1995 and 2012 in all the major cities under discussion. Table 3.4 shows that all cities have experienced a change in water tariff structure over the last 15 years. Both Sydney and Melbourne water retailers changed from TPT in the 1990s to IBT in 2005-06 in response to drought conditions. Melbourne retailers have kept the IBT structure since then while Sydney Water then changed back to TPT after 2009. Brisbane has changed from TPT to IBT since 2008-09. Adelaide, Perth, and Canberra applied IBT throughout that period, while Darwin applied TPT throughout this time.

**Table 3.4** Water tariff structures in major Australian cities over time

| | 1995-96 | | 2005-06 | | 2011-12 | |
|---|---|---|---|---|---|---|
| **Capital city** | **water** | **sewerage** | **water** | **sewerage** | **water** | **sewerage** |
| **Sydney** | TPT | FC | IBT (2 steps) | FC | TPT | FC |
| **Melbourne** | TPT | TPT | IBT (3 steps) | TPT | IBT (3 steps) | TPT |
| **Brisbane** | TPT | FC | TPT | FC | IBT (3 steps) | FC |
| **Adelaide** | IBT (3 steps) | FC | IBT (2 steps) | FC | TPT | FC |
| **Perth** | IBT (2 steps) | FC | IBT (5 steps) | FC | IBT (6 steps) | FC |
| **Darwin** | TPT | FC | TPT | FC | TPT | FC |
| **Canberra** | IBT (2 steps) | FC | IBT (3 steps) | FC | IBT (2 steps) | FC |

Source: WSAA (1996-2005); NWC (2006-2013).

In regard to sewerage charges, all cities applied a fixed charge, except Melbourne where retailers applied TPT. Melbourne households pay a relatively low sewerage fixed charge but a sewerage disposal charge that is in proportion to the level of water consumption. In this way, Melbourne households received a price signal for both water use and sewerage disposal.

### 3.3.3 Trends in water consumption and expenditure

In this sub-section, I will discuss the change in average water consumption and average water expenditure in different major Australian cities over time. This provides a background to understand the change in water affordability ratio across cities over time and the implications of water concession policy in the subsequent analysis.

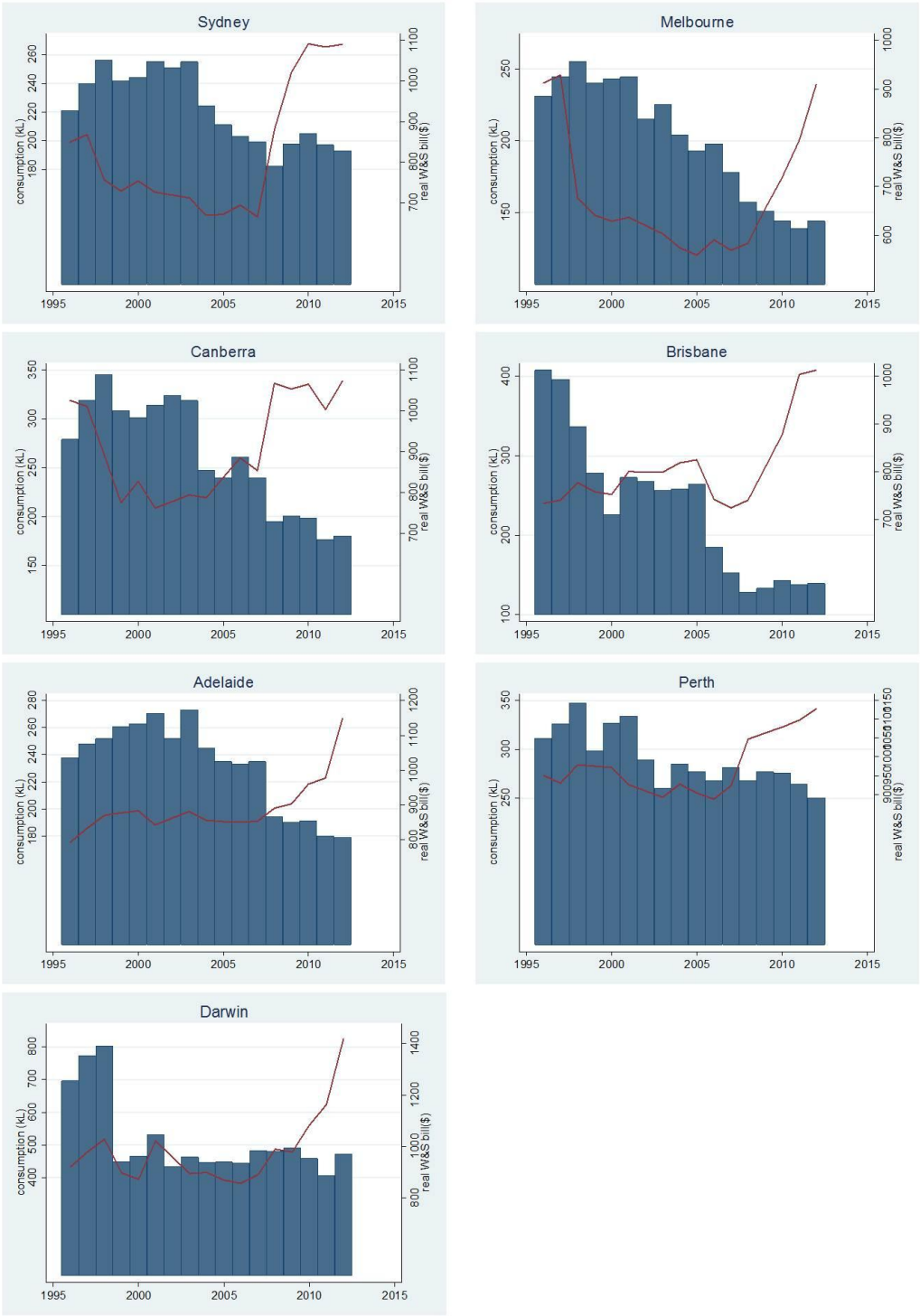
As shown in Figure 3.2, the level of average residential water consumption has, over the period 1995-96 to 2012-13, increased and then decreased across all major Australian cities. The reduction in consumption corresponds to the introduction of water restrictions, community water conservation and education programs, and increases in water prices (Halich and Stephenson 2009; Renwick and Green 2000).

In part because of high average maximum temperature and rainfall, Darwin has the highest average water consumption. Brisbane and Melbourne have the lowest average water consumption, with 139 kL and 144 kL respectively in 2011-12. Responding to drought conditions during the period 1997 to 2009, almost all major cities implemented water restrictions. Sydney imposed water restrictions in 2003 and upgraded to Level 3 mandatory water restrictions in 2008, which remained in force until June 2009. Similarly, Melbourne implemented Stage 1 restrictions in August 2006 and gradually ramped them up to Stage 3a in 2007. Under water restrictions, household residents were only permitted to water their

garden and lawns with hand buckets on alternate days; while washing cars or driveways or refilling swimming pools was not permitted. With increased rainfall, water restrictions were lifted in 2012 and have been replaced with other mandatory water conservation measures in all cities. Average water consumption has risen slightly in 2012-13, but it is still much lower than in 1996-97. This suggests that water efficiency and education programs implemented during the drought period have successfully reduced people's water consumption patterns.

A reduction in average water consumption over time does not necessarily translate to lower water bills (Figure 3.2). I adjusted the average water and sewerage bill from 1995 to 2012 with the consumer price index (CPI) (using 2012 as the base year) reported in the ABS (2013a). After accounting for a rise in the CPI, the real average water and sewerage expenditure in Sydney and Melbourne have decreased from 1995 to 2008 while real average water and sewerage bill in Canberra have decreased from 1995 to 2003. Real average water and sewerage bills in all cities have increased after 2007-08. For the latest 2011-12 figures, an average household in Darwin is charged the most (AU$1417), while Melbourne households pay the least (AU$910). In general, over the period there have been lower average water consumption levels (kL/property), meaning that water utilities have had to increase tariffs in order to recover costs. In addition, the prolonged drought from 2003 to 2007 encouraged many state and territory governments to invest in supply augmentation projects, such as the building of desalination plants in southeast Queensland (in 2009), WA (2006), NSW (2010), Victoria (2012), and SA (2012); in the ACT, the Cotter Dam has been enlarged. Such capital investments inevitably resulted in increased water tariffs because water charges are determined by the weighted average cost of capital. The ending of the drought has led to public queries about the value of these projects. Grafton et al. (2014, 2015) estimated that, in comparison to an efficient water pricing scenario, the current regulated water pricing scenario that triggered premature water supply augmentation in Sydney, has resulted in more than $AU3 billion Net Present Value (NPV) total welfare loss, or some $AU1900 NPV per households.

**Figure 3.2** Average water consumption (bars, left axis) and average water and sewerage bill (line, right axis) of major capital cities from 1996 to 2013

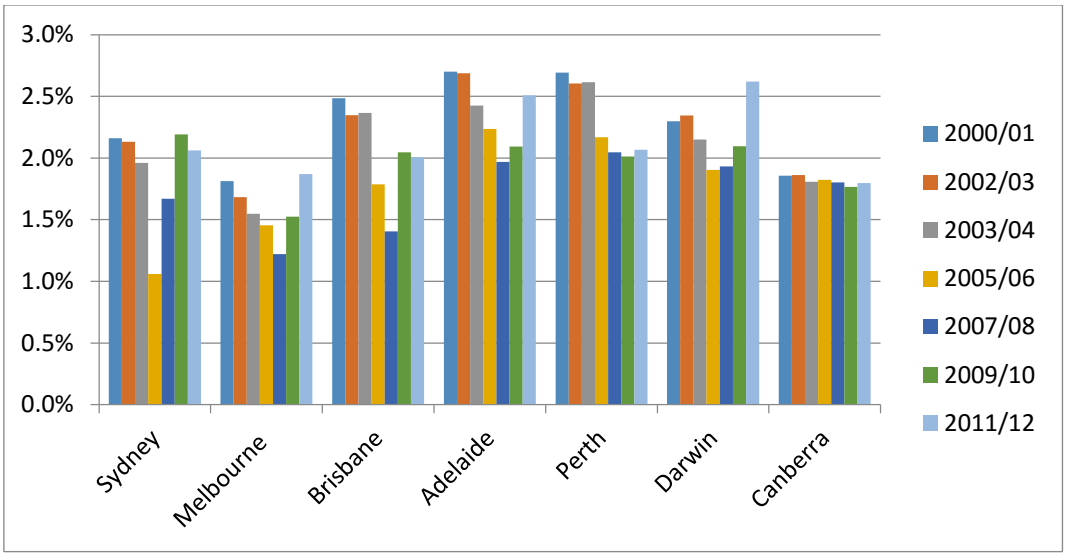



Data source: WSAA (1996-2005); NWC (2006-2013).

### 3.3.5 Water affordability analysis for major cities over time

In this section, I compare water affordability over time for the seven major Australian cities using the method applied in OECD (2003) and Fankhauser and Tepic (2007). In this analysis, water affordability (also called 'water burden') is the ratio of average residential water consumption to average household income. Average residential water consumption was extracted from *WSAA Facts* from 1995-96 to 2005-06, and also reported in *NWC National Performance Reports* from 2006 to 2013. Household income is adjusted by the amount of tax paid and is equivalised to the OECD modified scale to account for the different economic resources required by different family types. The weekly mean equivalent disposable income in each city is derived from ABS Household Income and Income Distribution in various years.

**Figure 3.3** Average household water burden in major Australian cities, 2000-01 to 2011-12




Data sources: ABS Household Income and Income Distribution, various years (2000-01 to 2011-12); NWC National Performance Reports, various years (2006 to 2013).

Figure 3.3 shows water burdens across cities from 2000-01 to 2011-12. In general, the average water burden decreased from 2000-01, but then increased again from 2006-07 to 2011-12. The increase in water burden largely corresponds with the rapid rise of water tariffs in most cities during the drought period. In 2000-01, the average water burden in Perth and Adelaide was above 3 per cent, it then declined to below 2.5 per cent in 2007-08 and became 2.8 per cent in 2011-12. Melbourne residents have enjoyed the lowest average water burden in most years, except 2011/12. Canberra residents, who have the nation's highest average income, had the lowest average water burden in 2011-12. All cities, except Darwin, have a lower average water burden in 2011-12 compared to 10 years previously.

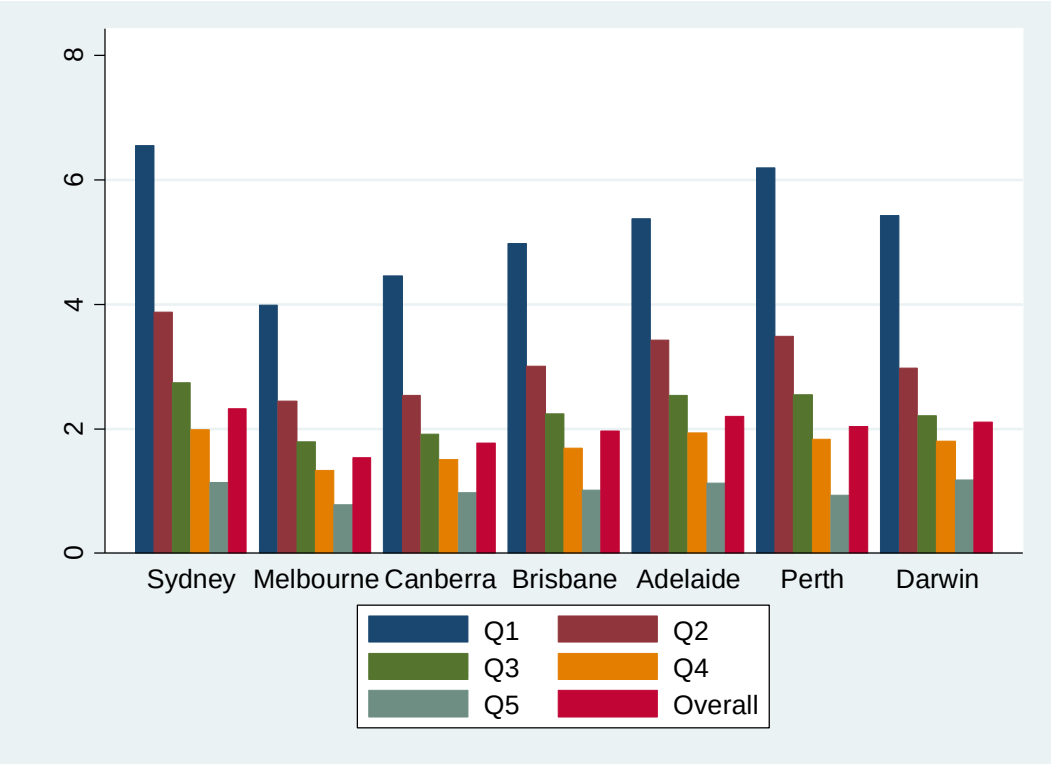
### 3.3.6 Water affordability across income quintiles

A comparison of water affordability of major Australian cities can be made across income groups. This microaffordability analysis is based on average water consumption and equivalent median household disposable income for each income quintile reported by the ABS (2013d). This analysis simply compares the potential water burdens among households in different income quintiles with the assumption that all households use the average amount of water in reference to the capital cities they live. It does not account for the distributional variation in water use and spending among households in different income levels.

Figure 3.4 shows the distribution of average water burden across household income quintiles based on average water consumption in 2009-10. As expected, the average water burden increases as household income decreases across all capital cities. For the lowest income quintile households (Q1), the water burdens were over 4 per cent for all cities, the highest being 6.6 per cent in Sydney and 6.2 per cent in Perth. The second quintile households (Q2) also had water burdens over 3 per cent in Sydney, Brisbane Adelaide, Perth, and Darwin. Melbourne households experienced the lowest water burden in all income quintiles, with Canberra households having the second lowest.

The water burdens for the lowest quintile ranged between 4 and 6.6 per cent, while the figure for the highest quintile households ranged from 0.8 to 1.2 per cent. The water burden for the lowest quintile is 2 to 2.5 times greater than for those in the top quintile. I employ the 3 per cent water affordability benchmark, as applied in Fitch and Price (2002) and Fankhauser and Tepic (2007), this result suggests that households in the bottom 40% of income distribution (Q1 and Q2) can face excessive water burden.

**Figure 3.4** Water burden by quintiles in major Australian cities in 2009/10




Data sources: ABS Household Income and Income Distribution, various years (2009-10); NWC National Performance Reports, various years (2010).

### 3.3.7 Water concessions in Australian cities

In Australia, all states and territory governments provide water concessions to help eligible households afford water. The concession schemes are usually funded and administered by government and delivered via water retailers as part of their customer service obligations. The eligibility requirements and entitlements vary from state to state, but are mostly tied to the possession of concession cards issued by the Commonwealth Government. In the case of Victoria, almost 25 per cent of the Victorians held at least one concession card and almost 35 per cent of the households received water concessions in 2006-07 (Vic DHS 2007a).

Water concession entitlements offered to households by major Australian cities is summarised in Appendix 3.1. It is noted that state level water concessions are offered in various forms. For example, in Canberra and Sydney, water concessions are applied only to the fixed water supply charge, whereas in Victoria and the NT concessions are applied as a discount on the total water and sewerage charges (up to a capped amount). In additional to the variation of water concession entitlement, eligibility criteria also vary across different jurisdictions. For instance, Health Care Card holders are eligible to water concession in the ACT, Victoria, but not other jurisdictions. However, State Senior Card holders are eligible to concession in SA, WA, and NT. Only Pensioner Concession Card (PCC) holders are eligible for water concession across all jurisdictions. This is due to the *National Partnership Agreement on Certain Concessions for Pensioner Concession Card and Senior Card Holders* by the Council of Australian Governments (COAG) since 2003. Based on the Agreement, various concession and rebates, including land, water and sewerage, energy, motor vehicle registration and public transport concessions, are available to all PCC holders. Therefore, the water concession calculation and comparison below is based on the rebates available for PCC holders in different major Australian cities.

In order to compare the values and impacts of state water concessions, I analyse three scenarios each with a different level of water consumption. This is done because many factors influence residential water consumption, including

household size and income. I ignore the different types of concession cards, but in accordance with an IPART (2010, p.116–117) survey of Sydney households, I make the following assumptions:

- Low water consumption households use 25 per cent less than the average water consumption in their city. It represents consumption for a small family households with 1 to 2 persons.
- Average consumption level represents the water use for a median size family households with 3 to 4 persons.
- High consumption households use 25 per cent more than the average. It represents consumption for large family household.

The consumption levels for the three household types in each major Australian city are calculated in accordance to the level of average household water consumption reported in the NWC National Performance Reports in 2010-11. The hypothetical annual water consumption for low, average and high consumption households are summarised in Table 3.5.

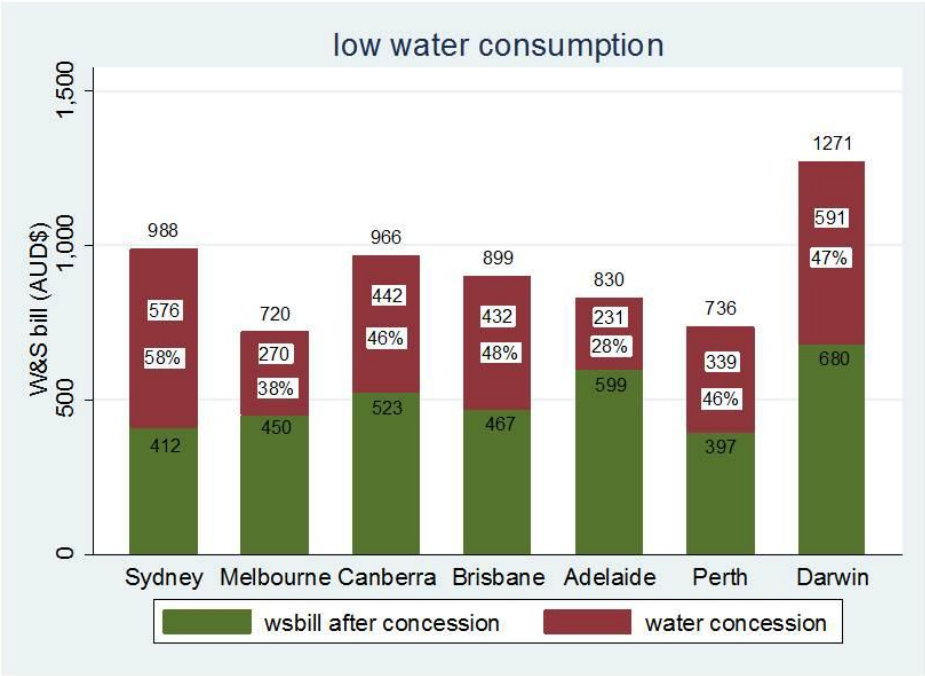
**Table 3.5** Hypothetical annual water consumption for low, average, and high consumption households

| | Annual water consumption (kL) | | |
|---|---|---|---|
| **City** | **Low consumption** | **Average consumption** | **High consumption** |
| **Sydney** | 145 | 193 | 241 |
| **Melbourne** | 107 | 142 | 178 |
| **Canberra** | 135 | 180 | 225 |
| **Brisbane** | 104 | 139 | 174 |
| **Adelaide** | 134 | 179 | 224 |
| **Perth** | 188 | 250 | 313 |
| **Darwin** | 377 | 471 | 589 |

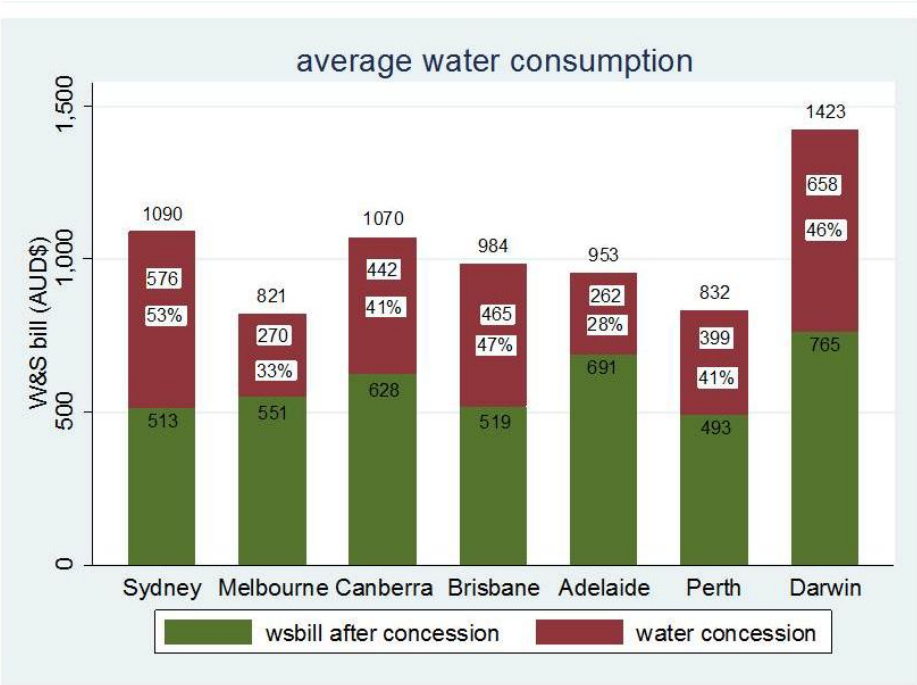
Based on the derived hypothetical water consumption levels, I then calculate the approximate amount of water rebates that eligible concession households in different capital cities would receive in accordance to the water concession rules in 2010-11 (Appendix 3.1). This comparison only considers households with PCC holders only. Differences in water rebates across tenancy types, concession card types, and other non-capital cities are not considered in this comparison. Figure 3.5 shows, for different water consumption levels, the water and sewerage (W&S) bills before and after concessions. Percentage discount represents the amount of water concession rebate as a proportion of pre-concession water and sewerage bill in different water consumption levels.

**Figure 3.5** Water and sewerage (W&S) bills before and after water rebates (2010-11) for households with different levels of water consumption

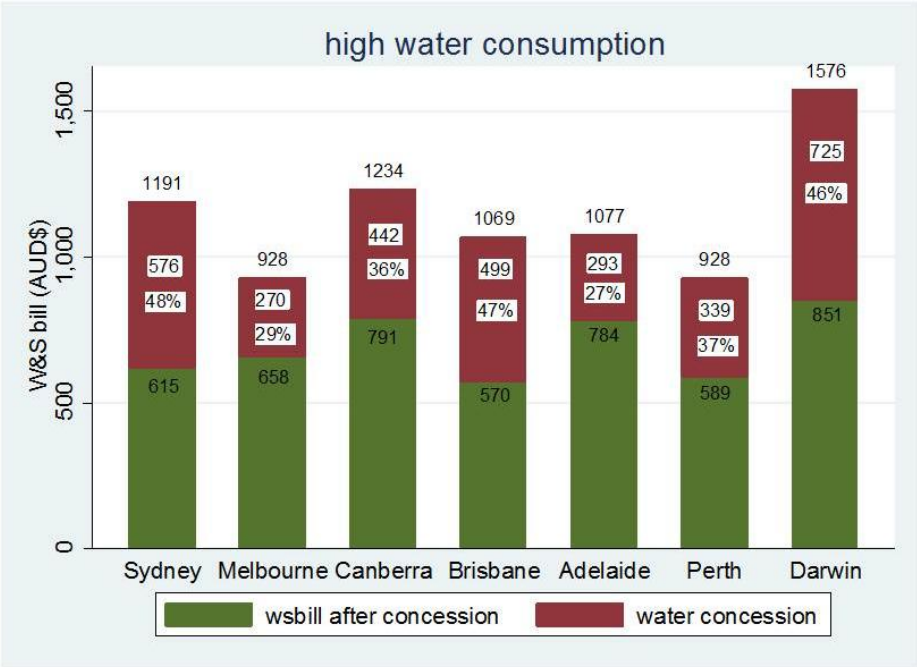
(a) Concession eligible households with low water consumption level



(b) Concession eligible households with average water consumption level




(c) Concession eligible households with high water consumption level




Data sources: Average water consumption level in different capital cities refer to NWC National Performance Reports, various years (2011); state government water concession entitlements refer to Appendix 3.1.

### *Scenario 1: Low water consumption households*

Among households with low water consumption, which use 25 per cent less than the average consumption, Darwin households had the highest W&S bills in 2010-11, both before (AU$1271) and after (AU$680) water concessions were applied. Melbourne households had the lowest bills before concessions were applied (AU$720), whereas after water rebates were applied, eligible Perth households had the lowest bills (AU$397). The value of water concessions ranged from AU$231 to AU$591 across cities.

Eligible households in Adelaide and Melbourne had the lowest levels of water rebates, AU$231 and AU$270 respectively. Darwin and Sydney households had the largest water rebate, AU$591 and AU$576 respectively. Overall, water concessions entitled eligible consumers to a 28 per cent to 58 per cent discount from the original bill. The largest reduction (58 per cent) applied to eligible Sydney households, while eligible households in Darwin, Brisbane, Perth, and Canberra had almost a 50 per cent reduction. By comparison, Adelaide households which had low water consumption received the smallest discount (28 per cent).

### *Scenario 2: Average water consumption households*

Darwin households have the highest W&S bills in 2011-12, both before (AU$1423) and after (AU$765) water concessions were applied. Melbourne households have the lowest bills before rebates (AU$821), while Perth households had the lowest total bills after rebates (AU$493). The value of water concessions ranged from AU$262 to AU$658. As for Scenario 1, Darwin and Sydney received the largest water rebates, while Adelaide and Perth households received the smallest. Percentage discounts from water concessions ranged from 28 per cent to 53 per cent. Eligible Sydney households had the largest percentage reduction (53 per cent) while Adelaide households received the smallest (28 per cent).

### *Scenario 3: High water consumption households*

For households with high levels of water consumption (25 per cent more than the average), the W&S bills in Darwin, Sydney, and Canberra were all above AU$1000 before concessions were applied. After water rebates, the bills were reduced by half. Both Melbourne and Perth households still had the lowest total bill before concessions were applied (AU$928), while Brisbane households had the lowest bills after water rebates (AU$570). The value of water concessions ranged between AU$270 and AU$725 across all cities. Melbourne consumers received the smallest amount of rebate while Darwin consumers received the largest amount for high levels of water consumption. Percentage discounts from water concessions ranged between 27 per cent and 48 per cent. At this consumption level, Sydney, Brisbane, and Darwin had the largest discounts (46-48 per cent) while Adelaide and Melbourne had the smallest (27-29 per cent).

By and large, water concession policies in all major cities appear to be effective in reducing water bills for eligible households by significant amounts. In Sydney, Melbourne, Canberra, and Perth, the value of water concessions (that is, the amount of rebate) remained about the same for different levels of water consumption. This is because water rebates only apply to fixed supply charges (in the cases of Sydney and Canberra) or to a percentage reduction and with a low cap amount (in the cases of Melbourne and Perth). In other cities, the value of water rebates increases with increasing water consumption. From the perspective of economic efficiency, Sibly (2006a) and Whittington (2003) recommend that rebates should target the fixed supply charge without distorting the marginal price of water.

In terms of percentages, the discounts generally become smaller with increasing levels of water consumption, regardless of city, in accordance with the relevant water concession rules. Eligible Darwin, Brisbane, and Adelaide households face a slight reduction in rebate discount (that is, the percentage discount on the original utility bill) as water consumption increases. In other cities, high

consumption households receive a lower rebate discount than low consumption households. This aligns to the objective of water conservation that the concession policy does not encourage excessive water use.

In terms of horizontal equity, larger households, who have higher levels of water consumption, receive relatively less concession benefits (i.e. percentage reduction). A review by the Productivity Commission (2011a, p.203) concluded that current water concessions were, to a certain extent, inefficient and inequitable. When designing a concession policy, striking a balance between different objectives therefore poses a challenge, both to water pricing regulators and social policy makers.

## 3.4 Conclusions

With rapid rises in urban water prices around the world, addressing the social equity and affordability issues which surround the cost of water is increasingly important. This chapter provides Australian and international perspectives on how social concerns about urban water costs can be tackled through the use of water pricing principles and policies.

Designing and implementing residential water pricing is complex. There are multiple objectives involving financial sustainability, economic efficiency, environmental conservation, social equity, and affordability. Some of these objectives conflict with each other, although others are complementary. Different pricing designs will achieve different equity balances. Among tariff-based solutions, the increasing block tariff (IBT) is the most popular method and has been used in both developed and developing countries (IBNET 2012). Nevertheless, it is debatable whether an IBT achieves the most equitable outcome.

To assess the effect of pricing policy, water affordability analysis can assist in identifying those water consumers who would encounter affordability problems if real prices were to increase. To better identify target households and address water

poverty issues, the use of metrics such as household size and income level are helpful. In all cases, the outcomes of such targeted solutions need to consider equity and efficiency. Targeted policies are more efficient than most other solutions, but they do require an advanced social security system, such as in Australia and Chile.

This chapter shows that current water concession scheme varies across Australian jurisdictions, and the percentage discounts from water rebates generally become smaller with increasing levels of water consumption. Therefore, the current state government water concession scheme may not be fair, nor equitable, to eligible households that have large family size. Successful social policy needs to achieve five Es: equity, effectiveness, employment, efficiency, and economy (Herscovitch and Stanton 2008). The strengths and weaknesses of various policies to address water and energy affordability have been discussed in Chapter 2. In the next chapter, I will further discuss the trend in water and energy affordability in Australia by using different methods. Then, in the subsequent chapters, I will evaluate the efficiency, effectiveness and equity implications of the state water and energy concession schemes by using different data and methodologies.

## Appendix 3.1 State-by-state water concession policies in Australian cities, 2011-12

| Cities | Eligibility | Concession | Source |
|---|---|---|---|
| **Canberra (ACT)** | Centrelink Pensioner Concession Card holder | 68% discount in water and sewerage supply charge | www.actewagl.com.au |
| | DVA Gold Card holder | 68% discount in water and sewerage supply charge | |
| | Health Care Card holder | Rebate on water charges only | |
| **Sydney (NSW)** | Owner-occupiers with Pensioner Concession Card, DVA Gold Card, DVA Blue Card – Pensioner Concession, or receiving DVA intermediate rate pension | Water: 100% discount on the standard quarterly service charge to maximum of $36.22. Reduction of 33% on water use charges to a maximum of 100 kL a year (for resident pensioners who have a water service only)<br>Sewerage: 83% discount on the standard quarterly service charge | www.sydneywater.com.au |
| **Melbourne (Vic.)** | Centrelink Pensioner Concession Card, Centrelink Health Care Card, DVA Concession Card, DVA Gold Card | 50% discount on water and sewerage charges up to max of $270.20 per year<br>Water only: 50% discount on water charges up to max of $138.50 per year | www.yvw.com.au |
| **Adelaide (SA)** | Owner-occupier or tenants with Pensioner Concession Card, Seniors Card, DVA Gold Card, full-time student, Centrelink benefit or allowance receiver, low-income earner | 25% discount on water charges over a year subject to minimum and maximum amounts<br>Water concession: Owner occupier: min $155, max $265<br>Tenant: min $90, max $200<br>Sewerage concession: max $110 per year | www.dcsi.sa.gov.au |
| **Brisbane (Qld)** | Owner-occupier or life tenant with Pensioner Concession Card or DVA Gold Card | Subsidy up to a max of $120 off the cost of water charges per year from Queensland Council. | www.communities.qld.gov.au |

| | | | |
|---|---|---|---|
| | | Brisbane City Council provides pension remission up to 40% discount of net charges in total bill to max $476 per year. | |
| **Perth (WA)** | Pensioner Concession Card, state concession card | Rebate of up to 50% of annual service charges and 50% of water usage charge up to 150 kL per year. | www.watercorporation.com.au |
| | WA Seniors Card | Rebate of up to 25% (capped) of annual service charges | |
| | Both WA Seniors and Commonwealth Seniors Health Card | Rebate of up to 50% on annual service charges, or may be eligible to defer those charges | |
| **Darwin (NT)** | Centrelink Pensioner Card; DVA Gold Card; DVA Concession Card; Centrelink carer allowance receiver; non-pensioner aged war service veteran; low-income superannuants; senior citizens | Daily water concession: water fixed charge = $0.407 per day; water usage charge = $0.725 per kL, sewerage fixed charge = $0.754 per day. | www.health.nt.gov.au |

Source: Adapted from Productivity Commission (2011a, Table 8.4) and updated information from the government websites listed

# Chapter 4

## Trends in water and energy affordability and utility stress in Australia

### 4.1 Introduction

Affordability of urban water and energy services for low-income households has attracted political and research attention in countries that have undergone extensive public utility pricing reform (e.g. Kessides et al. 2009; Gawel et al. 2011, 2014; Fankhauser et al. 2008). In some countries, legislation has been introduced to ensure water and energy affordability and to protect the poor (Smets 2000; DEFRA (2012). For instance, the United Kingdom has introduced the *Warm Homes and Energy Conservation Act 2000* (WHECA) which set a maximum target date of 15 years after the publication of the *UK Fuel Poverty Strategy* to eliminate fuel poverty within vulnerable groups (Hills 2011: 6). The European Commission subsequently introduced fuel poverty policies to address this emerging social issue (EC 2013; Bouzarovski et al. 2012). Concern about water affordability from the perspective of public policy has also increased in both transitional and developed economies (e.g. (Fankhauser and Tepic 2007; OECD 2003; DEFRA 2012; Snell et al. 2009; Sawkins and Dickie 2005). Despite its importance, it has attracted relatively little attention in terms of policy development for water and energy affordability compared to housing affordability and other social problems.

In many social policies, identification of the targeted groups in need of assistance is the crucial step to effective and efficient targeted social policy design. In this case, which households are at high risk of utility affordability stress and require targeted assistance? Previous experience has shown that the identification of fuel-

poor households in the United Kingdom is both costly and complex (Dubois 2012). In part, this is because the demand for water and energy depends on many factors such that a single benchmark may not be appropriate for all circumstances and various climatic conditions. Further, the causes of water poverty and fuel poverty are complex, multi-dimensional, and extend beyond income poverty alone (Hills 2011; Boardman 2012; OFWAT 2011). As a result, defining and measuring public utility affordability and identifying households suffering utility stress is important for effective public utility and social policy development.

At present, there is no agreed method to measure and define public utility (un)affordability. Different measures have their strengths, weaknesses and technical challenges (Kessides et al. 2009). A traditional affordability measure—the expenditure-to-income ratio method—is contested because of its arbitrary benchmark and because it technically excludes those who under-consume utility services due to genuine income poverty (Kessides et al. 2009). A relative affordability measure (Hills 2012) has recently been adopted as the new fuel poverty indicator in the United Kingdom to replace the 10 per cent affordability benchmark (DECC 2013). In addition, research shows that there are substantial discrepancies between objective and subjective affordability indicators (Price et al. 2012; Nance 2013; Palmer et al. 2008; Scott et al. 2008). These differences suggest that a single indicator may not be able to capture the multifaceted nature of the utility affordability problem (Bramey 2012; Saunders 2008, 2009; McLachlan et al. 2013; OFWAT 2011).

The objective of this chapter is to elucidate whether there were more Australian households facing water and energy affordability problem over time and who they are in the community. To prevent an undue focus on a single measure, I have applied three affordability measures to answer the following questions: (i) What are the trends in utility affordability in different Australian jurisdictions over time? (ii) What are the characteristics of households at risk of utility stress? (iii) Is there any relationship of utility stress and other material hardships among low-income households? and (iv) Which affordability indicator(s) will be more appropriate in Australian climatic and public policy context?

The chapter is structured as below. Section 4.2 discusses why utility affordability is an increasingly important social problem and provides a brief literature review of various existing methods to measure public utility affordability. Section 4.3 describes the data and methodology applied in this research. Section 4.4 presents the trends in utility affordability in Australia over time. Sections 4.5 and 4.6 compare headcount indexes - the proportion of households at risk of utility affordability stress - generated from different affordability indicators across time and across states. Section 4.7 analyses the relationship between utility stress and other material hardships, and the prevalence of utility stress among different household types. The concluding section 4.8 provides an overview discussion and conclusions.

## 4.2 Context

### 4.2.1 Rising utility prices since public utility reform

In Australia, both domestic retail water prices and energy prices, across all major capital cities, have increased much faster than the CPI over the past 15 years. At a national level, the real water price indexes increased by approximately 60 per cent from 1990-91 to 2015. Some capital cities, such as Brisbane and Darwin, experienced more than a doubling in real water prices over the same period (Figure 4.1).

The retail energy prices have increased substantially in recent years. At a national level, the average real electricity price and real gas price have increased by 80 per cent from 1990-91 to 2014-15 (Figure 4.2 and Figure 4.3). In major metropolitan cities such as Sydney and Melbourne, the real electricity price almost doubled over the same period, while Adelaide and Canberra households experienced the greatest price rise in mains gas consumption. Therefore, the rising cost of water

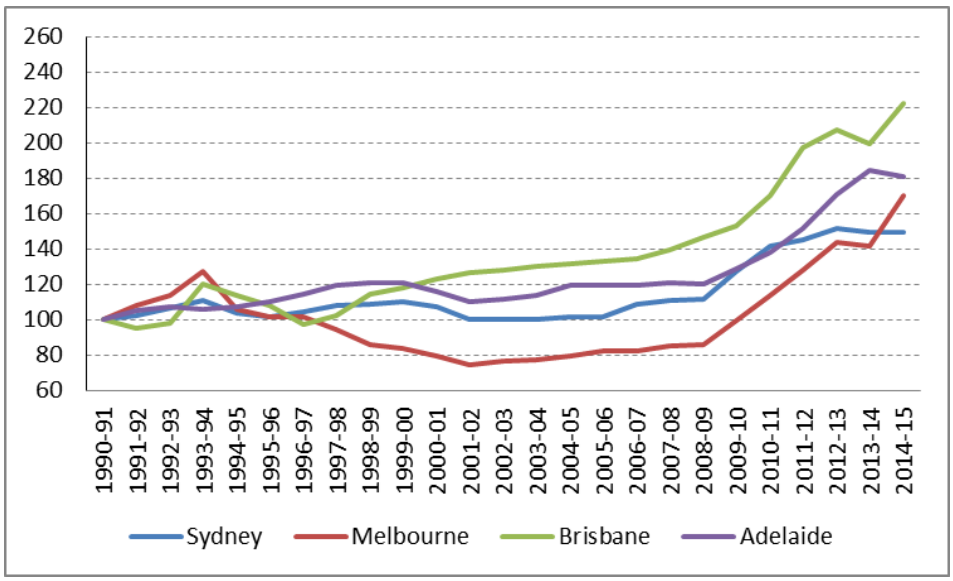
and energy utility services is one of the contributors to the rising cost of living[10], particularly among low income households in Australia in recent years (Phillips 2013).

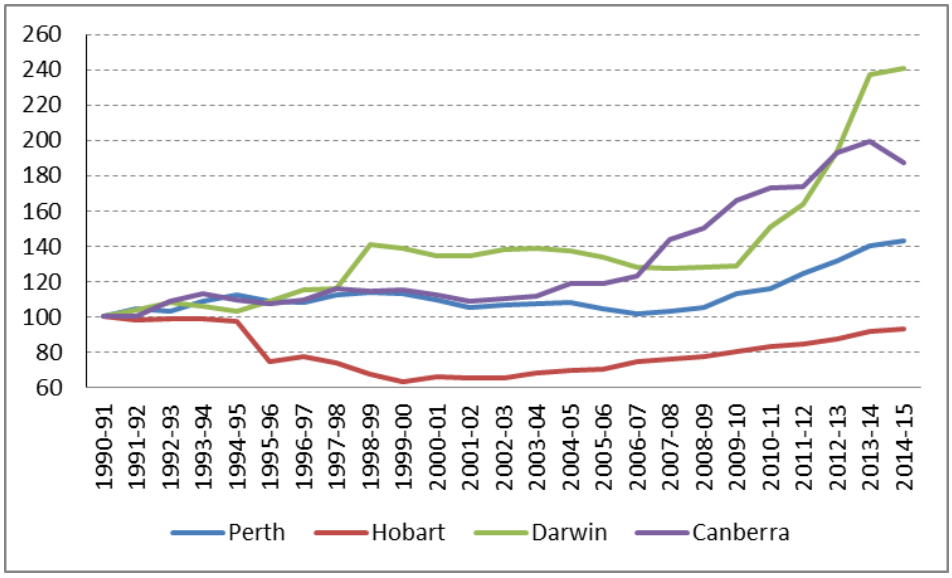
There are many factors that contributed to the rapid rise in water and energy prices in Australia. Utility market reforms in the past two decades resulted in cost reflective pricing and stressed financial sustainability and environmental responsibility (Chapter Three). In the last five years, the real water price has increased largely as a consequence of the prolonged drought in the previous decade over much of Australia. Because of the prolonged drought, many jurisdictions implemented multiple expensive supply argumentation projects, such as building desalination plants, recycling facilities, and dam enlargement projects, extensive water interconnection and pipeline networks, which contributed to higher prices under the full cost recovery principle (PC 2011).

Electricity and gas prices have increased dramatically over the last few years due to number of factors, such as rising infrastructure costs, various government policies around renewable energy and climate change, and changing global resource prices (DIS 2015a; Wood 2014; Wood and Carter 2013a, 2013b). The cost of additional network infrastructure, intended to cope with the growth of peak demand for electricity in days of extreme weather, is the major contributor to recent electricity price rises (DERT 2012). Other contributing factors to higher prices include: the obligations to Renewable Energy Target (RET) by the energy sector, and the costs associated with premium solar feed-in-tariffs paid to customers who install small scale solar systems (Wood et al. 2015).

[10] The ABS living cost index measure the impact of price changes to the out-of-pocket expenses incurred by households to gain access to a fixed basket of goods and services of selected households (ABS 2016). The cost of living index derived by Phillips (2013) was based on a similar methodology to the ABS living cost indexes, but has extended to measure the impacts on all Australia households.

**Figure 4.1** Real water and sewerage price trends in capital cities, 1990-91 to 2014-15

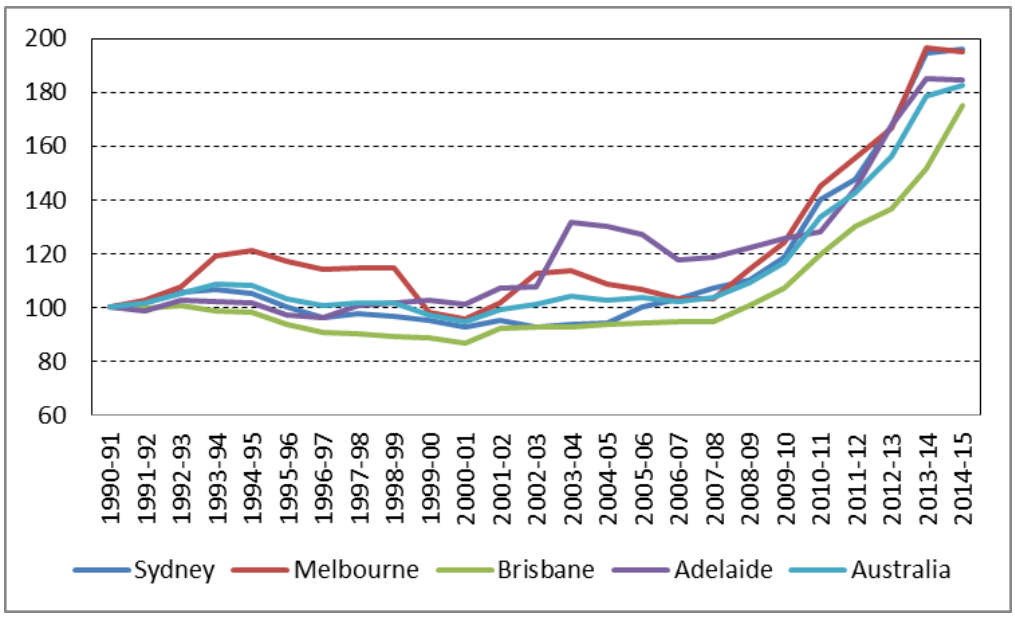


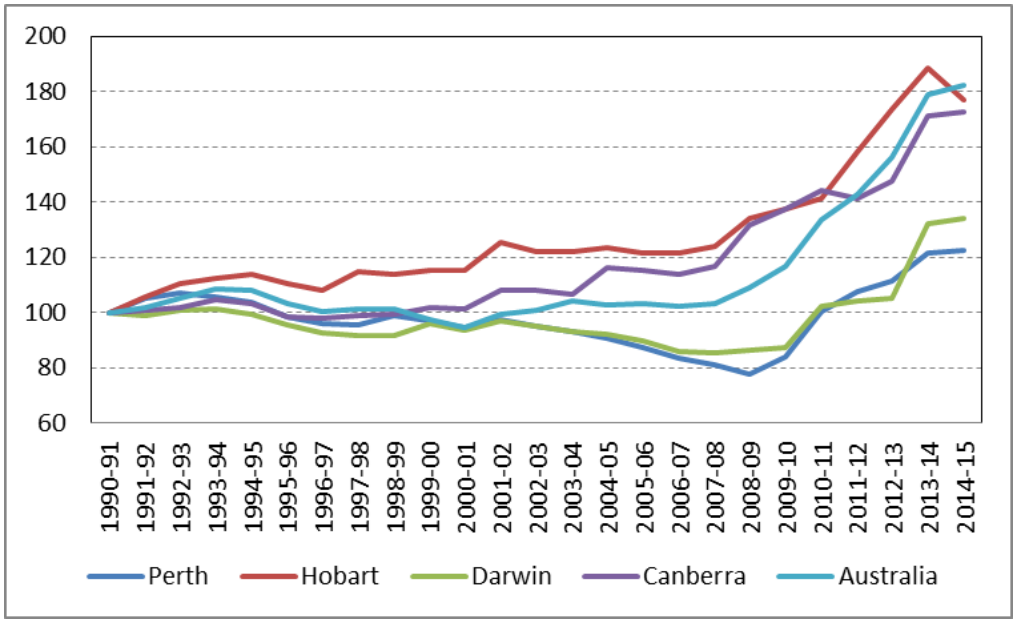




**Note:** Water and sewerage price index prior to 1998 is unavailable from ABS. Data shown between 1990-91 and 2000-01 is based on the estimated real water and sewerage price index calculated in Productivity Commission (2002: 130). Data after 2000-01: The real price index for each capital city was obtained by rebasing the CPI (water and sewerage) price indexes to a base year of 1990-91 and then deflating the rebased indexes by the rebased CPI (all groups) price index for each capital city. The CPI (electricity) price indexes for 2000-01 and after include the Goods and Services Tax. [All CPI indexes based on June quarter of the year],

**Data source:** Estimates based on ABS (Consumer Price Index, Australia, Cat. No. 6401.0) and Productivity Commission (2002: 30)

**Figure 4.2** Real electricity price trends in capital cities, 1990-91 to 2014-15

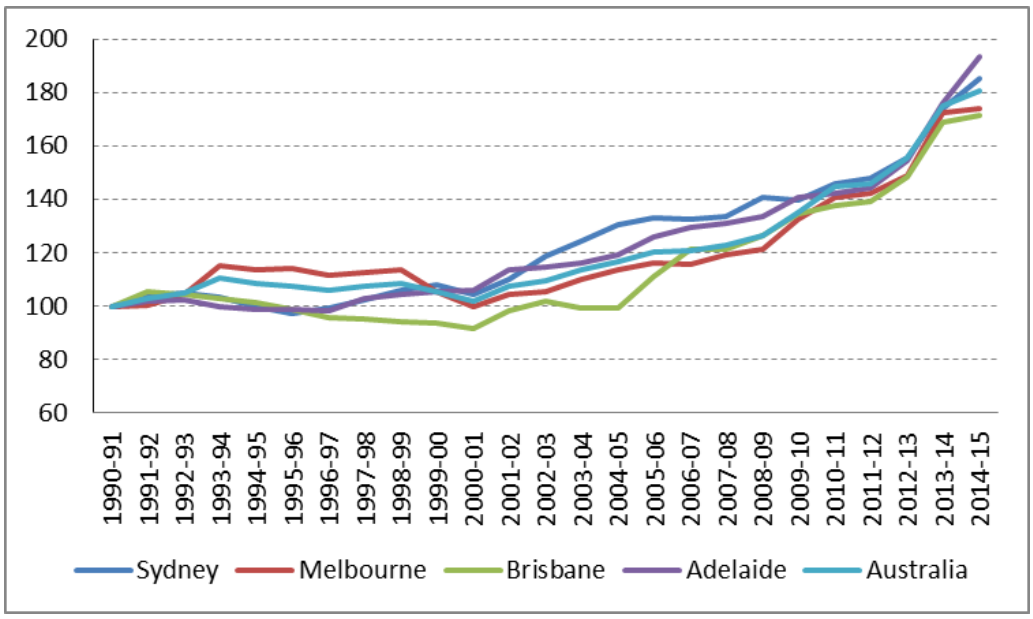


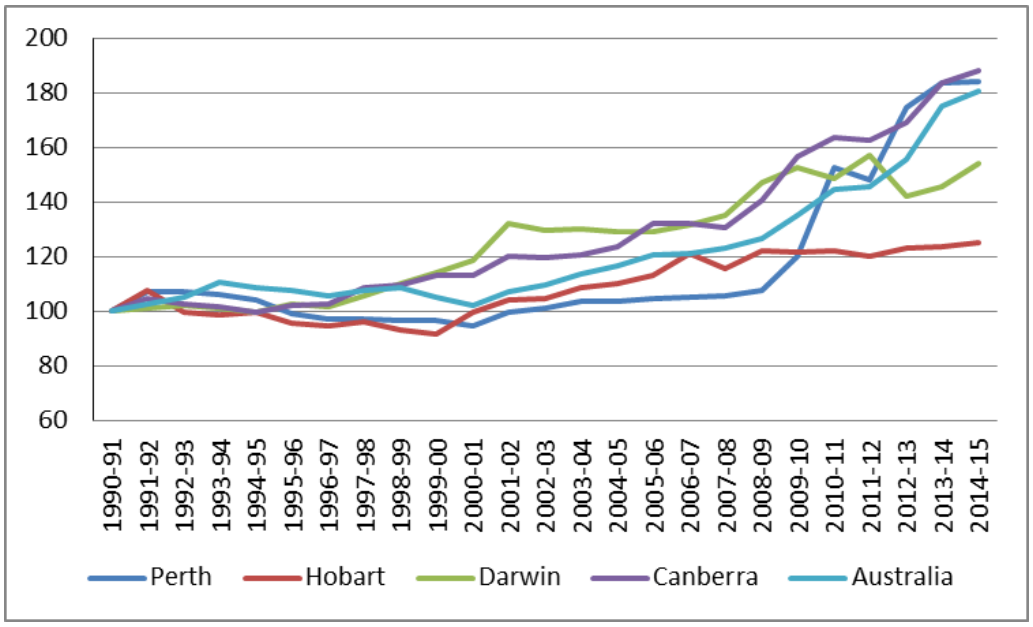




**Note:** The real price index for each capital city was obtained by rebasing the CPI (electricity) price indexes to a base year of 1990-91 and then deflating the rebased indexes by the rebased CPI (all groups) price index for each capital city. The CPI (electricity) price indexes for 2000-01 and after include the Goods and Services Tax. [All CPI indexes based on June quarter of the year]

**Data source:** Estimates based on ABS (Consumer Price Index, Australia, Cat. No. 6401.0)

**Figure 4.3** Real gas price trends in capital cities, 1990-91 to 2014-15




**Note:** The real price index for each capital city was obtained by rebasing the CPI (gas) price indexes to a base year of 1990-91 and then deflating the rebased indexes by the rebased CPI (all groups) price index for each capital city. The CPI (electricity) price indexes for 2000-01 and after include the Goods and Services Tax. [All CPI indexes based on June quarter of the year]

Data source: Estimates based on ABS (Consumer Price Index, Australia, Cat. No. 6401.0)

With improving national wealth and living standard among Australian households, there has been an increase in the number of household appliances, especially air conditioning systems, that have put extra load to network infrastructure to cope with the increased electricity peak demand. Recent trends show reduced aggregate electricity demand due to changes in economic structure, improved energy efficiency, and increased renewable energy generation (DIS 2015a). The combination of increased peak demand, but decreasing aggregate electricity consumption has indirectly pushed up the average electricity prices. This is because the high cost of the distribution network is now spread over a smaller volume of power use and this has resulted in higher per unit prices needed to provide the same revenue. Wealthier households have the capacity to avoid the impact of electricity price rise via premium solar feed-in tariff while poor households are left behind to pay for the higher average network cost. The above phenomenon poses a social challenge regarding low-income and vulnerable households who have limited financial capacity to improve energy efficiency or to install rooftop solar PV systems. Simshauser et al. (2011) called this phenomenon 'the Boomerang Paradox' which created the pre-condition of fuel poverty.

In response to concerns over higher utility prices, the terms water poverty and fuel poverty have gained currency in recent years in the Australian media, being used by advocacy groups (e.g. ACOSS, CUAC, CHOICE, COTA-NSW), government reports (e.g. PC 2011, Hatfield-Dodds et al. 2008, DRET 2012, AEO, ERAA and ACOSS 2013) and academic literature (e.g. Simshauser et al. 2010a, 2010b; Chester 2013, Chester and Morris 2011, Richardson and Travers 2002). The manifestations of the concepts of fuel poverty, energy poverty and utility stress are real for many low-income and vulnerable Australian households (Chester 2013, Willis et al. 2006). The notion of fuel poverty was recognised in the public policy sphere in the United Kingdom with the introduction of the *Warm Homes and Energy Conservation Act 2000* (WHECA) and the publication of the *UK Fuel Poverty Strategy* in 2001 (Hills 2011: 6). To combat the water poverty problem, water and sewerage businesses in the United Kingdom are mandated to provide

social tariffs to identified low-income and vulnerable households to assist them with water affordability (DEFRA 2012).

Concerns about fuel poverty have gained traction in NSW as a result of higher energy prices, and because of actual or planned price deregulation and divestment of state energy assets. In a now liberalised energy retail market, customers have the option to switch between energy suppliers. Contemporaneous with these changes, the number of utility customers who have experienced payment difficulties or service disconnections has increased (EWON 2013).

At present, there is limited literature published on the concepts of utility affordability and utility stress, and strategies to combat their effects in Australia. A key early review was the Committee for Melbourne (2005) in response to the energy market reforms in Victoria. Richardson and Travers (2002) also explored the concept of fuel poverty and its application in SA. Most of the studies to date have applied a 10 per cent of income threshold to define energy affordability (Chest and Morris 2011; Simshauser et al. 2010a) while a more recent study by Nance (2013) adopted the Hill's (2012) approach to measure relative energy poverty. In response to this emerging social challenge of utility stress, there is a need to fill the knowledge gaps to measure utility affordability, identify households at risk of utility stress, and develop coherent, sustainable and practical strategies for addressing utility stress in the Australian context.

### 4.2.2 Concepts of utility affordability and their measurements

There are a number of literature on water and energy affordability that focus on the policy challenge of reforming the public utility sector and the implications of rapid utility price rises on low-income households (e.g. Fankhauser and Tepic 2007; Fankhauser et al. 2008; Gawel and Bretschneider 2010, 2014; Kessides et al. 2009; Komives et al. 2005; Miniaci et al. 2008a). The recent UK fuel poverty review led by Professor John Hills (Hills 2011, 2012) and publications by led poverty researchers such as Brenda Boardman (1911, 2010) and Richard Moore

(Moore 2012) have provided a rich discussion of the definitions and measurement of fuel poverty indicators. Many of the studies refer to the concept, definition and measurement of poverty, both income poverty and material deprivation. Another studies relate to affordability is housing affordability, which is also called shelter poverty (e.g. Stone 2006), housing stress (e.g. Harding et al. 2004; Nepal et al. 2010), and housing affordability (e.g. Burke et al. 2011; Kutty 2005). I draw on the key principles of the different approaches to affordability to define and measure water and energy affordability in the Australian context.

Surprisingly, there is no agreed definition of public utility affordability (Kessides et al. 2009). According to the European University Institute (EUI) (2008: 2), affordability is defined as ‘the ability to pay for a necessary level of consumption within normal spending patterns’. The most common approach is the traditional utility expenditure-to-income ratio. Other methods include the residual income method, the potential affordability approach, the Relative Low Income and High Cost (RLIHC) approach, and subjective measures.  Below I discuss the most common methods used to measure affordability.

### Burden ratio method

Affordability can be measured as the ratio of actual utility bill to household’s income (EUI 2008: 2). This is called the 'burden ratio method'. In this method, a household is in utility stress (that is, water poverty or fuel poverty) if the ratio of the actual utility expenditure relative to their household income is above a defined benchmark. This approach is widely adopted, but is also criticised because of the difficulty in defining an appropriate unaffordability benchmark.

The OECD (2003) has proposed two-level water affordability indicators: a macroaffordability and a microaffordability indicator. Macroaffordability relates the average household utility expenditure to average household income or expenditure. The microaffordability indicator measures the affordability disaggregated by region, income group, and household type (Sawkins and Dickie 2005). An alternative measure is the headcount affordability index which

measures the proportion of households spending more than a specified percentage of their income on utility charges (Sawkins and Dickie 2005; Kessides et al. 2009).

The traditional burden ratio methods generally serve as macro-affordability indicators of utility affordability. The challenge with such measures is that the impacts of utility price changes and the growth of household wealth and income are not distributed evenly. In most cases, impacts of price changes on essential goods and services are regressive, or have a greater impact on lower income households. Thus, it is important to analyse the affordability impacts at a micro level (OECD 2003).

There are several shortcomings of using a burden ratio method to measure utility affordability or to identify households at risk of affordability problem. In the case of fuel poverty analysis, Moore (2012a: 21) has argued that 'expressing fuel costs as a percentage of income is a poor indicator of the actual affordability of fuel' because the choice of definition of income (for example, gross income, equivalised income, disposable income, or disposable income after housing cost) has a significant impact on the measurement. Moreover, using a burden ratio method alone to identify households who suffer from utility affordability problem encounters inclusion error and exclusion error (Kessides et al. 2009). That is, the measure can wrongly include non-poor households who 'over-consume' and fail to include households that 'under-consume'; but have a low-income. Furthermore, the method does not represent consumer's ability to pay, and it bears no reference to socially desirable adequate standards of consumption (EUI 2008: 2). Such problems have been widely discussed in both housing affordability literature (e.g. Hancock 1993; Heylen and Haffner 2013; Stone 2006; Nepal et al. 2010) and fuel poverty literature (e.g. Moore 2012a, 2012b; Hills 2011, 2012; Price et al. 2012).

The use of utility affordability thresholds to identify vulnerable groups for targeted assistance with their utility costs is also a subject of debate. For instance, Fankhauser and Tepic (2007) adopted the benchmarks of 10 per cent for electricity, 5 per cent for water, and 10 per cent for heating, as a proportion of

household expenditures, as indicative thresholds for utility affordability in developing and transitional countries (Table 4.1). What the thresholds should be is subject to political discretion which may mean some vulnerable households may be excluded from targeted assistance programs.

**Table 4.1** Benchmarks used in measuring public utility affordability

| Source | Electricity | Heating | Water |
|---|---|---|---|
| World Bank (2002) | 10-15% | | 3-5% |
| WHO (2004) | 10% | | |
| IPA Energy (2003) | 10% | 20% | |
| UNECE | | 15% | |
| US Government | | 10% | 3% |
| Asian Development Bank | | 6% | 2.5% |
| OECD (2003) | | | 3% |
| UK Fuel Poverty Strategy (prior to 2012) | | 10% | |

Source: Fankhauser and Tepic (2007: 1040); OECD (2003); Moore (2012). Indicators are expressed as proportion of total household income or total household expenditure spent on utility expenses

### Twice the median approach

In a recent European Commission working paper it was proposed that those in energy poverty be defined as 'households that spend more than a pre-defined threshold share of their overall consumption expenditure on energy products', where the threshold equals the doubling of the national average ratio number (EC 2010). The 10 per cent fuel poverty threshold was originally developed by Boardman (1991) and represented the share of the income spent on fuel services by the poorest 30 per cent of the households in the United Kingdom. That was twice, or more than twice, the median fuel expenditure of the overall sample population (Liddell *et al.* 2012; Heindl 2013). Applying the ‘twice the median’ concept helps to identify low-income households with unusually high fuel costs. The advantage of using the median approach, rather than a mean approach, is that the extremely low or high observed values in the survey sample do not affect the

value of median. In addition, if we calculate the affordability thresholds based on the median costs to income ratio for different Australian jurisdictions, the affordability threshold can be higher for areas where the levels of water or energy consumption is generally higher or where the household incomes is generally lower.

A key shortcoming of the twice the median approach, as well as other relative measures, is that it fails to reflect increases in utility price or decrease of household income measured in an absolute sense. For example, in terms of relative fuel poverty, the effect of a rising fuel price is absorbed in the rising median percentage of income spent on fuel costs among all households. Thus, it masks the fact that more households can have a genuine difficulty in meeting rising fuel costs (Moore 2012a, 2012b).

### Potential affordability approach

The second way to measure affordability is to replace the actual bills with reference bills, which is called the potential affordability approach (PAA) (Miniaci et al. 2008a, 2008b). In the PAA method, a reference consumption or expenditure point is determined from the household expenditure data so as to set the appropriate affordability thresholds. This method measures a household's potential utility bills for a minimum (acceptable) reference expenditure on (or consumption of) utility services in a burden ratio method. Such an approach has been applied and used to model fuel costs in the *UK Fuel Poverty Strategy*.

### Relative Low Income and High Cost approach

In the recent *Fuel Poverty Strategy* review by Hills (2011, 2012), he proposes to reframe the problem of fuel poverty and its measurement by a relative measurement approach - a Relative Low Income and High Cost (RLIHC) approach. Under the RLIHC approach, households are considered as fuel poor if:

(i) they have required fuel costs that are above the contemporary median level; and
(ii) were they to spend that amount, they would be left with a residual income below the official poverty line (Hills 2012: 50-60).

The low-income threshold is defined as 60 per cent of the median equivalised household income after housing costs, plus their particular fuel costs after equivalisation. The high fuel cost threshold is set as the median equivalised fuel cost for all households. Median fuel cost is based on the modelled fuel cost required to attain a comfortable temperature (18$^{o}$C in living space and 21$^{o}$C in bedrooms) in accordance with household composition, floor space, energy efficiency of housing stock, and climatic locations.

The data needed to calculate a RLIHC at a national or a state level is not available in Australia. As a result, Nance (2013) adapted the Hills' RLIHC approach to measure relative energy poverty in Australia. Nance (2013) analysis used CURF data from the 2009-10 Household Expenditure Survey (HES) of the ABS. He replaced modelled fuel costs with actual fuel and power expenditure from the survey data. He found that there 12 per cent of the Australian households were at RLIHC relative energy poverty in 2009-10 (Nance 2013). However, the application of the RLIHC approach has not been adopted as a water affordability indicator by OFWAT (2012) and its application in Australian water and energy affordability policy is mostly unknown.

Using the RLIHC approach to measure fuel poverty has been criticised by fuel poverty researchers. Moore (2012a) has argued that, over the period that fuel prices had increased faster than household income, fuel poverty base on the 10 per cent threshold rose continuously. However, there was little change in relative fuel poverty rate because the increase in median fuel costs (i.e. relative affordability benchmark) over time had masked the problem of increasing real fuel prices. Similar to the ‘twice the median’ approach, the relative measure therefore excluded some households that would have genuine difficulty in meeting their rising fuel costs.

### Residual income method

Another approach to tackling the measurement problems of burden ratio affordability is to use a residual income method (RIM), or budget standard approach (Saunders et al. 1998; Henman 2005, 2012, Stone 2006; Burke 2011; Kessides et al. 2009: 15). Under the RIM approach, a household is in utility-driven poverty (i.e. utility stress) if its disposable income, after paying utility bills, is lower than the minimum budget to afford other goods and services for a decent living standard. Moore (2012a: 22) proposed the fuel poverty threshold as the point at which 'total required fuel costs exceed the remaining household income available for fuel' based on Minimum Income Standard (MIS) approach. Moore (2012a) argued that using the MIS method to define fuel poverty can account for the higher living costs incurred by households in different family types, household sizes, and geographical locations.

The challenge is the definition of 'minimum or acceptable standard of consumption' which is subject to arbitrariness (EUI 2008:2). In Australian poverty research, there are two commonly applied budget standards. The first is the MIS, also called the Henderson Poverty Line (HPL) (Johnson 1987, 1996). The HPL is measured in reference to the benchmark income of AU$62.70 for the September quarter in 1973 established by the Henderson poverty inquiry (Melbourne Institute 2013). It is the disposable income required to support the basic needs of a family of two adults and two dependent children. The poverty lines for other family types are derived with reference to a set of equivalence scales and index of per capita household disposable income (Johnson 1987, 1996). Nevertheless, the HPL has been adopted as the official poverty line in Australian social welfare policy.

The second alternative measure is the budget standard approach developed by the Social Policy Research Centre (SPRC) at the University of New South Wales (Saunders et al. 1998). The SPRC report established a low cost budget standard (LCBS) and a modest cost budget standard (MCBS). The LCBS is a minimum

level of consumption in ‘contemporary’ Australia, while the MCBS allows for a comfortable but far from luxurious lifestyle. The RIM approach is yet another lens to inspect various affordability problems, such as housing affordability, in the economy (Burke et al. 2011; Henman 2012).

### Subjective method

Income-based measures alone may not be able to capture the multifaceted nature of water and fuel poverty problems faced by low-income and vulnerable households. The recent literature on poverty has emphasised ‘the need for a broader framework that captures the deprivation associated with poverty that is not revealed when comparing level of economic resources with an income poverty line’ (Saunders and Bradbury 2006: 353). If poverty involves people going without, poverty measures should elucidate the circumstances and living conditions of the poor so as to confirm that they are actually ‘missing out’ (Ringen 1988). This aligns to Sen’s idea of capability (Sen 1985, 1999) and Townsend’s (1979) relative deprivation approach.

Previous research has found that using a ratio measure to evaluate public utility affordability can encounter several errors (Kessides et al. 2009; Gawel and Bretschneider 2014). First, it may exclude households that are absolutely poor and cannot afford the minimum quantity of public utility services (that is, are below the affordability benchmark). Second, it may exclude households which ‘under-consume’ public utility services due to non-utility monetary constraints and disadvantages. Third, it might wrongly include households that have ‘over-consumed’ public utility services. To compensate for the above deficiencies, subjective measures have been recommended as supplementary indicators or alternatives to the objective measures (Hills 2011; Moore 2012a).

In fuel poverty research, Price et al. (2012) found that more than half of the ‘feeling fuel poor’ households – households indicated that they were unable to afford sufficient fuel for either their heating, or their cooking needs, or both - were

excluded from the 10 per cent expenditure based fuel poverty measure. Households who are at risk of being 'expenditure fuel poor' were usually characterized by low-incomes, while those in 'feeling fuel poor' were usually driven by self-rationing of energy consumption (Price et al. 2012). Thus, results from the two methods may generate different policy implications. Bramley (2012) has also argued that subjective evidence of payment problems and material hardship are important indicators and should be used to validate ratio measures in housing affordability analysis.

## 4.3 Data and methodologies

### 4.3.1 Data source

I have applied six datasets from the ABS Household Expenditure Surveys (HES) in this analysis, which include the HES Confidentialised Unit Record Files (CURFs) data in various years (1988-89, 1993-94, 1998-99, 2003-04, 2009-10) (ABS 1990, 1995, 2000, 2006, 2011) and the latest Household Energy Consumption Survey (HEC) 2012 CURF data (ABS 2013b). The HES and HEC 2012 datasets are cross-sectional data over various years. Both HES and HEC 2012 had applied similar sampling and estimation approaches. However, there were some minor differences in collection methodology and content, which is summarised in ABS (2013h). For instance, HES households were not asked directly during the interview to refer to their utility bill or statement, but they are encouraged to do so. However, HEC respondents were asked directly to refer to their utility bill or statement if it is available. In addition, HES asked respondents to report all domestic energy expenditure in a diaries, except those used for business purposes; while HEC was slightly more specific in asking about expenditure used for dwelling. Another difference is the question related to financial stress indicator. These difference are discussed further in subsequent sections.

The above datasets do not allow me to trace the utility consumption among particular individual households over time. In addition, when comparing different datasets surveyed in different reference periods, it is noted that there had been changes in utility consumption and supply charges, variation in climate and temperature differences, and possibly difference in household energy and water usage characteristics over time. All these can be taken into account when comparing the household utility expenses and utility burdens over time. Nevertheless the rich dataset allows us to analyse the pattern of utility affordability across jurisdictions and among different household types.

Adjustments were made to the data to minimise potential errors in income and utility expenditures. A majority of the households in the bottom 5 per cent of the income distribution are found to have gross income and disposable income below zero. This may be due to possible misreporting of income received by very low-income households or from encountering temporary income loss from investments (Saunders and Bradbury 2006; Saunders et al. 2012). In most of the analysis by the ABS, households in the bottom 10 per cent are excluded to avoid the error of misreporting. On the other hand, Saunder et al. (2012) suggests eliminating the bottom 3 to 4 per cent of the income distribution. For my study, I decided to eliminate the bottom 5 per cent of the households in order to avoid reported disposable income below zero for the utility affordability analysis. Summary statistics of the six datasets are summarised in Table 4.2. Key variables from the HES surveys and HEC 2012 survey CURF dataset are summarised in Appendix 4.1.

**Table 4.2** Summary statistics of nominal income and utility expenditure data across different datasets

| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
|---|---|---|---|---|---|---|
| **No. of Households** | 6947 | 8068 | 6631 | 6681 | 9328 | 11628 |
| **Household weight** | 5198371 | 6351713 | 6829018 | 7423168 | 8062458 | 8470206 |
| **Weekly household income (AU$)** | Mean<br><br>(s.d.) | Mean<br><br>(s.d.) | Mean<br><br>(s.d.) | Mean<br><br>(s.d.) | Mean<br><br>(s.d.) | Mean<br><br>(s.d.) |
| **Gross household income** | 660.96 | 755.34 | 923.59 | 1168.07 | 1748.33 | 1924.05 |
| **Disposable household income** | 522.43 | 612.71 | 737.51 | 1183.72 | 1477.68 | 1608.63 |
| **Disposable household income after housing cost** | 449.68 | 526.17 | 638.77 | 1039.34 | 1252.53 | 1333.08 |
| **Equivalised disposable income after housing cost** | 252.60 | 304.89 | 370.79 | 602.54 | 725.81 | 777.69 |
| **Weekly water bill (AU$)** | 6.89<br><br>(6.38) | 8.68<br><br>(8.44) | 9.08<br><br>(8.98) | 9.42<br><br>(9.00) | 12.60<br><br>(11.66) | 15.77<br><br>(15.00)] |
| **Weekly domestic energy bill (AU$)** | 13.26<br><br>(11.54) | 17.26<br><br>(14.66) | 18.26<br><br>(15.84) | 24.26<br><br>(20.86) | 33.77<br><br>(28.92) | 40.58<br><br>(34.00) |
| **Median equivalised disposable income after housing cost (AU$ per week)** | 218.20 | 253.5 | 312.17 | 555.05 | 590.11 | 647.33 |
| **Poverty line (AU$ per week)** | 130.92 | 152.10 | 187.30 | 333.03 | 354.07 | 388.40 |

Note: (1) ABS HES and HEC surveys provide household weight. Analysis of this chapter is based on weight adjusted household data. (2) Poverty line is defined as 60 per cent of the median equivalised disposable household income after housing cost.

### 4.3.2 Measuring utility affordability

According to OFWAT (2011) and Vinson et al. (2015), using a basket of indicators would help to capture affordability better, and prevent an undue focus on a single measure of a multi-dimensional issue such as water affordability, energy affordability and persistent poverty. Utility affordability can be expressed in different forms, such as an income-based indicator or an expenditure-based indicator (OFWAT 2011; Kessides et al. 2009). Total household expenditure is considered a better indicator of how much households were able to spend over time, because low-income households may under-report their income or have unstable income (Saunders 2013; Saunders et al. 2012). Unfortunately, information on total household expenditure is not reported in the HEC 2012 survey. Thus, the affordability analyses in this chapter are based on income-based indicators. Utility affordability is expressed as the ratio of utility expenditure to disposable household income.

**Table 4.3** Definitions of utility stress indicators

| Method | Utility stress | Description |
|---|---|---|
| **Low Income High Burden** | High burden water affordability stress (HBWAS) | Below bottom 2 quintile of income distribution, water expenditure > 3% of DIAHC |
| | High burden energy affordability stress (HBEAS) | Below bottom 2 quintile of income distribution, energy expenditure > 10% of DIAHC |
| **Relative Low Income High Cost** | Relative water affordability stress (RWAS) | Below income threshold, above median water expenditure |
| | Relative energy affordability stress (REAS) | Below income threshold, above median energy expenditure |
| **Subjective method** | Self-reported energy affordability stress (SEAS) | Households that encounter one or more energy-related financial stress over the last 12 months |

I compare three major methods to identify households at risk of water and/or energy affordability stress. The three methods are: (i) Low Income and High Burden (LIHB) approach; (ii) Relative Low Income and High Cost (RLIHC) approach; and (iii) a subjective method (see Table 4.3). Using these three methods allows me to identify the characteristics of households at risk of utility stress through different policy lenses.

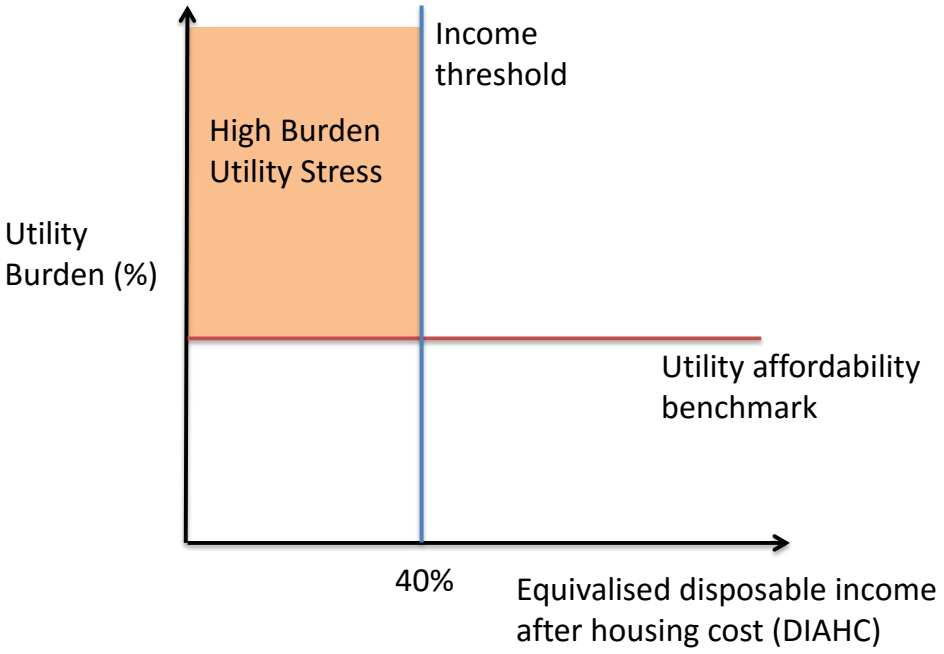
### High burden utility stress - Low Income High Burden (LIHB) approach

Although there are various methods available to measure housing stress, the Low Income and High Burden (LIHB) approach remains the most widely recognised indicator (Stone 2006; Nepal et al. 2010; Harding et al. 2004). In the LIHB approach, households are defined as being in housing stress if they are paying more than 30 per cent of their disposable income on housing costs, and also belong to the bottom 40 per cent of the income distribution (Harding et al. 2004; Nepal et al. 2010). I adapt this approach to define households at risk of high burden utility stress (illustrated in orange area of Figure 4.4) because they are: (i) low-income households whose equivalised disposable income after housing cost (DIAHC) is below the fortieth percentile of the population; and (ii) their utility burdens – utility expenditure to disposable income ratio – are above the utility affordability benchmark. In my analysis, income distribution is ranked according to household disposable income after adjusting for housing cost and household structure using the OECD modified scale.

The common thresholds for water and energy affordability are 3 per cent and 10 per cent, respectively, in international studies (Fankhauser and Tepic 2007). Therefore, low-income households are identified as being in high burden water affordability stress (HBWAS) if they pay more than 3 per cent of their income on water and sewerage expenditure; while they are categorised as high burden energy affordability stress (HBEAS) if they pay more than 10 per cent on domestic energy expenditure. Altogether, households are identified as high burden utility

stress (HBUS) if they spend more than 13 per cent of their income on total household water and energy bills.

**Figure 4.4** Low Income and High Burden (LIHB) approach

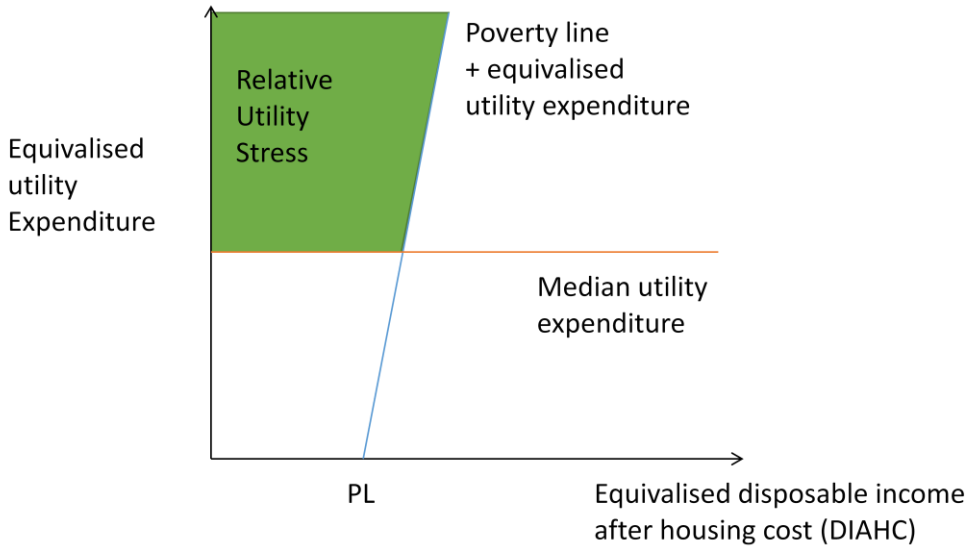



**Relative utility stress – Relative Low Income and High Cost (RLIHC) approach**

The Relative Low Income and High Cost (RLIHC) method is recommended by Hills (2012) and adopted as the latest *UK Fuel Poverty* measure (DECC 2015: p.14). The UK approach to measuring fuel poverty is based on the modelled household energy costs – the cost of the energy required to deliver a home at a comfortable temperature. Unfortunately, the HES and HEC data do not enable me to model required energy costs or required water costs for individual households. Consequently, my analysis is based on Nance's (2013) adapted version of Hills' approach to measure relative energy poverty in Australia. As illustrated in Figure 4.5, a household is considered to be in relative utility stress if:

- their equivalised utility expenditures are above the median equivalised household utility expenditure level; and
- their residual income – equivalised disposable household income after paying housing costs and utility expenses – is below the poverty line.

**Figure 4.5** Relative Low Income and High Cost (RLIHC) approach




**Source:** Adapted from Hills (2012: 58) and Nance (2013)

### *Income threshold in relative affordability method*

The income threshold in relative affordability method is defined using a relative approach. My analysis follows the 60 per cent of median income as poverty line (PL) as in the UK fuel poverty research. Household income – equivalised disposable household income after housing cost (*EQDIAHC*) – is adjusted with family composition, housing costs, and tax paid so as to reflect a household's capacity to pay. Table 4.4 summarises the relative poverty line, which is defined as 60 per cent of the median equivalised disposable household income after housing costs, in each survey period.

**Table 4.4** Poverty lines and affordability thresholds for RLIHC approach

| | | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
|---|---|---|---|---|---|---|---|
| **Nominal** | **Unit** | | | | | | |
| **Median eq. household income after housing cost** | AU$/wk | 218.20 | 253.5 | 312.17 | 555.05 | 590.11 | 647.33 |
| **Poverty line** | AU$/wk | 130.92 | 152.10 | 187.30 | 333.03 | 354.07 | 388.40 |
| **Median eq. water expenditure** | AU$/wk | 3.58 | 4.75 | 5.08 | 5.33 | 7.06 | 9.00 |
| **Median eq. energy expenditure (AU$/week)** | AU$/wk | 6.65 | 8.83 | 9.54 | 12.81 | 17.65 | 21.00 |
| **CPI (June 2012 = 100)** | **n/a** | **52.79** | **61.66** | **67.84** | **80.28** | **95.42** | **100.00** |
| **CPI adjusted** | | | | | | | |
| **Real median eq. household income after housing cost** | AU$/wk | 413.33 | 411.13 | 460.19 | 691.41 | 618.45 | 647.33 |
| **Real poverty line** | AU$/wk | 248.00 | 246.68 | 276.12 | 414.85 | 371.07 | 388.40 |
| **Real median eq. water expenditure** | AU$/wk | 6.77 | 7.70 | 7.49 | 6.64 | 7.40 | 9.00 |
| **Real median eq. energy expenditure** | AU$/wk | 12.59 | 14.32 | 14.06 | 15.96 | 18.49 | 21.00 |

Data source: Author calculation from ABS HEC 2012.

Note:

(a) OECD modified scale was used for the equivalisation factors for household income and household water and energy expenditure

(b) Poverty line = 60% of median equivalised household income after housing cost

(c) Real household income and real water and energy expenditure are adjusted with the change of consumer price index (CPI) over time with base year 2011-12 as 100. Change of CPI is derived from the CPI data reported in ABS (2013a).

There are a number of equivalisation scales to adjust household size so as to compare family needs (Whiteford 1985; Bradbury 1989; Banks and Johnson 1994; Coulter et al. 1992; Gray and Stanton 2010). I used the OECD modified scale to adjust household income and household utility expenditure as to be consistent with the application in the ABS HES and HEC surveys. The relative income threshold (the blue line) represents the sum of a household's equivalised utility expenditure and the poverty line while the relative utility threshold (the red line) is the median equivalised utility expenditure of that year. Households identified to be in relative utility stress were those households with income below the poverty line after paying for utility expenses and also having above median utility expenses.

### Subjective utility stress - Self-reporting energy-related financial stress indicators

Subjective measures, such as self-reported utility related financial stress and hardship, have been recommended as alternative indicators to the burden ratio method to better identify households with affordability problems (Price et al. 2012; Bramley 2012; Bray 2003). Two energy-related financial stress indicators are included in HES 1998-99, 2003-04, and 2009-10 surveys as below.

(i) the inability to pay utility bills on time due to lack of income (*CFELECTR*), and

(ii) being unable to heat their home due to shortage of money (*CFNOHEAT*) in the last 12 months.

In this analysis, I classified those households in subjective energy affordability stress (SEAS) if they self-reported having encountered one or both of the above indicators of energy-related financial stress. In the HEC 2012 survey, there was a set of eight energy-related financial stress indicators (Table 4.5). Thus for 2011-12, households are classified subjective energy affordability stress (SEAS-2012) if they have reported experiencing at least one of the eight energy financial stress

indicators (Indicator 1-8). Furthermore, I classified households at risk of material hardship if they have reported to encounter at least one of the situations described in Indicators 9 to 16.

**Table 4.5** Financial hardship indicators in HES and HEC 2012

| Indicators | ABS variable | |
|---|---|---|
| | **Domestic energy related financial stress indicators** | |
| **1** | CFELECTR / FINSTNBH | Could not pay gas/electricity/telephone bill on time in the last 12 months due to shortage of money |
| **2** | CFNOHEAT/ FINSTHCH | Unable to heat (or cool) home in the last 12 months due to shortage of money |
| **3** | HFINSTB | Household often or always could not pay electricity, gas or telephone bills on time in last 12 months due to a shortage of money |
| **4** | FINSTLH | Entered into a loan arrangement or used a credit card to pay electricity or gas bill in the last 12 months due to shortage of money |
| **5** | FINSTAH | Received or sought assistance from electricity or gas company with paying bills in the last 12 months due to shortage of money |
| **6** | FINSTDWH | Received a disconnection warning from electricity or gas company in the last 12 months due to shortage of money |
| **7** | FINSTERH | Chose to restrict heating/cooling because household could not afford extra costs in the last 12 months due to shortage of money |
| **8** | FINSTWGH | Could not afford to repair a major household whitegood in the last 12 months due to shortage of money |
| | **Other material hardship indicators** | |
| **9** | FINSTNFH | Could not afford to put fuel in motor vehicle in the last 12 months due to shortage of money |
| **10** | FINREGIH | Could not pay registration/insurance on time in the last 12 months due to a shortage of money |
| **11** | FINPWNHH | Pawned or sold something in the last 12 months due to a shortage of money |
| **12** | FINMEALH | Went without meals in the last 12 months due to shortage of money |
| **13** | FINWELFH | Sought assistance from welfare/community organisations in the last 12 months due to shortage of money |
| **14** | FINFAMHH | Sought financial help from friends/family in the last 12 months due to shortage of money |
| **15** | LMANHINCH | Spent more money than we get over the last 12 months |
| **16** | WSTNDOLHH | Present standard of living is worse than 2 years ago |

## 4.4 Trends in utility affordability in Australia

Tables 4.6 and Table 4.7 summarise the average weekly utility expenditure and utility burdens by Australian households from 1988-89 to 2011-12, after adjustment with the CPI. Utility burden is defined as the percentage of household disposable income spent on water or energy utility expenses.

### 4.4.1 Trends in real utility expenditure over time

As shown in Table 4.6(a), real average water and sewerage expenditure has increased and decreased over the period. There was an increase in real average weekly expenditure from AU$13.06 to AU$14.7 from 1988-89 to 1993-94, but it gradually decreased to AU$11.73 in 2004-05, but increased again to AU$15.77 in 2011-12. The increase in water expenditures corresponds to the urban water sector pricing reform which occurred in the early 1990s. Under this reform, most of the urban water utilities have removed property-based pricing and free water allowance and introduced consumption-based pricing (i.e. two part tariffs or increasing block tariffs). These changes resulted in a significant reduction in average household water consumption, but also increased the per unit water price (NWC 2011a). In the 2000s, institutional and structural reforms in urban water sector and National Water Initiative reform improved sector efficiency and productivity (PC 2002) and consumers have benefited from lower real water prices.

In response to the severe drought between 2003 and 2009, many Australian cities implemented water restrictions and invested in supply augmentation infrastructure and strategies. Water rationing has reduced average household water consumption over this period. Nevertheless, the per unit water price increased substantially to allow urban water utilities to achieve full cost recovery from both the investment in supply augmentation and the reduction in average household water consumption. Refer to the ABS consumer price index (CPI) in Australia, after adjustment with CPI of all goods and services and using 1998 as the base year, the

real water and sewerage CPI has increased by 3-10 per cent during 2003 and 2007, and has increased by 70 per cent in 2013. Overall, real average water and sewerage expenditure rose by 21 per cent from 1988-89 to 2011-12.

From 1988-89 to 1993-94, the average weekly electricity expenses (Table 4.6b) and mains gas expenses (Table 4.6c) has increased. During this period, extensive reform has occurred in the energy sector in accordance with the principles of NCP introduced in 1995. A significant milestone was the establishment of the NEM and NGM in southeast Australia. Real weekly domestic energy expenditure decreased from AU$28 to AU$26 from 1993-94 in 1998-99 as a result of price reductions from efficiency and productivity gains from energy sector structural reform in the 1990s. Nevertheless, real average domestic energy expenditure increased during the 2000s, and increased sharply in the early 2010s. From 1988-89 to 2011-12, real average electricity and gas expenditures have increased by almost 60 per cent.

I divided the households into different five income quintiles (Q1 to Q5) in accordance to their equivalised household disposable income after housing cost (*EQDINCAHC*). As summarised in Table 4.6, the average household utility expenditures on water and energy services increase when a household's income increases. Households in the highest income quintile (Q5) spend on average 1.3 to 1.5 times more on weekly water and energy expenses than those in the lowest income quintile (Q1) over the period. Lower income groups experienced larger proportional increases in real utility expenses over the study period than did the average and higher income groups.

**Table 4.6** Trends in real weekly utility expenditure from 1988-89 to 2011-12

***(a) Weekly water expenses (real price, June 2012=100)***

| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 | % change from 1988 to 2012 |
|---|---|---|---|---|---|---|---|
| Q1 | 11.61 | 12.61 | 11.65 | 9.62 | 10.08 | 13.37 | 15% |
| Q2 | 10.91 | 11.31 | 10.97 | 9.95 | 10.68 | 13.61 | 25% |
| Q3 | 13.34 | 13.54 | 13.02 | 11.03 | 13.28 | 15.73 | 18% |
| Q4 | 13.28 | 14.84 | 14.64 | 12.80 | 15.01 | 17.04 | 28% |
| Q5 | 15.51 | 17.06 | 15.47 | 14.04 | 15.70 | 18.62 | 20% |
| **Australia** | **13.06** | **14.07** | **13.38** | **11.73** | **13.21** | **15.77** | **21%** |
| Q5/Q1 ratio | 1.34 | 1.35 | 1.33 | 1.46 | 1.56 | 1.39 | |

***(b) Weekly electricity expenses (real price, June 2012=100)***

| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 | % change |
|---|---|---|---|---|---|---|---|
| Q1 | 16.06 | 17.57 | 16.69 | 17.75 | 22.48 | 26.44 | 65% |
| Q2 | 17.81 | 18.05 | 17.23 | 18.78 | 24.00 | 28.68 | 61% |
| Q3 | 20.09 | 20.17 | 20.16 | 21.30 | 26.25 | 31.53 | 57% |
| Q4 | 21.01 | 21.39 | 20.97 | 24.62 | 28.29 | 32.98 | 57% |
| Q5 | 22.14 | 23.29 | 21.64 | 26.54 | 31.58 | 36.26 | 64% |
| **Australia** | **19.57** | **20.21** | **19.45** | **21.95** | **26.69** | **31.16** | **59%** |
| Q5/Q1 ratio | 1.38 | 1.33 | 1.30 | 1.50 | 1.40 | 1.37 | |

***(c) Weekly mains gas expenses (real price, June 2012=100)***

| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 | % change |
|---|---|---|---|---|---|---|---|
| Q1 | 9.44 | 12.16 | 10.36 | 10.96 | 14.44 | 15.13 | 60% |
| Q2 | 9.20 | 11.21 | 11.39 | 13.32 | 13.73 | 15.61 | 70% |
| Q3 | 11.26 | 12.69 | 13.12 | 12.89 | 14.24 | 17.59 | 56% |
| Q4 | 11.95 | 12.77 | 12.79 | 14.53 | 15.51 | 17.92 | 50% |
| Q5 | 11.73 | 13.52 | 12.39 | 15.19 | 14.88 | 18.23 | 55% |
| **Australia** | **10.83** | **12.52** | **12.13** | **13.57** | **14.62** | **17.01** | **57%** |
| Q5/Q1 ratio | 1.38 | 1.33 | 1.30 | 1.50 | 1.40 | 1.37 | |

| *(d) Weekly domestic energy (real price, June 2012=100)* | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1988-89** | **1993-94** | **1998-99** | **2003-04** | **2009-10** | **2011-12** | **% change** |
| Q1 | 20.66 | 24.49 | 22.35 | 23.79 | 29.52 | 34.00 | 65% |
| Q2 | 22.55 | 24.81 | 24.03 | 25.96 | 31.75 | 37.33 | 66% |
| Q3 | 25.94 | 27.96 | 28.20 | 29.78 | 34.38 | 40.86 | 58% |
| Q4 | 27.22 | 29.74 | 28.71 | 33.31 | 38.04 | 43.36 | 59% |
| Q5 | 28.28 | 32.24 | 30.35 | 37.05 | 41.96 | 47.35 | 67% |
| **Australia** | **25.12** | **28.00** | **26.92** | **30.22** | **35.39** | **40.58** | **62%** |
| Q5/Q1 ratio | 1.38 | 1.33 | 1.30 | 1.50 | 1.40 | 1.37 | |

**Note:** Income distribution is ranked in equivalised disposable income after housing cost. Q1 = first quintile (lowest 20%); Q2=second quintile; Q3=third quintile; Q4=fourth quintile; Q5=fifth quintile (highest 20%)

### 4.4.2 Trends in household utility burdens over time

Table 4.7 expresses the trends in average utility burden - the percentage of utility expenditure out of disposable household income - from 1988-89 to 2011-12, while Figure 4.6 illustrates the differences in average utility burdens among different income quintiles compared with the previous period. Consistent with the trends in average water and sewerage expenditure and water prices, average water burdens among Australian households increased from 1.64 per cent in 1988-89 to 1.72 per cent in 1993-94, and decreased gradually to 0.9 per cent in 2003-04 (Table 4.7a). Overall, there was a large reduction in average water burdens across all income quintiles from 1998-99 to 2003-04 (Figure 4.6a). This was principally due to decreased average household water consumption, reduced real water prices, and increased household income. However, the average water burden has increased to 1.31 per cent in 2011-12 due to increased water prices post a severe drought period and slower income growth. Across all income groups, the lowest quintile households experienced the largest increase in average water burden from 2009-10 to 2011-12.

The trends in electricity burden (Table 4.7b), gas burden (Table 4.7c), and domestic energy burden (Table 4.8c) show similar movements. Figures 4.6b to 4.6d show the difference in average electricity burden, gas burden, and total energy burden among different income groups compared to the previous period. All the figures show a U-shape curve that illustrates that the average energy burden declined during the late 1990s and early 2000s, but increased after 2003-04. The average electricity burden decreased from 2.5 per cent in 1988-89 to 1.74 per cent in 2003-04, and bounced back to 2.7 per cent in 2011-12. For mains gas consumption households, the average gas burden decreased from 1.31 per cent in 1988-89 to 1.06 per cent in 2003-04 and then rose to 1.4 per cent in 2011-12. If I include all fuel and power costs for domestic consumption, the average domestic energy burden among Australian households was around 3.2 per cent in 1988-89, reduced to 2.4 per cent in 2003-04, and then increased to 3.5 per cent in 2011-12.

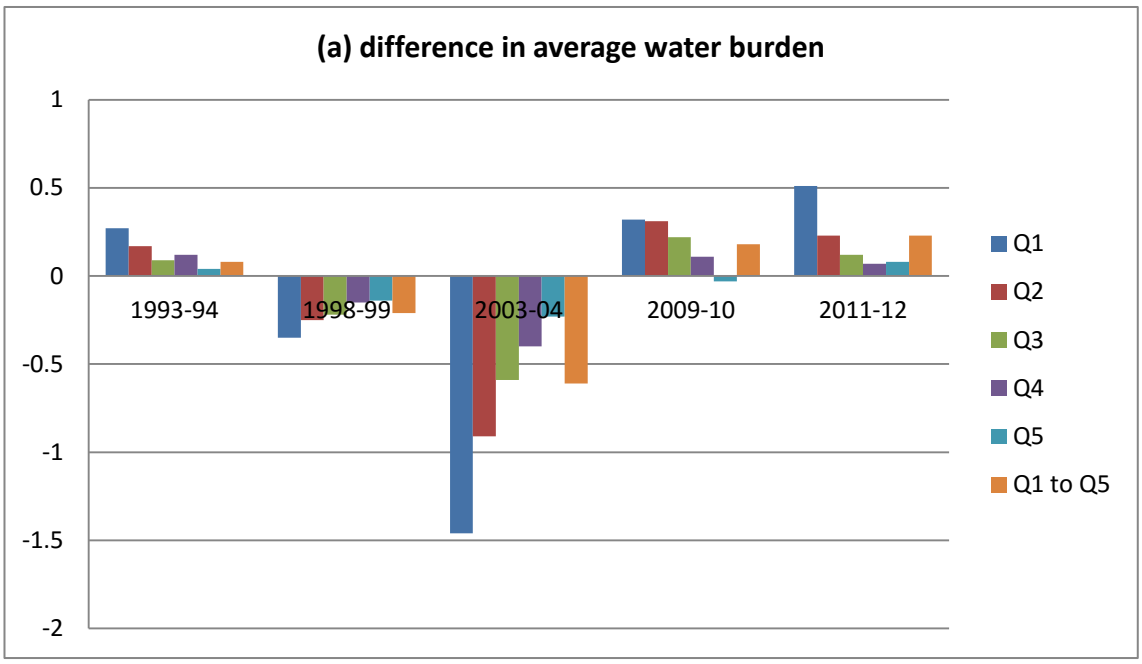
As water and energy are essential utility expenditures for domestic consumption, the utility burden among households in the first income quintile (Q1) was almost three to four times more than those among highest income quintile households (Q5). The inequality of water burden (Q1/Q5 ratio) increased from 3.28 in 1988-89 to 3.59 in 2011-12, while the inequality of energy burden rose from 3.1 in 1988-89 to 3.7 in 2011-12.

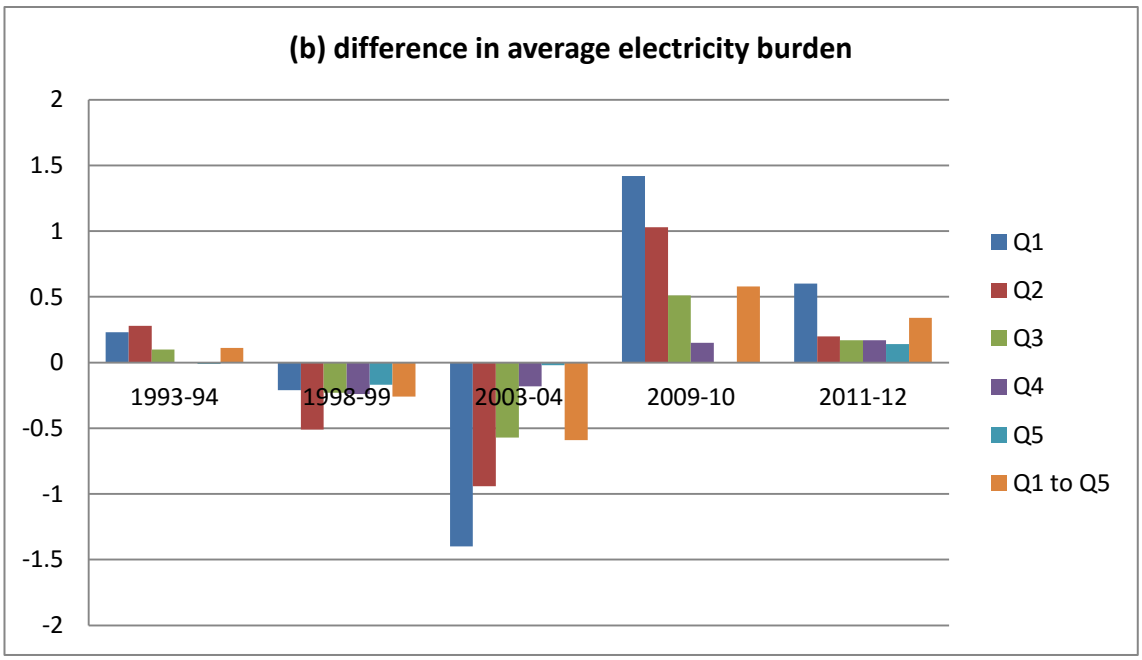
**Table 4.7** Trends in average utility burdens across income quintiles

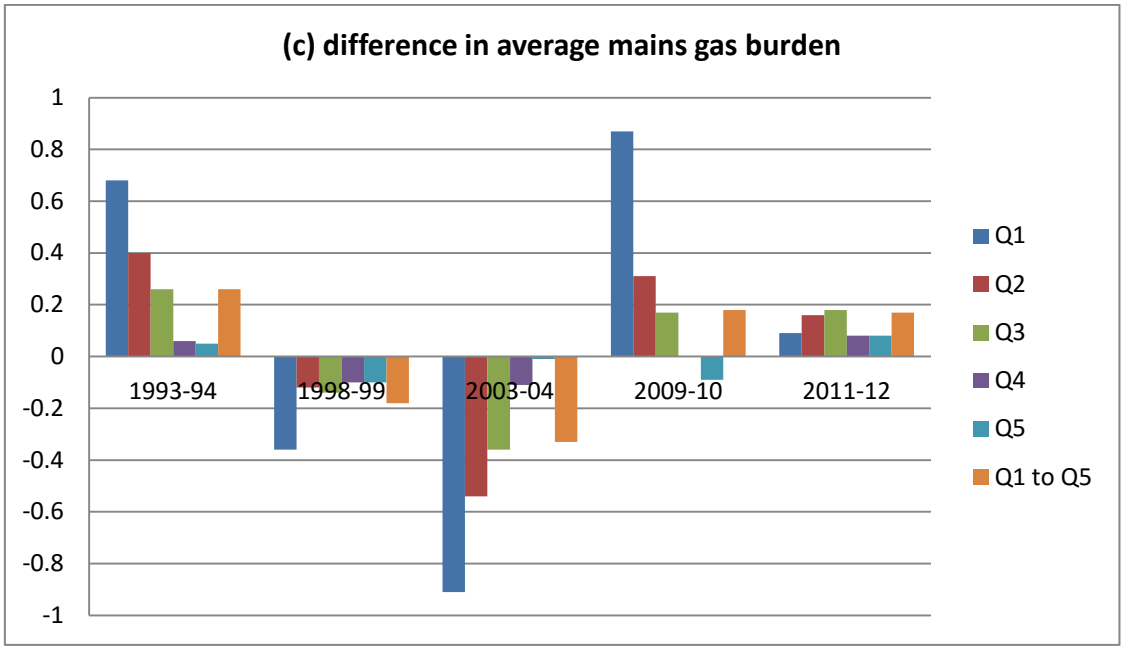
| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
|---|---|---|---|---|---|---|
| **(a) Average water burden (%)** | | | | | | |
| Q1 | 3.04 | 3.31 | 2.96 | 1.50 | 1.82 | 2.33 |
| Q2 | 2.03 | 2.20 | 1.95 | 1.04 | 1.35 | 1.58 |
| Q3 | 1.59 | 1.68 | 1.46 | 0.87 | 1.09 | 1.21 |
| Q4 | 1.18 | 1.30 | 1.15 | 0.75 | 0.86 | 0.93 |
| Q5 | 0.93 | 0.97 | 0.83 | 0.60 | 0.57 | 0.65 |
| **All** | **1.64** | **1.72** | **1.51** | **0.90** | **1.08** | **1.31** |
| Q1/Q5 ratio | 3.28 | 3.39 | 3.55 | 2.48 | 3.20 | 3.59 |
| **(b) Average electricity burden (%)** | | | | | | |
| | **1988-89** | **1993-94** | **1998-99** | **2003-04** | **2009-10** | **2011-12** |
| Q1 | 4.07 | 4.30 | 4.09 | 2.69 | 4.11 | 4.71 |
| Q2 | 3.13 | 3.41 | 2.90 | 1.96 | 2.99 | 3.19 |
| Q3 | 2.35 | 2.45 | 2.22 | 1.65 | 2.16 | 2.33 |
| Q4 | 1.86 | 1.86 | 1.62 | 1.44 | 1.59 | 1.76 |
| Q5 | 1.33 | 1.32 | 1.15 | 1.13 | 1.13 | 1.27 |
| **All** | **2.48** | **2.59** | **2.33** | **1.74** | **2.32** | **2.66** |
| Q1/Q5 ratio | 3.06 | 3.25 | 3.56 | 2.37 | 3.64 | 3.72 |
| **(c) Average mains gas burden (%)** | | | | | | |
| | **1988-89** | **1993-94** | **1998-99** | **2003-04** | **2009-10** | **2011-12** |
| Q1 | 2.27 | 2.95 | 2.59 | 1.68 | 2.55 | 2.64 |
| Q2 | 1.62 | 2.02 | 1.90 | 1.36 | 1.67 | 1.83 |
| Q3 | 1.26 | 1.52 | 1.38 | 1.02 | 1.19 | 1.37 |
| Q4 | 1.02 | 1.08 | 0.98 | 0.87 | 0.87 | 0.95 |
| Q5 | 0.70 | 0.75 | 0.65 | 0.64 | 0.55 | 0.63 |
| **All** | **1.31** | **1.57** | **1.39** | **1.06** | **1.24** | **1.41** |
| Q1/Q5 ratio | 3.26 | 3.93 | 3.96 | 2.64 | 4.64 | 4.21 |
| **(d) Average domestic energy burden (%)** | | | | | | |
| | **1988-89** | **1993-94** | **1998-99** | **2003-04** | **2009-10** | **2011-12** |
| Q1 | 5.19 | 5.98 | 5.47 | 3.61 | 5.36 | 6.01 |
| Q2 | 4.02 | 4.68 | 4.09 | 2.70 | 3.96 | 4.22 |
| Q3 | 3.00 | 3.38 | 3.08 | 2.33 | 2.85 | 3.06 |
| Q4 | 2.40 | 2.58 | 2.23 | 1.96 | 2.14 | 2.31 |
| Q5 | 1.70 | 1.83 | 1.61 | 1.58 | 1.52 | 1.65 |
| **All** | **3.18** | **3.59** | **3.20** | **2.39** | **3.06** | **3.45** |
| Q1/Q5 ratio | 3.06 | 3.26 | 3.39 | 2.29 | 3.53 | 3.64 |

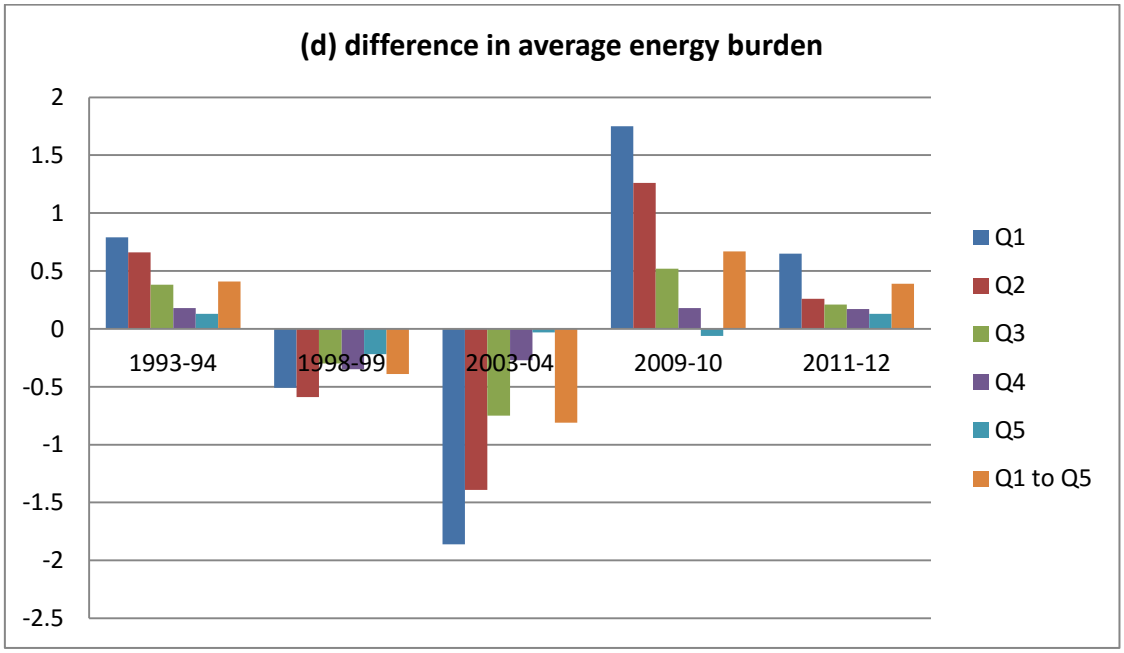
Note: Income distribution is ranked by equivalised disposable income after housing costs.
Q1 = first quintile (lowest 20%); Q2=second quintile; Q3=third quintile; Q4=fourth quintile; Q5=fifth quintile (highest 20%)

**Figure 4.6** Difference in average utility burdens compared to the previous period






**Note:** Difference in average utility burden = average utility burden in current period – average utility burden in the previous period. Q1 = the first quintile (lowest 20%); Q2= the second quintile; Q3=the third quintile; Q4=the fourth quintile; Q5= the fifth quintile (highest 20%)

### 4.4.3 Comparison of utility burdens among low-income households

Since the implementation of public utility sector reforms, utilities have been encouraged to charge consumption based pricing, under the principle of full cost recovery, or to generate revenue so as to achieve approved rates of return on investment (ROI) (PC 2002). Consequently, urban water and energy prices varied across utilities and regions to reflect the cost of water and sewerage service provision, but were still determined by state economic regulators or by state government ministers (NWC 2014).

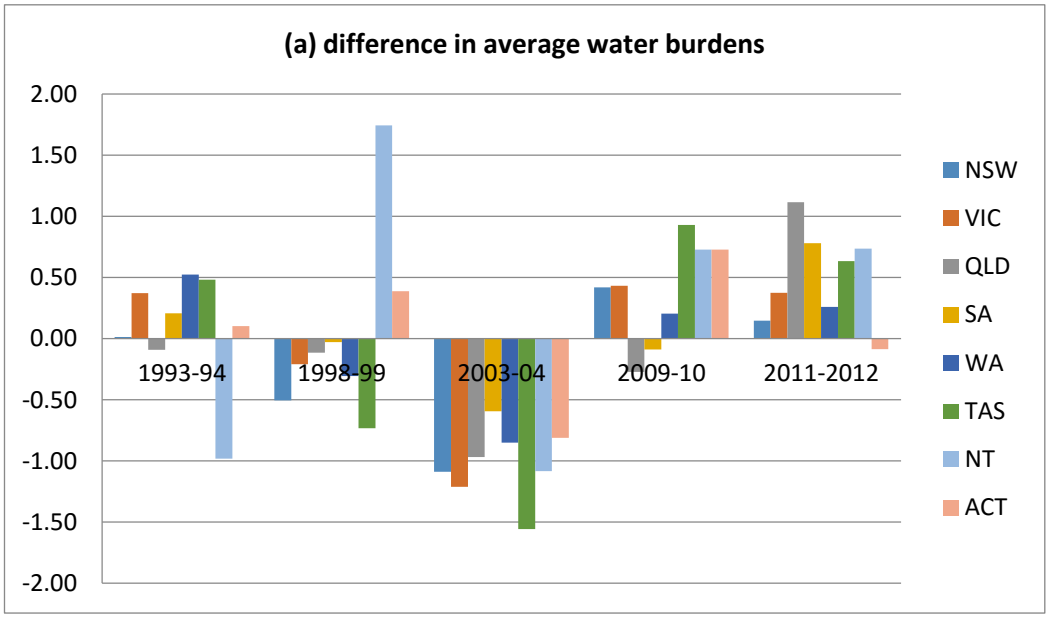
One of my objectives is to understand the affordability of these essential utility services among low-income households over time and across jurisdictions. Table 4.8 summarises the trends in average utility burden among low income (those in the bottom two income quintiles) households across different states and territories. Figure 4.7 illustrates the difference in average water and energy burdens compared to the previous period among low income households.

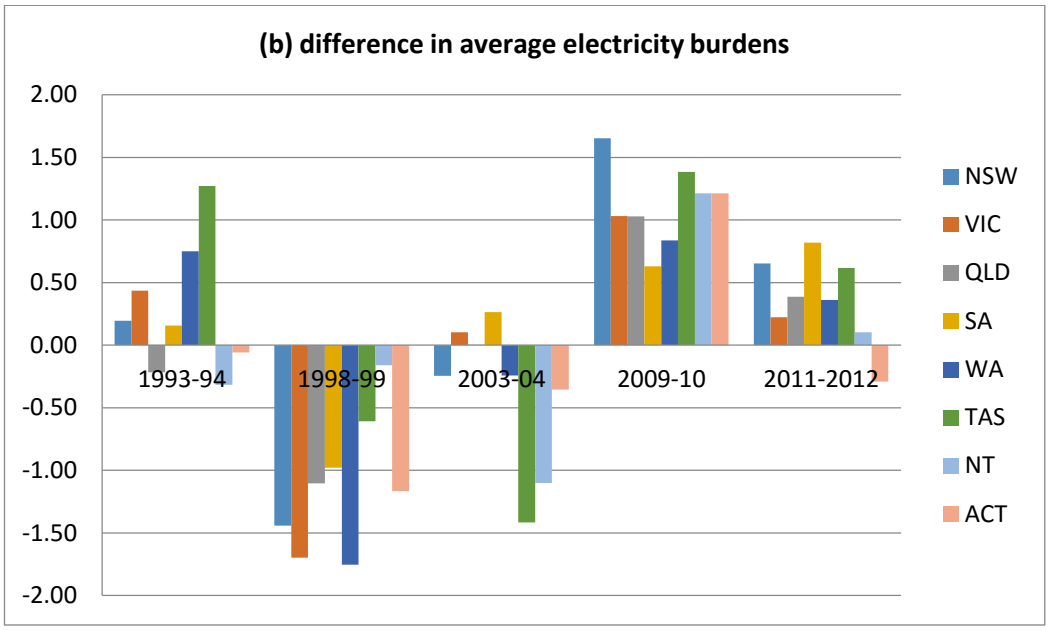
Table 4.8a and Figure 4.7a illustrates that average water burdens decreased from 1988-89 to 2003-04, and rose again post 2004 across all jurisdictions. In 1988-89, low-income households in NSW and Queensland had the highest average water burden. In 1993-94, Tasmanian low-income households had the highest average water burden; on average, they paid more than 3 per cent of their disposable income on water and sewerage expenses. In 2011-12, low-income households in the NT had the highest average water burden (3.3 per cent) while ACT low-income households had the second highest burden (2.4 per cent) across all jurisdictions. In 2011-12, low-income households in WA had the lowest average water burden (less than 1.6 per cent). It is noted that despite the establishment of an independent economic regulator in WA, the WA government is responsible for deciding all residential water charges, including the price levels and tariff structures (Water Corporation 2015).

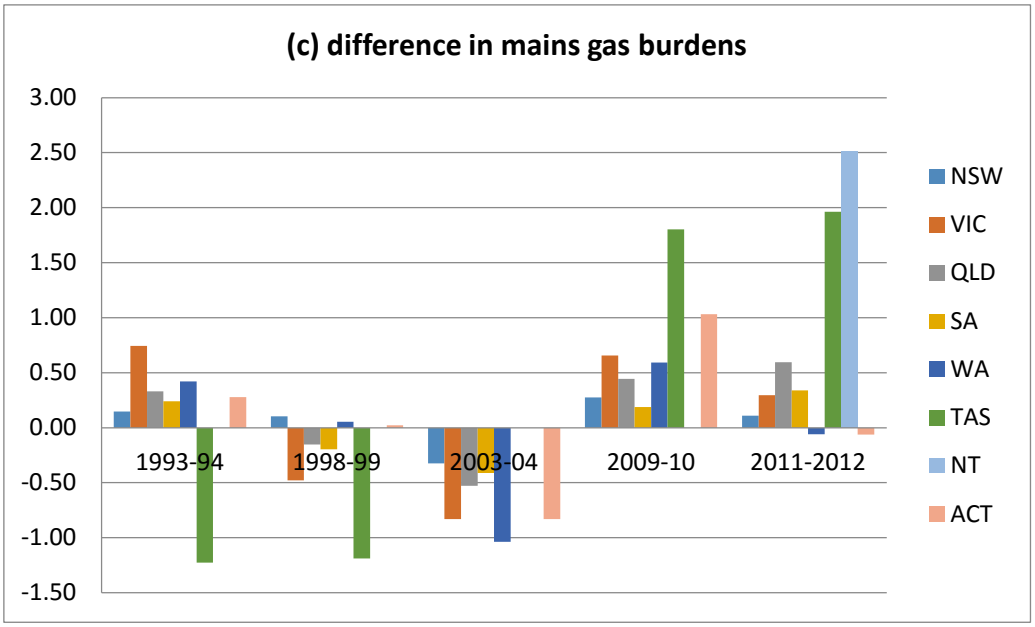
**Table 4.8** Trends in average utility burdens among low income households (Q1 & Q2) across states/territories

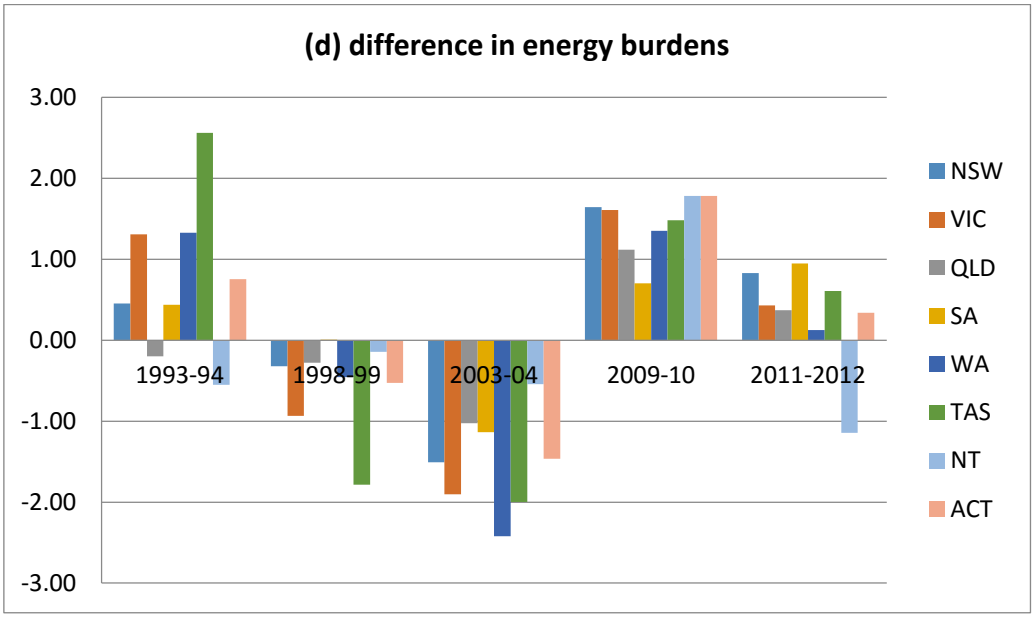
| (a) Average water burden (%) | | | | | | |
|---|---|---|---|---|---|---|
| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
| NSW | 2.68 | 2.18 | 1.09 | 1.51 | 1.66 | 2.68 |
| VIC | 2.64 | 2.43 | 1.22 | 1.65 | 2.03 | 2.64 |
| QLD | 2.60 | 2.49 | 1.52 | 1.25 | 2.36 | 2.60 |
| SA | 2.23 | 2.20 | 1.61 | 1.52 | 2.30 | 2.23 |
| WA | 2.30 | 1.99 | 1.14 | 1.35 | 1.61 | 2.30 |
| TAS | 3.03 | 2.30 | 0.74 | 1.67 | 2.30 | 3.03 |
| NT | 1.06 | 2.81 | 1.72 | 2.45 | 3.19 | 1.06 |
| ACT | 2.15 | 2.54 | | | 2.37 | 2.15 |
| **(b) Average electricity burden (%)** | | | | | | |
| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
| NSW | 3.75 | 2.31 | 2.07 | 3.72 | 4.37 | 3.75 |
| VIC | 3.90 | 2.20 | 2.31 | 3.34 | 3.56 | 3.90 |
| QLD | 3.31 | 2.20 | 2.21 | 3.24 | 3.62 | 3.31 |
| SA | 3.64 | 2.66 | 2.92 | 3.55 | 4.37 | 3.64 |
| WA | 4.06 | 2.31 | 2.06 | 2.90 | 3.26 | 4.06 |
| TAS | 5.74 | 5.13 | 3.71 | 5.10 | 5.71 | 5.74 |
| NT | 4.11 | 3.95 | 2.85 | 4.06 | 4.16 | 4.11 |
| ACT | 4.37 | 3.20 | | | 3.77 | 4.37 |
| **(c) Average mains gas burden (%)** | | | | | | |
| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
| NSW | 1.62 | 1.73 | 1.40 | 1.68 | 1.79 | 1.62 |
| VIC | 3.00 | 2.53 | 1.70 | 2.35 | 2.65 | 3.00 |
| QLD | 1.52 | 1.37 | 0.84 | 1.28 | 1.88 | 1.52 |
| SA | 2.24 | 2.04 | 1.63 | 1.81 | 2.15 | 2.24 |
| WA | 2.15 | 2.21 | 1.17 | 1.76 | 1.70 | 2.15 |
| TAS | 1.19 | n/a | n/a | 1.80 | 3.77 | 1.19 |
| NT | n/a | n/a | 2.25 | 3.28 | 2.51 | n/a |
| ACT | 3.06 | 3.08 | | | 3.22 | 3.06 |
| **(d) Average domestic energy burden (%)** | | | | | | |
| | 1988-89 | 1993-94 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
| NSW | 4.58 | 4.26 | 2.75 | 4.40 | 5.23 | 4.58 |
| VIC | 6.67 | 5.73 | 3.83 | 5.44 | 5.87 | 6.67 |
| QLD | 3.70 | 3.42 | 2.40 | 3.52 | 3.89 | 3.70 |
| SA | 5.16 | 5.16 | 4.03 | 4.73 | 5.68 | 5.16 |
| WA | 5.93 | 5.47 | 3.05 | 4.40 | 4.53 | 5.93 |
| TAS | 7.96 | 6.17 | 4.17 | 5.66 | 6.26 | 7.96 |
| NT | 4.31 | 4.17 | 3.62 | 5.40 | 4.26 | 4.31 |
| ACT | 5.62 | 5.09 | | | 5.74 | 5.62 |

**Figure 4.7** Difference in average utlity burden among low-income households (Q1 and Q2) compared to the previous period in different jurisdictions






**Note:** The CURF dataset in HES 2003-04 and HES2009-10 have grouped the households living in the NT and the ACT together as NT/ACT. The water and energy burdens in the NT and the ACT in these two years are a combined result of the two Territories.

Table 4.8 b, c, d and Figures 4.7b, c, d demonstrate that the average electricity, gas and energy burdens among low-income households decreased from 1988-89 to 2003-04, but increased again in 2009-10 and 2011-12. Overall, Tasmanian low-income households have the highest average electricity burden among all jurisdictions at all times over the reporting period. By contrast, WA low-income households have the lowest average electricity burden across all jurisdictions. This may be because the energy utility in WA is government owned and is subsidised by state government. In addition, the WA government has implemented a uniform tariff policy whereby all households pay the same electricity tariff regardless of where they live (WA Department of Finance 2015). In 2011-12, low-income households in NSW and SA had the second highest electricity burden (almost 4.3 per cent) due to the rapid rise in electricity prices in both jurisdictions. Only in the ACT did low-income households experience a reduction in their electricity burden in 2011-12.

For those low-income households connected with mains gas services, ACT households had the highest average gas burdens across all states over the period, except in 2011-12 when Tasmanian households had an even higher average gas burden, up to 3.7 per cent (Table 4.8c, Figure 4.7c). Low-income Victorian households had the second highest gas burden among all states. This is largely due to the high gas consumption for space heating and hot water heating during colder winters in the ACT and Victoria.

If all fuel costs are included for domestic energy consumption, the overall energy burden decreased from 1988-89 to 2003-04, but increased again in 2009-10 and 2011-12. Across all jurisdictions, Tasmanian low-income households have the highest average energy burden while low-income Queensland households have the lowest energy burden (Table 4.8d, Figure 4.7d). In 2011-12, low-income Victorian households had the second highest energy burden, followed by low-income households in the ACT, NSW, and SA.

## 4.5 Trends in utility stress in Australia

### 4.5.1 Trends in high burden utility stress

Figure 4.8 shows the trends in high burden water affordability stress (HBWAS) and high burden energy affordability stress (HBEAS) across jurisdictions from 1988-89 to 2011-12. Since not all households pay for water and sewerage services, the reported HBWAS headcount index excludes those households that do not pay for water and sewerage services. Overall, about 9 per cent of Australian households that paid for water and sewerage services were at HBWAS in 1988-89 and 1993-94. The HBWAS rate dropped to less than 2 per cent in 2003-04, but increased to 6.5 per cent in 2011-12.

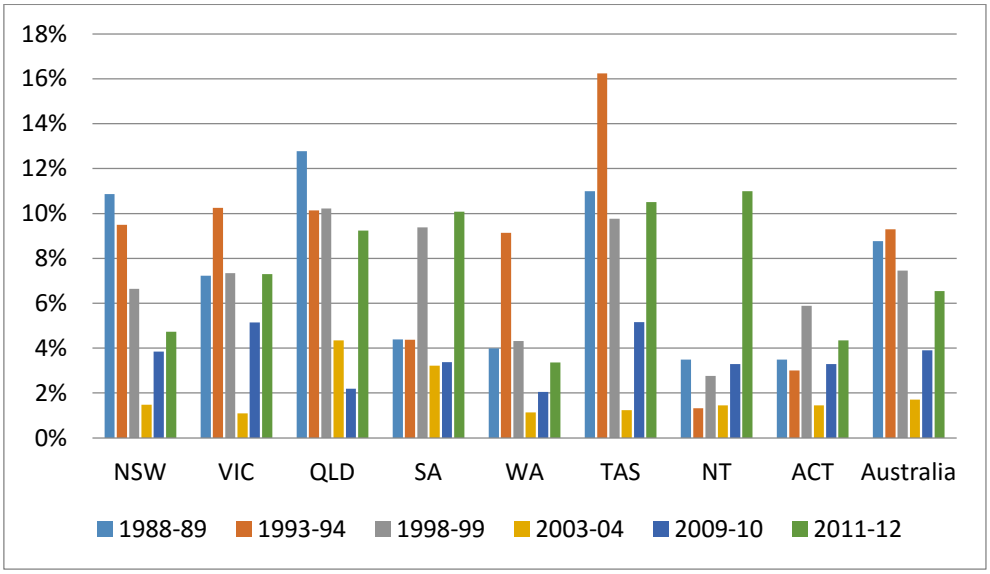
There were variations in the HBWAS headcount index across jurisdictions due to variations in household income, water and sewerage expenditure. In 1988-89, NSW and Queensland had the highest HBWAS headcount index, and more than 30 per cent of low-income households that paid for water and sewerage services were at risk of HBWAS. In 1993-94, Tasmania had the highest HBWAS headcount index (16 per cent) and almost 40 per cent of low-income Tasmanian households that paid water and sewerage services were at HBWAS. Circumstances improved in 1998-89 in many states except in SA, the NT and the ACT. More than a third of low-income ACT households and NT households that paid for water services were at HBWAS.

During 2003-04, households across all jurisdictions enjoyed lower water prices and higher incomes and, the lowest HBWAS rate (0.5 per cent) is observed. Water prices across many cities increased post-2004 following the prolonged drought. Concurrently, there is a slight increased in HBWAS headcount index across all jurisdictions in 2009-10. In 2011-12, the NT had the highest HBWAS headcount index (15 per cent) and more than 45 per cent of low-income NT households that paid for water and sewerage services were at HBWAS.

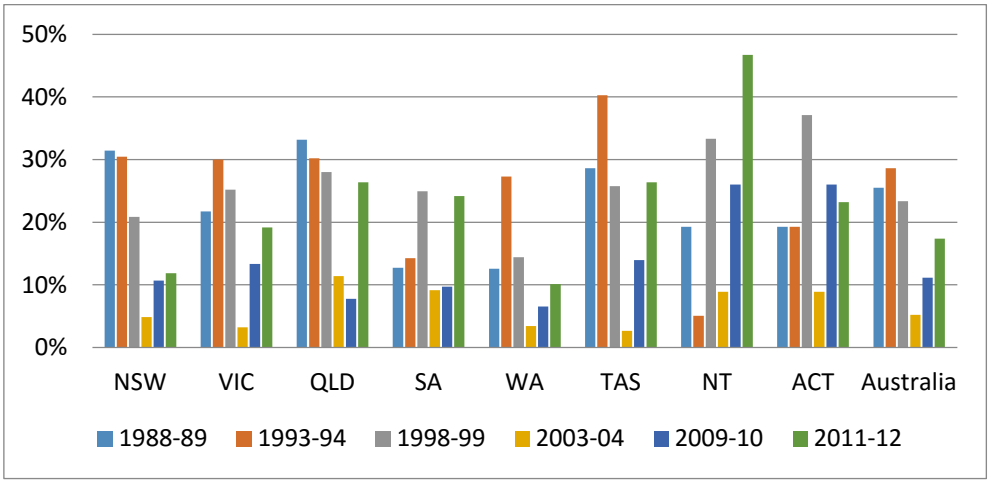
Using the 10 per cent affordability threshold, Figure 4.8c and 4.8d show that less than 5 per cent of Australian households were at risk of HBEAS over the last 15 years. Across all jurisdictions, Tasmania had the highest HBEAS headcount index at all times. Among low-income Tasmanian households, more than one fifth were in HBEAS in 1993-94 and 13 per cent in HBEAS in 2011-12. Victoria has the second highest HBEAS headcount index across all states. About 12 per cent of low-income Victorian households were at HBEAS in 2011-12. The HBEAS headcount indexes in these two states also increased rapidly in 2011-12. Although the ACT has the highest average income across jurisdictions, it has the third highest HBEAS headcount index. By contrast, while energy prices have risen rapidly in NSW over the last five years, only 8 per cent of low-income NSW households were at HBEAS in 2011-12.

**Figure 4.8** Trends in high burden utility stress headcount index

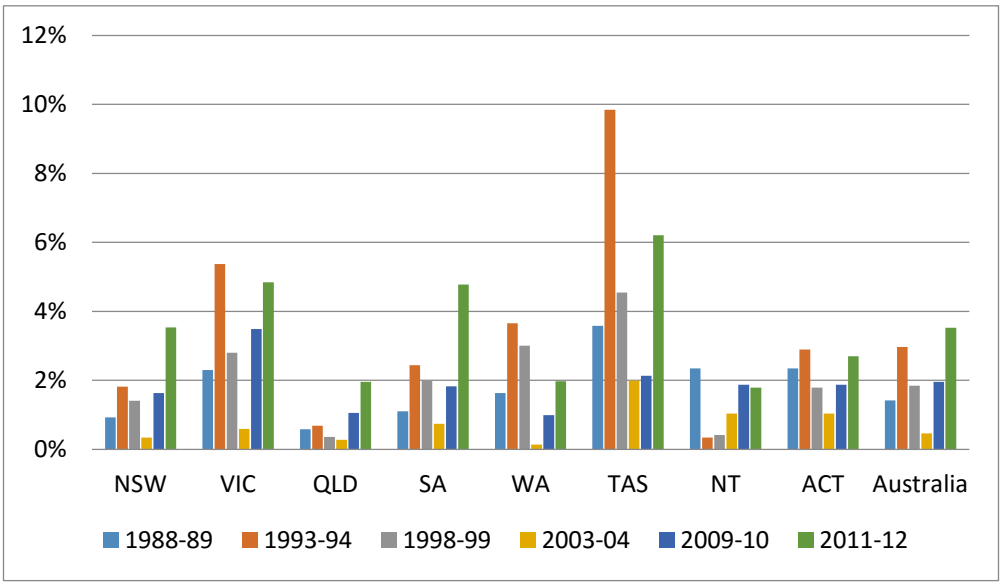
(a) High burden water affordability stress (HBWAS) headcount index



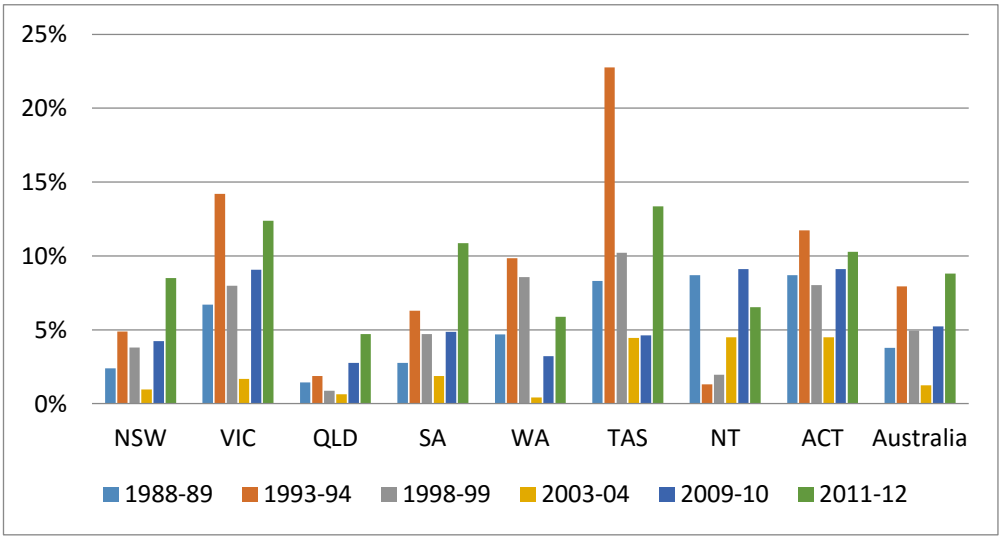

(b) HBWAS headcount index, low-income households



(c) High burden energy affordability stress (HBEAS) headcount index




(d) HBEAS headcount index, low-income households



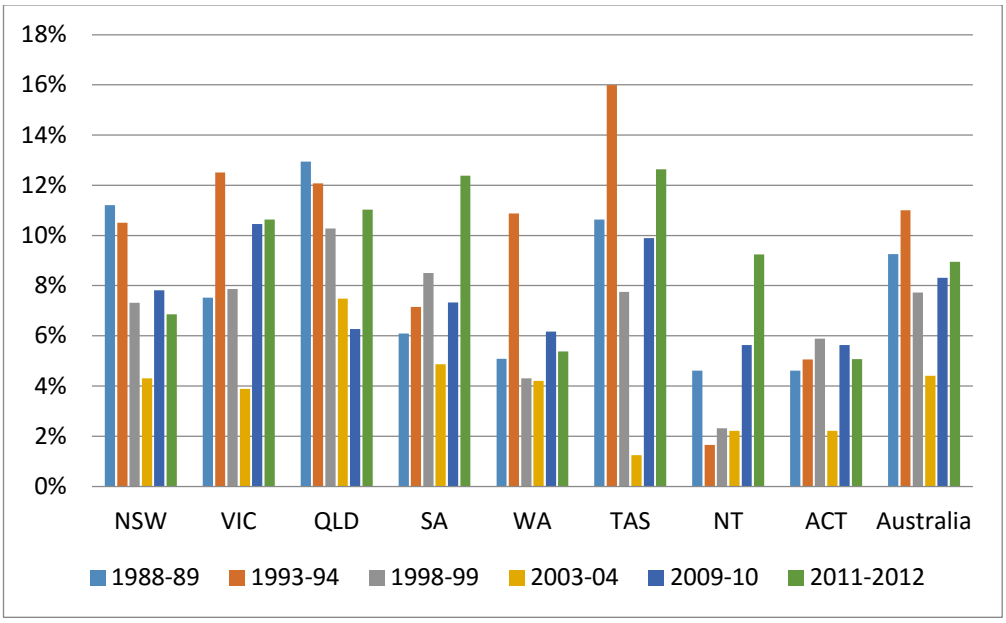
### 4.5.2 Trends in relative utility stress

Households identified to be in relative utility stress were those households with income below the poverty line after paying for utility expenses and having above median equivalised utility expenses. Figure 4.9 illustrates the trends in relative water affordability stress (RWAS) and relative energy affordability stress (REAS) across jurisdictions from 1988-89 to 2011-12. Overall, about 8 to 10 per cent of Australian households were at risk of RWAS over this period, except in 2003-04 (Figure 4.9a). Among low-income households, more than one fifth of them were at RWAS and paid above median water expenditure so that their income fell below the poverty line after paying for water bills, except in 2003-04 (Figure 4.9b). There was a declining trend of RWAS headcount index in the 1990s, and an increasing trend after 2003-04.

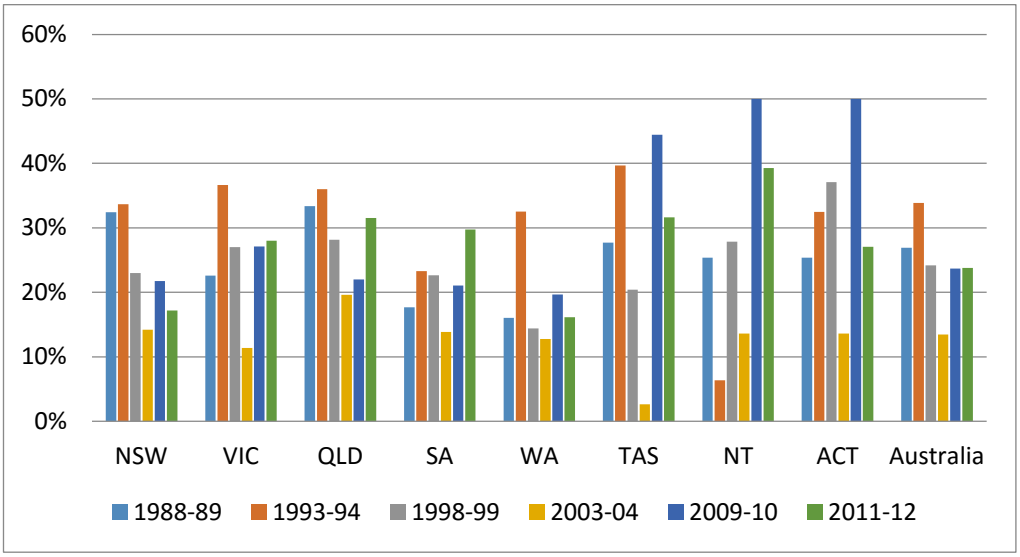
In 1988-89, Queensland had the highest rate of RWAS, followed by NSW and Tasmania. More than 30 per cent of low-income Queensland and NSW households were at risk of RWAS. In 1993-94, RWAS rates had declined relative to 1988-89 in NSW, Queensland, SA, NT and the ACT, but had increased in Victoria, WA, and Tasmania. In 1993-94, Tasmania had the highest RWAS headcount index (12 per cent) where more than 30 per cent of low-income Tasmanian households were in RWAS. The RWAS headcount index reduced significantly in 2003-04, especially in Tasmania and the ACT/NT. In 2009-10, Victoria had the highest RWAS rate (10 per cent). However, among low-income households, the NT/ACT had the highest RWAS rate (44 per cent) in 2009-10. In 2011-12, Tasmania had the highest RWAS rate (12 per cent) across all Tasmanian households but the NT had the highest rate of low-income households facing RWAS (40 per cent).

**Figure 4.9** Relative utility stress headcount index by jurisdictions

(a) Relative water affordability stress (RWAS) headcount index, all households

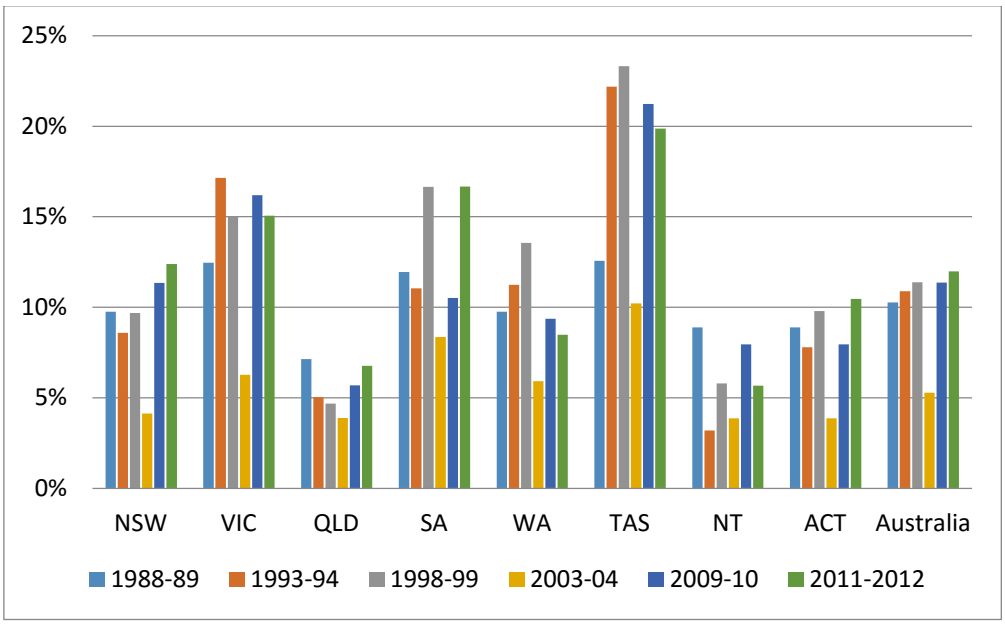



(b) Relative water affordability stress (RWAS) headcount index, low-income households

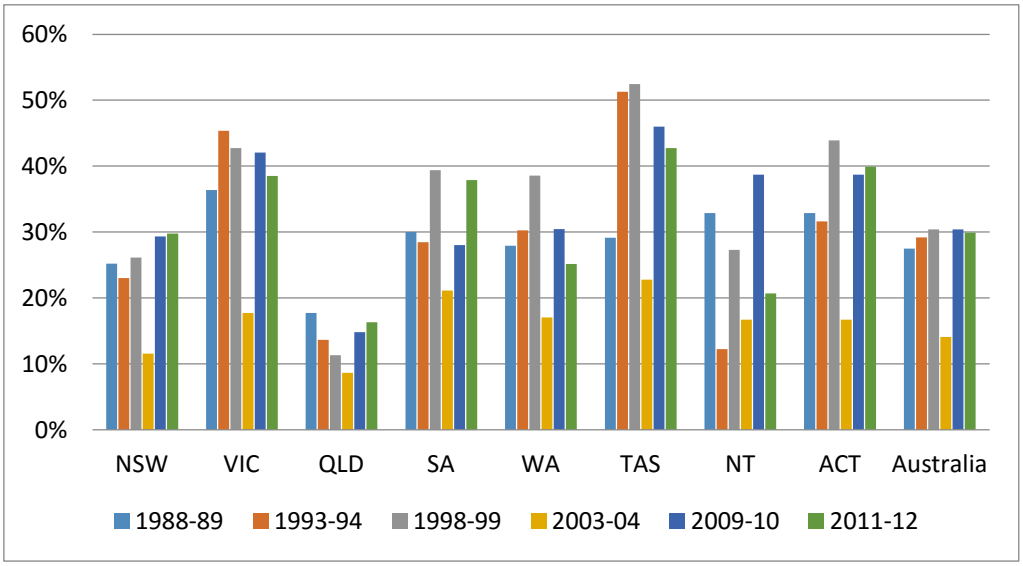



Note: (a) Households reported with negative income and zero or negative water and sewerage expenditure were excluded in the analysis.

(c) Relative energy affordability stress (REAS) headcount index, all households




(d) Relative energy affordability stress (REAS) headcount index, low-income households




Note: (b) Households in the ACT and the ACT in 2003-04 and 2009-10 survey data are grouped together as NT/ACT. The headcount indexes for the ACT and NT in 2003-04 and 2009-10 in the above figures represent the average headcount indexes in the group ACT/NT in the respective year.

Between the years 1988-89 to 2011-12, except 2003-04, around 10 per cent of Australian households were at risk of REAS, such that they paid above median energy expenses and also fell below the poverty line after paying energy bills, the REAS headcount index fell below 5 per cent (Figure 4.9c). Across all jurisdictions, Tasmania had the highest REAS headcount index at all times (Figure 4.9c). Almost half of low-income Tasmanian households were at risk of REAS in the 1990s while the rate had reduced to 20 per cent in 2003-04 and then increased to 40 per cent in 2011-12 (Figure 4.9d). Victoria had the second highest REAS headcount index in most periods. Despite the fact that the ACT has the highest average income in Australia, close to 40 per cent of low-income ACT households were at risk of REAS in 2011-12. Almost 35 per cent of low-income SA households and 30 per cent of low-income NSW households were at REAS in 2011-12. Overall, my analysis reveals that the risk of relative water and energy affordability stress has increased among low-income households in recent years.

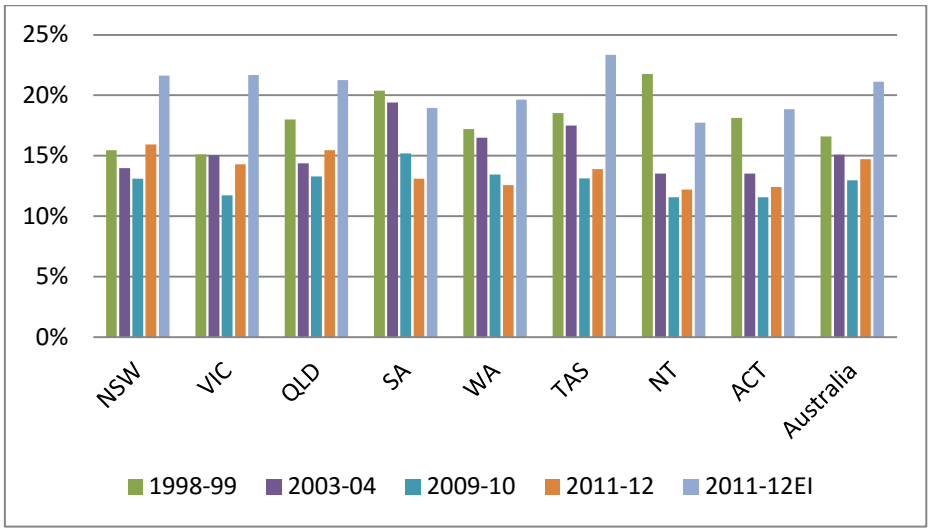
### 4.5.3 Trends in subjective utility stress

Figure 4.10a and 4.10b illustrate the proportions of Australian households who self-reported subjective energy affordability stress (SEAS) in different states and over time. In 1998-99, about 17 per cent of Australian households reported SEAS and the headcount index declined to 13 per cent in 2009-10 and had risen to 15 per cent in 2011-12. If I include all the eight indicators reported in HEC 2012 survey (2011-12 EI), my results show that more than a quarter of Australian households reported experiencing at least one type of energy-related financial stress.

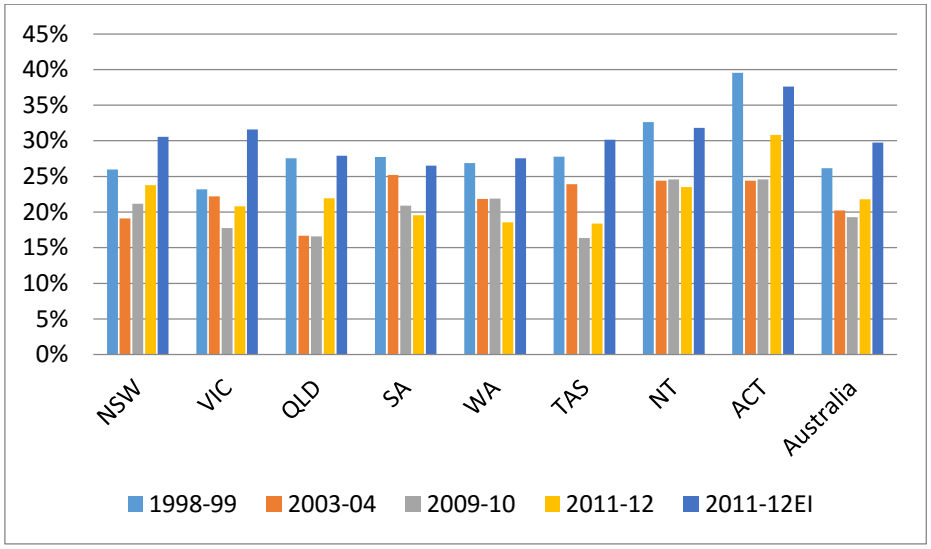
In the late 1990s, the NT had the highest SEAS headcount index (22 per cent) and almost one third of low-income NT households reported SEAS. The ACT had the highest SEAS headcount index among low-income households, with close to 40 per cent of persons in this category reporting being unable to pay utility bills on time or to being unable to heat their home due to a shortage of money in 1998-99.

**Figure 4.10** Trends in subjective utility stress headcount index across jurisdictions

(a) Subjective energy affordability stress (SEAS) headcount index, all households




(b) SEAS headcount index among low-income households (Q1 and Q2)




**Note:** (i) SEAS when household expressed (a) unable to pay utility bill on time or (b) unable to heat home due to shortage of money in the last 12 months. (ii) Households in the NT and the ACT in 2003-04 and 2009-10 represent the average results from the group NT/ACT. (iii) 2011-12EI means households expressed that they have experienced more than one of the eight energy-related financial stress indicators in the HEC 2012 survey (see Table 4.10 list of indicators).

The situation has improved in most jurisdictions in terms of SEAS rates over time, but recently SEAS rates have increased in many states. In 2011-12, more than 15 per cent of NSW and Queensland households reported SEAS. Among low-income cohorts, the ACT had the highest SEAS rate (30 per cent), followed by the NT (25 per cent) and NSW (24 per cent). If all eight energy-related financial stress indicators were included (2011-12 EI), more than a fifth of households in Tasmania, NSW, Victoria, and Queensland reported SEAS in 2011-12 (Figure 4.10a). In 2011-12, the SEAS rates were higher among low-income households (Figure 4.10b). Almost 38 per cent low-income ACT households had experienced one or more of the eight energy-related financial stresses in the HEC 2012 survey. More than 30 per cent of low-income households in NSW, Victoria, Tasmania and the NT reported SEAS in 2011-12.

If we unpack the SEAS indicator reported in the survey (Table 4.9a), a majority of the SEAS originates from the inability to pay a utility bill on time rather than being unable to heat their home due to a shortage of money. Among low-income households (Table 4.9b), ACT had the highest reported incidence of an inability to pay a bill on time (37 per cent in 1998-99 and 29 per cent in 2011-12), and also the highest reported incidence of inability to heat (or cool) their home due to shortage of money (11 per cent in 1998-99 and 8 per cent in 2011-12). Overall, there is a declining trend in bill payment problems among low-income households, but over the reporting period, an increasing percentage of households stated they were unable to heat (or cool) home.

**Table 4.9** Incidence of utility-related financial stress by jurisdictions

(a) Among all Australian households

| | Unable to pay utility bill on time | | | | Unable to heat (or cool) home | | | |
|---|---|---|---|---|---|---|---|---|
| | 1998-99 | 2003-04 | 2009-10 | 2011-12 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
| NSW | 14.9% | 13.6% | 12.8% | 14.5% | 1.6% | 2.2% | 1.5% | 3.4% |
| VIC | 14.5% | 14.6% | 11.0% | 13.1% | 2.4% | 1.6% | 1.8% | 2.9% |
| QLD | 17.4% | 14.0% | 12.9% | 14.7% | 1.1% | 1.2% | 1.7% | 2.8% |
| SA | 20.0% | 17.6% | 14.2% | 12.1% | 3.4% | 4.4% | 2.3% | 3.1% |
| WA | 16.0% | 16.2% | 12.5% | 11.1% | 4.1% | 2.5% | 2.2% | 3.7% |
| TAS | 17.3% | 17.0% | 12.3% | 12.5% | 3.7% | 3.5% | 2.5% | 4.1% |
| NT | 21.7% | 13.5% | 10.9% | 12.2% | 0.1% | 0.6% | 1.3% | 2.1% |
| ACT | 17.2% | | | 11.8% | 3.5% | | | 2.7% |
| **Australia** | **15.9%** | **14.6%** | **12.4%** | **13.5%** | **2.2%** | **2.1%** | **1.8%** | **3.1%** |

(b) among low-income households (Q1 and Q2)

| | Unable to pay utility bill on time | | | | Unable to heat (or cool) home | | | |
|---|---|---|---|---|---|---|---|---|
| | 1998-99 | 2003-04 | 2009-10 | 2011-12 | 1998-99 | 2003-04 | 2009-10 | 2011-12 |
| NSW | 24.6% | 18.7% | 20.4% | 21.4% | 4.0% | 3.5% | 3.5% | 5.8% |
| VIC | 22.2% | 21.6% | 16.3% | 18.8% | 4.8% | 2.8% | 4.1% | 5.7% |
| QLD | 26.4% | 16.3% | 15.8% | 21.0% | 2.3% | 1.8% | 3.6% | 4.8% |
| SA | 27.2% | 22.2% | 18.9% | 17.8% | 3.8% | 6.8% | 5.0% | 5.5% |
| WA | 24.9% | 21.7% | 19.6% | 15.9% | 8.1% | 3.6% | 5.6% | 7.2% |
| TAS | 25.1% | 23.2% | 14.5% | 16.5% | 7.0% | 5.7% | 4.1% | 6.1% |
| NT | 32.4% | 24.4% | 22.3% | 23.5% | 0.6% | 1.8% | 2.9% | 3.6% |
| ACT | 37.1% | | | 29.0% | 11.1% | | | 7.6% |
| **Australia** | **24.9%** | **19.6%** | **18.1%** | **19.8%** | **4.4%** | **3.3%** | **4.0%** | **5.7%** |

Note: (i) HES survey only asked households about their inability to heat home due to shortage of money, but HEC 2012 survey extended the indicator as unable to both heat or cool home due to short of money; (ii) Households in the NT and the ACT in 2003-04 and 2009-10 survey data are grouped together as NT/ACT.

### Unpacking subjective energy stress indicators among low-income households

Affordability trends can be explained by unpacking the eight energy-related financial stress indicators reported in the HEC 2012 survey (Table 4.10). Among all indicators, utility bill payments (*FINSTNBH*) were the dominant utility stress across all jurisdictions. Almost 30 per cent of low-income ACT households had a payment problem, while more than 20 per cent of low-income households in NSW, Queensland and NT expressed an inability to pay utility bills on time.

'Choose to restrict heating/cooling' was the second dominant utility stress among Australian households (*FINSTERH*). Among the low-income cohorts, 13 per cent of the households chose to restrict heating or cooling their home because they could not afford the extra costs due to a shortage of money. Across jurisdictions, more than one fifth of ACT households and 18 per cent of Tasmanian households restricted heating or cooling. Restricting heating and cooling in cold winters or hot summers may have health consequence such as increased health costs and health vulnerability, particularly among households with aged persons, young children, people with disabilities, or people with chronic illness.

Another indicator related to utility bill payment is 'received or sought assistance from electricity or gas company due to short of money' (*FINSTAH*). In 2011-12, about 10 per cent of Australian low-income households availed themselves of this opportunity. The rate of assistance was highest among low-income ACT households (16 per cent) and lowest in Tasmania (7 per cent). This indicator can be linked to the inability to pay indicators (*FINSTNBH*, *HFINSTB*). This is because households experiencing energy hardship are encouraged to contact their energy retailers for assistance and, under the NECF, all energy retailers that operate within the national energy market are required to have hardship policies in place.

**Table 4.10** Incidence of energy-related financial stress among low-income households (Q1 and Q2), 2011-12

| | Variable | NSW | VIC | QLD | SA | WA | TAS | NT | ACT | AUS |
|---|---|---|---|---|---|---|---|---|---|---|
| **Weighted number of households** | | 1130160 | 821311 | 700358 | 288880 | 300178 | 94470 | 17345 | 35704 | 3388405 |
| **Energy-related financial stress indicator** | | | | | | | | | | |
| Could not pay utility bill on time due to shortage of money | *FINSTNBH* | 21.4% | 18.8% | 21.0% | 17.8% | 15.9% | 16.5% | 23.5% | 29.0% | 19.8% |
| Unable to heat or cool home due to shortage of money | *FINSTNBH* | 5.8% | 5.7% | 4.8% | 5.5% | 7.2% | 6.1% | 3.6% | 7.6% | 5.7% |
| Often or always could not pay utility bill on time due to shortage of money | *HFINSTB* | 7.7% | 7.4% | 6.7% | 8.2% | 6.3% | 7.8% | 3.6% | 11.7% | 7.4% |
| Entered into a loan arrangement or used a credit card to pay electricity bill due to shortage of money | *FINSTLH* | 6.2% | 8.0% | 9.5% | 4.9% | 6.7% | 7.3% | 6.7% | 7.9% | 7.3% |
| Received or sought assistance from electricity or gas company with paying bills due to shortage of money | *FINSTAH* | 9.6% | 11.0% | 9.7% | 9.2% | 9.4% | 7.4% | 8.4% | 16.2% | 9.9% |
| Received a disconnection warning from electricity or gas company due to shortage of money | *FINSTDWH* | 6.7% | 9.2% | 9.8% | 7.7% | 9.0% | 7.4% | 13.0% | 12.9% | 8.4% |
| Choose to restrict heating/cooling because household could not afford extra costs due to shortage of money | *FINSTERH* | 13.2% | 14.7% | 9.6% | 12.4% | 15.7% | 17.5% | 13.0% | 21.6% | 13.2% |
| Could not afford to repair a major household white good due to short of money | *FINSTWGH* | 4.9% | 4.7% | 5.3% | 3.6% | 5.4% | 5.0% | 5.3% | 8.0% | 4.9% |

Data source: author calculation from HEC2012

Under NECF, ‘disconnection of energy services or sending disconnection warning’ (*FINSTDWH*) is regarded as the last resort to resolve customer payment issues. In 2011-12, about 8.5 per cent of low-income households received disconnection warnings. The rate was highest in the NT (13 per cent) and the ACT (13 per cent) and lowest in SA (7.7 per cent) and Tasmania (7.5 per cent). On the other hand, about 7 per cent of Australian low-income households shifted their utility debt to another loan arrangement or credit card debt (*FINSTLH*). Among the low-income cohorts, about 9.5 per cent of Queensland households and 8 per cent Victorian households entered into loans to manage their energy bills.

## 4.6. Comparing utility affordability indicators

Figures 4.11a to 4.11d illustrate that the change in headcount indexes of the three utility affordability indicators exhibit similar trends between 1988-89 and 2011-12. Among households that pay for water bills, the HBWAS headcount index increased slightly from 1988-89 to 1993-94 and then decreased to its lowest point, 1.7 per cent, in 2003-04. After 2004, the percentage of households at risk of HBWAS increased, to 6.5 per cent by 2011-12. The RWAS headcount index follows a similar trend. The RWAS headcount was a slightly higher than the HBWAS headcount in most of reporting periods, but were twice as much as the HBWAS headcount in 2003-04 and 2009-10.

Using a relative affordability measure has resulted in a higher headcount rate than the high burden affordability method in measuring energy affordability. In 1988-89, the REAS headcount was 10 per cent while the HBEAS headcount was only 1.4 per cent. The REAS headcount index was over 11 per cent in 2009-10 and 2011-12 while the HBEAS headcount was 2 to 3.5 per cent in the same period.

When I narrowed the sample to low-income households only, less than 4 per cent of the households were at risk of HBEAS, but more than a quarter of households were at risk of REAS in 1988-89. During 2003-04 the average energy burden was relatively low, and thus HBEAS headcount was low, but the REAS rates among

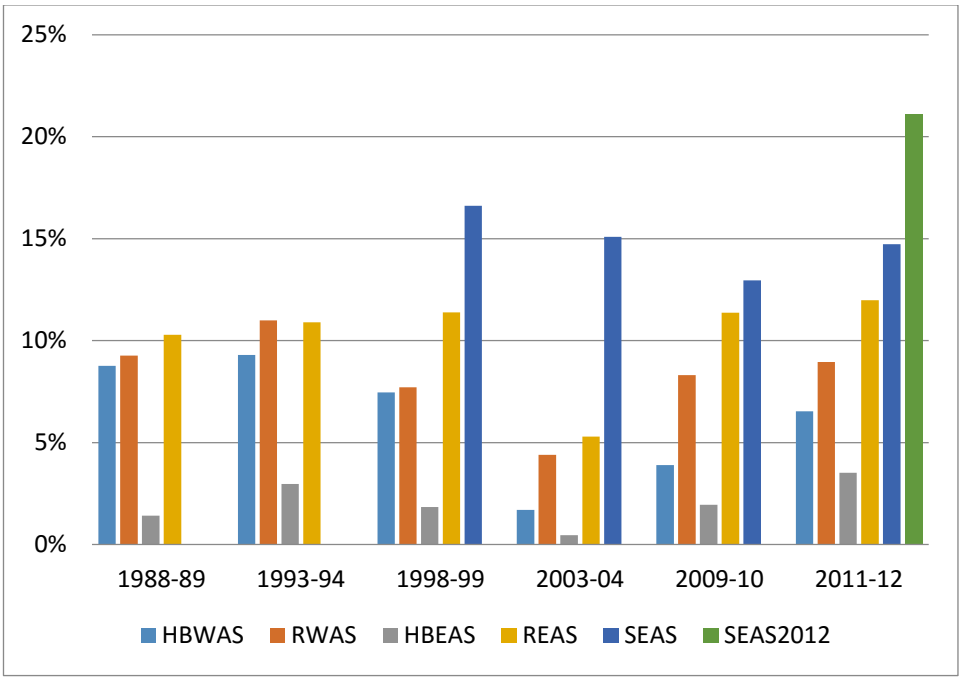
low-income households were 14 per cent. During 2009-10 and 2011-12, the REAS rates remained about 30 per cent for low-income households.

Perceived energy unaffordability has been an important political and social issue. My analysis shows that less than 10 per cent of Australian households were at risk of HBEAS over the reporting period. However, using subjective affordability indicator illustrates another side of the story that is not revealed from the HBEAS result. Some households may choose to restrict utility consumption in response to higher utility prices. If this were the case, objective measures may not reveal their affordability problems.

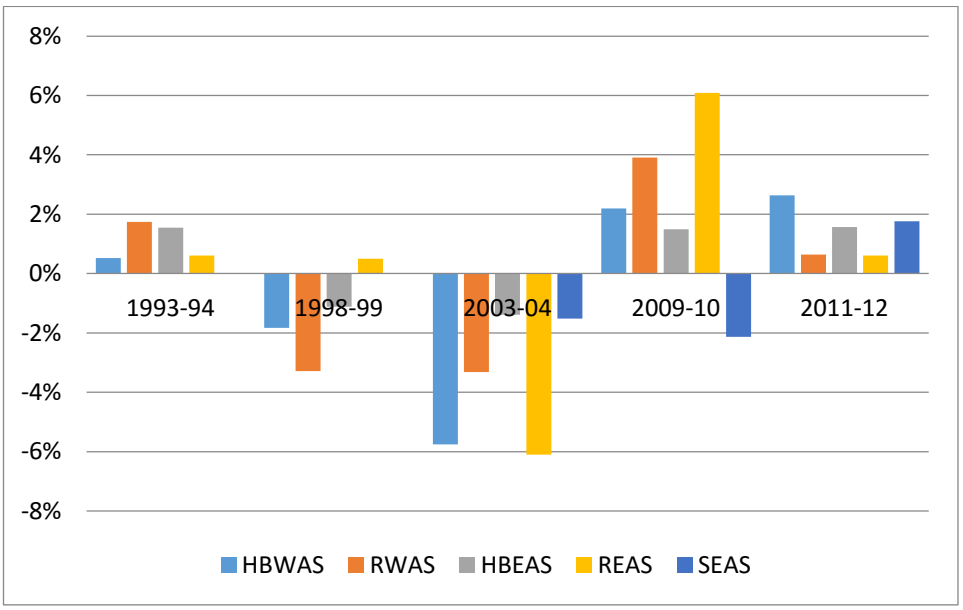
My findings show that the proportion of households at risk of subjective utility stress was consistently higher than high burden utility stress and relative utility stress from 1998-99 to 2011-12. In 1998-99, almost 16 per cent of Australian households reported subjective utility stress, but the headcount index fell to 13 per cent in 2009-10, and then increased to 15 per cent in 2011-12. If I include all eight energy-related financial stress indicators, more than a quarter of Australian households reported subjective energy affordability stress (SEAS2012) in 2011-12. Among the low-income households, more than 25 per cent of them reported SEAS in 1998-99. The rate had reduced to 19 per cent in 2009-10, but increased to 22 per cent in 2011-12. In 2011-12, almost 30 per cent of low-income households reported to have experienced one or more of the eight energy related financial stress indicators in the last 12 months.

**Figure 4.11** Trends in utility stress rates using different indicators

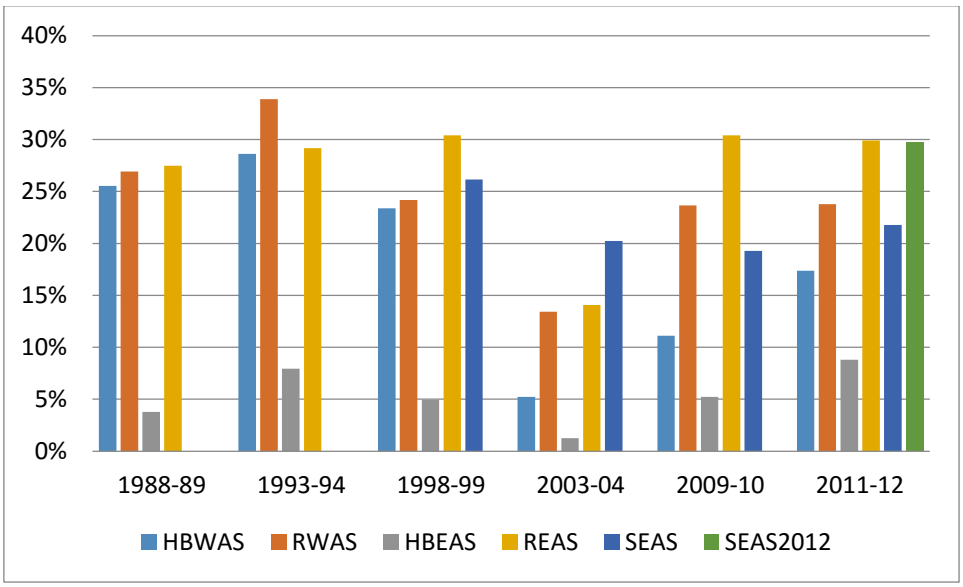
(a) Utility stress headcount over time, all households



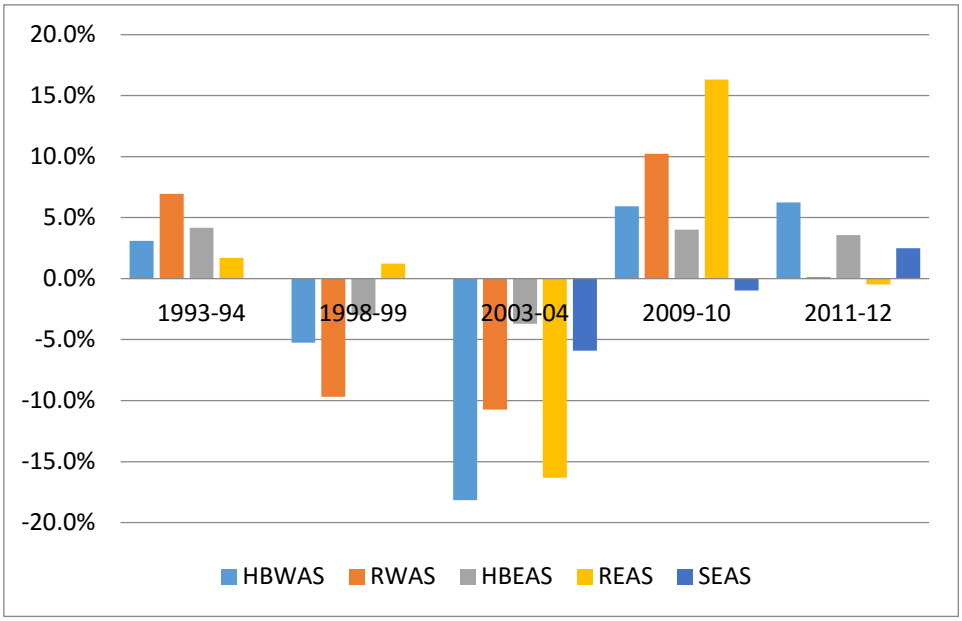

(b) Difference in utility stress headcount to the previous period, all households



(c) Utility stress headcount over time, low-income households




(d) Difference in utility stress headcount to the previous period, low-income households




Note: HBWAS = high burden water affordability stress; RWAS = relative water affordability stress; HBEAS = high burden energy affordability stress; REAS = relative energy affordability stress; SEAS = subjective energy affordability stress; SEAS2012 = subjective energy affordability stress in dataset HEC 2012

Table 4.11 summarises the incidence of an identified utility stress household being at risk of other types of utility stress. I find that 70 per cent of HBWAS households were at risk of RWAS, and about 60 per cent of RWAS households had HBWAS. Similarly, 88 per cent of HBEAS households were at risk of REAS, but less than 30 per cent of REAS households were at risk of HBEAS.

I find that the association of the outcomes from objective measures and subjective measures are weak. In 2011-12, about a quarter of HBWAS and RWAS households encountered SEAS (i.e. at least one of the eight types of energy-related financial stress) and about 36 per cent of HBEAS and REAS households reported SEAS. Nonetheless, less than 10 per cent of SEAS households were identified to be at risk of high burden utility stress, and about one fifth of them also encountered relative energy affordability stress.

**Table 4.11** Incidence of experiencing other types of utility stress among different indicators in 2011-12

| | Household identified with indicated utility stress | | | | | | |
|---|---|---|---|---|---|---|---|
| | **HBWAS** | **RWAS** | **HBEAS** | **REAS** | **SEAS** | **SEAS2012** | **Total** |
| **Number of households (weighted)** | **611** | **726** | **425** | **1323** | **1712** | **2455** | **11628** |
| | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | **Column per cent** | | | | | | |
| HBWAS | - | 56.9% | 29.6% | 19.3% | 4.9% | 5.3% | 5.3% |
| RWAS | 70.2% | - | 28.9% | 30.0% | 7.6% | 7.8% | 6.5% |
| HBEAS | 20.6% | 16.2% | - | 27.4% | 6.8% | 6.3% | 3.7% |
| REAS | 42.9% | 54.0% | 87.6% | - | 21.6% | 19.9% | 11.7% |
| SEAS | 13.8% | 17.2% | 27.4% | 27.2% | - | - | 14.7% |
| SEAS2012 | 21.2% | 25.6% | 36.5% | 36.1% | - | - | 21.1% |

Data source: Author calculation based on HEC 2012.

## 4.7 Utility stress and other household characteristics

### 4.7.1 Prevalence of utility stress by household characteristics

Table 4.12 tabulates the propensity to be in utility stress of selected household characteristics against different affordability indicators in 2011-12. Although the likelihood of objective utility stress is relatively low among Australian households, results from Table 4.12 indicate that the risk of utility stress changes depending on stages in life and social circumstances. In terms of the family lifecycle, we find that the propensity to be in objective utility stress (i.e. HBWAS, RWAS, HBEAS, REAS) increases among households with reference person age 55 or above; while the likelihood of experiencing subjective utility stress (SEAS) increases among households with dependent children.

My results highlight that single parents with dependent children have at much higher risk of HBEAS, REAS, and SEAS. Almost half of the single parent households expressed that they have experienced one or more of the types of subjective energy-related financial stress (SEAS). Moreover, more than one fifth of them were identified as encountering REAS, that is, they have higher than median energy expenditure and they would fall below the income poverty line after paying for energy expenses. The likelihood of a couple with dependent children being at risk of objective utility stress was relatively low, but a quarter of couples with young children (i.e. eldest child between 5 and 14) were experiencing SEAS.

Among older people, living alone was associated with a greater risk of objective utility stress. More than 19 per cent of single older person households were at risk of HBWAS or RWAS, and about 26 per cent were at risk of REAS. Nevertheless, their likelihood of SEAS was lower than other household types. Older aged couples (aged 65 and above) were also at slightly higher risk of HBWAS and REAS, but their likelihood of SEAS and SEAS-2012 was relatively low. About 8 per cent of older couples were at risk of HBWAS and 16 per cent of them were at

risk of REAS. The results emphasise the prevalence of energy affordability stress experienced by single parent families, young families, and aged lone persons.

The results demonstrate that propensity to be in utility stress varies according to household tenure types. Both public and private renters have a very high risk of energy affordability stress. More than a quarter of private renters were identified to be in REAS and more than 40 per cent of them reported experiencing SEAS-2012. Public renters were also found to have greater risk than home owners for subjective utility stress. Almost a third of them reported to experience SEAS-2012. On the other hand, households who owned the property outright, mostly retirees, have higher risk of water affordability stress. About 10 per cent of them were identified to be at HBWAS and RWAS.

Unemployment plays key role in increasing the risk of utility stress. Almost 30 per cent of households with unemployed members were at risk of REAS and 56 per cent of them reported to be in SEAS-2012. Those households who were not in the labour force were at a higher risk for water affordability stress. Moreover, households that rely on government pensions and allowances as the main income source have a higher risk of utility stress. This poses the question of whether the current income support payments are sufficient to assist recipient households to pay for essential household utility services.

**Table 4.12** Prevalence of utility stress by household characteristics, 2011-12

| | | Percentage of households at risk of different type of utility stress | | | | | |
|---|---|---|---|---|---|---|---|
| | **No. of households (Weight)** | **HBWAS** | **RWAS** | **HBEAS** | **REAS** | **SEAS** | **SEAS-2012** |
| **Overall Australia** | **8,470,206** | **7.3%** | **6.5%** | **3.8%** | **11.7%** | **14.7%** | **21.1%** |
| ***Family Lifecycle*** | | | | | | | |
| Lone person aged under 35 | 275,501 | 3.6% | 6.3% | 2.5% | 11.5% | 18.7% | 26.7% |
| Couple only, reference person aged under 35 | 478,227 | 0.3% | 2.6% | 1.1% | 4.1% | 9.9% | 13.7% |
| Couple with dependent children - Eldest child under 5 | 493,342 | 2.0% | 6.0% | 2.4% | 9.5% | 16.0% | 22.1% |
| Couple with dependent children - Eldest child 5 to 14 | 853,033 | 2.7% | 5.7% | 3.1% | 4.4% | 19.4% | 26.2% |
| Couple with dependent children - Eldest child 15 to 24 | 537,260 | 3.9% | 5.4% | 3.2% | 4.4% | 12.7% | 19.1% |
| Lone parent with dependent children | 500,595 | 4.3% | 6.1% | 7.3% | 24.1% | 41.9% | 51.8% |
| Couple with dependent and non-dependent children | 260,069 | 1.2% | 2.0% | 1.3% | 5.6% | 19.0% | 27.8% |
| Couple with non-dependent children only | 520,584 | 1.8% | 0.9% | 1.5% | 3.1% | 9.3% | 14.7% |
| Couple only, reference person aged 55 to 64 | 520,584 | 6.9% | 6.4% | 3.9% | 10.3% | 7.0% | 13.3% |
| Couple only, reference person aged 65 and over | 787,161 | 8.3% | 9.3% | 4.2% | 16.2% | 2.6% | 9.3% |
| Lone person aged 65 and over | 811,718 | 18.8% | 19.1% | 7.3% | 25.9% | 5.6% | 11.2% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Tenure type*** | | | | | | | |
| Owned outright | 2,608,048 | 11.4% | 10.3% | 4.5% | 11.9% | 3.3% | 8.5% |
| Purchasers | 3,075,881 | 4.1% | 8.1% | 2.5% | 8.5% | 14.1% | 21.0% |
| Public renters | 1,528,495 | 0.3% | 1.8% | 2.1% | 28.2% | 25.6% | 32.6% |
| Private renters | 360,516 | 1.0% | 0.6% | 9.0% | 10.9% | 34.1% | 41.0% |
| ***Main source of income*** | | | | | | | |
| Wage and salary | 5,316,978 | 2.1% | 3.6% | 1.4% | 4.9% | 14.3% | 20.3% |
| Own unincorporated business income | 361,122 | 6.9% | 9.7% | 4.9% | 17.5% | 10.4% | 16.1% |
| Government pensions and allowances | 2,051,285 | 12.9% | 14.2% | 9.2% | 30.2% | 20.3% | 28.8% |
| ***Employment status*** | | | | | | | |
| Employed | 5,813,661 | 2.5% | 4.0% | 2.0% | 6.4% | 14.5% | 20.6% |
| Unemployed | 103,512 | 8.7% | 9.2% | 12.9% | 34.0% | 45.4% | 55.9% |
| Not in the labour force | 2,553,033 | 11.4% | 12.1% | 7.1% | 22.7% | 13.9% | 20.9% |

Data source: Author calculation based on HEC 2012

### 4.7.2 Utility stress and material hardships/disadvantages

Using odd ratios in logistic regression, my analysis shows there is an association between households at risk of various categories of utility stress and other financial stresses and material hardships. Odd ratios are the exponential of the logit coefficients, which represent the effect of the independent variable on the dependent variable. Odds ratios range from 0 to +∞, with value of no effect being equal to 1. Thus, odds ratios below 1 are 'negative' effects and odds ratio greater than 1 are 'positive' effects (Pevalin and Robson 2009: 304). Similar analysis has been done by Iceland and Bauman (2007) to analyse the association of income poverty and material hardship.

The HEC 2012 survey includes eight energy-related financial stress indicators (indicators 1-8) and eight material hardship indicators (indicators 9-16). Based on this data, I created two other variables: (a) households with low economic resources (*LER*), and (b) households at risk of housing stress (*hsestress*) for this analysis. LER households are defined as those who have both low-income (i.e. the bottom two quintiles of equivalised disposable household income) and low net wealth (i.e. the bottom two quintile of equivalised household net wealth) (ABS 2013e). A household in housing stress is defined as one in the bottom two income quintiles of income distribution and which spends more than 30 per cent of its disposable income on housing costs (Harding et al. 2004; Nepal et al. 2010).

Table 4.13 shows that some households that have experienced other financial stresses and material hardships are more likely to be at risk of various types of utility stress. I find that LER households have less likelihood of encountering water affordability stress (both HBWAS and RWAS), but are two or three times more likely to be at risk of HBEAS, REAS and SEAS than non-LER households. Moreover, households at risk of housing stress are 1.5 time more likely be at risk of HBWAS, and 5.5 times more likely to be at RWAS than those non-housing stress households. Such households are also 1.5 to 3.5 times more likely to encounter energy affordability problems (HBEAS and REAS), but there is little association with SEAS.

**Table 4.13** Odd ratio relating incidence of utility stress and material hardships

| | Overall | HBWAS | RWAS | HBEAS | REAS | SEAS | SEAS-2012 |
|---|---|---|---|---|---|---|---|
| Percentage of households in different type of utility stress | | 7.3% | 8.6% | 3.8% | 11.7% | 14.7% | 21.1% |
| Estimated number of households (weighted) | 8,470,206 | 618,325 | 728,438 | 321,868 | 991,014 | 1,245,120 | 1,787,214 |
| | | | | | | | |
| | **Per cent** | **Odds Ratios** | | | | | |
| | | | | | | | |
| **Low economic resources** | 17.9% | 0.63*** | 0.60*** | 2.08*** | 3.06*** | 2.29*** | 1.94*** |
| **Housing stress** | 15.6% | 1.57*** | 5.45*** | 1.80*** | 3.73*** | 1.18 | 1.17 |
| | | | | | | | |
| **Energy financial stress** | | | | | | | |
| Could not pay utility bill on time | 13.5% | 0.77 | 0.63*** | 0.94 | 0.96 | - | - |
| Unable to heat or cool home | 3.1% | 1.25 | 1.30 | 0.85 | 0.71** | - | - |
| Often or always unable to pay utility bill on time | 4.6% | 1.28 | 1.65** | 1.52 | 1.60*** | - | - |
| Entered loans or other debts to pay energy bills | 6.3% | 0.77 | 0.76 | 0.60*** | 0.77** | 3.11*** | - |
| Sought assistance from energy company | 6.1% | 1.30 | 1.53*** | 1.33 | 1.40*** | 14.47*** | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Received disconnection warning | 5.7% | 1.09 | 1.41 | 1.50** | 1.58*** | 14.38*** | - |
| Restricted heating/cooling | 8.6% | 1.05 | 1.41** | 1.29 | 1.38*** | 3.55*** | - |
| Could not afford to repair major white good | 3.2% | 1.11 | 1.06 | 1.38 | 0.89 | 1.33 | - |
| | | | | | | | |
| **Other material hardship** | | | | | | | |
| Could not afford to put fuel in motor vehicle | 4.3% | 1.06 | 1.14 | 0.39*** | 0.69*** | 1.26 | 6.51*** |
| Could not pay registration/insurance | 6.2% | 0.71 | 0.64** | 0.67 | 0.65*** | 8.95*** | 11.5*** |
| Pawned or sold something | 3.1% | 1.20 | 0.91 | 1.19 | 0.67*** | 1.95*** | 5.84*** |
| Went without meals | 2.9% | 0.48** | 0.67 | 0.87 | 1.15 | 2.30*** | 2.78*** |
| Sought assistance from welfare agencies | 3.1% | 1.12 | 0.59 | 1.65** | 1.31 | 1.31 | 3.61*** |
| Sought financial help from friends/family | 7.0% | 0.55*** | 0.58*** | 0.98 | 0.99 | 2.55*** | 4.90*** |
| Spent more money than received | 12.5% | 1.51*** | 1.20 | 2.02*** | 1.27*** | 1.22 | 1.53*** |
| Present standard of living is worse than 2 years ago | 29.6% | 1.69*** | 1.55*** | 1.47*** | 1.45*** | 1.55*** | 2.34*** |

Note: *** P<0.005 (red); ** P<0.01 (blue)

Data source: Author calculation based on HEC 2012.

There is little association between households reported with various types of energy-related financial stress and the risk of HBWAS. Households who often or always could not pay utility bills on time are 1.6 times more likely to be in RWAS and REAS. Households reported to have received or sought assistance from energy companies are 1.5 times more likely to be in RWAS and 14 times more likely to be in SEAS. Households which entered into other loan or debt arrangements to manage energy bills are less likely to be in HBEAS and REAS, but three times more likely to be in SEAS. Households who have received disconnection warnings are 1.5 times more likely be in HBEAS and REAS and 14 times more likely be in SEAS. Households who restricted heating or cooling are 1.3 times more likely in RWAS and REAS and have a 3.5 times higher chance of being in SEAS.

It is surprising to find that households that have experienced other material hardships exhibit little association with objective utility stress, but a stronger positive relationship with SEAS and SEAS-2012. For instance, households which went without a meal were less likely to be in HBWAS, but two times more likely to in SEAS and SEAS-2012. Households which could not afford to put fuel in motor vehicle were less likely to be in HBEAS or REAS, but at 6.5 times higher risk of SEAS-2012. Households who could not pay registration or insurance were less likely in REAS, but almost 11 times more likely to be in SEAS-2012. Households who sought assistance from friends or family were less likely to be in HBWAS or RWAS, but three to five times more likely to be SEAS-2012. Households who spent more than they received and households reported a declining living standard were 1.5 to 2 times more likely to be in all types of utility stress. In sum, households at risk of water or energy affordability stress are encountering many types of financial stress and material hardships.

Households' economic resources include both income and net wealth. Wealth, such as bank accounts, shares, superannuation or property, can be drawn upon by households to smooth and support consumption over time, particularly during

periods of low income (ABS 2012). Thus, LER households, who have both low income and low net wealth, are particularly vulnerable, and most at risk of experiencing economic hardship including water and energy affordability stress. In addition, housing stress is another contemporary social problem because mortgage repayment or rents are large and unavoidable expenses high among low-income households. Thus, it is not uncommon to find households experiencing both housing stress and utility stress.

Vulnerable households may choose to restrict heating or cooling home, shift utility debts to other loan arrangements, or seek financial help from family or friends in order to manage their utility expenses. This behaviour may reduce the likelihood of experiencing objective utility stress, but can have a strong positive relationship with SEAS. Many households at risk of utility stress expressed that they have spent more than they received in income and also have a reduced living standard over the last two years. The results demonstrate that relying on objective measures alone may overlook those vulnerable households in multiple material hardships, or those which choose to restrict utility consumption and expenses. Thus, it is important to integrate subjective indicators as supplementary measures of utility stress.

### 4.7.3 Demographic characteristics of utility stress households

In this section, I respond to the question, What are the demographic and dwelling characteristics of those households who are at risk of utility stress? To help answer the question, I undertook a logit regression analysis to identify the determinants of both objective and subjective utility stress as defined by:

> *P(Utility stress) = f* (*demographic characteristics, tenure type, dwelling type, family type, city, climate zones, energy-related characteristics*)

Table 4.14 shows the results from the logit analysis of households in utility stress under different measures.

**Table 4.14** Logit model regression of different utility stress indicators on household characteristics, 2011-12

| | HBWAS | | RWAS | | HBEAS | | REAS | | SEAS | | SEAS-2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Variables*** | Coef. | (S.D.) | Coef. | (S.D.) | Coef. | (S.D.) | Coef. | (S.D.) | Coef. | (S.D.) | Coef. | (S.D.) |
| **Demographic** | | | | | | | | | | | | |
| Log(disposable household income after housing costs) | -2.431 | (0.133)** | -3.210 | (0.186)** | -2.205 | (0.161)** | -3.355 | (0.161)** | -0.495 | (0.072)** | -0.493 | (0.062)** |
| Log(household net wealth) | 0.074 | (0.109) | -0.013 | 0.086 | 0.211 | (0.120) | 0.209 | (0.073)** | -0.382 | (0.053)** | -0.344 | (0.045)** |
| No. of unemployed member | -0.108 | (0.278) | -0.195 | 0.444 | -0.040 | (0.335) | 0.013 | (0.278) | 0.344 | (0.166)** | 0.274 | (0.143)* |
| Log(government pension and allowance) | 0.000 | (0.001) | 0.001 | 0.001 | 0.002 | (0.001)** | 0.004 | (0.001)** | 0.003 | (0.001)** | 0.003 | (0.001)** |
| No. of dependent children (aged below 16) | 0.141 | (0.110) | 0.437 | (0.088)** | -0.047 | (0.142) | 0.289 | (0.085)** | 0.210 | (0.053)** | 0.198 | (0.045)** |
| No. of bedrooms | 0.085 | (0.095) | 0.032 | 0.095 | 0.386 | (0.118)** | 0.225 | (0.078)** | 0.144 | (0.064)** | 0.154 | (0.056)** |
| **Tenure type** | | | | | | | | | | | | |
| Owner outright | 1.204 | (0.184)** | 0.051 | 0.171 | 0.724 | (0.252)** | -0.200 | 0.158 | -1.007 | (0.154)** | -0.660 | (0.113)** |
| Purchaser + | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Public renter | -2.829 | (0.642)** | -3.974 | (0.608)** | 1.107 | (0.401)** | 0.003 | 0.268 | -0.499 | (0.215)** | -0.539 | (0.184)** |
| Private renter | -1.889 | (0.943)** | -4.131 | (1.170)** | 0.539 | (0.465) | 0.246 | 0.292 | -0.427 | (0.223)* | -0.306 | (0.188) |
| **Dwelling type** | | | | | | | | | | | | |
| Separate house | 0.755 | (0.378)** | 1.086 | (0.354)** | 0.730 | (0.452) | 0.615 | (0.261)** | 0.628 | (0.226)** | 0.598 | (0.196)** |
| Semi-detached house | 0.719 | (0.391)* | 0.942 | (0.365)** | 0.330 | (0.486) | 0.090 | (0.269) | 0.458 | (0.246)* | 0.414 | (0.211)* |
| Flat/multi-storey dwelling + | | | | | | | | | | | | |
| **Family type** | | | | | | | | | | | | |
| Aged couple, no children | -0.299 | (0.195) | 0.087 | 0.210 | -0.538 | (0.262)** | 0.334 | (0.170)** | -1.667 | (0.308)** | -0.752 | (0.167)** |
| Single aged person, no children | -0.190 | (0.173) | -0.218 | 0.175 | -0.507 | (0.235)** | -0.237 | (0.157) | -1.150 | (0.214)** | -0.852 | (0.157)** |
| Single parents with children | 0.377 | (0.314) | -0.081 | 0.295 | 0.660 | (0.309)** | 0.645 | (0.247)** | 0.552 | (0.158)** | 0.618 | (0.146)** |
| Couple with children | -0.141 | (0.376) | 0.195 | 0.329 | 0.201 | (0.488) | 0.372 | (0.304) | -0.240 | (0.179) | -0.227 | (0.150) |
| Other household type + | | | | | | | | | | | | |
| **Location** | | | | | | | | | | | | |
| Capital city | -0.145 | (0.132) | -0.399 | (0.134)** | 0.094 | (0.175) | 0.062 | (0.124) | 0.019 | (0.113) | -0.027 | (0.090) |
| **Climate zone** | | | | | | | | | | | | |
| Zone 1 (Hot humid summer, warm | -0.214 | (0.480) | -1.245 | (0.591) | 0.651 | (0.561) | 0.720 | (0.408)* | -0.372 | (0.284) | -0.089 | (0.231) |

| | | | | | | |
|---|---|---|---|---|---|---|
| winter) | | | | | | |
| Zone 2 (Warm humid summer, mild winter) | 0.181 (0.176) | 0.099 (0.183) | -0.287 (0.299) | -0.526 (0.208)** | -0.279 (0.156)* | -0.218 (0.127)* |
| Zone 3/4 (Hot dry summer, cool or warm winter) | -0.336 (0.315) | -0.863 (0.354)** | 0.834 (0.299)** | 0.498 (0.210)** | -0.386 (0.215)* | -0.446 (0.169)** |
| Zone 5 (Warm temperate) + | | | | | | |
| Zone 6 (Mild temperate) | 0.241 (0.145)* | 0.490 (0.144)** | 0.635 (0.196)** | 0.356 (0.132)** | 0.087 (0.119) | 0.005 (0.097) |
| Zone 7/8 (Cool temperate/Alpine) | 0.167 (0.179) | 0.243 (0.191)** | 0.664 (0.236)** | 0.843 (0.164)** | -0.057 (0.172) | 0.096 (0.135) |
| **Energy-related characteristics** | | | | | | |
| Dual-fuel household | n/a | n/a | 0.256 (0.187) | 0.811 (0.132)** | -0.059 (0.117) | -0.015 (0.094) |
| Have solar PV system | n/a | n/a | -0.595 (0.256)** | -0.781 (0.172)** | -0.232 (0.137)** | -0.135 (0.106) |
| Using LPG for heating | n/a | n/a | 0.321 (0.270) | 0.772 (0.167)** | 0.013 (0.148) | 0.136 (0.118) |
| Central heating system | n/a | n/a | 0.263 (0.165) | 0.052 (0.116) | -0.355 (0.110)** | -0.123 (0.085) |
| Windows have heavy curtains or double glazed | n/a | n/a | 0.102 (0.157) | -0.004 (0.111) | 0.071 (0.099) | 0.032 (0.080) |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Constant | 10.999 (1.585) | 17.692 (1.438) | 5.763 (1.704)** | 14.461 (1.165)** | 5.474 (0.708)** | 5.364 (0.607) |
| | | | | | | |
| Obs | 9004 | 9004 | 9004 | 9004 | 9004 | 9004 |
| Pop size | 6391414 | 6391414 | 6391414 | 6391414 | 6391414 | 6391414 |
| D.F. | 9003 | 9003 | 9003 | 9003 | 9003 | 9003 |
| F-Statistics | 27.39 | 23.4 | 12.98 | 27.02 | 23.71 | 23.58 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Note: ** P<0.05 (red); *P<0.10 (blue) ; + represent reference group for comparison
Data source: Author calculation based on HEC 2012.

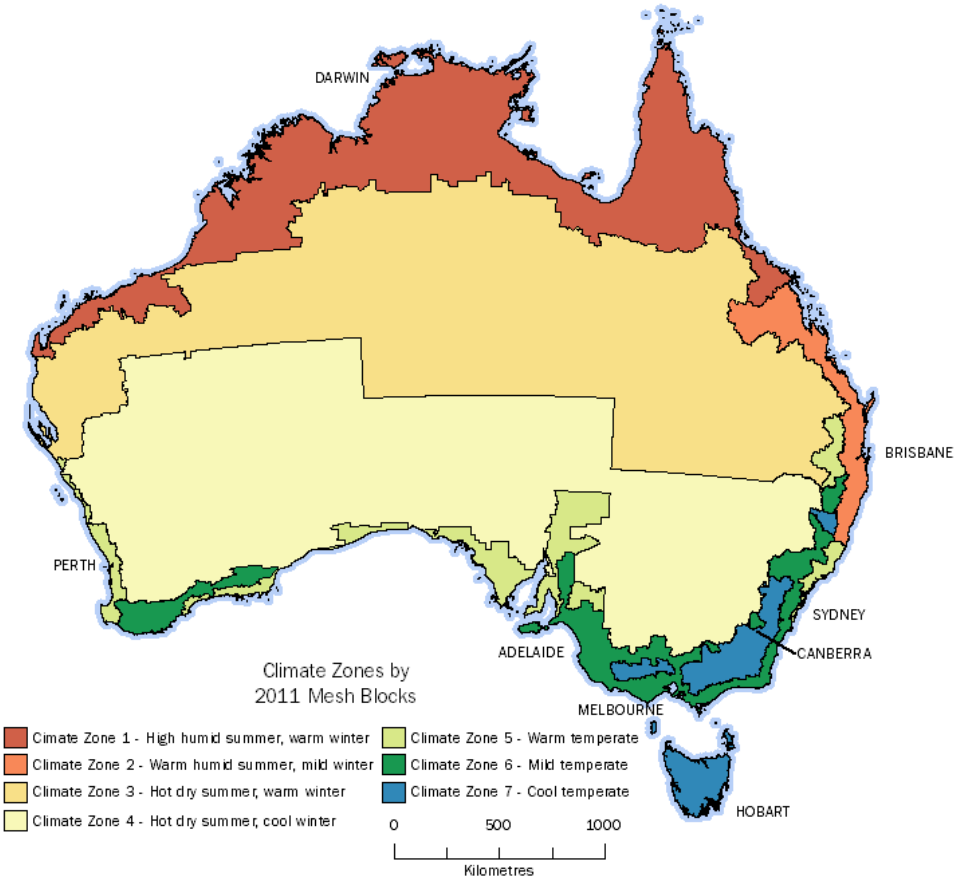
A number of variables are statistically significant. Household income after housing cost (-ve), which represents the households' ability to pay for essential goods and services after paying for mortgage or rents. Households with more dependent children (+ve) were more likely to be at risk of relative utility stress and subjective utility stress. Households with less net wealth also have higher likelihood to be at risk of SEAS, but not objective utility stress. Households that have a higher proportion of their income that comes from government pensions or allowances (+ve) are more likely to encounter energy affordability stress and subjective utility stress. In addition, there is a positive relationship between the number of unemployed members and risk of SEAS and SEAS-2012.

There is a mixed outcome in terms of tenancy types. Outright owners were more likely to be at risk of HBWAS and HBEAS than purchaser - home owners with mortgages, but are less likely to encounter REAS and SEAS. On the other hand, both public and private renters were less likely to encounter water affordability stress and SEAS than purchasers.

When comparing different dwelling characteristics, households living in separate households or semi-detached dwellings are more likely to have utility stress than those living in flats or multi-storey dwellings. Having more bedrooms, which is a proxy for dwelling floor space, is positively related to the likelihood of households experiencing energy affordability stress.

When comparing different family types, aged couple households or aged persons living alone are less likely to encounter HBEAS and SEAS than other family types. However, a single parent with children is found to have higher risk of HBEAS and SEAS than other family types.

**Figure 4.12** Geographical distribution of Climate Zones in HEC 2012




Source: ABS (2013f). *4670.0 - Household Energy Consumption Survey, Australia: Summary of Results, 2012. Climate Zone*, Map.

Importantly, climatic conditions do have a statistically significant effect on whether households were at risk of utility stress. The 2012 HEC survey classified Australia into eight climate zones (Figure 4.12). Climate zones 1 to 8 represent different types of climate and temperature (see ABS 2013f).

When comparing with Zone 5 (warm temperate), results from the logit models show that households in Zone 1 (hot humid summer, warm winter) had a lower risk of RWAS and REAS. Zone 2 (warm humid summer, mild winter) residents had a lower likelihood of encountering both REAS and SEAS. Households

residing in Zone 3/4 (hot dry summer, cool or warm winter) were less likely be in RWAS and SEAS, but had a higher likelihood of HBEAS and REAS. Zone 6 (mild temperate) was where it is most likely that households would encounter objective water and energy affordability stress. Households residing in Zone 7/8 had a higher risk of HBEAS than households in Zone 5. In terms of location, households living in non-metropolitan areas did not have a higher risk of utility stress than households living in cities, except for RWAS.

The HEC 2012 survey recorded households' domestic energy source, heating equipment, and features of energy efficiency in the dwellings. I find that households using dual fuel (both electricity and mains gas) were more likely to encounter REAS. Households using liquefied petroleum gas (LPG) fuel were found to be more at risk of REAS. Having a roof top solar PV system was associated with a statistically significantly reduction in the likelihood of both objective and subjective energy affordability stress. Installing a central heating system, such as ducted gas heating or a reverse cycle heating and cooling system, also reduced the likelihood of REAS. However, having window treatments such as heavy curtains or double-glazing did not significantly reduce the likelihood of either objective or subjective energy affordability stress.

## 4.8 Discussion

### 4.8.1 Trends in utility affordability

This chapter uses various indicators that define and measure utility affordability in Australia between 1988-89 and 2011-12. I find that the average water burden – the ratio of water expenditure to household disposable income – increased during the late 1980s and early 1990s, declined during 2003-04, and increased significantly in the late 2000s and early 2010s. This was contemporaneous with water pricing reform that occurred across many urban water utilities. These reforms included the removal of free water allowances and the introduction of consumption-based pricing. In addition, water restrictions and supply

augmentation investment projects in the late 2000s responded to the severe drought across Australia.

There is substantial variation in trends in water affordability across jurisdictions due to different climatic conditions, different water prices, water consumption needs, and water security strategies introduced by state governments. The average water burden among low-income NT households was highest among all states, above 3 per cent, in 2011-12.

Household' energy affordability has had different trends to water affordability. Real average energy expenditures, both electricity and gas, declined in the 1990s. This corresponded to reduced real energy prices during the early stage of energy sector reform, such as introduction of NCP in 1995 and the establishment of the national electricity and gas markets. Nonetheless, real energy prices have increased since the 2000s and increased sharply in the late 2000s and early 2010s, primarily as a result of higher network capital costs.

Overall, both electricity and gas burdens have increased substantially across all jurisdictions, particularly among low-income households since 2009-10. Low-income Tasmanian households have the highest average electricity burden among all jurisdictions, while low-income ACT households have the highest average gas burden. When including all fuel costs for domestic use, low-income Tasmanian households had the highest energy burden, Victoria came the second highest, and the ACT was the third highest over the last 15 years. High heating costs to accommodate the cold winter climate was the likely contributing factor to high energy burdens among these jurisdictions.

### 4.8.2 Utility affordability indicators

Identifying households with a utility affordability problem and unpacking their demographic characteristics are crucial steps to developing and implementing targeted social policy (Dubois 2012). Similar to housing affordability studies,

most public utility affordability analysis relies on a high burden ratio method (see, for example: Richardson and Travers 2002; Kessides et al. 2009; OECD 2003; Fankhauser and Tepic 2007; Fitch and Price 2002). Recently there has been increasing emphasis on relatively affordability measures (Hills 2012; Nance 2013) and subjective method to identify households in fuel poverty (Price et al. 2012) and housing stress (Temple 2008; Bramley 2012).

A relative utility affordability method is of particular interest because it has been adopted by the UK government as the new fuel poverty indicator to replace the previous 10 per cent expenditure-to-income ratio threshold. The UK indicator is based on modelled fuel expenditure that depends on fuel price, household structure, dwelling characteristics (e.g. floor space and energy efficiency) and climatic conditions where the household is located. Such information is not currently available in Australia and, thus, relative utility affordability in this chapter is based on actual household energy expenditure reported in the ABS HES and HEC 2012.

Different affordability approaches have a mix of strengths and weaknesses that depends on data requirements, complexity, and political influences (Table 4.15). A key purpose of this chapter is to compare the application of these three common affordability indicators: high burden utility stress,; relative utility stress; and subjective utility stress, to analyse the trends in both water and energy affordability in Australia, and to triangulate these measures to identify households in utility stress.

Classifying households using relative indicators yields different results from the traditional burden ratio method. When comparing relative and high burden ratio methods, the trend analysis indicates the strengths and weaknesses of different methods. The absolute burden ratio method is relative easy to apply and to conduct comparison over time and across different places. However the definition requires several arbitrary thresholds - the 40 percentile low income threshold, 3 per cent water affordability benchmark, and 10 per cent energy affordability benchmark - are subject to debate.

**Table 4.15** Strengths and weaknesses of different approaches to measuring affordability

| Approach | Strengths | Weaknesses |
|---|---|---|
| **Burden ratio method** | • relatively easy to apply<br>• easy comparison<br>• reflects market realities in utility prices and household income | • arbitrary benchmark<br>• needs modification to address household structure<br>• need to account for different income after tax and government benefits<br>• does not identify households with under-consumption and may include households who over-consume |
| **Relative Low Income and High Cost (RLIHC) approach** | • consistent with the definition of fuel poverty under the *Warm Homes and Energy Conservation Act 2000*<br>• can replace arbitrary high burden utility benchmark<br>• consistent with 'relative' poverty principle | • excessively complex modelled fuel costs<br>• non-transparent due to energy equivalisation factor<br>• median fuel cost threshold would mask the affordability problem of escalating utility prices<br>• unable to eliminate fuel poverty because there are always 50 per cent of the households below the median thresholds |
| **Residual income method** | • accounts for household's living standards<br>• sensitive to household structure<br>• sensitive to both income and living costs<br>• reflect market realities of utility prices and household income | • more complex to apply<br>• expensive data collection process (price variation of goods and services across regions)<br>• does not address quality and adequacy of services<br>• need to update to account for changing social expectation of acceptable living standards |
| **Potential Affordability Approach** | • avoid inclusion errors or exclusion errors in burden ratio method<br>• accounts for climatic variation and changing social expectations over time and across regions | • complex calculation<br>• arbitrary benchmark of acceptable utility affordability standard |
| **Subjective method** | • identifies households which would be missed in the BR method | • potential stigma that hinders self-identification<br>• subjective to interviewed households |

**Source:** Henman (2012: 10), Saunders et al. (1998), Price *et al.* (2012), Miniaci et al. (2008a), Moore (2012a)

The strengths of the relative method are that it removes the arbitrary affordability threshold that is part of the high burden ratio method, and considers both utility

expenditure and household income in relation to median expenses or median income respectively. A drawback of the relative indicator is that when average water and energy expenditure are low due to lower real utility prices, the relative method would classify those households who have a low utility burden as encountering relative utility stress. By contrast, when utility prices are high, using a relative indicator will exclude those households that actually spent more than the high burden utility affordability benchmarks. Unsurprisingly, considerable differences were found in the headcount indexes between HBWAS and RWAS, and between HBEAS and REAS when there were significant price/expenditure changes. For instance, both HBWAS and HBEAS reduced from 1993-94 to 1998-99, which is consistent with the reduction of water and energy burdens over the same period. However, RWAS and REAS rates increased over the same period. Similarly, there was a reduction in REAS rate among low-income households from 2009-10 to 2011-12 but their average energy burden increased over the same period. Thus, I would contend that the relative affordability method may not be as appropriate as the high burden ratio method in the analysis of trends in utility affordability over time when these trends are affected from utility price changes.

The classification of households in utility stress by the subjective method gives different results from objective affordability indicators, in both high burden and relative methods. Many households that spent more than 3 per cent of their disposable income on water and sewerage expenses, or 10 per cent on domestic energy expenses, did not experience energy-related financial stress, while very few households who have experienced SEAS have spent more than the high burden or relative affordability benchmarks. This discrepancy does not downplay the policy implications of the subjective method, but it does pose a policy dilemma when responding to utility affordability. Problems in paying utility bills is the major subjective utility stress. The majority of the households in SEAS expressed that they were unable to pay for utility bills on time in the last 12 months due to being short of money.

I show that there is an increasing incidence over time of low-income households being unable to keep their home heated (or cooled). A high proportion of low-

income households (for example, 22 per cent in the ACT) chose to restrict heating (or cooling) because they could not afford extra utility costs. Simply relying on utility expenditure and income in an objective affordability indicator might incorrectly exclude these households from being considered at risk of energy affordability stress. My analysis indicates that subjective energy affordability stress has become increasingly common in both low-income households and middle income households from 2009-10 to 2011-12. Using the self-reported method as a supplementary indicator would be a valuable aid to policy development (Price et al. 2012), and would also be useful for validating different affordability indicators and thresholds (Bramley 2012).

Above all, there are potential inclusion errors and exclusion errors in different approaches. My analysis shows the trend in the chosen three major indicators in water and energy affordability in Australia. If more data such as household characteristics, dwelling characteristics, and water and energy efficiency features, were available, modelled required water and sewerage bills and modelled fuel expenditure as a potential affordability approach could overcome the problem of over-spending or under-consumption in households' reported water and energy expenditure data.

### 4.8.3 Utility stress and material hardships

Restricting heating or cooling was one of the strategies applied by many households in utility stress. This corresponds to Chester's (2013) survey finding that low-income households responded that they had tried hard to reduce energy consumption, but their energy expenditure had not reduced. Restricting heating and cooling or going without meals may exacerbate health vulnerability (Chester 2013), increase health costs, or reduce income from causal employments. As reported in the subjective method, other strategies applied by households at risk of utility stress were to shift utility debts to other loan arrangements, seek assistance from family or friends, or sell an asset. These strategies may offer temporary relief from financial stress, but could increase household debts. Furthermore,

households at risk of utility stress also indicated that they could not afford to put fuel in their vehicles or pay car registration or insurance. The trade-off between utility bill payment and transport-related expenses may further reduce economic and employment opportunity for low-income and vulnerable households.

As an essential household service, disconnection of energy services should be treated as the last resort to resolve energy affordability problem under the NECF (AER 2014a, 2014b). The data I use shows that the incidence of receiving disconnection warnings is highly correlated to households in utility stress. This finding corresponds to the increased complaints received by state energy and water ombudsmen arising from credit-related energy disconnection or restriction. For instance, there was a 32 per cent increase in reported cases by utility customers in NSW and 50 per cent increase in Victoria in 2012-13 ( EWON 2014; EWOV 2014) as reported by the AER (AER 2014b). This indicates the importance of developing an inclusive, compassionate, and proactive energy customer hardship policy to reduce the likelihood of energy disconnections.

Community welfare organisations (CWO), or non-governmental organisation (NGO) could play a significant role in responding to utility affordability problems. Some households at risk of utility stress already seek assistance from welfare agencies. Currently, the NSW government provides Energy Accounts Payment Assistance vouchers, the Victorian government operates the Utility Relief Grant Scheme (URGS), and the WA government provides a Hardship Utilities Grant Scheme via NGO. In these schemes, utility payment vouchers are provided to assist people in short term financial crisis or emergencies to pay their energy bills. Eligibility is assessed by NGO on case-by-case basis. Given that low-income households living in the ACT and Tasmania have a higher incidence of energy affordability stress, and low-income households residing in the NT have a higher rate of water affordability stress, special considerations of affordability may be required in these jurisdictions.

## 4.9 Policy implications and conclusions

In this chapter, I applied three methods to analyse the trends in water and energy affordability in Australia between 1988-89 and 2011-12. Although the burden ratio method has been criticised for its arbitrary affordability threshold, it remains the most useful objective indicator to review the trends in utility affordability over time. Relative affordability indicators have been adopted in the new *UK Fuel Poverty Strategy*. Nonetheless, my analysis shows that households may be incorrectly included or excluded as having an affordability problem because changing utility prices will shift the median affordability thresholds. On the other hand, using the subjective method shows that energy affordability is a multi-dimensional problem faced by low-income households. They may choose to restrict heating and cooling, enter into other loan arrangements, or be unable to afford to pay for other essential services that reduce their economic opportunity. The comparative analysis show that these three affordability indicators provide alternative perspectives of the utility affordability problem and have different strengths and weaknesses.

My analysis reveals that some household characteristics are more prevalent in utility stress. Single parents with dependent children and households rely in government pensions and allowances as the main income sources are at high risk of objective and subjective energy affordability stress. In addition, it is found that renters would have higher risk of HBEAS, while purchasers would have a higher risk of SEAS. The findings suggest that these groups need to be targeted for receiving extra assistance to deal with both the causes and symptoms of utility stress and hardships. It could be worthwhile to review whether current levels of target assistance are adequate, efficient, and equitable to provide support these vulnerable groups.

Improving home energy efficiency can effectively reduce domestic energy consumption, and thus causes of utility stress. In the recent years, households seems to be more aware of energy efficiency. The data shows that almost 71 per cent of households had home insulation, 60 per cent had undertaken window

treatment in 2011-12. Additionally, ownership of a solar power system and having more efficient central heating systems installed were identified to be the major indicators of reduced energy stress vulnerability. However, the analysis found that 20 per cent of home owners have solar power installed versus 3 per cent of renters. Similarly, almost 40 per cent of home owners have a central heating system installed, but only 20 per cent of renters have central heating. Contrary to Wood et al. (2012), my findings highlight that split-incentives and energy gaps between owners and renters in terms of energy expenditures may have widened in the past five years. Given that Australia is facing falling electricity demand and rising electricity prices (Wood and Carter 2013a), it is important to develop targeted social policies and targeted energy efficiency schemes (discussed in Chapter 2) to reverse an increasing energy affordability gap between rich and poor households (Gillingham et al. 2012; Wilkerson 2012).

Finally, the results suggest that there is a strong correlation between risk of utility stress and risk of facing housing stress, other financial stress and material hardship, and having both low income and low net worth – low economic resource. Thus, to effectively tackle utility stress requires the consideration of the overall social policy landscape and ensure assistance are targeted to those most in need.

## Appendix 4.1 Key variables from HES and HEC 2012 surveys CURF datasets

| Key variables | Variable name in HES and HEC surveys |
|---|---|
| **weekly water rates payment** | *RATESWCH* |
| **weekly expenditure on domestic energy** | *EXP02* in HES and *TOTEXP* in HEC 2012 |
| **weekly expenditure on electricity** | expenditure item 0201010101 in HES and *ELECPAY* in HEC 2012 |
| **weekly expenditure on mains gas** | expenditure item 0201010201 in HES and *TOTGAS* in HEC 2012 |
| **weekly disposable household income** | *DISPSCH* |
| **weekly housing costs** | *EXP01* in HES data and *HCOSTSH* in HEC 2012 |
| **weekly total household expenditure** | *EXPTL* in HES data, not available in HEC 2012 |
| **Household equivalising factor** | *EQUIVH* |

# Chapter 5

# The efficiency and effectiveness of state water and energy concession schemes: a Victorian case study

## 5.1 Introduction

Water and energy affordability is an increasingly important issue in Australia. Over the last fifteen years, urban water prices and energy prices in major Australian cities have increased by 60 per cent and 80 per cent in real terms respectively. The number and proportion of households reported to have utility debts and hardship has increased substantially (AER 2014b). As a result of public utility reform over the three decades, price-based policy is no longer the preferred option to respond to utility affordability problems.

There are a number of policies and programs to address water and energy affordability in the contemporary policy settings, as described in Chapter 2. Above all, targeted assistance, such as concessions on water and energy services provided by state and territory governments (i.e. state utility concessions), are regarded as one of the main social policy instruments to respond to utility affordability in Australia (PC 2011a; AEO, ERAA, ACOSS 2013). This leads to the question of whether the current state concession scheme is an efficient and effective policy instrument to address the problem.

At present, state concessions are one of the major state expenditures apart from government funded housing, education, and health services. Total expenditure on state concessions was estimated at AU$1.7 billion in 2005-06 across all state and territory governments (AIHW 2007: 30-31). The majority of state concessions are

funded by state and territory governments, but since 2003 the Commonwealth Government also contributes to the concession expenditures to pensioners through the *National Partnership Agreement on Certain Concessions for Pensioner Concession Card and Seniors Card Holders* (NPA) (COAG 2013). Consequently, in most cases, Commonwealth concession cards are used as the screening mechanism for state concessions including concession rebates on water and energy services.

To date, numerous reviews have concluded that many state concessions, on various goods and services, including water and energy services, are inefficient, inconsistent and inequitable (PC 2011a; Henry 2009; Deloitte 2013; ACOSS 2014). In addition, relying on Commonwealth concession cards as the targeting mechanism may leave some vulnerable households unassisted under the current state concession schemes (Deloitte 2013). Under the trends of population ageing in Australia, the fiscal sustainability of the federal and state welfare systems is being questioned in public policy debate (Hockey 2014; McClure et al. 2014).

The aim of this chapter is to evaluate the efficiency and effectiveness of the state water and energy concession scheme approach using data from the State of Victoria, Australia. By using data from the Victorian Household Utility Consumption and Expenditure Survey in 2007, I apply a Low Income and High Burden (LIHB) approach to identify households that are at risk of utility stress (see Chapter Four). Overall, I find that the Victorian utility concession scheme has achieved highly successful targeting rates, but also has high inclusion error rates. As a result, only a quarter of the concession expenditures were efficiently allocated. I show that removing inefficiencies and redirecting funding to those in need could generate large savings for the state concession budget. I also show the potential gains to be realised in the efficiency and effectiveness of state water and energy concession policies, specifically, for addressing households' utility affordability. The framework that I have developed can be adapted to other targeted assistance to address affordability problems.

The plan of this chapter is as follows. Section 5.2 describes the role of state concession systems in Australia and in Victorian urban water and energy markets in recent years. Section 5.3 discusses the concept of social welfare targeting. Theoretical analytical frameworks are discussed in Section 5.4. In the next two sections, I present the data and the results of the analysis. Section 5.7 discusses the implications of the various targeting analyses described.

## 5.2 Context

### 5.2.1 Tariff based measure and targeted welfare

There are two common approaches to assisting households with water and energy affordability: (i) tariff-based measures; and (ii) targeted welfare assistance (OECD 2003). Komives et al. (2005: 8) regarded tariff-based measures as consumer utility subsidies, which are defined as 'subsidies that result in some or all residential consumers paying less than the cost of the electricity, water, or sanitation services that they receive'. By contrast, targeted welfare is an assisted payment delivered outside public utility tariff design and decisions.

#### *Tariff-based measure*

The typology of different types of customer utility subsidies is summarised in Table 5.1. In a tariff-based measure, it is sub-divided into untargeted subsidies and targeted subsidies. Provision of untargeted subsidies is usually possible through industry-based subsidies through fiscal transfers, guarantees, and concession credit. In this case, public utility businesses such as water and energy retailers are obliged to provide affordable water and energy services.

**Table 5.1** Typology of consumer utility subsidies

| Type | Sub-class | Who benefits? |
|---|---|---|
| ***Tariff-based measures/untargeted subsidies*** | | |
| | • across the board price subsidies to all consumers, particularly by subsidies to utilities via fiscal transfers | All customers |
| | • charging for variable charge but not fixed charge | All customers |
| | • no connection fee | All new customers |
| | • post stamp pricing: subsidised interest rate via financing connection fee for new development | All new customers |
| ***Implicit targeting subsidies*** | | |
| | • flat fee for connection | New customers |
| | • low connection rate with no disconnection policy | Consumers who do not pay bills |
| | • illegal connections | Consumers who do not pay bills |
| | • flat fee for unmetered connections | High volume users |
| | • combined water and sewerage tariffs | Depends on usage |
| | • single volumetric charge with cross-subsidisation between customer classes | High cost customers |
| **(Explicit) Targeted subsidies** | | |
| ***Quantity targeting:*** | • increasing block tariff | Low volume users |
| | • volume-differential tariffs | Depends on consumption and tariff design |
| ***Service level targeting:*** | • free water at public water taps | Public tap users |
| | • low rates for low voltage electricity service | Low voltage household users |
| | • reduced connection fee for lower service levels | Households that choose low service levels |
| ***Administrative selection:*** | • geographically differentiated tariff | Depends on location |
| | • social tariffs | Customers identified as poor |
| | • merit discount and discounts for pensioners | Qualifying pensioner customers |
| | • burden limit cash transfers | Households whose utility burden exceeds a defined burden limit |
| | • social connections | Households identified as poor |

Source: Adapted from Komive et al. (2005: 9)

There are a variety of ways to provide untargeted subsidies. For instance, a free water or energy allowance or social tariff, are common in utility tariff design for the purpose of equity and poverty alleviation. Implicit target subsidies are chosen due to their lower administrative costs, where water or energy services are unmetered, where is difficult to enforce policy and monitoring, or where a comprehensive social welfare system is not in place. Explicit targeted subsidies are, typically, administered through bill reduction through discounts on connection charges, reduced consumption charges, or provision of income to a specific group of customers.

In Australia, a mixed approach of utility subsidies have been applied to ensure household water and energy affordability. A common form of utility subsidy is postage stamp pricing, also called a Uniform Tariff Policy, which is commonly applied in the urban water sector (NWC 2014) and the rural energy sector (WA Department of Finance 2015). This means households in locations where there is a high marginal cost of delivering water or energy services pay a lower price, through cross-subsidisation by households where the marginal cost of supply is relatively low.

An IBT is commonly applied by most domestic water and energy retailers across major Australia cities (NWC 2011a). IBT has been regarded as the best pricing mechanism to balance social equity, achieve economic efficiency, and to achieve financial sustainability for public utilities (Agthe and Billings 1987). More recent economic research has criticised IBT as unfair to large and low-income families (Sibly 2006a, 2006b; Whittington 2003). To respond to efficiency concerns, targeted assistance, rather than IBT, is recommended to address utility affordability concerns of low-income households (PC 2011a; Whittington 2003).

### *Targeted welfare*

From a vertical equity perspective, targeted welfare, such as using explicit targeted subsidies or income transfers, is considered to be more equitable and economically efficient than indirect or universal measures (Dutrey 2007). There are a large number of literature on targeted income maintenance or income transfers policies (examples see OECD 1976; Mitchell 1991; Hill 2000). There has been a rapid expansion of income maintenance expenditure (or targeting social spending) in the OECD countries after World War II. By the early 1970s, expenditure on income maintenance programs accounted for 8.5 per cent of GDP among OECD countries (OECD 1976: 18). There were diversity of targeted social programs, but the four major areas were old age pensions, child allowances, unemployment benefits, and sickness cash benefits. The majority of the OECD countries collected social security taxes to finance social program while other countries, such as Australia and New Zealand, fund the income maintenance and health expenditure from general revenue. In 1997, the social spending in the European Union accounted for 44.7 per cent of total government spending (Hill 2000: xi). Mitchell (1991) provides a detailed comparative analysis on the impact of social security and taxation policies on poverty and inequality in ten OECD countries, including Australia. In 2008, with the comprehensive review of the Australia's tax system, the Henry review noted that architecture of the Australia system has differed from those in other OECD countries due to the highly complex and deep integration between the targeted welfare and the taxation system (Henry 2008).

The Australia's system provided targeted assistance to the poor by two ways - the provision of income with means testing, and through the very low direct taxes on the poor households (Whiteford 2010). The integration of the national welfare system and the taxation system is intended to enhance equity and efficient targeting (Henry 2009). The Australia's welfare policy has a multi-level and complex welfare system to provide welfare to low-income and vulnerable households (McClure et al. 2014; Henry 2009; Harmer 2009). At the national level, Australia has a highly targeted tax and transfer system (Whiteford 2010).

The purpose of the national welfare system is to alleviate poverty and to protect those who are permanently or temporary unable to participate in the workforce (Herscovitch and Stanton 2008; Stewart et al. 2015; Podger et al. 2014). Income support payments are specifically targeted at certain groups, such as older people, people with disabilities, the unemployed, students, and low-income families with children (McClure et al. 2014; Whiteford and Angenent 2001). Eligibility for government benefits, and rates of payment, are subject to means-testing, (i.e. household income and assets) and household characteristics and individual circumstances. In addition to the basic income support payments, supplementary payments such as Utility Allowance, Pension Supplement, Seniors Supplement, Essential Medical Equipment Payment, and other energy related supplements, are provided to assist with the cost of living associated with rising utility costs. These measures are discussed in Chapter Two.

All state and territory governments provide various types of concessions and rebates, including water and energy concessions, to assist with the essential costs of living for eligible households. Water and energy concessions are primarily funded by state and territory governments, but a rebate service is delivered by utility businesses under their CSOs. Given the large increase in water and energy prices in recent years, provision of state utility concessions is regarded as the major social policy instrument to address water and energy affordability among low-income households (ACOSS 2014; Deloitte 2013; AEO, ERAA and ACOSS 2013). Although there is variation in terms of the eligibility criteria across jurisdictions, possession of a Commonwealth concession card is the major screening mechanism to access concession. I refer to this as category-based targeting.

Given that the household utility affordability problem is multi-dimensional (Chapter Four), using concession card eligibility as a selection criteria may not deliver well targeted outcomes. Recent reviews have found that the current category-based state concession schemes can result in inequity, inadequacy, and inefficiency (Deloitte 2013; ACOSS 2014; Johnston 2013a, 2013b; PC 2011a). Furthermore, there is a concern around fiscal sustainability of the current welfare

system as the result of an ageing population. Almost 75 per cent of old age Australians receive at least some social security payments, typically in the form of Age Pensions (Bradbury 2010: p.3). With an ageing population, the cost of the Age Pension and associated concession benefits will grow. The purpose of this chapter is to analyse the efficiency and effectiveness of category-based concessions to target households in utility stress prior to concession rebates. The Victorian government's utility concession scheme is used as case study and was selected because of data availability at the time of study.

### 5.2.2 Urban water and energy sectors in Victoria

Both the urban water and energy sectors in Victoria are well advanced in market-based public utility reform in Australia (Chapter Two). Structural reform occurred in the urban water sector, resulting in vertical and horizontal separation in 1994, when a single wholesale water company (Melbourne Water) and three retailer-distributors (Yarra Valley Water, City West Water, and South East Water) were established. The three water retailers provide water and sewerage services in different geographical locations in the Melbourne metropolitan area. In regional Victoria, as of 2013-14, there were 13 utility businesses providing water, sewerage and stormwater services (NWC 2014). All water utilities in Victoria are state-owned corporations.

Pricing for water and sewerage services varies across different urban water retailers in Victoria (NWC 2014). Water and sewerage tariffs are regulated by an independent state economic regulator – the Essential Services Commission (Victoria) (ESCV). To respond to the prolonged drought during the 2000s, the Victoria government implemented a water security strategy, which included mandatory water rationing, water conservation projects, and a rainwater tank rebate program to encourage households to install rainwater tanks at their homes. In addition, several supply augmentation capital upgrade projects, such as the Victorian Desalination Plant and the North-South Pipeline (also known as the Sugarloaf Pipeline) have been started to diversify water supply from different

sources. All these strategies have contributed to higher water prices. According to the ABS (2013a), the real water price index increased by 70 per cent in Victoria from 1988 to 2013. Despite a decline in average household water consumption, the average household water and sewerage bill has increased in most jurisdictions in Australia (NWC 2014).

In Victoria, full energy retail contestability was introduced in both electricity and gas markets in 2002. Prior to full competition, three incumbent retailers, AGL, Origin Energy and TRUenergy (later called EnergyAustralia), provided services to designated geographical regions. In 2012, there were 12 electricity retailers and seven natural gas retailers operating and competing across Victoria (ESCV 2012b). Nonetheless, the 'big three' incumbent energy retailers still retain more than 70 per cent of the market share in the domestic electricity and gas market in 2012-13 (ESCV 2012b; AER 2014b).

The function of the state government in regulating energy tariffs has been gradually removed since tariff deregulation. In the initial stage of retail competition, the ESCV retained the function of regulating household electricity and gas tariffs, which it called ‘regulated offers'. Concurrently, households could choose between regulated offers or ‘market offers’ – established tailored market contracts with energy retailers. In 2009, price regulation of Victorian energy markets was removed. Thus, ESCV no longer regulates energy tariffs. In addition, time-of-use pricing and flexible pricing have been introduced in residential energy pricing as a demand side management strategy in 2013 (ESCV 2013b).

Corresponding with the energy market reform, the Victorian government has introduced several measures to empower energy customers. For instance, the Victorian government introduced a mandatory smart metering rollout in 2009 as a measure to assist customers to manage their energy consumption. Nonetheless, the cost of smart metering is paid as part of residential energy prices. The smart metering fee is to recover the cost associated with the significant investment in metering infrastructure and new technology. It is estimated that the total costs of smart metering project was over $2 billion during 2009-2015 (AER 2014d).

Despite energy market reform and retail competition in Victoria, the real electricity price and real gas price have increased more than 70 per cent and 50 per cent respectively over the last 15 years. Overall, energy market reform has changed Victorian energy affordability strategy from a tariff-based approach towards a market-based approach (that is, it is the responsibility of energy customers) along with targeted welfare (that is, via income support and state energy concessions).

### 5.2.3 Victorian water and energy concessions

Provision of water and energy concessions is part of the Victorian government's strategy to address disadvantage and improve the affordability of essential services among low-income Victorians. Incremental reforms have already occurred in the Victorian concession schemes. Key policy documents that underpin concessions and hardship programs are *Growing Victoria Together* and *A Fairer Victoria* in 2001 and 2005, and the *State Concession Act 2004* (Vic DHS 2007a). According to the Act, the Minister is empowered 'to specify the structure and level of available concessions by Ministerial Order' (Vic DHS 2007a: 4).

In Victoria, the provision of water and energy concessions is administrated by the Department of Human Services (DHS) while water and energy rebate services are delivered by retailed water and energy businesses as household utility bill reductions. Eligible recipients are Commonwealth concession card holders, who hold a Pensioner Concession Card, a DVA Gold Card, or a Low Income Health Care Card. Eligibility for these concession cards and the required means tests are detailed in McClure et al. (2014). In 2012, over 1.3 million Victorians (approximately a quarter of all Victorians) held one or more concession cards and were eligible for state energy and/or water concessions (Vic DHS 2013a: 9). The water and energy utility concession schemes, excluding administrative costs, accounted for AU$350 million of Victorian state government expenditure in 2012 (VicDHS 2013a).

**Table 5.2** Types of water and energy concessions in Victoria, 2013-14

| Concession types | Entitlement |
|---|---|
| **Water concessions** | |
| Water concession | 50% of the total bill capped at AU$283.90 for customers with water and sewerage services |
| Life support concession | A discount the cost of 168 kL of water used each year |
| Non-main water concession | Rebate is AU$108 in 2014-15, to assist cardholders who are not connected to mains water with the costs of purchasing non-mains water for domestic usage |
| **Energy concessions** | |
| Annual electricity concessions | 17.5% discount off electricity bill (excl. AU$171.60) to max. AU$2763 per year<br><br>Excess Gas Concession – 17.5% discount after reaching AU$1462 cap in WGC |
| Winter Gas Concession (WGC) | 17.5% discount off mains gas bills during winter period (1 May to 31 Oct) to max. AU$1462 (excl. $62.4) |
| Service to Property Concession | Reduction of supply charge to the same price as the electricity usage cost |
| Non-Mains Energy Concession | Various rebate amount to max cap AU$484 |
| Medical Cooling Concession | 17.5% discount on summer electricity costs for family member with medical conditions<br><br>Controlled Load Electricity Concession – 13% discount of controlled load usage charge |
| Life Support Concession | discount the cost of 1,880 kW hours of electricity per year |
| Electricity Transfer Fee Waiver | 50% of the total bill capped at AU$141.90 for customers with a single service |
| Excess Electricity Concession | 17.5% discount after AU$2763 cap on AEC (introduced in July 2014) |
| Excess Gas Concession | 17.5% discount after AU$1462 cap on WGC (introduced in May 2014) |

Source: Vic DHS (2014)

Among all state and territory governments, the Victoria government offers the most comprehensive water and energy concessions to target vulnerable groups under different circumstances. Table 5.2 summarises the types of water and energy concessions available in Victoria. For water concessions, eligible households can receive a 50 per cent discount on quarterly water and sewerage bills up to a maximum cap (AU$283.9 in 2013-14). The annual cap is based on concession reform in 2004 (the *Securing Our Water Future Together Reforms*) that specified an annual cap of AU$135 in 2003-04 and is adjusted with inflation on an annual basis (Vic DHS 2005). In addition, Life Support Water Concessions offer a quarterly water bill discount to eligible households with members who use haemodialysis machines.

In addition, a wide range of energy concessions were offered by the Victorian DHS in 2013-14 (Table 5.2). These include seasonal based concessions (that is, the Winter Gas Concession (WGC)), medical related concessions (such as, the Medical Cooling Concession and Life Support Concession), assistance for low usage households (the Service to Property Concession), and assistance with connection fees (such as the Electricity Transfers Fee Waiver). Other jurisdictions have gradually introduced medical cooling and life support related water and energy concessions in recent years.

A few incremental changes have occurred within Victorian energy concessions over time. Prior to 2011, the main energy concession was the WEC, a 17.5 per cent discount off winter electricity and gas bills, provided to eligible households. The Annual Electricity Concession (AEC) and the WGC were introduced in 2011 to replace WEC. The AEC, which provides a 17.5 per cent discount off household's electricity bills, accounted for 64 per cent of the energy concession expenditure in 2011-12. The WGC, which is a 17.5 per cent discount off winter gas bills during May and October, accounted for 26 per cent of the energy concession expenditure in 2011-12 (Vic DHS 2007a; 2012). These changes extended concession assistance from the winter period to all year round.

In 2013, in response to new Commonwealth Government carbon pricing policy, there was a change in the Victorian energy concessions to prevent eligible households from being compensated by both state energy concessions and the Commonwealth Government's carbon tax compensation for the same expenses (Vic DHS 2013a). Further change was implemented in December 2013 'to address fraud and misuse of' AEC and WGC (Vic DHS 2013a). The new concession policy requires eligible households whose annual energy bills exceed the stated energy bill thresholds to further apply for another concession – the Excess Electricity Concession and the Excess Gas Concession – in order to continue to receive the 17.5 per cent discount on energy expenditure. Recipients who also receive Life Support Concession and/or Medical Cooling Concession are exempt. Johnston (2013c) has argued that these policy changes and red tape could increase the barriers for low-income households to access energy concessions.

In 2011-12, about 0.67 million Victorian households received water concessions with a total value of AU$145 million (Table 5.3). The total expenditures for energy concessions were AU$210 million, and more than 0.8 million Victorian households received at least one type of energy concession. As a whole, more than a third of Victorian households receive water and/or energy concessions. Given its importance in state government expenses and the proportion of benefitted households, it is surprising that the efficiency and effectiveness of the concession scheme remains largely unstudied.

**Table 5.3** Water and energy concessions outputs and expenditures in Victoria, 2011-12

| Concession | No. of beneficial households | Total expenditure (AU$) | Average value (AU$ per household) |
|---|---|---|---|
| ***Water concession*** | | | |
| Water and sewerage | 669,263 | $144,359,649 | $215.70 |
| Life support - water | 522 | $99,119 | $189.88 |
| Non-main water | 1334 | $199,855 | $149.82 |
| **Total** | **-** | **$144,658,623** | **-** |
| | | | |
| ***Energy concession*** | | | |
| Annual electricity | 852,404 | $135,394,749 | $158.84 |
| Life support - electricity | 3,925 | $1,374,704 | $350.24 |
| Medical cooling | 7,855 | $576,067 | $73.34 |
| Off peak | 179,046 | $8,467,160 | $47.29 |
| Service to property | 64,526 | $5,667,969 | $87.84 |
| Transfer fee | 35,236 | $866,781 | $24.60 |
| Winter energy concession for gas | 558,156 | $54,157,425 | $97.03 |
| Non-mains energy | 23,997 | $4,092,691 | $170.55 |
| **Total** | **-** | **$210,597,546** | **-** |

Source: Vic DHS (2013a: p.12)

## 5.3 Concepts of social policy targeting

### 5.3.1 Universal welfare versus targeting welfare

Targeting design in social welfare programs has been favoured by policy makers both internationally and within Australia. Targeting allows for social spending to be more efficiently allocated to those poor who needs assistance than through

universal welfare (Gelbach and Pritchett 1997). Universal welfare is classified as broad targeting (Van de Walle 1998), which implies that social benefits are provided to both rich and poor. Government funding for the provision of free health and education services are popular examples of universal welfare. By contrast, narrow targeting refers to the case where only certain types of people – those who are in most need and require assistance – are eligible to receive the targeted social benefits (Van de Walle 1998). In general, proxies are used to identify the deserving target recipients, such as geographic locations, household income, age, health conditions, or level of disability.

In the case of addressing water and energy affordability, using tariff-based policy such as subsidised a social tariff or IBT design is viewed as a broad targeting approach. On the other hand, using Commonwealth concession cards as selectivity mechanism to access a variety of Commonwealth and state and territory governments' concessions benefits is a kind of narrow targeting approach. In principle, applying narrow targeting can redistribute resources towards those most in need and support vertical equity.

The concept and design of targeting welfare are frequently revisited in both Australia and internationally (e.g. Saunders 1991a; Bradbury 2004; Coady et al. 2004; Dutrey 2007; Shuck and Zeckhauser 2006; van de Walle 1998; Mitchell et al. 1994). Van de Walle (1998) argues that narrow targeting may not always be more cost effective. The reason is that narrow targeting often incurs hidden costs while broad targeting may have indirect long term benefits. Hidden costs in narrow targeting include administrative costs, transaction costs, and political costs. Political costs, such as dealing with rent-seeking behaviour and picking winners and losers in policy changes, can be complex, costly, and inefficient (Mkandawire 2005; Gelbach and Pritchett 1997).

In addition, many targeting welfare programs require target recipients to self-identify themselves to participate in the social programs and require them to go through application and verification processes. This self-selection process and red tape creates stigma and increases transaction costs for potential recipients to take

up the intended welfare benefits. It has been recorded in Australia that the effect of stigma has discouraged disadvantaged individuals or households from using concession cards (Baker 2010, 2011). By contrast, universal welfare or broad targeting may have positive spill-over effects and long term benefits such as improved public health and social wellbeing. If these hidden costs and hidden benefits were considered, Gelbach and Pritchett (1997) and Van de Walle (1998) contend that, in some cases, narrow targeting may not necessary deliver more effective outcomes nor redistribute more resources towards the poor.

### 5.3.2 Welfare targeting in Australia

Targeting welfare raises the question of who are the target group, or the 'lucky ones'? The concept of 'selectivity' is different from 'targeting' (Saunders 1991a). In targeting welfare, various proxies are used to represent the characteristics of the target group. Geographic location, age, employment status, types of disability, and household income, are commonly used as selectivity mechanisms and the eligibility criteria change over time. For instance, in the May 2014 budget, the Australian Government announced its intention to increase the age threshold for age pension eligibility and to restrict further means testing for various income support payments (The Treasury 2014). These policy changes are introduced in response to budget constraints and the policy cycle (Everett 2003; Howlett et al. 2003).

Among OECD countries, the Australian social welfare system is regarded as one of the most efficient and egalitarian systems (Whiteford 2010). Australia is classified as a dual welfare state because the social security system is highly integrated with the taxation system (Stebbing and Spies-Butcher 2010). The Australian tax-transfer system is highly complex because all three layers of government (federal, state, and local) provide various types of income supports and welfare services. In addition, the administration, welfare funding, and service delivery cut across multiple layers of government and multiple agencies (Henry 2009). Pierson (1995) has referred to it as a fragmented welfare state. He also

notes that the design and delivery of state level welfare is highly sensitive to federal government policies and political incentives.

The Australian welfare system is highly selective, incorporating the use of means testing (Saunders 1991a). Means testing and payment rates are the main instruments to ensure that income supports are given to those in most need. A means test is a selectivity mechanism to determine whether an individual or family is eligible for government assistance and eligible for the Commonwealth concession cards (see DHS 2015f; McClure et al. 2014). In Australia, gross family income and asset holdings are commonly used to assess eligibility for various government income support payments, in addition to citizenship and residency status (DHS 2015f). Additional conditions are occasionally included, such as age requirement to access Age Pensions, employment or study requirement to access Child Care Rebate (CCR), and work activities test to access unemployment benefits (such as Newstart Allowance). Typically, payment rates are reduced when household income increases.

The Australian income support system is one of the most selective among developed countries. Nonetheless, a more selective system does not necessary improve targeting nor equity outcomes (Saunders 1991a). Recent reviews of the Australian social welfare system suggests that inconsistency and inequity exists in the current means testing approach and government benefits among different individuals or households who have similar economic resources (Henry 2009: 489; McClure et al. 2014: 45).

In Australia's federal constitution structure, provision of energy and water concessions is regarded as part of state responsibility (or 'state transfers' described in Henry 2009). Nevertheless, eligibility for state concessions often relies on meeting eligibility tests for various types of concession cards (such as the Pensioner Concession Card, DVA Gold Card, and Health Care Card issued by the Commonwealth Government. Although this screening mechanism can reduce administrative costs for state welfare agencies, it has a number of drawbacks such

as complexity, inequity, inefficiency due to distorting price signals to consumers, and disincentives to increase work income (Henry 2009: F6-2; PC 2011).

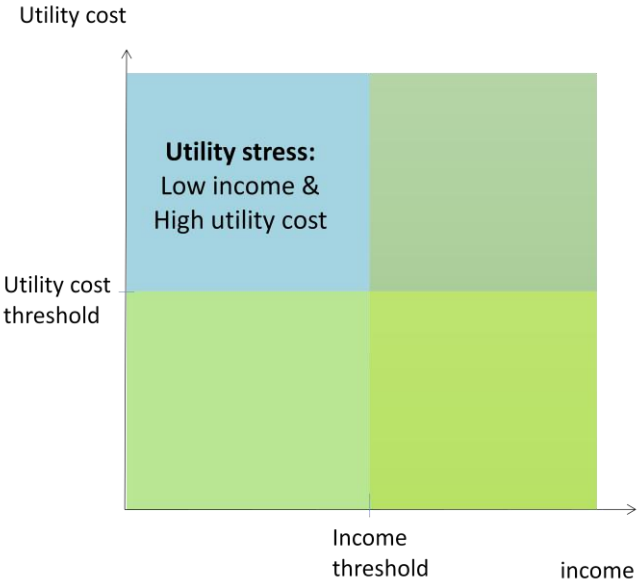
## 5.4 Analytical frameworks

I apply a three stage analysis to evaluate the efficiency and effectiveness of the Victorian state energy and water concession policies. The first stage begins with an identification process which determines those households which are at risk of high burden utility stress and require targeted assistance. In the second stage, I measure the target efficiency and effectiveness of the current concession system. Finally, I modify the Beckerman model used in poverty targeting (Beckerman 1979) to evaluate the expenditure efficiency of the Victorian water and energy concession schemes.

### 5.4.1 Identification process

An affordability analysis was applied to identify which households are at risk of energy and water affordability problems. I adopted the Low Income and High Burden (LIHB) approach, which is commonly applied in housing affordability analysis, in this analysis (Figure 5.1). The purpose of the LIHB method is to identify households that have both a low income and an excessive utility burden. Excessive utility burden is defined here as when the household utility expenditure-to-income ratio exceeds a nominated threshold.

**Figure 5.1** Low Income and High Burden (LIHB) approach in Victorian case study




Source: Modified from Hills (2011: 18)

The Relative Low Income and High Cost (RLIHC) approach, which is used in the recent *UK Fuel Poverty Strategy*, is not adopted due to data limitations. In the RLIHC approach, instead of using real energy expenses, fuel costs are used to model the energy cost required to achieve adequate warmth in winter (i.e. 21$^{o}$ C in bedrooms and 18$^{o}$ C in living area) for a particular household. Modelled energy cost is derived from household composition, dwelling space, energy and thermal efficiency of housing stocks, and climatic locations where the household resides (Hills 2012). This approach requires comprehensive household data.

Recently, Nance (2013) adapted the Hill's approach to analyse relative energy poverty in Australia based on real energy expenditure reported in the 2009-10 ABS HES. Energy expenditure data reported in the HES is estimated as weekly out of pocket expenditure reported by the households. Unfortunately, state utility concession information, such as which households have received water and energy rebates, when and how much, was not available in the HES survey data.

In my study, I define households that are at risk of high burden utility stress (i.e. water, energy, or overall utility) based on two conditions: (i) their pre-concession affordability burden ratios ($r^U{}_h$) have exceeded the affordability thresholds ($r^U$*); and (ii) their household incomes fall within the bottom two quintiles of income distribution among the Victorian population (see equation 5.1). With these two conditions, non-poor households that had over-consumed water and energy services would be excluded from misclassification as experiencing affordability stress. Only low-income households that had an excessive utility burden (i.e. $HBUS^U{}_h$ =1) were identified to be the targeted concession recipients.

$$UAS^{U}{}_{h} = \begin{cases} 1 \text{ if } (r^U{}_h > r^{U*}) \text{ and } (Y^h < Y_{pc40}) \\ 0 \text{ otherwise} \end{cases} \qquad (5.1)$$

The choice of a utility affordability benchmark is arbitrary. In my study, I utilise the common applied utility affordability thresholds in international literature. A three per cent benchmark is adopted as the water affordability threshold (Sawkins and Dickie 2005; Fankhauser and Tepic 2007; Smets 2009), while a ten per cent benchmark is employed as the energy affordability threshold (Fankhauser and Tepic 2007; Boardman 1991; Hills 2012), and thus, a thirteen per cent benchmark is used as the total water and energy utility affordability threshold.

There is no agreed income threshold to distinguish poor and non-poor households in the poverty literature (Whiteford 1997a, 1997b). Poverty lines are commonly defined as half the median income based on the relative poverty principle (DFCS 2003; Harding and Mitchell 1992). Alternatively, using a budget standard approach, a price adjusted Henderson Poverty Line is available in Australia (Johnson 1987, 1996). Similarly to housing and food expenses, water and energy expenses are regarded as essential costs of living. Consequently, I adopted the 40th percentile income threshold in my study and which is commonly applied in housing affordability literature (Harding et al. 2004; Nepal et al. 2010).

To compare household incomes fairly within the Victorian population, the income variable was adjusted to account for income tax, government benefits, household size, and number of children. A fair comparison of household income needs to consider different economic resources required to achieve the same living standard across different family compositions. The equivalisation scale is used to adjust household income to account for the extra resources required for additional household members and number of children. Commonly used equivalisation scales include the OECD scale, the OECD modified scale, and the square root scale (Whiteford 1985; Lancaster and Ray 2007; Gray and Stanton 2010). The OECD modified scale was applied as the equivalisation scale for household structure which is consistent with the ABS HES. In the OECD modified scale, the first adult is assigned with a value of 1, then 0.5 for each additional adult, and 0.3 for each child under the age of 16.

**Table 5.4** Defining utility stress in the Victorian case study

| Type of affordability stress | Definitions |
|---|---|
| **High Burden Water Affordability Stress (HBWAS)** | Household's water expenditure-to-disposable income ratio exceeds 3 per cent and income is below 40 per cent of the income distribution |
| **High Burden Energy Affordability Stress (HBEAS)** | Household's energy expenditure-to-disposable income ratio exceeds 10 per cent and income is below 40 per cent of the income distribution |
| **High Burden Utility Affordability Stress (HBUAS)** | Household's total water and energy expenditure-to-disposable income ratio exceeds 13 per cent and income is below 40 per cent of the income distribution |

As summarised in Table 5.4, households were categorised as experiencing high burden water affordability stress (HBWAS) if their water burdens exceeded three per cent of their disposable household income and their equivalised household income was below the fortieth percentile of income distribution among Victorian

households.After excluding non-poor households, households were found to be at risk of high burden energy affordability stress (HBEAS) if their energy burdens exceeded ten per cent of their disposable income. Altogether, a household is at risk of high burden utility affordability stress (HBUAS) if their total water and energy burdens exceeded 13 per cent of their disposable income.

### 5.4.2 Target effectiveness analysis

A change in headcount index is the commonly applied method to assess income maintenance program effectiveness (Harding and Mitchell 1992). In measuring income poverty, the headcount index is the proportion (or percentage) of individuals or households living below a poverty line. When evaluating the effectiveness of a state utility concession scheme, a change in utility stress headcount index can be expressed as the differences in the proportion of households that experienced affordability stress prior to and after receiving concession benefits. In equation 5.2, *N* represents the total number of households in the population, while 1(.) equals one if the argument is true, zero otherwise.

$$\Delta HI = \frac{\sum 1*(UAS_h^U = 1)}{N} \qquad (5.2)$$

While the headcount index is a simple and useful measure of poverty and housing affordability problem, there are few drawbacks, including its sensitive to where the poverty line sits, and it is unable to reflect the intensity of the poverty or affordability problem (Mitchell 1991: 36). Therefore, the concept of poverty gap or affordability gap is proposed as an alternative measure. Poverty gap is 'the difference between the income of the unit in question and the income that would be required to bring that unit up to its defined poverty line' (Mitchell 1991: 37). Similarly, utility affordability gap is the amount of money that is required to bring a household up to defined utility affordability threshold. This links to the concept of benefit adequacy below. Together, using both the headcount index and utility affordability gap will assist us better understand the target effectiveness of the utility concession scheme.

Social program effectiveness depends on two factors: benefit adequacy and target efficiency. If the amount of benefit is inadequate, the social program will be ineffective in lifting the targeted households above the income poverty line. In this case, the eligible utility stress households would remain in affordability stress and hardship if the amount of water and energy rebate is insufficient. However, maintaining benefit adequacy is challenging under fiscal constraints. With a limited budget, governments need to decide between less benefit for more target recipients and more benefit for less recipients.

### 5.4.3 Target efficiency analysis

To improve targeting requires 'avoiding bad bets in a draw' or 'removing bad apples from the basket' (Schuck and Zeckhauser 2006). The best way to achieve resource transfer in targeting welfare is to maximise the resource allocation to those most in need and to minimise leakage to the non-poor. No single selectivity mechanism can achieve perfect targeting. This is because there is always some degree of inefficiency due to exclusion errors (i.e. under-coverage) and/or inclusion errors (i.e. program leakage).

To measure the target efficiency of a state utility concession scheme, I modified the target analysis model from Dutrey (2007). As illustrated in Figure 5.2, successful targeting is defined as the case where water or energy concessions are delivered to identified households that were at risk of high burden water affordability stress (HBWAS), high burden energy affordability stress (HBEAS), or high burden utility affordability stress (HBUAS) prior to receiving the concession. Correspondingly, successful exclusion is referred to as the situation where households without any utility stress have not received water and/or energy concessions. In my analysis, households that have members with certain medical conditions and were receiving medical related concessions are classified as successful targeting, regardless of their incomes. Overall target efficiency of the state concession system can be estimated as the proportion of Victorian households that were successfully targeted or successfully excluded (Figure 5.2).

There are commonly two types of error, type I and type II, in targeting statistical analysis. Type I error occurs when households experiencing utility stress are excluded from the concession system. It is commonly known as an exclusion error, omission error or under-coverage in targeting. By contrast, type II error is referred to as the situation when concession benefits are given to non-utility stress households. It is called program leakage or inclusion error.

**Figure 5.2** Targeting analysis framework

| | | **Household utility stress status** | |
|---|---|---|---|
| | | Households with utility stress | Households without utility stress |
| **State utility concession scheme** | Concession households | **Successful targeting** | **Inclusion error (leakage)** |
| | Non-concession households | **Exclusion error (under-coverage)** | **Successful exclusion** |

**Source:** Modified from Dutrey (2007)

### 5.4.4 Target expenditure efficiency analysis

Common question in evaluating targeted welfare is: Does the social spending represent value for money? Measuring expenditure efficiency in poverty targeting programs is paramount when under a binding fiscal constraint. Wilfred Beckerman created a framework to evaluate the expenditure efficiency of income maintenance programs to alleviate income poverty in developed countries (see Appendix 5.1). This model has been widely applied to evaluate the efficiency and

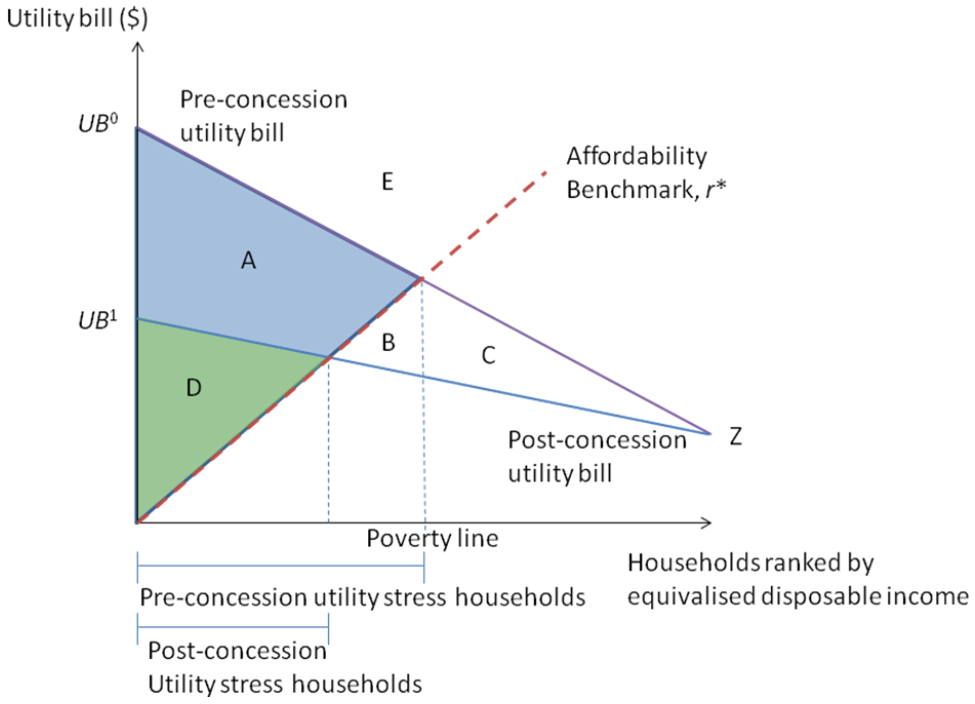
effectiveness of tax and income transfer programs in many countries (e.g. Harding and Mitchell 1992; Kim 2000; Behrendt 2002; Nelson 2004).

I modified the Beckerman model to evaluate how efficient the Victorian state utility concession program is in alleviating households' utility affordability problems (see Figure 5.3). In the Figure 5.3, $UB^0Z$ represents the household's pre-concession utility expenditure, while $UB^1Z$ represents the utility expenditure after state utility concession and rebates. The dotted line $r^*$ represents the utility affordability thresholds. In this case, the poverty line is defined as the fortieth percentile of the income distribution.

The modified Beckerman model divides households into the following four categories:

- Households that are at risk of utility stress both prior and after receiving concessions;
- Households that are at risk of utility stress prior to receiving a concession, but their utility burdens are reduced to below the affordability thresholds ($r^*$) after receiving a concession;
- Households that did not have utility stress prior to receiving concessions, but received concession rebates; and
- Households that did not have utility stress prior to receiving concessions and did not receive concession benefits.

**Figure 5.3** The expenditure efficiency of utility concession scheme




**Source:** Modified from Beckerman (1979, p.53)

**Table 5.5** Representation of different areas in Figure 5.3

| Area | Description |
|---|---|
| ***A + B*** | concession expenditure in successful targeted household |
| ***B*** | 'excess' amount of concession benefits (spill-over) |
| ***A + B + C*** | total concession expenditure |
| ***A + B*** | total transfers received by the utility stress households |
| ***A + D*** | pre-concession affordability gap |
| ***C*** | 'inclusion error' expenses |
| ***D*** | 'inadequate' amount of concession benefits |
| ***E*** | 'exclusion error' inadequacy |

Beckerman (1979) developed three indicators to measure target efficiency: vertical expenditure efficiency (VEE); spill-over on excess benefit (SEB); and poverty reduction efficiency (PRE). In Figure 5.3, Areas *A* to *E* represent the allocation of state concession expenditure relative to household income and utility expenditures (Table 5.5) and correspond to the computation of the three target efficiency measurements. I modified the above efficiency measures in the context of measuring utility affordability. In addition, I extended the indicators to measure the efficiency loss due to inclusion error, exclusion error, and inadequate concession benefits as defined below:

(a) Vertical expenditure efficiency (VEE) - the proportion of total concession expenditure received by those who were at risk of utility stress prior to receiving concession

$$VEE = (A+B) / (A+B+C) \qquad (5.3)$$

(b) Spill-over on excess benefits (SEB) – the excess amount, paid to the pre-concession utility stress households who are above the affordability benchmark ($r^*$) after receiving concession, as a proportion of all concession expenditure on the pre-concession utility stress households

$$SEB = B / (A+B) \qquad (5.4)$$

(c) Poverty reduction efficiency (PRE) – the proportion of total concession expenditure that is received by those utility stress households without spill-over.

$$PRE = A / (A+B+C) \qquad (5.5)$$

(d) Inefficiency due to inclusion error (IIE) – the concession expenditure received by non-utility stress households as a proportion of total concession expenditure

$$IIE = C / (A+B+C) \qquad (5.6)$$

(e) Inefficiency due to exclusion error (IEE) - the extra amount of concession expenditure required to assist utility stress households that have been excluded in the current concession eligibility criteria, out of total concession expenditure

$$IEE = E / (A+B+C) \qquad (5.7)$$

(f) Inadequate concession benefits (ICB) - the extra amount of concession expenditure required to assist utility stress households which fall below the affordability benchmark after concessions, as a proportion of total concession expenditure

$$ICB = D / (A+B) \qquad (5.8)$$

## 5.5 Data and key variables

My study employs data from the 2007 Victorian Utility Consumption Household Survey (Vic DHS 2007b). The survey applied a two-stage approach of stratified sampling and face-to-face interviews amongst concession and non-concession households in Victoria. Household characteristics such as employment income, household size, dwelling types, and concession card types were reported. Annual and seasonal (i.e. summer and winter) water and energy consumption and expenditure data were collected from utility retailers for the sampled 2,061 households. Detailed sampling methodology and survey design were described in Roy Morgan Research (2008). Definitions of key variables for this analysis are described in Table 5.6.

**Table 5.6** Definition of key variables

| Variable | Definition and explanation |
|---|---|
| ***Concession card type*** | |
| **Aged concession household** | The household head currently holds an Age Pensioner Concession Card or a DVA Gold Card. |
| **Non-aged concession household** | The household head currently holds a Non-Age Pensioner Concession Card or a Health Care Card. |
| **Concession household** | The household head currently holds one or more of the concession cards (i.e. PCC, HCC or DVA Gold Card). |
| **Non-concession household**[1] | The household head does not currently hold any of the afore-mentioned concession cards. |
| | |
| ***Utility expenditure*** | |
| **Pre-concession water expenditure** | Total water and sewerage expenses, including GST, but excluding Park Charge, Drainage Service Charge and other charges/discounts. |
| **Water concession** | The water and sewerage concessions and Utility Relief Grant Scheme (URGS) provided by VicDHS. |
| **Post-concession water expenditure** | The water expenditure after deducting water rebate, but including GST. |
| **Pre-concession energy expenditure** | Total electricity and gas expenditure before concession applied and including GST. |
| **Energy concession** | The total energy rebate from all types of energy concessions provided by the VicDHS. |

| | |
|---|---|
| **Post-concession energy expenditure** | The total energy expenditure after deducting energy rebate, but including GST. |
| **Pre-concession utility expenditure** | The total water, electricity and gas expenditure including GST. |
| **Utility rebate** | Total water and energy concession provided by VicDHS. |
| **Post-concession utility expenditure** | The total water, electricity and gas expenditure after deducting water and energy rebate, but including GST. |
| ***Household income*** | |
| **Household employment income**[2] | Household with members declared to receive employment income, the mid-point of reported income is summed to estimate household employment income. |
| **Household investment income** | Household with members who declared as self-funded retiree would be added an estimated AU$14,671 per year as self-funded retirement investment income (Roy Morgan Research 2007: 46). |
| **Household market income**[3] | Sum of estimated household income from employment and investment |
| **Government income supports**[4] | Sum of estimated government benefits received by individual household members with reference to their concession card types, income source, employment status, activity status (that is, retiree, job seeking, full time tertiary student, home duties), individuals and partners' market incomes, and family composition. Estimation of the 2006-07 government benefits is based on the base rate, maximum rate and entitlement rules described in the Guide to Australian Government Payments issued by Centrelink (2006). Types of government benefits include age pension, non-age pension, unemployment benefits, youth allowance, and Family Tax Benefit Part A and Part B. |

| | |
|---|---|
| **Gross household income** | Sum of estimated household market income and government income supports |
| **Disposable household income** | Tax was deducted from the gross income according to the individual tax rates for 2006-07 (ATO 2013). The computation did not account for Medicare levy, superannuation contributions, or housing costs, due to data limitation. |
| **Equivalised disposable household income** | Household income was adjusted with OECD modified scale, which assigns a value of 1 to the household head, of 0.5 to each additional adult, and of 0.3 to each child who are under age 16. |

**Note:** [1] A non-concession household might receive concessions on some bills because other household members may hold a concession card. Also, a non-aged concession household may have another household member who holds an aged concession card (Roy Morgan Research 2008: 12). [2] 58% of households reported have employment income; [3] Household market income is the sum of employment income and investment income, where 17% of households are self-funded retirees who receive investment incomes. [4] 71.5% of households receive government income supports (e.g. pension for age and non-age pensioners, allowance for low-income families, Newstart allowance for unemployed individuals, youth allowance for students, Family Tax Benefit-A and Family Tax Benefit-B for low-income families, single parent families and families with one main income).

The Victorian state utility concession scheme uses a targeting by category approach: possession of the Commonwealth Pensioner Concession Card (PCC), DVA Gold Card, or Health Care Card (HCC) was used as the eligibility criteria (Vic DHS 2007a). Surveyed households were divided into age concession households, non-age concession households, and non-concession households. Age concession households were referred to those had a PCC and/or DVA Gold Card, while non-age concession households were those concessions households that did not have a PCC and/or DVA Gold Card; they were mostly households with a HCC.

The Victorian state utility concession scheme uses a targeting by category approach: possession of the Commonwealth Pensioner Concession Card (PCC), DVA Gold Card, or Health Care Card (HCC) was used as the eligibility criteria (Vic DHS 2007a). Surveyed households were divided into age concession households, non-age concession households, and non-concession households. Age concession households were referred to those had a PCC and/or DVA Gold Card, while non-age concession households were those concessions households that did not have a PCC and/or DVA Gold Card; they were mostly households with a HCC.

I performed treatments on the household income variable for more equitable comparison. Household disposable income was estimated by the summation of an individual's employment income, investment income, and benefits from government income supports (i.e. computed in accordance to the Centrelink 2007), with a deduction for taxes based on personal income tax rates in 2006-07 (Australian Taxation Office 2013). An OECD modified scale was applied to adjust household income to account for different family structure. As the Victorian sample data was skewed towards low-income households, I adopted the equivalised household income level in Victoria (AU$27,835) at the fortieth percentile point in the ABS (2008) Household Income and Income Distribution Survey data so as to distinguish poor and non-poor households.

**Table 5.7** Seasonal differences of utility consumption, expenditure and utility burdens (weighted mean and standard error)

| Variable | Unit | Annual total[1] | Winter monthly average[2] (*W*) | Summer monthly average[3] (*S*) | Difference (*W-S*) |
|---|---|---|---|---|---|
| ***Household utility consumption*** | | | | | |
| **Water consumption** | kL | 213.7 | 15.08 | 21.22 | -6.139 |
| | | (135.6) | (.239) | (.472) | (.443)*** |
| **Electricity consumption** | kWh | 5443.6 | 466.0 | 421.7 | 44.24 |
| | | (3522.1) | (8.10) | (7.12) | (6.607)*** |
| **Gas consumption** | kJ | 62155.1 | 6536 | 2483 | 4052.7 |
| | | (35295.4) | (100.20) | (47.13) | (93.20)*** |
| | | | | | |
| ***Household utility expenditure*** | | | | | |
| **Water and sewerage bill** | AU$ | 505.0 | 39.61 | 41.60 | -1.99 |
| | | (272.0) | (.544) | (.622) | (.639)*** |
| **Electricity bill** | AU$ | 936.6 | 78.66 | 73.71 | 4.949 |
| | | (506.9) | (1.132) | (1.106) | (1.002)*** |
| **Gas bill** | AU$ | 649.9 | 63.55 | 28.94 | 34.60 |
| | | (386.4) | (.984) | (.485) | (.818)*** |
| **Total energy bill (include both electricity & gas)** | AU$ | 1586.6 | 142.2 | 102.7 | 39.55 |
| | | (671.7) | (1.52) | (1.23) | (1.37)*** |
| **Total utility bill (include both water & energy)** | AU$ | 2091.6 | 181.8 | 144.25 | 37.55 |
| | | (820.5) | (1.76) | (1.51) | (1.44)*** |
| | | | | | |
| ***Households' utility burden*** | | | | | |
| **Water burden** | % | 1.43 | 1.41 | 1.46 | -.0848 |
| | | (1.28) | (1.35) | (1.45) | (.0282)** |
| **Energy burden** | % | 4.52 | 5.13 | 3.68 | 3.979 |
| | | (3.47) | (4.02) | (3.12) | (.0797)*** |
| **Utility burden** | % | 5.95 | 6.54 | 5.13 | 1.439 |
| | | (4.44) | (4.96) | (4.10) | (.0628)*** |

*** Pr<0.001, ** Pr < 0.05, * Pr<0.10, . [1.] Annual period refers to year 2006; [2.] Winter period is 7 months (May to November), monthly average is presented; [3.] Summer period is 5 months (Dec to April), monthly average is presented. Seasonal household income is calculated on a pro-rata basis so as to compute utility burdens in summer and winter periods.

The summary statistics of household income, water and energy consumption, utility expenditures and computed utility burdens in 2006-07 are presented in Table 5.7. Prior to a concession being applied, the average annual water and sewerage expenditure was AU$505 and the average total annual energy expenditure was AU$1587 in 2006-07. T-tests results show that there were significant seasonal differences in water and energy usage and utility expenditures. In particular, the average water consumption was higher in the summer season while average electricity and gas consumptions were higher over the winter period. Average winter gas consumption and average winter gas bills were much higher due to space heating. Therefore, households would have a slightly higher water burden during summer, but face a significantly higher energy burden during winter. The average utility (both water and energy) burden, as a proportion of income, was 5.9 per cent among Victorian households in 2006-07.

## 5.6 Results

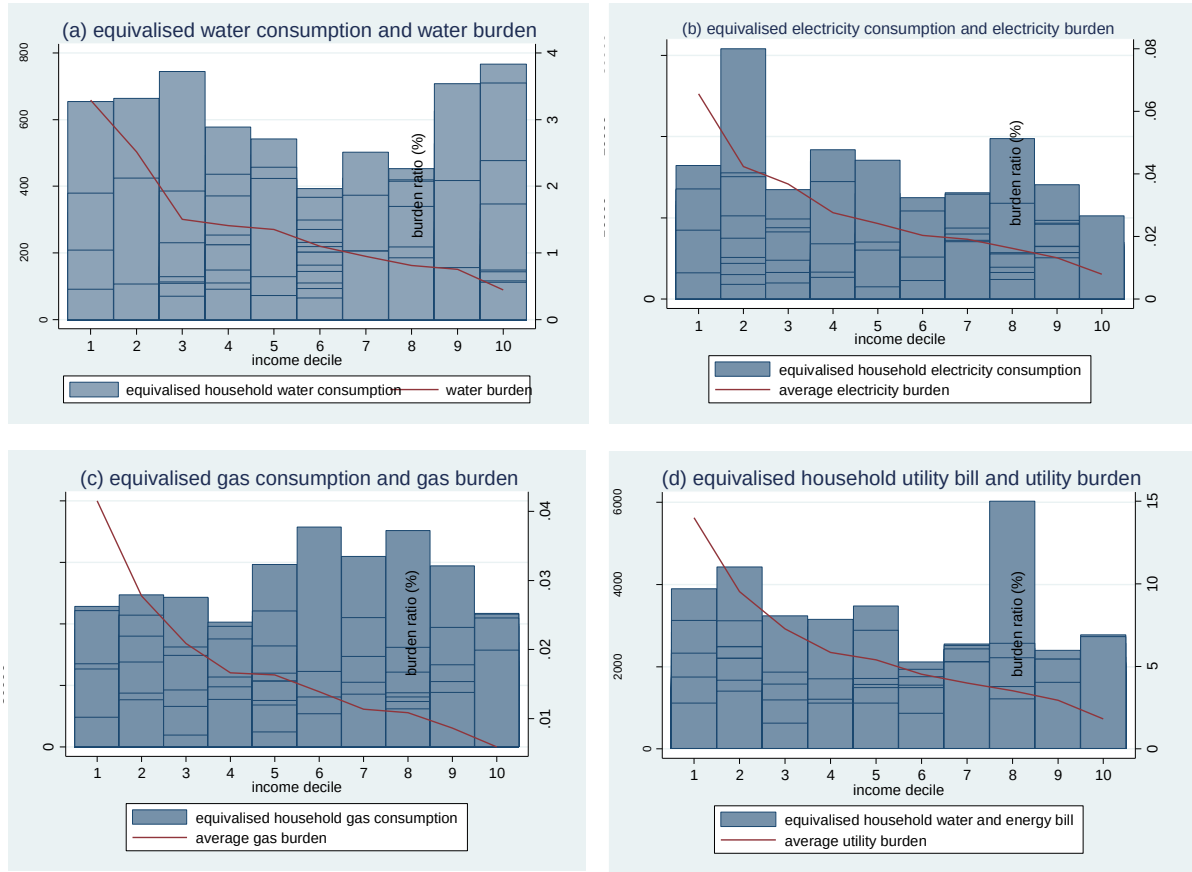
### 5.6.1 Utility affordability among Victorian households

#### *Utility affordability by income groups*

I compared the annual water and energy consumption among different income groups (see Figure 5.4a, b, c). Equivalisation was applied on utility consumption comparisons so as to account for household structure. The figures show that there were no observed increasing trends for average equivalised water, electricity or gas consumptions across income groups. Prior to the concession being applied, the average equivalised water and energy expenditures did not increase with increasing household income (Figure 5.4d). These findings contradict the traditional assumption that income and consumption are positively related (e.g. Agthe and Billings 1987). Nonetheless, the average water, electricity and gas burdens tended to decrease when income increased. These patterns indicate that, after equivalisation, lower income households do not necessarily consume less

water or energy. By contrast, their average utility burdens were two to three times more than those in at the top income quintile.

**Figure 5.4** Average equivalised utility consumption, expenditure across income deciles




Note: Income decile is measured as equivalised disposable household income among the surveyed households after weight adjustment

### *Utility affordability by concession types*

Did eligible concession households have higher water and energy utility burdens than non-concession households? Table 5.8 shows that the average household income of concession households was less than half that of non-concession households, even after accounting for tax deductions and/or equivalisation. When utility consumption and expenditures were equivalised (using the OECD modified scale), the average water and energy consumption levels and average expenditures among concession households and among non-concession households are not much different. Accordingly, concession households in 2006-07 were facing almost double the average utility burdens as non-concession households.

Further insight is obtained when sub-categorising the concession households into aged concession and non-aged concession households. Prior to receiving a concession, aged concession households had higher average equivalised utility expenditure (AU$1284) than non-concession households (AU$1190), whereas non-aged concession households had fairly similar average equivalised utility expenditure (AU$1203) as the non-concession households.

In terms of the utility burden, the average pre-concession water burden and energy burden for the aged concession households was 2.5 per cent and 7.0 per cent, respectively. The average water and energy burdens for non-aged concession households were 1.5 per cent and 5.6 per cent. For non-concession households, their average utility burdens were 1 per cent for water and 3.3 per cent for energy services. As a whole, the average pre-concession utility burden for aged concession households was more than double that of non-concession households, while the average utility burden for non-aged concession households was 1.5 times more than the non-concession households.

**Table 5.8** Income, utility consumption, expenditure and burdens (weighted means and standard errors), by concession household types

| Variable | Unit | Aged concession households | Non-aged concession households | Concession households | Non concession households | All households |
|---|---|---|---|---|---|---|
| ***Observations*** | | 608 | 416 | 1024 | 1033 | 2061 |
| **Weighted proportion** | % | 21.50% | 19.12% | 40.64% | 59.36% | 100% |
| ***Income measure*** | | | | | | |
| **Household gross income** | AU$ | 25308 | 37864 | 31216 | 80889 | 60814 |
| | | (16541) | (23448) | (21034) | (45784) | (49906) |
| **Disposable household income** | AU$ | 23915 | 34810 | 29041 | 68052 | 52331 |
| | | (14207) | (19749) | (17879) | (40600) | (49070) |
| **Equivalised disposable household income** | AU$ | 16009 | 18512 | 17187 | 35757 | 28250 |
| | | (6896) | (7084) | (7092) | (20965) | (8850) |
| | | | | | | |
| ***Equivalised annual household utility consumption*** | | | | | | |
| **Water consumption** | kL | 120.7 | 116.4 | 118.7 | 116.0 | -- |
| | | (80.0) | (71.2) | (76.1) | (67.9) | |
| **Electricity consumption** | kWh | 3213 | 2932 | 3081 | 3078 | -- |
| | | (267.8) | (269.5) | (269.1) | (262.6) | |
| **Gas consumption** | kJ | 38988 | 34169 | 36706 | 34023 | -- |
| | | (21925) | (19625) | (20993) | (18529) | |
| | | | | | | |
| ***Equivalised annual pre-concession utility expenditure*** | | | | | | |
| **Water and sewerage bill** | AU$ | 334.8 | 237.3 | 288.9 | 287.2 | -- |
| | | (183.0) | (156.4) | (177.7) | (145.5) | |
| **Electricity bill** | AU$ | 557.7 | 520.6 | 540.3 | 531.9 | -- |
| | | (267.8) | (269.5) | (269.1) | (262.6) | |
| **Gas bill** | AU$ | 391.4 | 354.9 | 374.2 | 371.4 | -- |
| | | (252.6) | (245.9) | (250.0) | (208.4) | |
| **Total energy bill – electricity & gas** | AU$ | 949.1 | 875.5 | 914.5 | 903.3 | -- |
| | | (344.3) | (354.3) | (350.8) | (346.0) | |
| **Total utility bill – water & energy** | AU$ | 1284.0 | 1112.8 | 1203.4 | 1190.5 | -- |
| | | (430.1) | (426.4) | (436.6) | (414.5) | |
| | | | | | | |
| ***Pre-concession household utility burden*** | | | | | | |
| **Water burden** | % | 2.5 | 1.5 | 2.0 | 1.0 | 1.43 |
| | | (1.6) | (1.3) | (1.6) | (0.9) | (1.28) |
| **Energy burden** | % | 7.0 | 5.6 | 6.3 | 3.3 | 4.52 |
| | | (3.8) | (3.5) | (3.7) | (2.6) | (3.47) |
| **Utility burden** | % | 9.5 | 7.1 | 8.4 | 4.3 | 5.95 |
| | | (4.9) | (4.3) | (4.8) | (3.3) | (4.44) |

### 5.6.2 Effectiveness of the Victorian state concession schemes

#### *Reduction of utility stress headcount index*

The effectiveness of the concession schemes can be measured by the reduction of the utility stress headcount index, which is the proportion of households at risk of utility stress prior to and after receiving concession benefits (Figure 5.5). Prior to concession rebates, about 11 per cent of Victorian households were at risk of HBWAS, 8 per cent at risk of high HBEAS, and 8.5 per cent faced HBUAS. After concessions were provided to eligible households, the headcount indexes were reduced to 6.5 per cent for HBWAS, 6 per cent for HBEAS and 5.5 per cent for HBUAS.

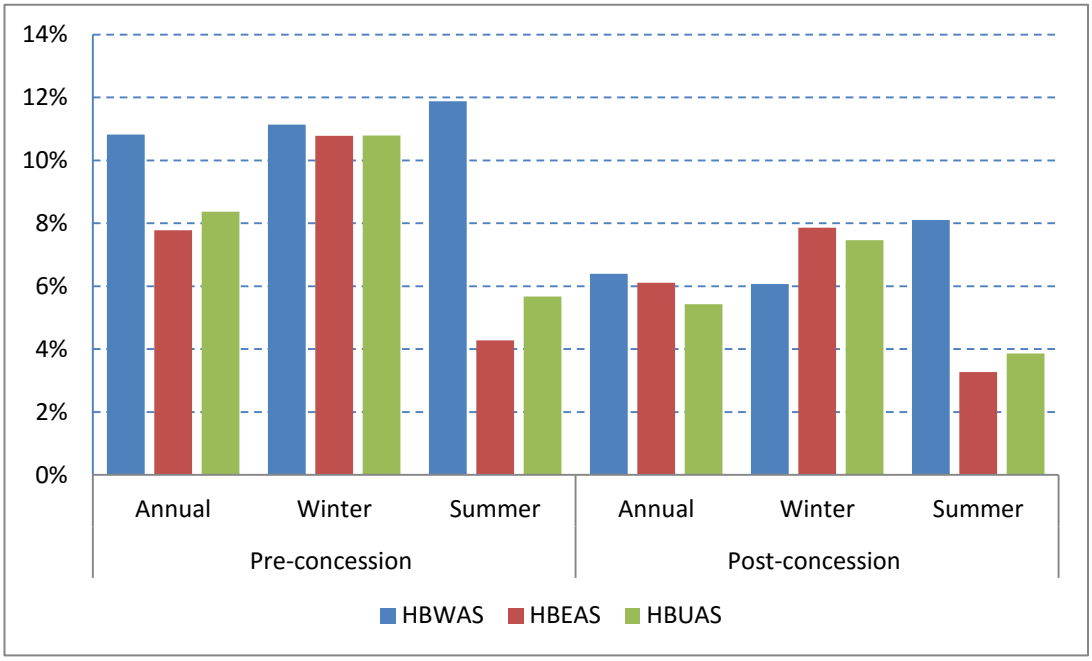
I also observed seasonal differences in the affordability stress headcount indexes because households in Victoria tended to use more water during summer and use more energy for space heating during winter. Figure 5.5 shows that the proportion of households at risk of HBWAS was slightly higher in summer (12 per cent) than in winter (11 per cent). By contrast, the headcount index for HBEAS in winter (11 per cent) was more than double that during summer (4 per cent).

The headcount analysis reveals that the Victorian energy concession had effectively reduced the proportion of households at risk of HBEAS during winter (i.e. reduced from 11 per cent to 6 per cent). In 2006-07, WEC, a 17.5 per cent discount off the winter electricity and gas bills, was provided to eligible households. The summer headcount index of HBEAS was reduced from 4 per cent to 3 per cent by the other energy concession benefits provided throughout the year.

I found that the water concession scheme was not as effective as the energy concession scheme in responding to the seasonal difference in utility concessions and utility burdens. The Victorian water concession scheme imposes an annual cap (AU$154 in 2006-07) that is reviewed on 1 July every year. Consequently,

eligible households may have reached the maximum rebate on their quarterly water bills before the more expensive summer bills arrive (after January). As a result, the water concession scheme can be less effective in alleviating the water affordability stress of eligible households during the summer period.

**Figure 5.5** Utility stress headcount index prior to and after receiving a concession




### *Utility stress by household characteristics*

Aggregate results do not give sufficient insight about which types of families and what household characteristics would have  higher prevalence of utility stress. Table 5.9 summarises the headcount index of each sub-group at risk of HBWAS, HBEAS and HBUAS prior to and after concession rebates.

Table 5.9 shows that a higher proportion of lone person households, group households, couple only households, and single parent households encounter HBWAS, HBEAS and HBUAS both prior to and after a concession is applied.

Overall, the Victorian concession schemes removed about one third of these utility stress households from utility affordability problems. Among tenure types, the headcount indexes for outright owners and public renters were higher than owners with mortgages and private renters, both prior to and after the concession is applied. In addition, households living in separate houses are more likely to be at risk of HBWAS, HBEAS, and HBUAS than households residing in other dwelling types.

An LPG area is defined as an area which have limited natural gas connection and thus households rely on liquefied petroleum gas (LPG) for their indoor heating, cooking or hot water. Households residing in certain geographical locations, such as Ballarat, Bendigo, and LPG areas, incur relatively greater utility stress. Households living in LPG areas seem to have higher risk of HBWAS and HBEAS. Among Ballarat households, almost one fifth of the households were at risk of HBWAS and 12 per cent were at risk of HBEAS prior to concession. Analysis shows that the Victorian water concession scheme only slightly reduced the HBWAS headcount index among Ballarat and LPG areas. By contrast, the energy concession scheme was more effective at assisting Ballarat households to reduce HBEAS (from 12.4 per cent to 7.5 per cent).

Between concession household types, more than one third of age concession households were at risk of HBWAS, and one fifth were at risk of HBEAS prior to a concession rebate. For non-age concession households, the headcount indexes were 13 per cent for HBWAS and 11 per cent for HBEAS. Overall, the Victorian water concession scheme reduced by half the HBWAS headcount indexes among concession households (from 25.6 per cent to 12.4 per cent), while the energy concession scheme reduced by one quarter the HBEAS indexes among concession households (from 15.5 per cent to 11 per cent).

**Table 5.9** Prevalence of utility stress among Victorian households, 2006-2007

| | HBWAS | | HBEAS | | HBUAS | |
|---|---|---|---|---|---|---|
| | Pre-concession | Post-concession | Pre-concession | Post-concession | Pre-concession | Post-concession |
| ***Family type*** | | | | | | |
| **Couple only** | 14.1% | 8.1% | 11.0% | 9.1% | 11.5% | 8.1% |
| **Couple with children** | 1.6% | 0.7% | 1.8% | 1.1% | 1.5% | 1.0% |
| **Single parent** | 8.2% | 5.9% | 6.4% | 6.1% | 8.8% | 4.8% |
| **Lone person** | 22.7% | 13.7% | 14.1% | 9.5% | 14.9% | 8.4% |
| **Group house** | 12.0% | 7.2% | 10.4% | 8.2% | 12.1% | 7.1% |
| **Couple with adult children** | 2.0% | 1.0% | 1.9% | 1.9% | 2.0% | 1.8% |
| ***Tenure*** | | | | | | |
| **Owner outright** | 18.4% | 11.3% | 12.4% | 9.2% | 13.9% | 9.1% |
| **Purchaser** | 4.0% | 2.1% | 2.0% | 1.8% | 2.1% | 1.4% |
| **Private renter** | 1.8% | 0.7% | 5.2% | 4.4% | 3.7% | 2.2% |
| **Public renter** | 8.9% | 4.0% | 10.4% | 7.4% | 11.3% | 4.3% |
| **Other** | 6.8% | 3.5% | 8.2% | 8.2% | 10.2% | 6.7% |
| ***Dwelling type*** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Separate house** | 11.8% | 7.1% | 8.4% | 6.4% | 9.4% | 5.9% |
| **Semi-detached** | 6.6% | 3.7% | 6.5% | 5.0% | 4.8% | 3.4% |
| **Flats** | 2.6% | 0 | 4.0% | 3.4% | 2.1% | 0.8% |
| ***Region of residence*** | | | | | | |
| **Melbourne** | 7.7% | 3.7% | 7.0% | 5.5% | 7.5% | 4.8% |
| **Geelong** | 8.9% | 4.2% | 7.5% | 6.3% | 8.2% | 4.1% |
| **Ballarat** | 20.7% | 17.9% | 12.4% | 7.5% | 13.3% | 8.0% |
| **Bendigo** | 15.3% | 7.9% | 12.4% | 9.4% | 12.5% | 8.3% |
| **Shepparton** | 8.2% | 5.1% | 8.1% | 5.8% | 6.8% | 4.4% |
| **LPG area** | 36.0% | 27.6% | 11.7% | 8.0% | 13.3% | 9.6% |
| ***Concession type*** | | | | | | |
| **Age concession** | 34.5% | 17.9% | 19.8% | 14.6% | 23.1% | 14.5% |
| **Non-age concession** | 12.5% | 6.2% | 10.7% | 7.1% | 10.8% | 4.9% |
| **Concession** | 25.6% | 12.4% | 15.5% | 11.1% | 17.3% | 10.0% |
| **Non-concession** | 3.6% | 2.3% | 2.8% | 2.7% | 2.6% | 2.3% |

Note: Table shows weighted proportion of the households at risk of utility stress among the total households in that sub-group.

### 5.6.3 Target efficiency of the Victorian state concession system

Target analysis allows us to assess how efficient the state concession scheme is at delivering assistance to those households at risk of utility stress. Table 5.10 summarises the targeting outcomes of the Victorian water concession and energy concession schemes on an annual and seasonal basis in 2006-07. The results show that more than 80 per cent of the HBWAS households had been successfully targeted by the water concession scheme. The successful targeting rate in the summer period (76 per cent) was lower than in the winter period (83 per cent). About one fifth of the HBWAS households had not received any water rebates during the summer period. However, more than one third of the non-HBWAS households had received water rebates. As a whole, the 2006-07 Victorian water concession scheme has achieved an overall 41 per cent successful rate (either successful targeting or successful exclusion), but a 59 per cent error rate (either inclusion error or exclusion error).

Target analysis shows that the Victorian energy concession scheme has a mixed targeting outcome. The scheme successfully targeted 85 per cent of the HBEAS households, but also included more than 60 per cent of non-HBEAS households. The targeting errors, both inclusion error and exclusion error, were slightly higher in the summer period (60 per cent) than in winter (54.7 per cent).

When water and energy expenditures were treated as a bundle of household essential utility expenses, the Victorian utility concession scheme (both water and energy concessions) successfully targeted almost 90 per cent of the HBUAS households. The inclusion error was relatively high (65 per cent) while the exclusion error was relatively low (10 per cent). If I account for population size, the overall successful targeting rate of the Victorian utility concession scheme was 41per cent (either successful targeting or successful exclusion). The overall targeting error of the Victorian utility concession scheme was 58.5 per cent from either via program leakage (inclusion error) or under coverage (exclusion error).

**Table 5.10** Targeting outcome of Victorian utility concession in 2006-07

| | | No. of households | Success targeting | Success exclusion | Inclusion error | Exclusion error |
|---|---|---|---|---|---|---|
| **(a) Annual Targeting** | | | | | | |
| Water concession | WAS households | 299 | 83.8% | | | 16.2% |
| | Non-WAS households | 1758 | | 65.3% | 34.7% | |
| | **All households** | **2061** | **67.8%** | | **31.5%** | |
| Energy concession | EAS households | 206 | 85.1% | | | 14.9% |
| | Non-EAS households | 1851 | | 37.7% | 62.3% | |
| | **All households** | **2061** | **42.3%** | | **57.2%** | |
| Water/Energy concession | UAS households | 217 | 89.8% | | | 10.2% |
| | Non-UAS households | 1840 | | 35.4% | 64.6% | |
| | **All households** | **2061** | **41.1%** | | **58.5%** | |
| **(b) Winter period** | | | | | | |
| Water concession | WAS households | 298 | 82.9% | | | 17.1% |
| | Non-WAS households | 1759 | | 65.3% | 34.7% | |
| | **All households** | **2061** | **67.7%** | | **31.5%** | |
| Energy concession | EAS households | 281 | 84.8% | | | 15.2% |
| | Non-EAS households | 1776 | | 61.6% | 38.4% | |
| | **All households** | **2061** | **44.6%** | | **54.7%** | |
| Water/Energy concession | UAS households | 285 | 88.7% | | | 11.3% |
| | Non-UAS households | 1772 | | 36.0% | 64.0% | |
| | **All households** | **2061** | **43.2%** | | **56.3%** | |

| | | No. of households | Success targeting | Success exclusion | Inclusion error | Exclusion error |
|---|---|---|---|---|---|---|
| **(c) Summer Period** | | | | | | |
| Water concession | WAS households | 329 | 76.0% | | | 24.0% |
| | Non-WAS households | 1728 | | 64.8% | 35.2% | |
| | **All households** | **2061** | **66.5%** | | **32.5%** | |
| Energy concession | EAS households | 118 | 80.6% | | | 19.4% |
| | Non-EAS households | 1939 | | 36.6% | 63.4% | |
| | **All households** | **2061** | **39.1%** | | **60.5%** | |
| Water/Energy concession | UAS households | 157 | 89.0% | | | 11.0% |
| | Non-UAS households | 1900 | | 34.6% | 65.4% | |
| | **All households** | **2061** | **38.7%** | | **60.9%** | |

### 5.6.4 Target expenditure efficiency

I applied the modified Beckerman (1979) model to assess the efficiency of concession expenditure delivered to the identified HBWAS, HBEAS and HBUAS households. Vertical expenditure efficiency (VEE) represents the proportion of state utility concession expenditure spent on reducing the utility burden among utility stress households to below the utility affordability threshold. As summarised in Table 5.11, the estimated total concession expenditure received by the identified HBWAS and HBEAS households was AU$24 million and AU$19.5 million, respectively, in 2006-07. My analysis indicates that the VEE of the Victorian utility concession scheme is relatively low. The estimated VEE of the Victorian water and energy concession schemes was 26 per cent and 17 per cent respectively in 2006-07.

Expenditure inefficiency of state concession schemes can be caused by one of three reasons: spill-over, inclusion error, and benefit inadequacy. The spill-over,

which were the total ‘excess’ benefits received by the utility stress households, were only 6.7 per cent of total water concession expenditure and 7 per cent of the total energy concession expenditure. The expenditure inefficiencies due to inclusion errors were almost 75 per cent for water concession and 83 per cent for energy concession scheme. Estimated total concession expenses paid to non-HBWAS households were AU$69 million for the water concession scheme and AU$95 million for the energy concession scheme in 2006-07.

Benefit inadequacy is the concession shortfall due to both exclusion error and provision of insufficient benefits to remove households from utility stress (also called post-transfer poverty gap in income maintenance programs). The expenditure inefficiency due to benefit inadequacy was 16 per cent for the water concession and 41 per cent for the energy concession scheme. My analysis shows that total concession shortfalls were AU$14 million in the water concession and AU$47 million in the energy concession scheme in 2006-07.

**Table 5.11** Target expenditure efficiency of the Victorian utility concession, 2006-2007

| | Unit | Water Concession | Energy Concession |
|---|---|---|---|
| **All Victorian households** | | | |
| **Total DHS concession expenditure** | AU$million | 93.4 | 114.3 |
| **Total concessions received by utility stress households** | AU$million | 24.0 | 19.5 |
| **Vertical expenditure efficiency (VEE)** | % | 25.7% | 17.1% |
| | | | |
| ***Spill-over (S)*** | | | |
| **Excess benefits to eligible households** | AU$million | 6.2 | 8.0 |
| **Inefficiency due to spill-over** | % | 6.7% | 7.0% |
| | | | |
| ***Inclusion error (IE)*** | | | |
| **Inclusion error expenses** | AU$million | 69.4 | 94.8 |
| **Inefficiency due to inclusion error** | % | 74.3% | 83.0% |
| | | | |
| ***Benefit inadequacy (BI)*** | | | |
| **Concession shortfall to eligible households** | AU$million | 10.0 | 32.1 |
| **Concession shortfall due to exclusion error** | AU$million | 4.9 | 15.0 |
| **Inefficiency due to concession shortfalls** | % | 16.0% | 41.2% |
| | | | |
| ***Estimated expenses for optimal targeting*** | | | |
| **Total DHS concession expenses (*O*)** | AU$million | 93.4 | 114.3 |
| **Reduction of Inefficiency due to spill-over and inclusion error (*S* + *IE*)** | AU$million | - 63.2 | - 86.8 |
| **Addition of benefit inadequacy (*BA*)** | AU$million | + 14.9 | + 47.1 |
| **Optimal targeting expenses (*E*)** | AU$million | **45.1** | **74.6** |
| **Difference = (*E-O*)** | AU$million | - 48.2 | -39.8 |
| **Difference = (*E-O*)/*O*** | % | **-51.6%** | **-34.8%** |

If optimal targeting were possible and was able to remove the inefficiencies due to spill-overs, inclusion errors and benefit inadequacies, the estimated savings would have been AU$48 million for the water concession scheme, and AU$40 million for the energy concession scheme in 2006-07. The estimated savings would account for almost half of the original water concession expenditure and 35 per cent of the energy concession expenditure.

### 5.6.5 Sensitivity analysis

One of the challenges in poverty targeting analysis is the identification of the individuals or households who deserve targeted assistance. In the LIHB approach, whether households are classified as at risk of utility stress is subject to the choice of affordability benchmarks and income thresholds. Since the data in this case study does not have accurate reported household income, the estimated affordability outcome needs to be treated with caution.

I performed two series of sensitivity analysis. First, I checked if the results were sensitive to the choice of different utility affordability benchmarks. The three per cent water affordability benchmark was varied by +/-1 per cent, the 10 per cent energy affordability benchmark was varied by +/-2 per cent, and the 13 per cent utility affordability benchmark was varied by +/-3 per cent. Second, I identified if there were any differences in targeting outcomes if the income threshold was changed to 30 per cent and to 50 per cent equivalised disposable household incomes. The income thresholds were selected in accordance with the current value of estimated Victorian household incomes in 2006-07 (ABS 2008).

The headcount indexes and targeting outcomes of various utility affordability benchmarks are presented in Table 5.12. My results show that both the pre-concession and post-concession headcount indexes for water and energy utility stresses (that is, HBWAS, HBEAS and HBUAS) are sensitive to the choice of

benchmarks. Nevertheless, targeting efficiencies were consistent with the baseline model under different utility benchmarks. Overall, both water and energy concession schemes had high successful targeting rates towards households with utility stress, but also exhibited high inclusion error rates.

Although the choice of income threshold and poverty line is contestable, the results presented in Table 5.13 demonstrate that little differences were found in the headcount indexes and target efficiencies under alternative income thresholds. In addition, outcomes and conclusions from the Beckerman expenditure efficiency analysis were consistent with the baseline model.

As demonstrated from the two sensitivity analyses, target effectiveness and expenditure efficiencies are sensitive to the choice of utility affordability benchmarks, but not to income thresholds. Nonetheless, consistent conclusions were found under all alternative scenarios. Expenditure efficiency analysis demonstrated that there would be savings from the original concession expenditure if inefficient spending were redirected to those households that were incorrectly excluded or those who had not received adequate benefits.

**Table 5.12** Sensitivity analysis 1. Varying utility affordability benchmarks

| | | HBWAS | | HBEAS | | HBUAS | |
|---|---|---|---|---|---|---|---|
| | Unit | Affordability benchmarks | | Affordability benchmarks | | Affordability benchmarks | |
| | | **2%** | **4%** | **8%** | **12%** | **10%** | **16%** |
| **Annual headcount index** | | | | | | | |
| Pre-concession | % | 21.5 | 5.8 | 13.5 | 4.5 | 15.1 | 4.3 |
| Post-concession | % | 15.2 | 2.3 | 10.8 | 2.8 | 11.4 | 2.0 |
| **Annual target efficiency** | | | | | | | |
| Successful targeting | % | 73.9 | 89.1 | 86.2 | 85.7 | 88.8 | 91.4 |
| Inclusion error | % | 30.8 | 37.0 | 60.7 | 63.2 | 62.9 | 65.7 |
| **Target expenditure efficiency** | | | | | | | |
| Total concession (O) | AU$million | 93.4 | 93.3 | 45.9 | 45.9 | | |
| Successful targeting | AU$million | 41.2 | 13.8 | 29.7 | 12.2 | | |
| Spill-over | AU$million | 8.6 | 5.6 | 6.5 | 9.4 | | |
| Inclusion error | AU$million | 52.1 | 79.5 | 84.6 | 102 | | |
| Benefit inadequacy | AU$million | 45.1 | 5.25 | 89.0 | 25.1 | | |
| | | | | | | | |
| Vertical expenditure efficiency | % | 44.1 | 14.8 | 26.0 | 10.7 | | |
| Spill-over inefficiency | % | 9.2 | 6.0 | 5.7 | 8.2 | | |
| Inclusion error inefficiency | % | 55.8 | 85.2 | 74.0 | 89.2 | | |
| Benefit inadequacy inefficiency | % | 48.3 | 5.6 | 77.9 | 22.0 | | |
| | | | | | | | |
| **Optimal targeting expenditure (*E*)** | **AU$million** | **77.7** | **13.5** | **112.2** | **28.0** | | |
| Difference *(E-O)* | AU$million | -15.6 | -79.9 | -2.1 | -86.3 | | |
| Difference *(E-O)/O* | % | -16.7 | -85.6 | -1.8 | -75.5 | | |

**Table 5.13** Sensitivity analysis 2: Varying income thresholds

| | | HBWAS | | HBEAS | | HBUAS | |
|---|---|---|---|---|---|---|---|
| | Unit | Income threshold | | Income threshold | | Income threshold | |
| | | **30%** | **50%** | **30%** | **50%** | **30%** | **50%** |
| **Annual headcount index** | | | | | | | |
| Pre-concession | % | 10.82 | 10.87 | 8.0 | 8.0 | 8.6 | 8.6 |
| Post-concession | % | 6.39 | 6.43 | 6.1 | 6.1 | 5.4 | 5.4 |
| **Annual target efficiency** | | | | | | | |
| Successful targeting | % | 83.79 | 83.85 | 85.1 | 85.1 | 89.8 | 89.8 |
| Inclusion error | % | 34.72 | 34.69 | 62.3 | 62.3 | 64.6 | 64.6 |
| | | | | | | | |
| **Target expenditure efficiency** | | | | | | | |
| Concession spending (O) | AU$million | 93.4 | 93.4 | 114.3 | 114.3 | | |
| Successful targeting | AU$million | 24.0 | 24.1 | 19.5 | 19.5 | | |
| Spill-over | AU$million | 6.2 | 6.2 | 7.96 | 7.76 | | |
| Inclusion error | AU$million | 14.9 | 15.0 | 47.1 | 47.1 | | |
| Benefit inadequacy | AU$million | 14.9 | 15.0 | 47.1 | 47.1 | | |
| | | | | | | | |
| Vertical expenditure efficiency | % | 25.7% | 25.8% | 17.1% | 17.1% | | |
| Spill-over inefficiency | % | 6.7% | 6.7% | 7.0% | 7.0% | | |
| Inclusion error inefficiency | % | 74.3% | 74.2% | 82.9% | 82.9% | | |
| Benefit inadequacy inefficiency | % | 16.0% | 16.1% | 41.2% | 41.2% | | |
| | | | | | | | |
| **Optimal targeting expenditure (*E*)** | AU$million | **32.6** | **32.9** | **58.6** | **58.6** | | |
| Difference *(E-O)* | AU$million | -60.7 | -60.5 | -55.7 | -55.7 | | |
| Difference *(E-O)/O* | % | -65.0% | -64.8% | -48.7% | -48.7% | | |

## 5.7 Discussion

In a given social spending, efficiency and effectiveness of the targeted social program would be increased if a greater proportion of the transfers were targeted to those most in need (Saunders 1990). While there is no consistency in eligible criteria and concession entitlement across Australian jurisdictions, the Commonwealth concession cards have been adopted as the eligibility criteria across jurisdictions. This category-based targeting mechanism may not be the most effective and efficient to target households in most need. Some vulnerable households may fall through the cracks in various state concession systems because they did not fit into any eligibility category. On the other hand, households that have eligible concession card members receive water and energy concessions even when they may not have a utility affordability problem. Within category-based targeting, concession benefits may be too large for some eligible households, but insufficient for others. Since factors affecting utility stress are multi-dimensional (Chapter Four), inefficiency arises in category-based targeted concession programs.

The Victorian case study illustrates the performance of state utility concession targeting to inform future reform. Among the sampled Victorian households, headcount analysis reveals that certain household types are more likely to have utility stress prior to a concession being applied. Among all family types, a large proportion of lone persons, couples without children, and single-parent households were found to be at risk of utility stress (that is, HBWAS, HBEAS and HBUAS). Home owners and public renters had a greater prevalence of affordability stress than home owners with mortgages and private renters. Age pensioners are more likely to have both water and energy affordability stress. Thus, providing target water and energy concession to low-income age pensioners is important on equity grounds. It would seem, therefore, that effective targeted assistance to address utility affordability needs to include these household types. Effective target assistance could be achieved either through Commonwealth

welfare systems to improve income support payments or the provision of state utility concessions to utility stress households.

Households in the Ballarat, Bendigo and LPG regions are shown to be more likely to experience affordability stress than other locations, but the state water and energy concession schemes do not appear to effectively reduce the headcount indexes in these locations. Using a percentage-based concession may be an effective option to tackle the problem. The results show that further research is needed on the factors contributing to the geographical differences of utility burdens. These factors may include higher utility prices, high water and energy consumption due to climatic conditions, and likelihood of socio-economic disadvantage (Vinson 2007; Vinson et al. 2015). Understanding these differences could allow decision makers to develop more effective targeted assistance programs.

My findings are only partly consistent with the recent energy concession review conducted by Deloitte (2013) which found that four vulnerable groups had fallen through the cracks under the existing Victorian energy concession system. These groups were: (i) families with young children ; (ii) single renters with low income; (iii) regional low-income customers without connections to the energy network, and (iv) new home buyers with low after-housing cost income. In my analysis of the Victorian utility consumption data, neither families with children nor home purchasers were more likely to suffer water or energy affordability stress. A limitation of my analysis is that it does not include housing costs such as rent payments or mortgage, due to data limitations. If data such as housing cost, floor space, size of garden, water and energy efficiency of housing stock, power and size of rooftop solar panels, and size of rainwater tanks, were available, a more refined measure of utility burdens accounting for these factors could reveal another dimension of utility stress and provide feedback for targeting program design.

Overall, the Victorian utility concession scheme has effectively reduced the headcount indexes by 40 per cent for HBWAS, 21 per cent for HBEAS, and 35

per cent for HBUAS. However, the annual cap on the water concession entitlement does not deliver optimal benefits to eligible households when they face higher water burdens in the summer period. By contrast, the provision of the WEC during 2006-07 effectively reduced HBEAS headcount index during the winter period. Thus it would seem that seasonal targeting is more effective than a fixed lump-sum concession or capped annual rebates.

My targeting efficiency analysis shows that the existing eligibility criteria have led to a mixed targeting outcome. I find that both Victorian water and energy concession schemes had successfully targeted more than 80 per cent of those households at risk of utility stress. The concession schemes also generated very low exclusion errors. Unfortunately, the current category-based targeting has also resulted in high inclusion errors, which means that a significant amount of water and energy concessions were provided to those without utility affordability problems.

The adapted Beckerman (1979) targeting efficiency analysis shows that the current water and energy concession schemes had low VEE (25 per cent). Inefficiencies due to inclusion errors accounted for 75 per cent and 83 per cent of the total water concession and energy concession expenditures, respectively. Inefficiency due to a spill-over effect was low: less than 7 per cent. Nonetheless, if these funds could be redirected to those utility stress households that were excluded or given inadequate benefits, it would generate significant savings for the concession budget: an estimated 50 per cent saving for the water concession scheme and 35 per cent saving for the energy concession scheme.

Given the increase of real energy prices over the last few years, the Victorian energy concession scheme has changed since 2006-07. In 2010, the WEC scheme was extended to an Annual Electricity Concession, thus eligible households would be eligible for an electricity bill discount year round. Subsequently, the energy concession expenditure has increased substantially over the last few years (Vic DHS 2005, 2007a, 2012, 2013a). If the extended scheme is more effective and

efficient in tackling the utility affordability problem needs to be reassessed with new household consumption and income data.

Finally, I noted that if Commonwealth concession cards are to continue to be used for eligibility for state utility concession schemes, fiscal sustainability of the schemes will be a challenge as the population ages. Among old age Australians, 75 per cent receive at least some social security payments. A majority of these age pensioners own homes, but this asset is not considered in means testing for the Age Pension. Bradbury (2010) has argued that under-utilitisation of housing stock has been high among old age Australian. The asset rich but income poor profile among old age pensioners in Australia is attributed to income tests and wealth-allocation incentives arising from the Old Age Pension asset test exemption (Bradbury 2010).

In addition, under the current social welfare system, both full pension and part-rate pension recipients are eligible for the Commonwealth Pensioner Concession Card and, thus, are entitled to the same level of state concession benefits under the COAG NPA (COAG 2013). At present, almost a quarter of Victorian households hold at least one type of concession card. Thirty five per cent of Victorian households received a water concession and more than 40 per cent received an energy concession. In some jurisdictions, such as Tasmania and SA, the proportions of concession recipients are even higher. Thus, without accounting for income after housing costs and utility consumption expenditure in concession eligibility, the current concession targeting could result in high inclusion error rates and low targeting expenditure efficiency in Victoria and other jurisdictions. In view of fiscal constraints in recent times, more efficient concession targeting design is required.

## 5.8 Conclusions

Water and energy utility services are regarded as essential services. Low income households generally spend larger proportion of their household income on these essential services than higher income households. With both urban water and energy prices have increased faster than the consumer price index (CPI) since 2007, there has been an increased attention among policy makers, advocacy groups and utility retail sectors to seek solution to addressing utility affordability problem among vulnerable households. Using state concession scheme to provide target assistance to vulnerable households is regarded as one of the solutions.

Targeted assistance is widely believed to be more equitable and efficient in redistributing social spending specifically to households in most need. An example of targeted assistance is a state utility concession scheme specifically designed to address the cost of essential water and energy services. Previous reviews have found that state water and energy concession systems are inequitable and inefficient (PC 2011, Deloitte 2013). I add to this literature by evaluating the efficiency and effectiveness of category-based state concession systems in relation to households' water and energy burdens. I find that the factors related to utility stress are multi-dimensional. Identification of the target recipients for utility assistance is not simply about identifying poor households. In particular, a burden ratio affordability framework is needed to identify households at different scales of utility stress. Affordability analysis presented in this chapter shows that households within certain regional Victorian areas, such as Ballarat and Bendigo, are more susceptible to utility stress.

Overall, the Victorian water and energy concession systems have effectively reduced the proportion of households experiencing utility stress. In addition, seasonal targeting is shown to be more effective than all year concessions or capped concession benefits in relieving higher summer water burdens or higher energy burdens during winter. However, the current water concession scheme may be inequitable to larger consumption households, be too generous for small utility users, and have high inclusion error rates.

My target analysis indicates that the current Victorian concession schemes have high successful targeting rates, but also have generated high inclusion errors. Results from the modified Beckerman (1979) analysis revealed that the estimated VEE accounted for less than a quarter of the state utility concession expenditure. This is mainly attributed to the expenditure inefficiency from inclusion errors: up to 75 per cent in the water concession scheme and 80 per cent in the energy concession scheme. If redirecting inefficient concession expenditure to those households that are at risk of utility stress but were excluded in the current concession scheme or were given insufficient rebate is possible, there will be substantial budget savings.

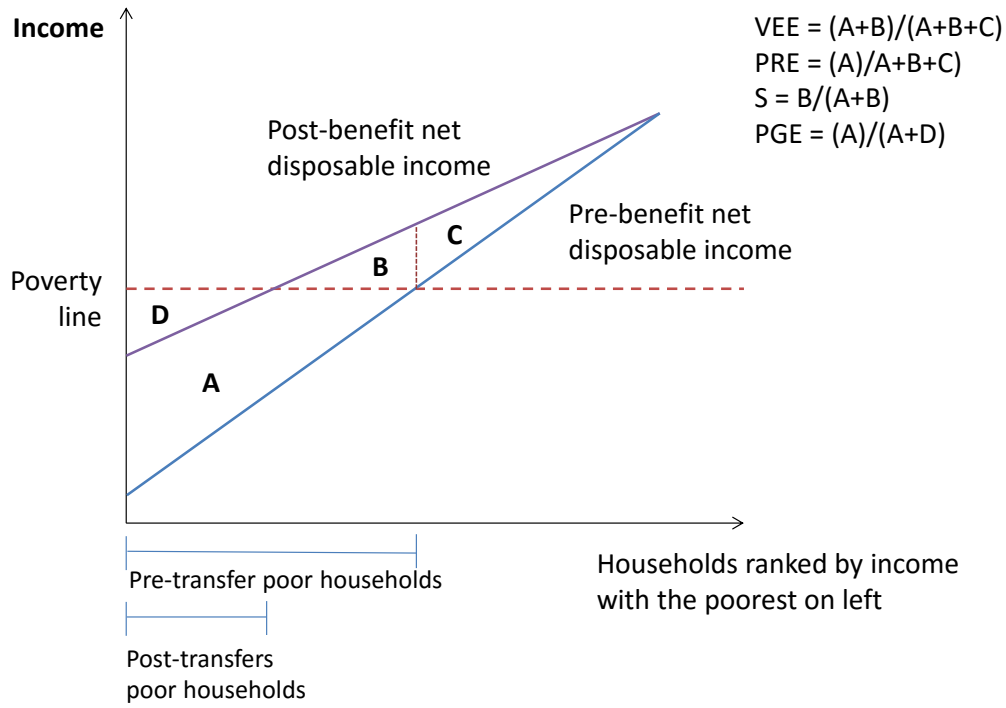
Using the Commonwealth concession cards as a screening mechanism for state utility concessions has its advantages and limitations. There are savings in administrative costs associated with the identification process. However, the possession of concession cards does not accurately reflect individual household circumstances, economic status, or utility burdens. With a quarter of Victorians currently holding concession cards (Vic DHS 2013a, 2013c), there will be significant fiscal burdens in sustaining the state utility concession schemes. This will be especially pronounced as the Australian population ages (ABS 2013g).

Herscovitch and Stanton (2008) suggest that any social policy should embrace the prism of five Es: equity (both horizontal and vertical), effectiveness, employment, efficiency, and economy. These objectives can sometimes be in conflict. Nonetheless, a more equitable concession entitlement could be pursued by accounting for factors such as household size, geographical differences, and other particular circumstances. To acquire this equitable outcome will require a more precise identification process, affordability analysis, and more regular data collection. As demonstrated in this chapter, performing target evaluation assists to develop strategies to redistribute concession funding more efficiently. Furthermore, savings generated from minimising inclusion errors can be reallocated to water and energy efficiency programs, specifically targeting identified vulnerable households. If undertaken successfully , better targeting could generate 'win-win' outcomes.

## Appendix 5.1: Beckerman (1979) Model

Beckerman (1979) developed a model to evaluate the expenditure efficiency of income maintenance program in four developed countries: Australia, Belgium, Norway and Great Britain (1979). The areas defined in the diagram correspond to the different magnitude. The area (*A* + *B* + *C*) represents the total expenditures on the social benefits; and area (*A* + *B*) is the total amount of benefits received by pre-benefit poor. The area (*A* + *D*) represents the pre-benefit poverty gap; while area *D* represents post-benefit poverty gap.

Expenditure efficiency of social transfers




Source: adapted from Beckerman (1979: 53)

Using the Beckerman (1979) model can quantify the efficiency of poverty alleviation programs with the following indicators:

(i) Vertical expenditure efficiency (VEE): it represents the proportion of benefits accruing to families who would have been poor in the absence of benefits;

(ii) Spill-overs: it represents the ‘excess’ payment received by the poor;

(iii) Poverty reduction efficiency (PRE): it is the net extent to which the benefits reduce poverty.

# Chapter 6

# Equity implications of state water and energy concessions in Australia

## 6.1 Introduction

In Australia, both urban water prices and domestic energy prices have increased more rapidly than average household income and other costs of living in recent years. As water and energy are essential services, utility price increases will typically have a larger proportional impact on low-income and vulnerable households in the absence of concessions.

In recent years, both qualitative and quantitative research has shown that the number of households that have encountered utility stress and hardship has increased substantially (for example: Chapter Three; AER 2014b). For instance, complaints to Victoria's Energy and Water Ombudsman about energy disconnections, water restrictions, debt collections, or payment difficulties have tripled in the past five years (EWOV 2014). Utility stress can also trigger or amplify other financial stress, material deprivation, and health vulnerability (Chester 2013; Willis et al. 2006). As a result, responding to utility affordability among low-income and vulnerable households is becoming an increasing concern for Australia's energy sector reform (DIS 2015a; AEO, ERAA, and ACOSS 2013) and urban water sector reform (NWC 2014; PC 2011a).

Progressive reforms in the public utility sectors over the last two decades have increased the emphasis on economic efficiency, financial sustainability, market competition, and environmental imperatives (see Chapter Two). Given these changes, the application of universal utility tariff subsidies is not necessarily a

preferred policy option to achieve the traditional social objectives regarding public utilities (Komives et al. 2005). Instead, social goals might be more efficiently achieved through targeted subsidies (Komives et al. 2005) or activities and services specified in the CSOs of the sectors and funded by governments (Industry Commission 1997; PC 2011a).

A concession is defined as a fee reduction, discount, subsidy, rebate, or fee exemption on the value of goods and services (Harmer 2009). Both public and private sectors provide concession to specific targeted groups. In Australia, the provision of water and energy concessions to pensioners has been specified in the CSOs of the urban water and energy sectors. These concession payments were regarded as state transfers in kind in Australia's tax and transfers system in the Henry Review (Henry 2009). Eligibility for these concessions is typically based on holding one or more Commonwealth concession cards. Among pensioners, utility costs can be a substantial expense in relation their incomes. Harmer (2009) has suggested that these concessions are important supplementary payments, in addition to pension payments, that assist age pensioners to manage their essential utility expenses.

An increased interest in state concession policies has arisen in recent years as a result of rising utility prices, tightened government budgets, and Australia's ageing population (ACOSS 2014). Recent reviews on water concession (PC 2011a) and energy concession policies (Deloitte 2013; Johnston 2013a, 2013b) have concluded that the current concession schemes are both inconsistent and inequitable. Further to this, there is a lack of consistent eligibility criteria and some vulnerable households have fallen through the cracks of the current concession system (Deloitte 2013).

In his Pension Review, Harmer (2009: 113) found that current concession targeting did 'not effectively complement the role of income support in addressing the needs of groups with highest costs'. In addition, the use of Commonwealth concession cards as a gateway to state level concessions has contributed towards the disincentives for increasing employment income among pensioners and

eligible households, as an increased employment income can result in a high effective marginal tax rate (Henry 2009). Recognising the importance of these issues, a national review of state concession policies, including water and energy concessions has been recommended (Henry 2009; PC 2011a; AEO, ERAA, and ACOSS 2013).

Tighter targeting of social welfare and cuts to social spending are favourable policies when faced with fiscal constraints. Harmer (2009) suggested that 'options for tighter targeting should be explored' in response to an ageing population that benefits from the existing concession system. In addition, the Australian Government proposed the termination of federal funding for pensioner concession schemes in the May 2014 Budget in order to save AU$1.3 billion over four years (The Treasury 2014). Though the proposed policy was not passed in the Senate, it exposed the fiscal vulnerability of the current state concession scheme.

In Chapter 5, I found that the Victorian state water and energy concession scheme had high inclusion error rate and low vertical expenditure efficiency in respective to targeting households at risk of utility stress. Nonetheless, the adequacy and equity of state water and energy concessions scheme is yet not well understood. In this chapter, I expand the analysis to cover the equity aspects of the current state water and energy concession policies across all Australian jurisdictions.

Using the utility consumption data and household characteristics from the ABS 2012 HEC, I identify and model the amount of water and energy concession rebates received by eligible households in 2012-13. Two dimensions of equity, horizontal equity and vertical equity, are considered in my analysis. Horizontal equity refers to when individuals with similar circumstances are treated equally; while people with different circumstances are treated differently within a vertical equity perspective (Herscovitch and Stanton 2008).

My analysis found that both horizontal and vertical inequity exists in the current state utility concession entitlements and eligibility criteria. In particular, households with larger family size and higher utility burdens are disadvantaged as a result of state concession entitlement design. Targeting evaluation reveals that

30 to 40 per cent of low-income households at risk of utility stress were not eligible for concessions, while 60-80 per cent of non-utility stress households were eligible for concession benefits. The extent of inequality is more severe in water concession schemes than energy concession schemes across jurisdictions. Proposed alternative water and energy concession schemes in a national consistent framework are reviewed.

## 6.2 Context

### 6.2.1 Development of state concessions

Concessions play an important role in Australia's tax and transfer system and all three levels of government in Australia deliver some types of concessions (Henry 2009). In its review of Australia's tax and transfers system, the Henry Review defined concessions as:

> *Concessions are generally provided as reductions in prices or bills and are used to provide low-income groups with more affordable access to commonly used goods and services such as water, energy and transport. Concessions are also provided for government taxes and user charges (Henry 2009: 621).*

Concessions can be delivered in many forms, such as price reductions, discounts, subsidies, rebates, waivers, or exemptions on the values of goods and services. Sometimes a concession is provided on the basis of low-income, special needs or disadvantage, or being within a particular category such as age or war service or being a full-time student. In the public sector, concessions are provided for a particular policy rationale such as poverty reduction, to enhance social inclusion and participation, and to improve affordability of essential services, health services, education, and medicine purchases. In general, the provision of concessions is an important form of support to those in need in our society.

**Table 6.1** State and territory core concession expenditure, current prices, 2005-06 (AU$ million)

| | NSW | VIC | Qld | WA | SA | TAS | ACT | NT | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Total core concession expenditure (AU$ million)** | 613 | 395 | 322 | 217 | 109 | 64 | 19 | 8 | 1747 |
| Commonwealth funding on Special Purpose Payments (AU$ million) for compensation for extension of fringe benefits | 69 | 50 | 35 | 17 | 20 | 6 | 2 | 1 | 198 |
| Net state expenditure (AU$ million) | 544 | 345 | 287 | 200 | 89 | 58 | 17 | 7 | 1549 |
| ***Energy concession*** | | | | | | | | | |
| Expenditure (AU$ million) | 88 | 99 | 59 | 29 | 27 | 20 | 3 | 3 | 328 |
| Share of total concession expenditure (%) | 14 | 25 | 18 | 13 | 25 | 31 | 16 | 38 | 19 |
| Share of state concession expenditure (%) | 16 | 29 | 21 | 15 | 30 | 34 | 18 | 43 | 21% |
| ***Water and sewerage concession*** | | | | | | | | | |
| Expenditure (AU$ million) | 75 | 77 | n/a | 3 | 24 | n/a | 4 | 1 | 223 |
| Share of total concession expenditure (%) | 12 | 19 | n/a | 1 | 22 | n/a | 21 | 13 | 13 |
| Share of state concession expenditure (%) | 14 | 22 | n/a | 2 | 27 | n/a | 24 | 14 | 14 |

Data source: AIHW (2007: 32) Table 4.2.

Since the establishment of Australia's national welfare system in the early 1900s (Herscovitch and Stanton 2008), concessions have been gradually introduced as an important form of supplementary welfare, that is, transfers in kind, from all levels of government (Daniel 1999) (Appendix 6.1). State and territory governments have provided concessions on essential goods and services since 1972. The issue of the Pensioner Health Benefit Cards by the DSS in 1975 allowed eligible pensioners to access to a full range of discounted or free medical services, pharmaceuticals, and fare reductions on rail and shipping services. Over time, the PHB Card was replaced by the Pensioner Concession Card (PCC).

In 1993, the federal government extended the eligibility for the PCC to all part-rate pensioners. As a result, both full pensioners and part-rate pensioners are eligible for the state governments' core concessions as there is no discrimination between cardholders. Core concessions are the discounts or rebates on certain goods and services including charges on land, water and sewerage, energy services, motor vehicle registration and public transport (AIWH 2007). To compensate for the costs of an increased number of individuals becoming eligible for core concessions, the Commonwealth Government agreed to provide special purpose payments (SPPs) to state and territory governments under the COAG NPA. The NPA is renewed every four years (COAG 2008, 2013).

As summarised in Table 6.1, the total value of core concessions was estimated at AU$1.7 billion in 2005-06[11]. The state and territory government funded an estimated AU$1.5 billion of concession expenditure and the federal government funded the remainder through the SPPs (AIWH 2007). Of these, energy concessions and water and sewerage concessions accounted for 21 per cent and 14 per cent of the total state concession expenditure respectively. Compared across jurisdictions, energy concessions accounted for more than 40 per cent of the NT core concession expenditure while water and sewerage concessions accounted for

[11] In 2007, the AIWH Welfare Expenditure Australia series was put on hold due to budget constraints and no comprehensive state concession expenditure data has been updated in the recent Australia's welfare reports.

more than a quarter of concession expenditure in SA. Together, total water and energy concession expenditure accounted for more than half of the state core concession expenditure in the NT, SA, and Victoria. In 2012-13, Commonwealth Government funding for pensioner concession schemes was AU$270.5 million (COAG 2013). These figures convincingly demonstrate that concessions play an important role in Australia's tax and transfer system and welfare system by assisting those within the low-income and vulnerable groups in our communities.

### 6.2.2 The issues of current water and energy concessions policies

Given that water and energy are essential services, low-income households typically spend a relatively larger proportion of their income on these services, up to three to four times more than high income households (Chapter Four). Thus, any price rise in utility services has a larger impact on households with low incomes. Coincidental with the utility price increases, the number of households reported to have water or energy service restrictions, disconnections, utility debts, and payment difficulties has increased by two to three times in Victoria, NSW and other jurisdictions in the last few years (AER 2014; EWON 2014; EWOV 2014). Despite efforts to improve energy efficiency and water and energy conservation in low-income households, cases of fuel poverty, utility stress and energy hardships have also become increasingly common (Chester 2013; Simshauser et al. 2012; ACOSS 2014; Willis et al. 2006).

Targeted concessions for water and sewerage and energy utility services have become an additional safety net for households with low and fixed incomes in managing quarterly essential expenditure (Harmer 2009). These concessions reduce potential bill shock and improve utility affordability among eligible households faced with rapid utility price rises (ACOSS 2014).

The current state concession schemes which rely on the Commonwealth concession cards as eligibility standards have raised several issues. In the review

of the Australia's tax and transfers system, Henry (2009: Section F) noted that many of the current concessions on goods and services were inefficient, inequitable, and inconsistent. The value of concessions was unclear due to complex administration and the availability of similar concession benefits from multiple layers of government. In addition, eligibility for state concessions often relies on meeting the eligibility tests for the Commonwealth concession cards, and sometimes, the Commonwealth Seniors Health Card. The linked eligibility and concession benefits increase the effective marginal tax rate for concession recipients who increase employment income (Henry 2009: Section F6). In addition, the linked eligibility between state concession and Commonwealth concession schemes reduces the control of state governments over the concession budget. If the federal government changes eligibility for any of the Commonwealth concession cards that will have a direct impact on the number of eligible households and ultimately on state concession budgets.

The current funding arrangement also exposes the fiscal vulnerability of the state concession schemes. In May 2013, the Commonwealth Government announced its intention to terminate funding support to the NPA for pensioner concessions, to abolish the Seniors Supplement, and to increase the Age Pensioner age to 70 by 1 July 2035 (Klapdor 2013). The proposed termination of the NPA would provide savings of AU$1.3 billion over four years for the federal government (Klapor 2013; Australian Government 2014a). If the financial assistance from the Australian Government is withdrawn, state and territory governments would need to seek alternative revenues, such as through selling state assets (for example, through asset recycling) (Australian Government 2014b), or increasing taxes, or consider the withdrawal of some of the concessions available to eligible individuals or households.

Furthermore, trends in population ageing and governments' budget deficits have presented a further challenge to governments' social spending. Both the Pension Review (Harmer 2009) and recent welfare system review (McClure et al. 2014, 2015) have also recommended imposing tighter targeting, and further reforms to

make the social welfare system  simpler, fairer and more encouraging of work participation.

Several reviews have been conducted on state concessions over the last thirty years. Earlier reviews by the Standing Committee on Family and Community Affairs (HRC 1997) identified inequity relating to access to concessions, for instance ‘concessions available to pensioners are of higher monetary value than those available to the unemployed and others receiving “short-term” Government income support payments’. The Standing Committee recommended a review of concession eligibility criteria and the development of a national standard for the provision of concessions.

In relation to energy concession schemes, Deloitte (2013) found inconsistencies across jurisdictions. In particular vulnerable households such as family formation groups, single renters with low incomes, regional low-income households without a grid connection, and new home buyers with low residual incomes have fallen through the cracks. In the recent National Energy Affordability Roundtable, the Standing Council on Energy and Resources (SCER) recommended a national review of energy concessions with the intent to move towards a nationally consistent framework, and to identify an appropriate level of concessions (AEO, ERAA, ACOSS 2013: 4). Similarly, the Productivity Commission (2011a: 203) has observed that current water and sewerage concession schemes were ‘inefficient and inequitable’. Despite various incremental reviews of state concession policies over time, the issues of equity, efficiency and consistency still remain unaddressed.

## 6.3 Principles of concession design

### 6.3.1 Types of concession design

Within the framework of social policy delivery, there are five major approaches to designing state water and energy concession entitlements. These include (i) flat payment concessions; (ii) percentage-based concessions; (iii) income-based concessions; (iv) consumption-based concessions; and (v) price-based concessions. Table 6.3 describes different concession designs, their strengths and weaknesses, and application in Australia.

A variety of water and energy concession designs have been applied across Australian jurisdictions. Flat payments or rebates on fixed supply utility charges are the most common approach. Discounted water and energy usage charges have been applied in the NT, while Victoria is the only jurisdiction that has applied a percentage based discount on energy concessions.

There is no agreed design for concession entitlements as design is dependent on policy objectives and intended outcomes. Every concession design has benefits and deficiencies in relation to efficiency, equity, administration complexity, and fiscal predictability.

Given that the provision of state water and energy concessions is intended to achieve social policy objectives, these non-commercial activities are incorporated as CSOs for Government Business Enterprises (GBE). During the early public utility reforms, the definitions and funding of CSOs were reviewed in 1997 (Industry Commission 1997). In 2008, the Ministerial Council on Energy (MCE) outlined a national framework for energy CSOs in response to energy sector reforms (Table 6.4). Energy CSOs are defined as ‘services that governments require energy businesses to provide to sections of the community to fulfil government social policy objectives, including energy concessions and hardship assistance’ (Deloitte 2013: 21). The national framework provided a best practice guide for the development of a consistent, efficient and transparent approach for energy CSOs across jurisdictions. In its review of the urban water sector, the

Productivity Commission (2011a) suggested that it would be ‘more efficient to replace or amend concessions with direct payment to targeted households or rebates on the fixed component of water and wastewater service bills’.

The trends in increased energy market competition, energy pricing deregulation, and the increased number of households in energy hardship have brought a different emphasis to concession design. QCOSS (2014) recommend using a set of best principles for concession design that include: clear objectives; equity; adaptability; adequacy; and transparency (Table 6.4). In the 2013 National Energy Affordability Roundtable, the Standing Council of Energy and Resources (SCER) noted that ‘a percentage based concession applied to a customer’s bill provides the most meaningful and equitable assistance to eligible customers’ (AEO, ERAA and ACOSS 2013: 4). Over all, percentage-based concessions are claimed to be most adaptable and responsive to changing pricing and tariff arrangements in the competitive energy market (QCOSS 2014: 38). Nonetheless, these equity principles may contradict the efficiency objective in social policy design.

**Table 6.2** Major types of concession designs and their applications in Australia

| Concession types | Description | Strengths | Weaknesses | Applications in state water concessions | Applications in state energy concessions |
|---|---|---|---|---|---|
| **Flat payment concession** | Provide eligible households with a flat dollar amount as a discount off their bills | Administrative simplicity; budget predictability; avoids price distortion and thus affecting consumer behaviour | Inequitable and inadequate for large households with high utility consumption | NSW, ACT, TAS, Qld - discount on fixed charges only | NSW, Qld, SA - fixed energy rebate<br>WA - max. rebates varied with card types and no. of children |
| **Percentage-based concession** | Eligible households receive a percentage discount off their bill | Indexes automatically to open utility market; more equitable to larger households with higher utility consumption | Budget unpredictability; price distortion | Victoria - discount on total bill up to maximum rebate; SA: discount on total water bill with min and max rebate | Victoria - 17.5% discount off total electricity bill and winter gas bill without cap |
| **Income based** | Eligible household only pay up to a maximum | Avoid utility stress problem; more | Budget issue; disincentive to water or | n/a | n/a |

| | | | | | |
|---|---|---|---|---|---|
| **concession** | set proportion of their income on utility costs | equitable; | energy conservation; need HH income data to compute the rebate | | |
| **Consumption based concession** | Provide eligible households with a set level of energy use that is discounted or free | Ensure affordability of essential level of utility consumption | No agreement on discounted or free thresholds; levels need to varied with household size to account and climate condition to achieve equity | WA - discount on fixed charge and usage charge up to specified consumption level | ACT, TAS - discount rate up to maximum cap |
| **Price-based concession** | Eligible households are provided with subsidised tariff rates for their utility consumption | | Budget unpredictability; price distortion; | NT - concessional daily supply charge, sewerage charge, and usage charge | NT - concessional daily supply charge and usage charge |

**Source:** Adapted from QCOSS (2014).

**Table 6.3** Principles of CSOs and concession design

| Principle of energy CSOs | Principle of concessions |
|---|---|
| 1. CSOs should only be provided by governments where they are not commercial or efficient for the market to provide<br>2. Obligations for CSOs should be clearly specified by governments in publicly available documents<br>3. CSOs should be delivered transparently<br>4. CSOs should be directly funded by government, wherever possible<br>5. CSOs should be designed to achieve their social policy objectives in a cost effective manner<br>6. Cross subsidies between customers should not be used to deliver CSOs<br>7. CSOs should not materially impede competition in energy markets<br>8. CSOs should target identified sections of the community and minimise the impacts on general consumption patterns<br>**9.** CSOs should be reviewed regularly | 1. There is a clear identification and understanding of the target group<br>2. The government's social objectives and desired outcomes from the concession arrangements must be clearly defined<br>3. The operation of the concession produces the same outcome for people in similar circumstances (horizontal equity)<br>4. The concession produces vertical equity<br>5. The concession entitlements are clear to intended recipients, non-discretionary in their application, and the concession system is easy to use by the total number of people it is targeted at<br>6. People receiving the concession should receive the same goods and services on the same terms and conditions as apply to other customers<br>7. The concession must be flexible enough in its design to respond to the changing circumstances of eligible groups<br>8. The level of the concession must improve affordability of access to the service with which it is linked<br>9. The concession must be effectively managed in order to achieve its stated objectives and intended outcomes<br>10. The concession must be broadly consistent with other government policies<br>11. The concession must be supplemented by a small program of safety nets to provide one off assistance |

**Sources:** MCE (2008); QCOSS (2014).

### 6.3.2 Principle of equity

Equity is widely accepted as one of the core principles of social policy (Österle 2002). The notion of equity encompasses both qualitative and quantitative dimensions, and the concept of equity means different things to different people. Culyer and Wagstaff (1993) define equity in four dimensions: equality of utilisation; distribution according to need; equality of access; and equality of outcome. In addition, equity considerations can be extended to an intergenerational perspective by examining how the decisions of today's individuals and the government and welfare system, affect future generations (Commonwealth of Australia 2015). Equity can also be perceived as the equality of opportunity for individuals to participate in society, to achieve the things they value, and to create an inclusive society (OECD 2014). Under a right-based framework, equity means everyone has the right to access affordable essential services, such as water, sanitation and energy services, to be able to achieve a standard of living and affordable warmth (Smets 2000; Roberts 2008).

There are large number of social policy literature on the different dimensions of measuring equity (or inequity). Among all, the Lorenz curve and the Gini coefficient form the main conceptual bases for most of the equity measures, particularly analysing income inequality (Cowell 1977). The Lorenz curve is a graphical presentation which shows the cumulative percentage of total income received by each recipient population and is plotted against the cumulative percentage of the corresponding population from each unit. The extent of the plotted curve sags below diagonal, which is referred as the 'line of equality', represents the degree of inequality of income distribution among the population. The Gini coefficient, which is expressed as Gini ratio or Gini index, represent the extent to which the distribution of income among individual recipient units deviates from the perfectly equal distribution. Graphically, the Gini index represents the area between the Lorenz curve and the diagonal - the 'line of equality'. The Gini ratio is between 0 and 1, that is 0 represents perfect equality, while 1 implies perfect inequality. Other inequality measures include Atkinson's inequality aversion index for distribution, which measure the equity impacts of

transfers on income distribution (Atkinson 1970); Shorrocks aggregate inequality index, which accounts for the extent of 'within group' inequality and 'between group' inequality (Shorrocks 1980); and the Kakwani index, also called the concentration curve, which measures the progressivity of income transfers (Kakwani 1986). There are strengths and weaknesses of different inequality measures (Mitchell 1991: 105-120). The choice of an appropriate measure, however, would largely depend on the focus of each study.

Both policymakers and social policy practitioners are interested in ensuring that the current state utility concessions are delivered equitably, adequately, and efficiently to those who are in most need. In this analysis, two commonly used principles of equity are considered – horizontal equity and vertical equity (Herscovitch and Stanton 2008). Horizontal equity means that people with similar circumstances, such as similar economic resources, should be treated the same. For instance, households are expected to receive similar amounts of concession benefits should they have similar economic resources, regardless of where they live. On the other hand, vertical equity means that people with different circumstances should be treated differently. For instance, people who are unable to work due to old age, disability or caring responsibilities, should be treated differently to those who are fully employed in the labour force. In addition, people with higher needs for water and energy utility services due to particular circumstances, such as medical reasons, health concerns, having young children, and who also have a low income, should be recognised in the concession system.

## 6.4 Analytical framework

Horizontal inequity in concession eligibility is assessed by examining if households with similar economic resources, but with different concession card types, are treated equally in different jurisdictions. In this analysis, households were considered eligible for water and energy concessions in accordance with their relevant household characteristics in the survey dataset and state concession rules. Vertical inequity of concession eligibility is revealed if households with

fewer economic resources are more likely to be eligible for state concessions. To differentiate poor and non-poor households, half of the median income is used as the measure of the poverty line and is commonly applied in poverty research (e.g. Mitchell et al. 1994). In this case, income is ranked in equivalised disposable household income after housing costs; and households that have income below half of the median equivalised household income after housing cost (i.e. 0.5 x $647.3 per week) are considered as income poor.

### 6.4.1 Equity implications of concession entitlements

Horizontal equity at a national level of concession entitlements means that households with similar circumstances, but who are residing in different jurisdictions, are given a similar value of concession benefits. I use the percentage discount from pre-concession annual water and energy utility bills as a proxy of concession benefit values. Within the horizontal equity context, eligible households with larger family sizes that have higher levels of water and energy consumption need, should be given more concession rebates to account for their household composition relative to those with smaller families, all other factors remaining equal. In addition, the concession discount from the pre-concession annual utility bills among households was compared amongst different household sizes. To achieve vertical equity means that concession assistance should be targeted to households with less economic resources (equivalised household income after housing cost) or those experience higher utility burdens.

## 6.5 Data and key variables

The analysis in this paper uses the 'CURF data from HEC 2012 that was conducted by the ABS in 2012 (ABS 2013b). This was the first comprehensive national household energy consumption survey in Australia and included detailed household characteristics, income, domestic energy expenditure, and transport fuel expenditure.

The income and expenditure information within the survey were reported on a weekly basis. For the purpose of this analysis, the weekly utility expenditure information was converted to annual figures to model the amount of water and energy concessions received. Given there are substantial changes in water and energy concession policies before and after 1 July 2012, the 2012-13 water and energy concession policies were adopted (in Appendix 6.2 and 6.3) as these are most similar to the current concession policies of today.

Table 6.5 summarises some of the key household income and utility expenditure modified from the dataset. Household disposable income is adjusted with housing costs and the OECD modified scale so as to account for unavoidable housing related expenditure and the economic needs of different family structures. This allow us to compare the eligibility criteria to receive concession and amount of concession benefits received by households with similar economic resources across different jurisdictions.

**Table 6.4** Key household income and utility expenditure variables modified from the dataset

| Modified variable | Variable in HEC 2012 CURF data | Modification |
|---|---|---|
| Annual household water expenditure (AU$) | Weekly water rates payments – HH (*RATESWCH*) | RATESWCH x (365/7) weeks |
| Annual household fuel expenditure (AU$) | Household weekly expenditure on types of dwelling energy (*TOTEXP*) | *TOTEXP* x (365/7) weeks |
| Annual household electricity expenditure (AU$) | Household weekly expenditure on electricity (*ELECPAY*) | *ELECPAY* x (365/7) weeks |
| Annual household gas expenditure (AU$) | Household weekly expenditure on mains gas (*TOTGAS*) | *TOTGAS* x (365/7) weeks |
| Annual household disposable income (AU$) | Current weekly HH disposable income (*DISPSCH8*) | *DISPSCH8* x (365/7) weeks |
| Annual housing costs (AU$) | Weekly housing costs – HH (*HCOSTSH*) | *HCOSTSH* x (365/7) weeks |

| | | |
|---|---|---|
| Annual household disposable income after housing cost (*HHDINCAHC*) | n.a. | (*DISPSCH8 – HCOSTSH*) x (365/7) weeks |
| OECD Modified scale (*OECDSCALE*) | n.a. | First adult=1, each additional adult 0.5, each additional child 0.3 |
| Equivalised household disposable income after housing cost per annum (AU$) | n.a. | *HHDINCAHC / OECDSCALE* |

Given that the dataset does not specify if households have received state water and energy concessions or whether they owned any concession card(s), eligibility for water and energy concession was determined from characteristics of household members and if they received specific types of income support payments in the personal level HEC 2012 CURF dataset. The following assumptions were used to identify and model concession recipients based on the eligibility criteria of different concession card types (Appendix 6.4) :

- Household members with Pensioner Concession Card are those households with any individual who receives Centrelink's Pension Supplements. All age pensioners, non-age pensioners, and DVA Gold Card holders are eligible for Pension Supplements, and it is automatically paid quarterly to eligible recipients.
- Household members with DVA Gold Card are households with any individual who receives Department of Veterans' Affairs' Service Pension, Disability Pension or War Widows Pension.
- Household members with Health Care Card are households with any individual who receives one of the following types of income support payments: Carer Payment, Newstart Allowance, Parenting Payment, Partner Allowance, Sickness Allowance, War Widow Pension, Youth Allowance.

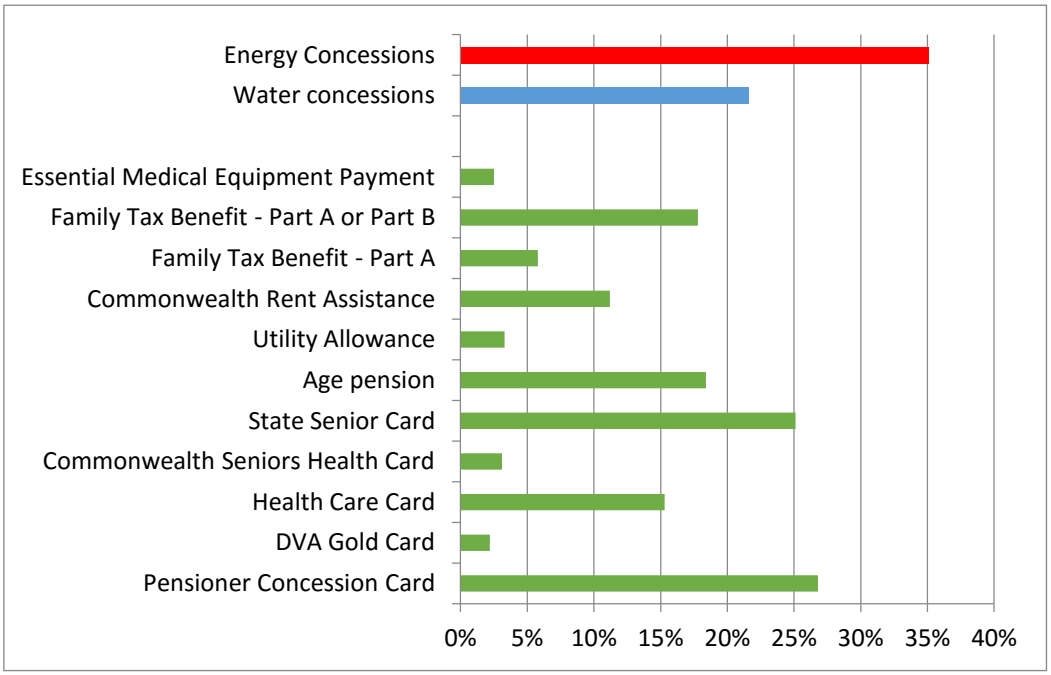
- Household members with Commonwealth Senior Health Card (CSHC) are households with any individual who receives Centrelink's Seniors Supplements. Only CSHC holders are eligible for receiving Seniors Supplements and it is automatically paid quarterly to eligible recipients.
- Households receiving Family Tax Benefits (either Part A or Part B) are households with any individual who receives Family Tax Benefits. This payment was modelled by ABS.
- Households receiving Family Tax Benefits (FTB) - Part A are households with any individual who receives both FTB and Commonwealth Rent Assistance. According to DHS (2015h), all FTB-Part A recipients who rent a home are eligible for Commonwealth Rent Assistance.
- Household members who held a state seniors card was identified by the age of the reference person in the HEC 2012 survey and age eligibility in different jurisdictions (see Appendix 6.5). Conditions on working hours are not accounted for in this analysis due to data limitations.

All the income support payments and eligibility for Commonwealth concession cards are administered by the federal government. It is noted that each state and territory has its own seniors card scheme. The state seniors cards (SSC) are free cards which provide transport concessions and discounts at participating business on a range of goods and services. In WA, for instance, approximately 345,000 Western Australians have WA Seniors Cards. In some jurisdictions, state seniors card holders are eligible for water and energy concessions. In most cases, eligibility for the state seniors card is based on age, but some jurisdictions include allowable working hours as conditions. Eligibility criteria for the state seniors card in each jurisdiction is summarised in Appendix 6.5.

As illustrated in Figure 6.1, about 27 per cent of Australian households held a Commonwealth PCC in 2012-13, 2.2 per cent had a DVA Gold Card, 15.3 per cent had a HCC, 3.1 per cent had a CSHC, and 25.1 per cent had a state seniors card (SSC). In that year, about 18 per cent of Australian households received

Family Tax Benefits (FTB), with 5.8 per cent receiving FTB-Part A payments. Only 0.3 per cent of households received Utility Allowance (UA) because UA payment had been integrated as part of the Pension Supplement and Senior Supplement for PCC and CSHC holders after the pension reforms in 2009.

**Figure 6.1** Percentage of households identified as holders of different types of concession cards, receiving different income support payments, and were eligible for state water and energy concessions in 2012-13




Data: Author calculated from HEC 2012 survey CURF data

Household eligibility for state water and energy concessions is identified with the application of the above assumptions and eligibility criteria among different jurisdictions in 2012-13 (details summarised in Appendix 6.3 and 6.4). As highlighted in Figure 6.1, 21.6 per cent of Australian households were eligible for water concessions, and 35 per cent eligible for energy concessions in 2012-13.

The value of concession entitlements varies across different concession card types, tenancy types, and across jurisdictions. Based on household characteristics, annual utility expenditure, water and energy tariffs in different jurisdictions, and state concession entitlement rules, the amount of water concessions and energy concessions received in 2012-13 was calculated. Information on domestic water and sewerage tariffs in 2012-13 within different jurisdictions was taken from the National Water Commission *Urban Water Utilities Performance Report 2012-13* (NWC 2013), while domestic energy tariffs used are the regulated tariffs published by state economic regulators in different jurisdictions during 2012-13. My analysis shows that the average concession received among eligible Australian households was AU$264.7 per annum for water concessions and AU$240.5 for energy concessions in 2012-13 (Table 6.6).

To identify which households are in most need of water and energy concessions, an analytical framework using the LIHB method and the subjective method developed in Chapter Four is applied. The following definitions required for the analysis include:

- Pre-concession water burden is defined as the percentage of disposable income spent on domestic water expenditure, prior to concession being applied.
- Pre-concession energy burden is defined as the percentage of disposable income spent on domestic fuel expenditure, prior to concession being applied.
- Post-concession water burden is defined as the percentage of disposable income spent on domestic water expenditure after concession is applied.
- Post-concession energy burden is defined as the percentage of disposable income spent on domestic fuel expenditure after concession is applied.
- Households that are classified as at risk of HBWAS are those who had water burdens exceeding 3 per cent and which were also below the fortieth percentile of the income distribution.

- Households that are classified as at risk of HBEAS are those who had energy burdens exceeding 10 per cent and which were also below the fortieth percentile of the income distribution.
- Households that are identified with SEAS are those who reported at least one or more energy-related financial stress in the HEC 2012 survey.

Table 6.6 shows the summary statistics of annual household income, annual utility expenditure, and utility burdens among Australian households in 2012-13. Prior to the state concession being applied, the average water burden among households that paid for water and sewerage expenditure was 1.3 per cent, and the average energy burden was 3.4 per cent. There were 5.1 per cent of Australian households identified as being at risk of HBWAS, 3.4 per cent in HBEAS, and 21 per cent in SEAS. After concessions are applied, the HBWAS headcount index is reduced from 5.1 per cent to 3.4 per cent, and the HBEAS headcount index was reduced from 3.4 per cent to 2.6 per cent. The average water burden reduced from 1.3 per cent to 1.1 per cent and average energy burden reduced from 3.4 per cent to 3.2 per cent among Australian households.

**Table 6.5** Summary Statistics from the ABS Household Energy Expenditure Survey 2012

| Variable | weighted mean | standard deviation | N |
|---|---|---|---|
| **Annual household income (AU$'000)** | | | |
| Household gross income | 152.7 | 110.2 | 11538 |
| Household disposable income | 83.4 | 63.2 | 11538 |
| Household disposable income after housing cost | 69.1 | 58.6 | 11538 |
| **Annual water and sewerage expenditure (W&S expenditure) (AU$)** | | | |
| W&S expenditure prior to concession | 799.4 | 489.8 | 8126 |
| Modelled water concession | 264.7 | 163.0 | 2602 |
| W&S expenditure after concession | 729.3 | 510.0 | 8126 |
| **Annual domestic fuel expenditure (AU$)** | | | |
| Energy expenditure prior to concession | 2,066.2 | 1,276.7 | 11205 |
| Modelled energy concession | 240.5 | 116.5 | 4258 |
| Energy expenditure after concession | 1,978.4 | 1,284.6 | 11205 |
| **Utility burden (%)** | | | |
| Pre-concession water burden | 1.3% | 1.2% | 8126 |
| Post-concession water burden | 1.1% | 1.1% | 8126 |
| Pre-concession energy burden | 3.4% | 2.9% | 11205 |
| Post-concession energy burden | 3.2% | 2.7% | 11205 |
| **Utility Stress** | | | |
| Percentage of households at risk of HBWAS prior to concession | 5.1% | -- | 11538 |
| Percentage of households at risk of HBWAS after concession | 3.4% | -- | 11538 |
| Percentage of households at risk of HBEAS prior to concession | 3.4% | -- | 11538 |
| Percentage of households at risk of HBEAS after concession | 2.6% | -- | 11538 |
| Percentage of households reported with SEAS | 21.0% | -- | 11538 |
| **Utility bill payment** | | | |
| Percentage of households who paid W&S bills | 72.3% | -- | 11538 |
| Percentage of households who paid for domestic fuel | 97.3% | -- | 11538 |

Note: Some households were excluded from this analysis, including: (i) households who had a disposable income of less than zero; (ii) households who had zero or below zero water or energy expenditure; and (iii) households who had unusually high water expenditure or energy expenditure (outliers).

## 6.6 Equity implications of current concession schemes

Based on the concession eligibility criteria across different jurisdictions, I estimate that more than one fifth of Australian households (that is, around 1.8 million households) were eligible for water and sewerage concessions, and around 39 per cent (that is, around 3.2 million households) were eligible for energy concessions (Table 6.7). When comparing across jurisdictions, the proportion of households eligible for water concessions is highest in Victoria and SA (more than 30 per cent), and the proportion of households eligible for energy concessions is highest in NSW and Tasmania (more than 45 per cent). By comparison, Queensland had the lowest proportion of households eligible for water concessions (only 11 per cent) and the NT had the lowest proportion of households eligible for energy concessions (less than 25 per cent). The estimated total expenditure on water concessions and energy concessions were AU$429 million and AU$750 million respectively in 2012-13. Among all jurisdictions, NSW spent the most on both water and energy concessions, while the ACT spent the least on water concessions and the NT the least on energy concessions.

**Table 6.6** Estimated number and percentage of households eligible for concessions and estimated concession expenditure, 2012-13

| | Water and sewerage concessions | | |
|---|---|---|---|
| | **Percentage of households** | **No. of eligible HH ('000)** | **Estimated expenditure (AU$ million)** |
| **NSW** | 17.42% | 469.16 | 155.00 |
| **VIC** | 32.90% | 688.26 | 148.00 |
| **QLD** | 11.06% | 185.75 | 22.10 |
| **SA** | 30.43% | 198.83 | 48.80 |
| **WA** | 22.16% | 195.95 | 32.90 |
| **TAS** | 25.42% | 51.38 | 8.05 |
| **NT** | 12.74% | 8.08 | 8.46 |
| **ACT** | 13.63% | 18.46 | 6.13 |
| **Australia** | **21.61%** | **1,815.88** | **429.00** |

| | Energy concessions | | |
|---|---|---|---|
| | Percentage of households | No. of eligible HH ('000) | Estimated expenditure (AU$ million) |
| **NSW** | 46.79% | 1,260.01 | 250.00 |
| **VIC** | 37.31% | 780.53 | 195.00 |
| **QLD** | 28.30% | 475.52 | 111.00 |
| **SA** | 39.61% | 258.86 | 42.50 |
| **WA** | 36.99% | 327.08 | 79.80 |
| **TAS** | 45.31% | 91.58 | 45.90 |
| **NT** | 24.58% | 15.59 | 12.70 |
| **ACT** | 26.65% | 36.11 | 13.40 |
| **Australia** | **38.62%** | **3,245.27** | **750.00** |

Source: Author estimation based on HEC 2012 data and state concession rules

### 6.6.1 Horizontal equity in concession eligibility

When comparing the eligibility criteria for water and energy concessions, there is some extent of consistency across jurisdictions (Table 6.8). This was due to the implementation of the COAG National Partnership Agreements between the federal government and state governments (COAG 2008, 2013). In the agreements, all state governments agreed to provide the 'core concessions' to PCC holders including both full pensioners and part-pensioners.

I find that all jurisdictions have introduced particular concessions related to medical conditions that mean households consume additional water and energy. For example, Life Support Concessions are provided to assist with the cost of water consumption for haemodialysis machines, and to assist with energy costs for using intermittent peritoneal dialysis machines, haemodialysis machines or oxygen concentrators. In addition, recognising the extra heating or cooling costs paid by patients who are unable to regulate their body temperature, such as those who suffer from multiple sclerosis, all state and territory governments have

introduced concessions related to medical heating and cooling. Eligibility for these concessions requires a medical certificate to prove the claimed medical conditions and the use of specified medical equipment. Nonetheless, there is significant variation between jurisdictions regarding the kinds of equipment and medical conditions for which concessions are available (ACOSS 2014).

Horizontal inequities in water and energy concession eligibility are found between jurisdictions. First, household members with low income HCC are not eligible for water concessions in NSW, Queensland and the ACT. HCC holders are mostly unemployed or full time students and receiving the Newstart Allowance. These benefits are lower and have a tighter means test than age pensions. Therefore, it was observed that utility bill payment difficulties and energy hardship is more common among other income support recipients than among age pensioners (Chapter Three). Second, renters who pay water bills are excluded from receiving water concessions in most jurisdictions, except in Victoria and SA. This is despite the fact that renters generally have lower income, lower net wealth, and a higher risk of being unemployed than home owners. This is paradoxical because most current tenancy agreements expect renters to pay for water usage charges while home owners pay for the water and sewerage fixed charge. On this basis alone, renters should be eligible for water concessions.

Lastly, SSC holders or CSHC holders, who might not be poor, are eligible for both water and energy concessions in WA and the NT, and energy concessions in Queensland. Eligibility for a state seniors card is based on age and reported number of hours of work engaged rather than a means test. Furthermore, eligibility for a CSHC is relatively generous because the purpose of the CSHC was to provide self-funded retirees, who are not eligible for age pensions, with access to cheaper prescription medicines through the Pharmaceutical Benefit Scheme. As a result, many CSHC holders are not characterised by either low-income or low wealth (Siminski 2009).

**Table 6.7** Water and energy concession eligibility across jurisdictions, 2012-13

| | | PCC/ DVA holders | HCC holders | CSHC holders | SSC holders | Renters | Medical conditions* | Other low income |
|---|---|---|---|---|---|---|---|---|
| NSW | Water | Y | | | | | Y | |
| | Energy | Y | Y | | | Y | Y | Family Energy Rebate for FTB recipients |
| Victoria | Water | Y | Y | | | Y | Y | |
| | Energy | Y | Y | | | Y | Y | |
| Queensland | Water | Y | | | | | Y | |
| | Energy | Y | Y | | Y | Y | Y | |
| South Australia | Water | Y | Y | | | Y | Y | Low-income earners, full- time students, other allowance recipients |
| | Energy | Y | Y | | | Y | Y | |
| Western Australia | Water | Y | Y | Y | Y | | Y | |
| | Energy | Y | Y | Y | Y | Y | Y | DCR – additional payment depends on no. of children; ACR - eligible locations |
| Tasmania | Water | Y | Y | | | | Y | |
| | Energy | Y | Y | | | Y | Y | |
| Northern Territory | Water | Y | Y | Y | Y | | Y | NTPCC |
| | Energy | Y | Y | Y | Y | Y | Y | NTPCC |
| ACT | Water | Y | | | | | Y | Refugee |
| | Energy | Y | Y | | | Y | Y | |

**Note:** * Medical conditions refer to life support concession and medical heating or cooling concession. Life support concession is available for household members using specific life support equipment which requires high water or energy consumption. Medical heating or cooling concession is available for households with member(s) who have medical conditions that may impede their ability to regulate their body temperature.

Some state and territory governments have extended concession eligibility to particular segments of the community to assist with utility affordability. For instance, some low-income households such as those headed by unemployed people or full time students are eligible for water concessions in SA, even if the head of the household does not hold a PCC, DVA card, or HCC. In the ACT, refugees are eligible for water concessions. In NSW, a Family Energy Rebate, a lump sum payment, is available to households which receive Family Tax Benefits Part A or Part B. In WA, a Dependent Child Rebate (DCR) is paid to concession households with children to acknowledge the extra energy costs associated with children. Payments under the DCR vary with the number of children. In addition, an ACR is paid to eligible households in specific locations that have periods of exceptionally high temperatures during the summer months.

There is a trade-off between nationally consistency and addressing specific local needs. A nationally consistent eligibility would result in a more equitable targeting across jurisdictions. Nonetheless, given the variations of climate and socio-economic status across Australia, there may be an advantage in having state concession card schemes, such as the NT Pensioner and Carer Concession Card (NTPCC) scheme, may provide flexibility and adaptability to address water and energy affordability that is responsive to local circumstances.

### 6.6.2 Vertical equity in concession eligibility

#### *Targeting to households in income poverty*

The vertical equity of state utility concession scheme can be assessed by whether concession benefits were targeted to people with relatively low economic resources. The first assessment analyses the targeting outcome towards households in income poverty.  Households are classified to be in income poverty if the household income is below half of the median income in the population

(Saunders et al. 2012). Income is adjusted with tax payments and housing costs, which are considered as unavoidable expenses of domestic households, and adjusted with an equivalisation scale that accounts for the different economic resources required for different household structures. The OECD modified scale was applied for equivalisation, which has index 1 for the first adult, 0.5 for an additional adult, and 0.3 for each child under the age of 15.

As summarised in Table 6.9a, less than half (42 per cent) of income-poor Australian households who paid for water and sewerage bills were eligible for state water concessions (i.e. successfully targeted) in 2012-13. Victoria, SA and the NT had higher successful targeting rates than other jurisdictions. However, in Queensland, almost 67 per cent of income-poor households were not eligible for a water concession (i.e. exclusion error). The overall inclusion error for state water concession schemes is very high. For instance, over 80 per cent of the households eligible for water concession are not considered to be income poor (i.e. inclusion error). In the ACT, over 95 per cent of the households that eligible for water concessions are classified as non-poor.

The state energy concession schemes have higher successful targeting rates than the water concession schemes (Table 6.9b). Over 60 per cent of income-poor households were eligible for energy concessions (i.e. successfully targeted) under the state concession eligibility criteria in 2012-13. The NT, which relied on the NTPCC scheme, successfully targeted three quarters of the income-poor households. Similarly, more than 70 per cent of income-poor households residing in NSW and SA were eligible for energy concessions. By contrast, only 43 per cent of income-poor Queensland households were eligible for energy concessions. However, energy concession schemes had high inclusion errors in Australia. More than 35 per cent of the non-poor households are eligible for energy concession (i.e. inclusion error). At the same time, only 25 per cent of the eligible households were considered as income poor, that means, the remaining 75 per cent were considered as non-income poor.

**Table 6.8** Income poverty targeting of state utility concessions, 2012-13

(a) Income poverty targeting of state water concessions

| | Income poor households who paid W&S bill | | Non-income poor households | | Households eligible for water concession | | Households not eligible for water concession | |
|---|---|---|---|---|---|---|---|---|
| | Number of income poor households ('000) | Eligible for water concession (successful targeted) | Number of non-poor households ('000) | Eligible for water concession (inclusion error) | Number of concession households ('000) | Income poor households (successful targeted) | Number of non-concession households ('000) | Income poor households (exclusion error) |
| **NSW** | 267.29 | 19.62% | 2,425.45 | 24.39% | 469.16 | 11.18% | 2,223.57 | 14.26% |
| **VIC** | 217.35 | 67.33% | 1,874.87 | 33.77% | 688.26 | 21.26% | 1,403.96 | 6.26% |
| **QLD** | 94.78 | 32.94% | 1,585.34 | 21.07% | 185.75 | 16.81% | 1,494.38 | 9.89% |
| **SA** | 61.82 | 68.18% | 591.70 | 35.69% | 198.83 | 21.20% | 454.68 | 6.51% |
| **WA** | 78.13 | 37.66% | 806.00 | 26.45% | 195.95 | 15.02% | 688.18 | 9.52% |
| **TAS** | 10.01 | 57.46% | 192.11 | 40.76% | 51.38 | 11.19% | 150.73 | 6.03% |
| **NT** | 2.19 | 66.51% | 61.23 | 25.04% | 8.08 | 18.01% | 55.34 | 3.56% |
| **ACT** | 3.92 | 19.33% | 131.54 | 19.91% | 18.46 | 4.11% | 117.00 | 4.26% |
| **Australia** | **735.50** | **42.09%** | **7,668.23** | **28.02%** | **1,815.88** | **17.05%** | **6,587.85** | **9.99%** |

**Note:** Income poor households are defined as those below 50 per cent of median equivalised household disposable income after adjusted with housing costs

(b) Income poverty targeting of state energy concessions

| | Income poor households | | Non-income poor households | | Households eligible for energy concession | | Households not eligible for energy concession | |
|---|---|---|---|---|---|---|---|---|
| | Number of income poor households ('000) | Eligible for energy concession (successful targeted) | Number of non-poor households ('000) | Eligible for energy concession (inclusion error) | Number of concession households ('000) | Income poor households (successful targeted) | Number of non-concession households ('000) | Income poor households (exclusion error) |
| **NSW** | 442.39 | 71.30% | 2,250.34 | 41.98% | 1,260.01 | 25.03% | 1,432.73 | 8.87% |
| **VIC** | 275.18 | 67.15% | 1,817.04 | 32.79% | 780.53 | 23.67% | 1,311.69 | 6.89% |
| **QLD** | 272.73 | 42.81% | 1,407.39 | 25.49% | 475.52 | 24.55% | 1,204.60 | 12.95% |
| **SA** | 94.09 | 71.58% | 559.43 | 32.23% | 258.86 | 26.02% | 394.65 | 6.78% |
| **WA** | 107.09 | 61.11% | 777.05 | 33.67% | 327.08 | 20.01% | 557.05 | 7.48% |
| **TAS** | 31.41 | 69.45% | 170.71 | 40.87% | 91.58 | 23.82% | 110.54 | 8.68% |
| **NT** | 31.41 | 74.54% | 56.24 | 18.20% | 15.59 | 34.34% | 47.83 | 3.82% |
| **ACT** | 7.18 | 69.34% | 122.14 | 22.00% | 36.11 | 25.59% | 99.36 | 4.11% |
| **Australia** | **1,243.39** | **63.22%** | **7,160.34** | **34.34%** | **3,245.27** | **24.22%** | **5,158.46** | **8.86%** |

**Note:** Income poor households are defined as those below 50 per cent of median equivalised household disposable income after adjustment with housing costs

### *Targeting to households in utility stress*

The current concession schemes were evaluated in relation to whether they successfully targeted households that are identified with utility stress –HBWAS, HBEAS, and SEAS, as described in Chapter Four. In my analysis, successful targeting means that households who are at risk of utility stress are eligible for concessions. Inclusion error refers to the circumstance where households who do not have utility stress are eligible for concessions. Exclusion error refers to the situation where households who are at risk of utility stress are ineligible for concessions. The targeting outcomes of state water concession and energy concession schemes are summarised in Table 6.10a and 6.10b respectively.

In 2012-13, almost 60 per cent of HBWAS households were eligible for water concessions under state concession eligibility criteria (i.e. successfully targeted) (Table 6.10a). Across jurisdictions, Tasmania had the highest proportion of HBWAS households (86 per cent) were eligible for water concessions. However, in NSW, more than 60 per cent of HBWAS households excluded from receiving concessions (i.e. exclusion error). Overall, more than 85 per cent of eligible water concession households in Australia were not at risk of HBWAS (i.e. inclusion error).

In terms of energy concession schemes, almost 70 per cent of HBEAS households were eligible for concessions in Australia (i.e. successfully targeted) (Table 6.10b). Across jurisdictions, the NT had the highest successful targeting rate (63 per cent) and Queensland had the lowest successful targeting rate (21 per cent). In terms of inclusion errors, about 38 per cent of non-HBEAS Australian households were eligible for concessions. Across Australia, only 10 per cent of the eligible households were at risk of HBEAS (i.e. successfully targeted); thus, more than 90 per cent of eligible households were not considered as at risk of HBEAS (i.e. inclusion error).

In 2012, almost one fifth of the Australian households self-reported as encountering SEAS (Chapter Four). Table 6.10c indicates that less than half of the SEAS households were eligible for energy concessions in 2012-13 (i.e.

successfully targeted). NSW had the highest successful targeting rate (62 per cent) towards SEAS households and the Queensland concession scheme had the lowest successful rate (21 per cent). Over 36 per cent of the non-SEA households were eligible to energy concessions (i.e. inclusion error). Among eligible energy concession households, only 26 per cent were considered as encountering SEAS. Only 17 per cent of the SEAS households were excluded from receiving energy concessions (i.e. exclusion error).

**Table 6.9** Utility stress households targeting of state concessions, 2012-13

(a). HBWAS households targeting of state water concessions

| | HBWAS households | | Non-HBWAS households | | Households eligible for water concession | | Households not eligible for water concession | |
|---|---|---|---|---|---|---|---|---|
| | Number of HBWAS households ('000) | Eligible for water concession (successful targeted) | Number of non-HBWAS households ('000) | Eligible for water concession (inclusion error) | Number of concession households ('000) | HBWAS households (successful targeted) | Number of non-concession households ('000) | HBWAS households (exclusion error) |
| **NSW** | 103.87 | 38.11% | 2,588.86 | 16.59% | 469.16 | 8.44% | 2,223.57 | 2.89% |
| **VIC** | 138.20 | 71.06% | 1,954.02 | 30.20% | 688.26 | 14.27% | 1,403.96 | 2.85% |
| **QLD** | 83.34 | 59.23% | 1,596.78 | 8.54% | 185.75 | 26.58% | 1,494.38 | 2.27% |
| **SA** | 56.06 | 61.22% | 597.45 | 27.54% | 198.83 | 17.26% | 454.68 | 4.78% |
| **WA** | 24.36 | 70.13% | 859.77 | 20.80% | 195.95 | 8.72% | 688.18 | 1.06% |
| **TAS** | 13.31 | 85.71% | 188.81 | 21.17% | 51.38 | 22.20% | 150.73 | 1.26% |
| **NT** | 4.03 | 75.70% | 59.39 | 8.47% | 8.08 | 37.75% | 55.34 | 1.77% |
| **ACT** | 3.90 | 49.82% | 131.56 | 12.56% | 18.46 | 10.53% | 117.00 | 1.67% |
| **Australia** | **427.08** | **59.70%** | **7,976.65** | **19.57%** | **1,815.88** | **14.04%** | **6,587.85** | **2.61%** |

(b). HBEAS households targeting of state energy concessions

| | HBEAS households | | Non-HBEAS households | | Households eligible for energy concession | | Households not eligible for energy concession | |
|---|---|---|---|---|---|---|---|---|
| | Number of HBEAS households ('000) | Eligible for energy concession (successful targeted) | Number of non-HBEAS households ('000) | Eligible for energy concession (inclusion error) | Number of concession households ('000) | HBEAS households (successful targeted) | Number of non-concession households ('000) | HBEAS households (exclusion error) |
| **NSW** | 88.23 | 73.38% | 2,604.50 | 45.89% | 1,260.01 | 5.14% | 1,432.73 | 1.64% |
| **VIC** | 106.05 | 68.95% | 1,986.17 | 35.62% | 780.53 | 9.37% | 1,311.69 | 2.51% |
| **QLD** | 29.22 | 41.44% | 1,650.90 | 28.07% | 475.52 | 2.55% | 1,204.60 | 1.42% |
| **SA** | 30.38 | 77.09% | 623.13 | 37.78% | 258.86 | 9.05% | 394.65 | 1.76% |
| **WA** | 16.47 | 79.90% | 867.67 | 36.18% | 327.08 | 4.02% | 557.05 | 0.59% |
| **TAS** | 12.46 | 81.58% | 189.66 | 42.93% | 91.58 | 11.10% | 110.54 | 2.08% |
| **NT** | 1.10 | 88.17% | 62.32 | 23.46% | 15.59 | 6.20% | 47.83 | 0.27% |
| **ACT** | 4.24 | 78.20% | 131.22 | 24.99% | 36.11 | 9.18% | 99.36 | 0.93% |
| **Australia** | **288.15** | **69.76%** | **8,115.58** | **37.51%** | **3,245.27** | **6.19%** | **5,158.46** | **1.69%** |

(c). SEAS households targeting of state energy concessions

| | SEAS households | | Non-SEAS households | | Households eligible for energy concession | | Households not eligible for energy concession | |
|---|---|---|---|---|---|---|---|---|
| | Number of SEAS households ('000) | Eligible for energy concession (successful targeted) | Number of non-SEAS households ('000) | Eligible for energy concession (inclusion error) | Number of concession households ('000) | SEAS households (successful targeted) | Number of non-concession households ('000) | SEAS households (exclusion error) |
| **NSW** | 578.20 | 62.85% | 2,114.54 | 42.40% | 1,260.01 | 28.84% | 1,432.73 | 14.99% |
| **VIC** | 453.98 | 51.12% | 1,638.24 | 33.48% | 780.53 | 29.74% | 1,311.69 | 16.92% |
| **QLD** | 353.93 | 21.05% | 1,326.19 | 30.24% | 475.52 | 15.67% | 1,204.60 | 23.20% |
| **SA** | 123.78 | 50.43% | 529.74 | 37.08% | 258.86 | 24.11% | 394.65 | 15.55% |
| **WA** | 172.59 | 42.46% | 711.54 | 35.67% | 327.08 | 22.40% | 557.05 | 17.83% |
| **TAS** | 47.52 | 56.95% | 154.59 | 41.73% | 91.58 | 29.55% | 110.54 | 81.49% |
| **NT** | 11.28 | 36.59% | 52.13 | 21.98% | 15.59 | 26.49% | 47.83 | 14.96% |
| **ACT** | 25.59 | 52.12% | 109.88 | 20.72% | 36.11 | 36.93% | 99.36 | 12.33% |
| **Australia** | **1,766.87** | **48.12%** | **6,636.86** | **36.09%** | **3,245.27** | **26.20%** | **5,158.46** | **17.77%** |

### 6.6.3 Horizontal equity of concession entitlements

#### *Concession benefits across different jurisdictions*

There are large variations in water and energy concession entitlement designs across jurisdictions, such as the lump sum rebate, percentage discount of total bill, price-based concessions, or discounts on fixed charge components. For instance, a percentage discount on the total water and sewerage bill, up to a maximum cap, is applied in Victoria, SA, and WA, a discount on fixed water supply charge and sewerage charge is applied in NSW, Tasmania and the ACT, while a concession water rate is applied in the NT without a maximum cap. For energy concessions, a lump sum energy rebate is applied in most jurisdictions (NSW, Queensland, SA, WA), while the ACT has imposed an annual cap on the energy concession amount. Other jurisdictions, such as the NT, Tasmania, and Victoria, provide uncapped energy bill discounts. In the NT, an electricity concession is available up for to 50 per cent the cost of household energy bill for people in the NTPCCS (Department of Health (Northern Territory) (2015). Overall, the rebate policies and eligibility criteria are inconsistent across jurisdictions, even among life support related water concessions.

Table 6.11 summarises the value of water and energy concessions received by eligible households in 2012-13, based on different jurisdictions' concession entitlement rules. The value of water and energy concessions received by eligible households varies across jurisdictions. The average value of water concessions received by eligible households was AU$236 per year in 2012-13. Eligible households in the NT received the highest amount of average water concession (AU$1047 per annum) while eligible Queensland households received the lowest average amount of water concessions (AU$119 per annum).

Despite the fact that household energy expenditure accounts for a higher proportion of household budgets than water expenditure, the average value of energy concessions provided was not much higher than the average water

concession received by eligible households. In 2012-13, the average annual energy rebate was AU$231 per annum for eligible households. The use of a price-based concession resulted in eligible households in the NT getting the largest average energy rebate (AU$812 per annum). Eligible Tasmanian households received the second highest energy rebate on average (AU$501 per annum), and SA had the lowest average energy rebate (AU$164 per annum) among eligible households.

There is horizontal inequity within state water concession entitlements in terms of percentage discounts from pre-concession utility bills. Table 6.11 demonstrates that, on average, state water concessions account for almost half of the pre-concession annual water and sewerage expenditure among eligible households. In the NT, the provision of price-based concessions results in an average 78 per cent reduction of water and sewerage bills, and NSW's fixed charge rebate provides for an average discount of three quarters of the original water and sewerage bill. In Queensland, a AU$120 lump sum water rebate accounted for an average of a quarter of the water and sewage bill among eligible households in 2012-13.

Overall, state energy concessions accounted for an average 18 per cent of the domestic fuel expenditure among eligible Australian households. Eligible households residing in the NT received the highest average percentage discount, where energy concessions accounted for more than half of the pre-concession domestic fuel expenditure. By contrast, Victoria had the lowest average discount (11.6 per cent) for domestic fuel bills from their main energy concession schemes.

This finding may result from several factors. Firstly, the Victorian government offers a 17.5 per cent discount from the annual electricity bill (the AEC) and a17.5 per cent discount from an additional winter gas bill (the WGC) without a maximum cap. However, these concessions are not applied to the first AU$171.60 of the electricity bill and the first AU$62.60 of the winter gas bill (Vic DHS 2013a, 2013b) to avoid double compensation with the Commonwealth's Clean Energy Advance Payment. Similar adjustments have not occurred in other jurisdictions.

**Table 6.10** Value of state utility concessions received among eligible households and percentage discount from pre-concession utility expenditure, 2012-13

| | Water concession per annum (AU$) | | Percentage discount (%) from pre-concession bill | |
|---|---|---|---|---|
| | **Mean** | **std. dev.** | **mean** | **std. dev.** |
| **NSW** | 329.59 | 175.26 | 74.85 | 27.76 |
| **VIC** | 215.34 | 76.72 | 38.28 | 12.24 |
| **QLD** | 119.11 | 3.65 | 24.73 | 22.46 |
| **SA** | 245.45 | 83.98 | 45.76 | 24.19 |
| **WA** | 168.04 | 16.80 | 43.49 | 31.38 |
| **TAS** | 156.72 | 10.95 | 28.61 | 19.15 |
| **NT** | 1,047.54 | 439.44 | 78.32 | 6.06 |
| **ACT** | 332.25 | 184.55 | 49.02 | 34.31 |
| **Australia** | **236.44** | **145.27** | **47.74** | **28.18** |
| | **Energy concession per annum (AU$)** | | **Percentage discount (%) from pre-concession bill** | |
| | **Mean** | **std. dev.** | **mean** | **std. dev.** |
| **NSW** | 198.08 | 67.16 | 15.44 | 13.71 |
| **VIC** | 250.32 | 159.80 | 11.63 | 2.21 |
| **QLD** | 233.56 | 23.37 | 29.30 | 20.87 |
| **SA** | 164.33 | 8.24 | 13.49 | 12.11 |
| **WA** | 244.09 | 103.37 | 21.88 | 17.29 |
| **TAS** | 501.29 | 41.21 | 34.54 | 21.38 |
| **NT** | 812.30 | 419.60 | 56.76 | 20.63 |
| **ACT** | 371.67 | 22.48 | 24.81 | 20.22 |
| **Australia** | **231.22** | **121.34** | **17.89** | **15.77** |

Note: (i) Computation was based on mains water concession. Non-mains water concession and life support concessions were not included due to data limitations. (ii) Computation was based on mains electricity and gas concession. Non-mains energy concession, medical heating/cooling concessions and life support concessions were not included due to data limitations.

Second, my computation of energy concessions in this chapter does not account for the varieties of concession types available in Victoria (see Chapter Five) due to data limitations. For instance, in addition to AEC and WGC, there are Non-Mains Energy Concessions, Controlled Load Electricity Concessions, Electricity Transfer Fee Waivers, and Service to Property Charge Concessions, Life Support Concessions and Medical Heating and Cooling Concessions. If all these concessions were taken into account, the price discount from Victorian energy concession schemes would be larger.

To compare the adequacy of concessions across jurisdictions, variation of utility prices and consumption due to different climatic conditions must be considered. For instance, households residing in locations with a very cold climate would, all else being equal, encounter high energy bills in winter, while households in a hot climate should consume more water and energy in summer. Analysis of the Victorian utility concession in Chapter 5 shows that the number of households at risk of water affordability stress would be higher in summer while more households would encounter energy affordability stress in the winter period. Concession targeting can be improved by providing extra winter energy concession in colder areas such as in Victoria, and provision of summer energy concession such as Air Conditioning rebate in WA. However, this data does not account for seasonal variations of water and energy demand and additional seasonal concession benefits. The analysis of additional seasonal water and energy concessions provided by some jurisdictions and its equity implication requires further investigation.

### *Concession benefits across different household size*

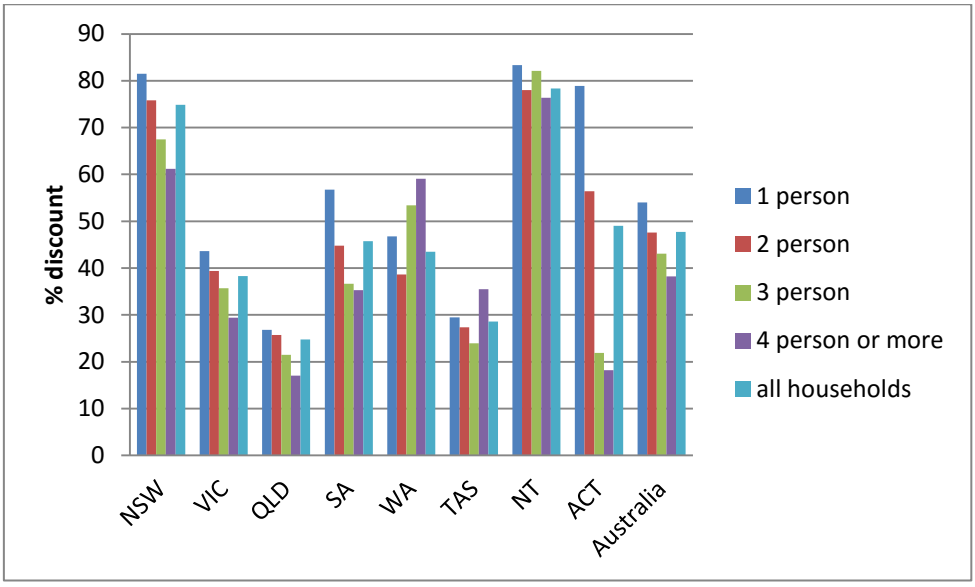
If horizontal equity were considered in state water and energy concession designs, households with higher needs should receive greater concessions. For instance, low-income households with more members will, all other factors being equal,

use more water and energy for domestic household needs and would require greater concession benefits to alleviate their utility burdens. I find that most of the current water and energy concession designs do not account for the greater needs among larger households. This is illustrated in Figures 6.2a and 6.2b which summarise the average percentage discount of concession benefits when household size increases.

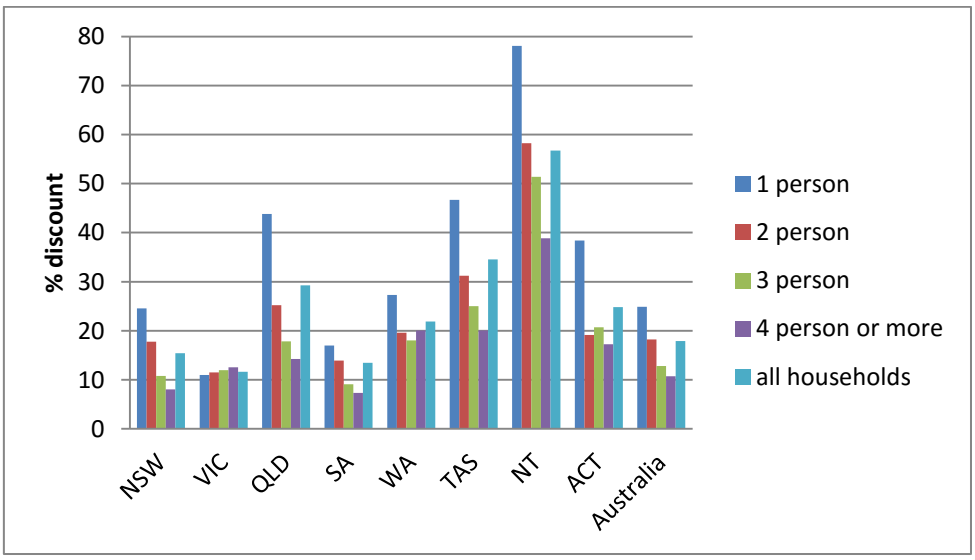
When comparing the water concession benefits among different jurisdictions, I found that the percentage discount on pre-concession water and sewerage bills decreases when household size increases in most jurisdictions, except in the NT and WA (Figure 6.2a). In NSW, the water concession represented more than 80 per cent of the original water and sewerage bill among eligible sole-person households, but it only accounted for 60 per cent of the water and sewerage bill for large households with four or more people. The difference was even larger in the ACT. The average energy concession discount also decreases as household size increases in all jurisdictions except Victoria and WA (Figure 6.2b). For instance, in the NT, the average energy concession discount was 80 per cent for a sole-person household and only 38 per cent for a large household with four or more members. Many jurisdictions apply a lump sum rebate, a discount on fixed supply charges, or set concession thresholds too low to accommodate the needs of large households. By contrast, the use of price-based water concessions in the NT, the percentage-based energy concession in Victoria, and the Dependent Child Rebate as a supplementary energy rebate in WA, have achieved a more equitable outcome in relation to household size.

**Figure 6.2** Average concession discount from pre-concession utility bill varied by household size

(a) Average percentage discount from pre-concession W&S bill by different household size




(b) Average percentage discount from pre-concession domestic energy expenditure varied by different household size



### 6.6.4 Vertical equity in concession benefits

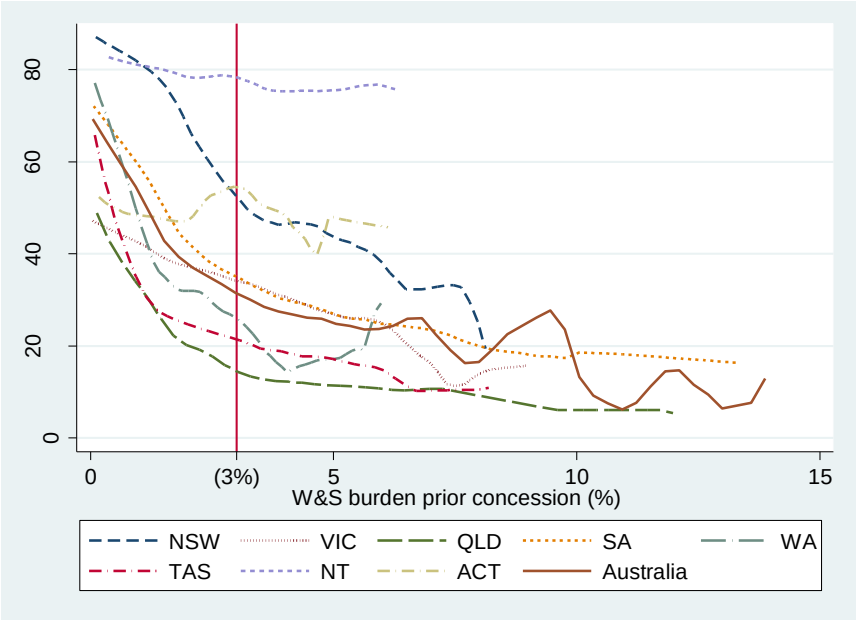
When considering vertical equity within the state concession framework, more concessions should be given to households with higher utility burdens (either because of lower income or higher utility expenditure). That is, households which at risk of HBWAS and HBEAS should receive greater concession benefits.

Figures 6.3a and 6.3b illustrate the trends in concession discounts when eligible households' utility burdens increase in a log polynominal smooth plot. The plots illustrate that households with higher utility burdens prior to the concessions receive smaller concession discounts. In particular, eligible households who spend more than 3 per cent of their disposable income on water and sewerage expenses generally receive less than 30 per cent water concession discounts across most jurisdictions, except in the NT and the ACT. On the other hand, households whose water burden is below 3 per cent generally receive between 20 to 80 per cent water concession discounts (Figure 6.3a).

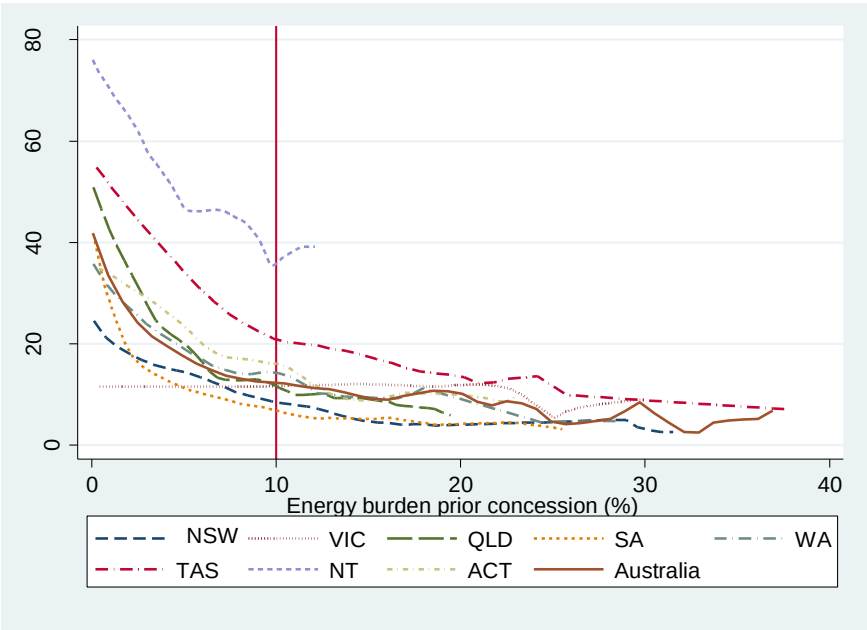
As with water concessions, the energy concessions discount declined as the energy burden of eligible households increased, except in Victoria (Figure 6.3b). Consequently, the majority of the eligible households that have a high energy burden (that is, that spent more than 10 per cent of their disposable income on energy bill) receive less than 15 per cent energy concession discounts, while eligible households with a low energy burden (that is, less than 10 per cent) are given a much higher percentage discount on pre-concession energy bills. The Victorian government, which provides a 17.5 per cent discount on both annual electricity bills and winter gas bills, and the NT government that provides price-based water concessions, deliver the most equitable outcomes in terms of accounting for households' utility burdens.

**Figure 6.3** Concession discount versus pre-concession utility burden among eligible concession households (log polynominal smooth plot from stata)

(a) Water rebate as percentage discount from pre-concession water and sewerage bills versus eligible households' pre-concession water burden




(b) Energy rebate as percentage discount from pre-concession domestic fuel expenditure versus eligible households' pre-concession energy burden



### 6.6.5 Summary: Inequity of the current state concession policy

State concession systems have relied on Commonwealth concession cards targeted to full and part pensioners to target eligible households. Such targeting may not align to current economic environments, reforms in public utility sectors, and community expectations. My analysis provides empirical evidence of the inequality in current state-based water and energy concession schemes. The state and territory governments have developed water and energy concession policies over the years in response to community expectations and political interests. Consequently, fragmentation of policy objectives and the inconsistency of eligibility and entitlements have resulted in inequality and target inefficiency in the concession system at a national level.

Horizontal and vertical inequity within concession eligibility criteria is found in current water and energy concession policies across jurisdictions. First, renters who pay water bills are not eligible for water concessions across most jurisdictions (except in SA and Victoria). Renters usually have lower economic resources, lower income and lower wealth, and are more likely to encounter financial stress and material hardship. On the basis of horizontal equity, renters should not be discriminated against within the water concession policy framework if they have similar needs for assistance as owner occupiers. Second, HCC holders who receive allowances due to unemployment or engaging in full time studies, or households who received Family Tax Benefit - Part A, are ineligible for water and energy concessions in many jurisdictions. Although a balance between work incentives and concession benefits is required (Henry 2009), the needs of people in the above groups who have to manage large and irregular utility expenses should not be ignored.

Since the 1990s, there have been various studies that suggest the state concession schemes are inequitable, inefficient and inconsistent. Several have recommended that a nationally consistent framework for concessions should be developed (HRC 1997; Deloitte 2013; Harmer 2009; Henry 2009; PC 2011a). Despite this advice, there has been little progress towards a nationally consistent concession

framework. The exception is the development of the NPA that allows both full and part-pensioners access to core concessions provided by all state and territory governments. Nonetheless, the NPA has resulted in a high inclusion error rate in state concession targeting because providing utility concessions to both full and part-pensioners does not consider the differences in income and utility burdens among the two groups.

Incremental reforms in the social welfare system have, over time, widened the gap and inequality between pensioners and those on other allowances (McClure et al. 2014). As a result, a larger proportion of SEAS households have become ineligible for concessions. By contrast, CSHC holders and SSC holders are eligible for concessions in some jurisdictions (such as WA and NT). This has resulted in large inclusion errors, that is, too many non-income-poor households or households who are not at risk of utility stress are eligible for concessions.

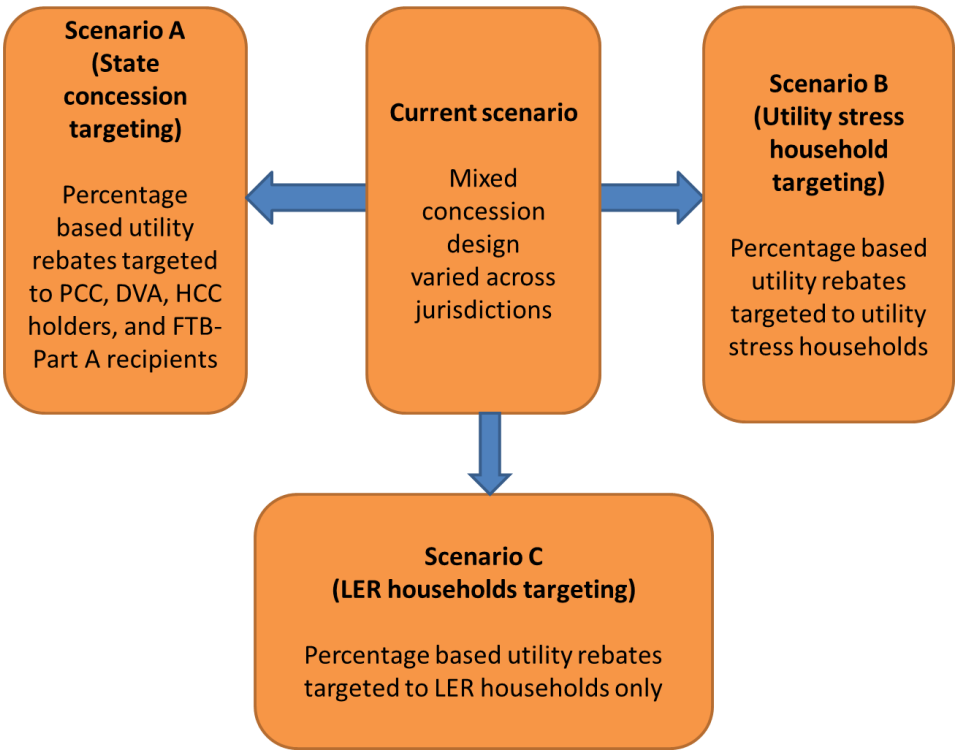
My analysis demonstrates that there is inequity in water and energy concession entitlements both within and across jurisdictions. Many state governments have applied a lump sum rebate or provide a rebate on a fixed supply charge. Such approaches have been adopted because they are considered to be economically efficient, reduce price distortions, administratively simple and to assist fiscal predictability. Nonetheless, fixed lump sum rebates impose a disadvantage on large households who have high water and energy consumption, and those households with high water and energy burdens.

The results also show that the value of concession benefits, represented as a percentage discount from pre-concession utility bills, were highest among households with a small family size, or households with low water or energy burdens. Thus, eligible households who have relatively low utility burdens may be over-compensated under the current concession designs. To address this issue, a percentage-based (as in the case of the Victorian energy concession scheme) or price-based concession (as in the case of the NT water concession scheme) would be more equitable (AEO, ERAA, and ACOSS 2013; QCOSS 2014).

## 6.7 Alternative concession schemes

The results from Section 6.6 concluded that the existing water and energy concession policies across different jurisdictions fail to achieve both horizontal equity and vertical equity in their eligibility criteria and entitlement design. To achieve a more equitable outcomes, I presented three alternative scenarios that be consider for future state water and energy concession policy reform (Figure 6.4).

**Figure 6.4** Scenarios of alternative concession schemes




First, to attain horizontal equity in concession entitlement, a percentage-based concession has the advantage of accounting for higher water and energy needs among larger household sizes, and is more equitable to tenants, who are typically responsible for the usage charge of water and sewerage expenditure. While all concessions generate inclusion and exclusion errors, a percentage-based

concession is claimed to be more equitable, meaningful, and responsive to changes in utility prices and tariff structures (AEO, ERAA and ACOSS 2013; QCOSS 2014). In Section 6.7.2, I explain the how I have derived the appropriate level of percentage rebate applied in the alternative scenarios.

Second, in view of achieving horizontal equity in eligibility criteria, I suggest a nationally consistent criteria to be applied when assessing eligibility to state utility concession across different jurisdictions. In Section 6.7.1, I will explain why the three scenario are selected. Then, I will compare the targeting and expenditure outcomes of three alternative concession schemes to the existing concession schemes.

### 6.7.1 Rationale of the three alternative scenarios

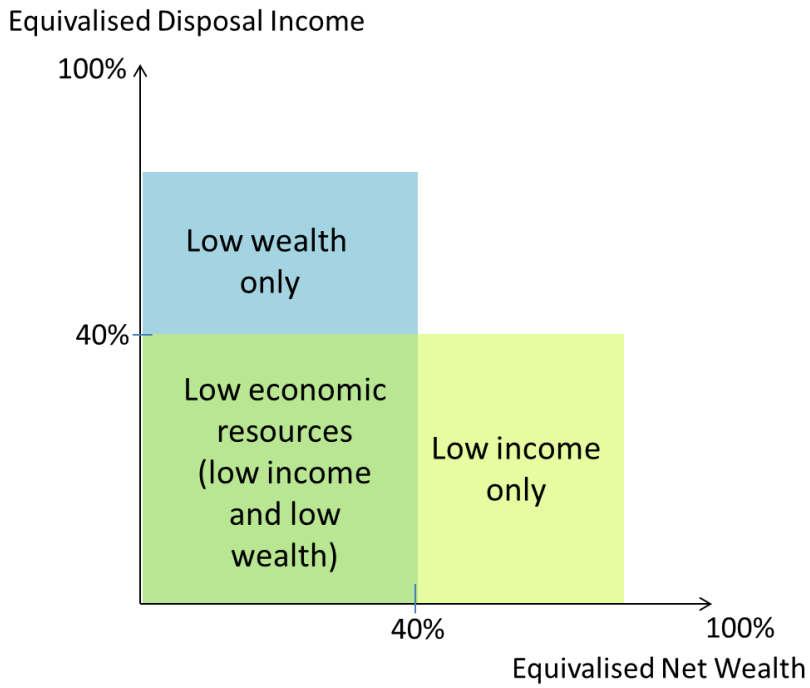
The first scenario (Scenario A) is similar to the existing state concession scheme by primarily using the eligibility to the Commonwealth income support payments. Eligibility of all state-based water and energy concessions requires household member who possess either a pensioner concession card (PCC), DVA Gold Card), a Low Income Health Care Card (HCC), or is a recipient of Family Tax Benefit – Part A. This scenario is also called broad targeting.

This eligibility criteria is similar to the existing concession scheme in most jurisdictions which provide concessions to all PCC and DVA holders. The expansion to all HCC holders and FTB-Part A recipients is in response to the identified gap of existing concession scheme in which the previous analysis shows that these two groups are also most likely low income and vulnerable households who are likely to experience utility stress and other material hardships (see Chapter X). On the other hand, I have excluded State Senior Cards (SCC) to assess state utility concession as eligibility to SCC is not means tested, thus is not relevant to the likelihood of experience utility stress. Using the 2012 HEC survey data, it is estimated that about 40 per cent of the Australian households were holders of PCC, DVA Goldcard, HCC or recipients of FTB-Part A payment.

The second scenario (Scenario B) demonstrates a hypothetical situation where utility concession payments are targeted to households that are at risk of utility stress and the amount of concession benefit would be stopped once the household' utility burden has been reduced to the affordability threshold. This scenario is like a hypothetical optimum where vertical expenditure efficiency (VEE) of the concession program would be close to 100 per cent (see Chapter 5 on the explanation and calculation of VEE). This is termed utility stress households targeting. Utility stress households are in the bottom 40 per cent of the income distribution and whose utility burdens exceed the affordability benchmarks (3 per cent for water burden and 10 per cent for energy burden). The LIHB method is described in Chapter Four. From the 2012 HEC survey, it is estimated that about 4.7 per cent of Australian households were identified as water utility stress and 3.3 per cent were classified as experiencing energy utility stress.

The third scenario (Scenario C) demonstrates another hypothetical situation where concessions are targeted to those most in needs in the society - a sub-group of the Australian households that is classified as low economic resources (LER). In accordance to ABS (2013e), LER households are defined as those households which are simultaneously in the bottom 40 per cent of both equivalised disposable income and equivalised household net worth (Figure 6.5). LER households are selected for state concession targeting because they are more likely to encounter both objective and subjective utility stress (see Chapter Four) and ‘more likely to experience reduced consumption possibilities, resulting in a lower material standard of living and greater risk of experiencing economic hardship' (ABS 2013e: p.1). From the 2012 HEC survey, it is estimated that about 18 per cent of the Australian households were classified as LER households.

**Figure 6.5** Low economic resource households




Source: Adapted from ABS (2013).

### 6.7.2 Determining the appropriate level of concession benefits

To determine the appropriate level of concession benefits, the amount of concession benefits required for those households at risk of HBWAS and HBEAS to reach the affordability thresholds (that is, 3 per cent water burden and 10 per cent energy burden) was calculated. The calculation is articulated in Table 6.12. If water concessions are provided as a percentage discount of pre-concession water and sewage bills, the average percentage discount required would be 27 per cent among HBWAS households in Australia. The percentage discount required is relatively similar across jurisdictions, between 23 per cent and 30 per cent. Similarly, in order to reduce the energy burden of HBEAS households to below the 10 per cent threshold, the average percentage discount required would be 22 per cent among HBEAS households across Australia. The range of energy rebate discounts required was between 18 per cent and 27 per cent across jurisdictions.

**Table 6.11** Estimated required percentage discount for concessions

| Water concessions | | | | | |
|---|---|---|---|---|---|
| | No. of households | mean | st. dev. | min | max |
| NSW | 103872 | 29.92 | 20.08 | 0.30 | 78.57 |
| VIC | 138201 | 25.34 | 16.28 | 0.04 | 66.52 |
| QLD | 83340 | 28.69 | 19.47 | 0.68 | 76.99 |
| SA | 56063 | 27.28 | 19.44 | 0.40 | 82.72 |
| WA | 24362 | 23.20 | 15.30 | 2.38 | 54.74 |
| TAS | 13310 | 22.85 | 15.59 | 0.48 | 71.53 |
| NT | 4029 | 27.97 | 21.43 | 1.35 | 67.07 |
| ACT | 3903 | 24.42 | 19.77 | 1.67 | 54.79 |
| **Australia** | **427081** | **27.18** | **18.38** | **0.04** | **82.72** |
| | | | | | |
| **Energy concessions** | | | | | |
| | No. of households | mean | st. dev. | min | max |
| NSW | 88234 | 23.32 | 18.25 | 0.81 | 68.27 |
| VIC | 106050 | 20.95 | 16.93 | 0.07 | 66.55 |
| QLD | 29219 | 21.15 | 17.66 | 1.40 | 56.67 |
| SA | 30383 | 20.20 | 14.36 | 0.09 | 61.60 |
| WA | 16465 | 24.78 | 21.41 | 0.27 | 71.53 |
| TAS | 12461 | 22.12 | 18.21 | 0.33 | 74.57 |
| NT | 1096 | 17.71 | 10.31 | 11.81 | 41.59 |
| ACT | 4239 | 26.66 | 16.51 | 4.06 | 56.30 |
| **Australia** | **288149** | **21.96** | **17.42** | **0.07** | **74.57** |

The adoption of a nationally consistent concession rate would probably improve both horizontal and vertical equity and reduce administration costs. A nationally consistent concession rate can ensure horizontal equity across jurisdictions, while using a percentage-based concession without a maximum cap would promote vertical equity. For a nationally consistent scheme, the determination of an appropriate concession discount rate would be necessary. In this chapter, I apply a simple method to demonstrate the possible water concession and energy concession rebate which are expressed in utility bill discount rates. Using the HEC2012 data, I identified those households that were at risk of HBWAS and HBEAS. Then I calculated the amount of concession benefits (i.e. income transfers) required to reduce these households' utility burden to the acceptable water affordability threshold (3 per cent of disposable household income) and energy affordability threshold (i.e. 10 per cent of their disposable household income. The calculation is summarised in Table 6.12. I found that HBWAS households would require on average 27 per cent water concession rebate to reduce their water affordability stress; while HBEAS households on average require 22 per cent energy concession rebate to remove their energy affordability stress.

Based on the above results, I assume that water concessions could be provided as a 27 per cent discount from annual water and sewerage bills for eligible households, and the energy concession could be provided as a 22 per cent discount from the total annual electricity and gas expenditure. Eligibility criteria are different in the three modelled scenarios.

### 6.7.3 Modelling outcome of Scenario A

Under a broad targeting scenario (Scenario A), all eligible concession recipients (PCC, DVA, HCC holders and FTB-Part A recipients) would receive a 27 per cent discount off annual water and sewerage bills and a 22 per cent discount off annual electricity and gas bills. The modelling outcome is presented in Table 6.13.

In 2012-13, about 28 per cent of the Australian households would have received water concessions if alternative Scenario A was applied. Victoria would have the largest proportion of households receiving water concessions (35 per cent) while the NT would have the smallest proportion of households receiving water concessions (9.6 per cent). The average amount of water concessions would be AU$169 per annum. Eligible households in the NT would receive the highest average amount of water concessions (AU$307 per annum) while eligible households in WA would receive the lowest average amount of water concessions.

Under Scenario A, almost 38 per cent of Australian households would have been eligible to receive energy concessions in 2011-12. The proportion would have been the highest in Tasmania (47 per cent) and the lowest in the NT (22 per cent). The average value of energy concessions provided would be AU$388.5 per annum. Households residing in the ACT would receive the highest average value of energy concessions (AU$542 per annum) and Queensland the lowest (AU$299 per annum). Since both the water concession and energy concession are provided as a percentage discount of total utility expenditures without a maximum cap, households with higher needs would not be disadvantaged.

**Table 6.12** Value of water and energy concession rebates under Scenario A, 2012-13

| Water Concession | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Number of Households | | | Value of energy rebate per annum (AU$) | | | |
| | Total HH in jurisdiction | % of beneficial households | No. of beneficial households | mean | s.d. | min | max |
| **NSW** | 2,692,735 | 30.8% | 828,022 | 145.33 | 118.44 | 28.16 | 746.16 |
| **Vic** | 2,092,221 | 34.6% | 723,830 | 186.09 | 126.68 | 28.16 | 830.64 |
| **Qld** | 1,680,123 | 15.9% | 267,876 | 198.63 | 122.16 | 28.16 | 675.77 |
| **SA** | 653,518 | 31.8% | 207,741 | 195.04 | 131.58 | 28.16 | 844.71 |
| **WA** | 884,132 | 26.7% | 236,148 | 129.58 | 83.94 | 28.16 | 816.56 |
| **TAS** | 202,117 | 25.5% | 51,573 | 190.14 | 82.45 | 28.16 | 661.69 |
| **NT** | 63,418 | 9.6% | 6,083 | 307.44 | 170.24 | 28.16 | 647.61 |
| **ACT** | 135,461 | 16.2% | 21,977 | 223.55 | 139.58 | 28.16 | 718.01 |
| **Australia** | **8,403,727** | **27.9%** | **2,343,250** | **168.97** | **122.23** | **28.16** | **844.71** |

| Energy Concession | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Number of Households | | | Amount of energy rebate per annum (AU$) | | | |
| | Total HH in jurisdiction | % of beneficial households | No. of beneficial households | Mean | s.d. | min | max |
| **NSW** | 2,692,735 | 39.7% | 1,068,648 | 395.02 | 263.70 | 11.47 | 1,674.83 |
| **Vic** | 2,092,221 | 39.3% | 821,445 | 449.09 | 264.60 | 11.47 | 1,869.84 |
| **Qld** | 1,680,123 | 37.2% | 624,634 | 299.01 | 207.73 | 11.47 | 1,720.71 |
| **SA** | 653,518 | 41.2% | 269,460 | 405.87 | 258.60 | 11.47 | 1,720.71 |
| **WA** | 884,132 | 32.4% | 286,821 | 338.70 | 224.96 | 11.47 | 1,720.71 |
| **TAS** | 202,117 | 47.0% | 94,955 | 414.45 | 253.97 | 11.47 | 1,720.71 |
| **NT** | 63,418 | 22.2% | 14,066 | 390.54 | 312.06 | 11.47 | 1,491.29 |
| **ACT** | 135,461 | 28.8% | 39,002 | 542.32 | 353.13 | 34.41 | 1,835.43 |
| **Australia** | **8,403,727** | **38.3%** | **3,219,031** | **388.42** | **257.39** | **11.47** | **1,869.84** |

### 6.7.4 Modelling outcome of Scenario B

Under Scenario B, water concessions and energy concessions would be provided to HBWAS and HBEAS households. In this case, concession would be provided as a lump-sum supplementary payment to eligible households to reduce utility burdens to a level equal with the acceptable utility benchmark. This method achieves high expenditure efficiency as described in Chapter Five while the modelling outcome is shown in Table 6.14.

If water concession payments are only targeted to HBWAS households, only 4.7 per cent of Australian households would have received water concession payments in 2011-12. SA would have had the highest proportion of households (7.8 per cent) receiving water concessions while the ACT would have the lowest proportion of eligible households (2.5 per cent). The average value of water concession payments would be AU$363 per annum. Households in the NT would receive the highest average amount of water concession (AU$459 per annum) while those living in WA would have the lowest average water concession (AU$237 per annum).

There were 3.3 per cent of Australian households of HBEAS in 2011-12. Subsequently, only 3.3 per cent of Australian households would have received energy concession payments in Scenario B. The proportion of eligible energy concession households would have been the highest in Tasmania (6 per cent), while the lowest proportion would have been in Queensland and the NT (1.7 per cent). The average value of energy concession payments would be AU$896 per annum. Eligible ACT households would receive the highest average energy concession payments (AU$1165 per annum) while eligible Queensland households would receive the lowest average energy concession payments (AU$683.5 per annum). In this scenario, both water and energy concession payments would be provided based on need. Therefore, eligible households would receive payment assistance if utility burdens exceed the affordability benchmarks, and payment would be ceased once utility burdens are reduced to affordability thresholds.

**Table 6.13** Value of water and energy concession rebates under Scenario B, 2012-13

| Water Concession | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Number of Households | | | Value of energy rebate per annum (AU$) | | | |
| | Total HH | % of beneficial households | No. of beneficial households | mean | s.d. | min | max |
| **NSW** | 2,692,735 | 3.5% | 93,073 | 427.02 | 420.67 | 2.77 | 2,171.24 |
| **Vic** | 2,092,221 | 6.4% | 134,038 | 309.72 | 313.99 | 0.46 | 1,750.24 |
| **Qld** | 1,680,123 | 4.5% | 74,981 | 392.72 | 363.05 | 8.14 | 1,926.84 |
| **SA** | 653,518 | 7.8% | 50,656 | 425.63 | 429.94 | 8.20 | 2,415.34 |
| **WA** | 884,132 | 2.6% | 22,806 | 237.39 | 204.54 | 14.98 | 1,655.36 |
| **TAS** | 202,117 | 6.3% | 12,810 | 249.24 | 290.03 | 6.06 | 1,753.04 |
| **NT** | 63,418 | 4.8% | 3,046 | 459.75 | 404.69 | 32.41 | 1,154.08 |
| **ACT** | 135,461 | 2.5% | 3,435 | 297.74 | 239.30 | 11.42 | 791.47 |
| **Australia** | **8,403,727** | 4.7% | 394,847 | 362.92 | 365.42 | 0.46 | 2,415.34 |

| Energy Concession | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Number of Households | | | Value of energy rebate per annum (AU$) | | | |
| | Total HH | % of beneficial households | No. of beneficial households | Mean | s.d. | min | max |
| **NSW** | 2,692,735 | 3.2% | 85,461 | 997.19 | 1,023.97 | 15.17 | 4,912.39 |
| **Vic** | 2,092,221 | 4.6% | 97,125 | 901.31 | 981.71 | 10.43 | 5,239.77 |
| **Qld** | 1,680,123 | 1.7% | 29,219 | 683.54 | 677.05 | 46.87 | 2,199.96 |
| **SA** | 653,518 | 4.6% | 30,383 | 723.49 | 587.44 | 4.54 | 3,886.46 |
| **WA** | 884,132 | 1.8% | 16,256 | 1,031.32 | 1,282.12 | 9.95 | 5,594.72 |
| **TAS** | 202,117 | 6.1% | 12,273 | 856.95 | 1,056.24 | 9.23 | 5,521.46 |
| **NT** | 63,418 | 1.7% | 1,096 | 690.22 | 382.76 | 332.52 | 1,496.50 |
| **ACT** | 135,461 | 2.4% | 3,308 | 1,164.68 | 894.15 | 103.82 | 3,159.67 |
| **Australia** | **8,403,727** | 3.3% | 275,122 | 896.36 | 954.04 | 4.54 | 5,594.72 |

### 6.7.5 Modelling outcome of Scenario C

In Scenario C, the concessions are provided based on the principle of horizontal equity (that is, the same concession discounts across jurisdictions, or same concession discounts across household size) and vertical equity (that is, concession targeted to households with less economic resources). This concession targeting design would provide utility payment assistance to households with low economic resources (LER) - both low incomes and low net wealth.

Under this scenario, utility concession payments are provided to LER only. As in the case of Scenario A, a water concession is provided uniformly across all jurisdictions at a 27 per cent discount to water and sewerage bills, and an energy concession at 22 per cent of electricity and gas bills. The modelling outcomes are summarised in Table 6.15.

The results demonstrate that about 9.6 per cent of Australian households would have received water concessions in 2011-12. In this modelling scenario, SA would have had the highest proportion of households eligible for water concessions (11.7 per cent) while the ACT would have the lowest proportion (1.7 per cent). The average water concession provided to LER households would be AU$146 per annum. Despite having the lowest proportion of eligible households, the ACT households would have the highest average water concession (AU$260 per annum).

Under LER households targeting, about 17 per cent of Australian households would have been eligible for energy concessions in 2011-12. Tasmania would have had the highest proportion of eligible energy concession households (22 per cent), while the NT would have the lowest proportion (12 per cent). The average value of energy concessions provided to LER households would have been AU$389 per annum. LER households in the ACT would receive the highest average energy concession (AU$467) while Queensland LER households would receive the lowest average amount (AU$323 per annum).

**Table 6.14** Value of water and energy concession rebates under Scenario C, 2012-13

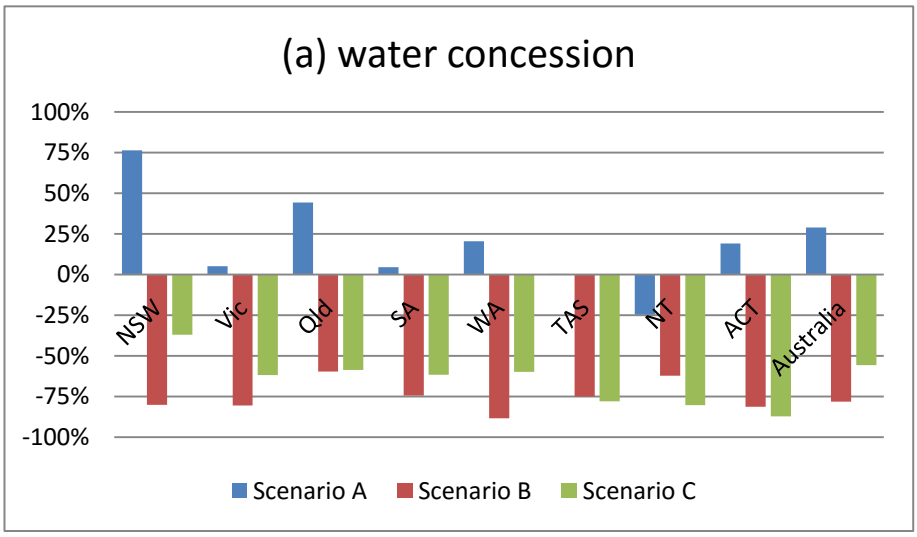
| Water Concession | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Number of Households | | | Value of energy rebate per annum (AU$) | | | |
| | Total HH | % of beneficial households | No. of beneficial households | mean | s.d. | min | max |
| **NSW** | 2,692,735 | 11.0% | 295,346 | 136.66 | 123.72 | 28.16 | 703.93 |
| **Vic** | 2,092,221 | 12.5% | 262,129 | 149.48 | 138.29 | 28.16 | 760.24 |
| **Qld** | 1,680,123 | 4.6% | 76,888 | 198.65 | 141.30 | 28.16 | 549.06 |
| **SA** | 653,518 | 11.7% | 76,281 | 153.92 | 140.16 | 28.16 | 844.71 |
| **WA** | 884,132 | 8.9% | 78,765 | 104.68 | 94.10 | 28.16 | 816.56 |
| **TAS** | 202,117 | 5.6% | 11,292 | 178.81 | 103.52 | 28.16 | 563.14 |
| **NT** | 63,418 | 2.5% | 1,589 | 183.79 | 155.78 | 28.16 | 436.44 |
| **ACT** | 135,461 | 1.7% | 2,343 | 259.89 | 232.86 | 28.16 | 858.79 |
| **Australia** | **8,403,727** | 9.6% | 804,634 | 146.31 | 131.43 | 28.16 | 858.79 |

| Energy Concession | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Number of Households | | | Value of energy rebate per annum (AU$) | | | |
| | Total HH | % of beneficial households | No. of beneficial households | Mean | s.d. | min | max |
| **NSW** | 2,692,735 | 18.4% | 495,009 | 384.79 | 242.83 | 57.36 | 1,732.19 |
| **Vic** | 2,092,221 | 15.9% | 332,904 | 429.60 | 240.44 | 11.47 | 1,732.19 |
| **Qld** | 1,680,123 | 18.3% | 307,490 | 323.20 | 222.07 | 45.89 | 1,720.71 |
| **SA** | 653,518 | 19.4% | 126,561 | 443.69 | 268.77 | 11.47 | 1,720.71 |
| **WA** | 884,132 | 13.1% | 115,853 | 354.49 | 241.02 | 11.47 | 1,307.74 |
| **TAS** | 202,117 | 22.3% | 45,146 | 438.68 | 254.79 | 11.47 | 1,628.94 |
| **NT** | 63,418 | 12.0% | 7,624 | 351.89 | 267.07 | 11.47 | 1,112.73 |
| **ACT** | 135,461 | 12.1% | 16,365 | 467.21 | 369.04 | 34.41 | 1,835.43 |
| **Australia** | **8,403,727** | 17.2% | 1,446,952 | 387.18 | 245.98 | 11.47 | 1,835.43 |

### 6.7.6 Comparing different concession scenarios

The three alternative concession designs generate different targeting outcomes in relation to both the number of benefited households and government expenditure. Figure 6.6 shows the percentage change in the number of eligible concession households when compared to the current state utility concession schemes in 2011-12. Table 6.15 summarises the total government expenditures on concessions under different scenarios.

**Figure 6.6** Percentage change in the number of benefited households in alternative scenarios compared to current concession schemes, 2012-13



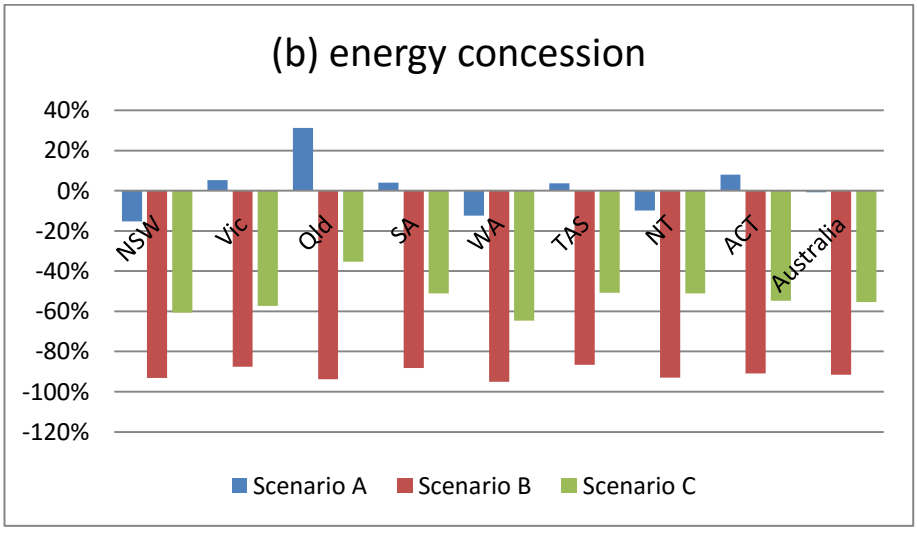



**Table 6.15** Total government concession expenditure (AU$ per annum) under different scenarios, 2012-13

| Water concessions | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Current scenario | Scenario A | | Scenario B | | Scenario C | |
| | Total expenditure (AU$ million) | Total expenditure (AU$ million) | Change from current scenario | Total expenditure (AU$ million) | Change from current scenario | Total expenditure (AU$ million) | Change from current scenario |
| NSW | 155.00 | 120.00 | -23% | 39.70 | -74% | 40.40 | -74% |
| Vic | 148.00 | 135.00 | -9% | 41.50 | -72% | 39.20 | -74% |
| Qld | 22.10 | 53.20 | 141% | 29.40 | 33% | 15.30 | -31% |
| SA | 48.80 | 40.50 | -17% | 21.60 | -56% | 11.70 | -76% |
| WA | 32.90 | 30.60 | -7% | 5.41 | -84% | 8.24 | -75% |
| TAS | 8.05 | 9.81 | 22% | 3.19 | -60% | 2.02 | -75% |
| NT | 8.46 | 1.87 | -78% | 1.40 | -83% | 0.29 | -97% |
| ACT | 6.13 | 4.91 | -20% | 1.02 | -83% | 0.61 | -90% |
| Australia | 429.00 | 396.00 | -8% | 143.00 | -67% | 118.00 | -72% |
| | | | | | | | |
| **Energy concessions** | | | | | | | |
| | Current scenario | Scenario A | | Scenario B | | Scenario C | |
| | Total expenditure (AU$ million) | Total expenditure (AU$ million) | Change from current scenario | Total expenditure (AU$ million) | Change from current scenario | Total expenditure (AU$ million) | Change from current scenario |
| NSW | 250.00 | 422.00 | 69% | 85.20 | -66% | 190.00 | -24% |
| Vic | 195.00 | 369.00 | 89% | 87.50 | -55% | 143.00 | -27% |
| Qld | 111.00 | 187.00 | 68% | 20.00 | -82% | 99.40 | -10% |
| SA | 42.50 | 109.00 | 156% | 22.00 | -48% | 56.20 | 32% |
| WA | 79.80 | 97.10 | 22% | 16.80 | -79% | 41.10 | -48% |
| TAS | 45.90 | 39.40 | -14% | 10.50 | -77% | 19.80 | -57% |
| NT | 12.70 | 5.49 | -57% | 0.76 | -94% | 2.68 | -79% |
| ACT | 13.40 | 21.20 | 58% | 3.85 | -71% | 7.65 | -43% |
| Australia | 750.00 | 1,250.00 | 67% | 247.00 | -67% | 560.00 | -25% |

### *Scenario A*

Within the concession scheme modelled in Scenario A, most jurisdictions would experience an increase in the number of households eligible for water concessions, except the NT. NSW would have the largest increase in eligible water concession households (+76 per cent) and Queensland the second (+44 per cent). The change in Tasmania would be minimal (+0.4 %) while the NT would have a 25 per cent reduction in the number of water concession recipient households. On the other hand, there would be mixed outcomes in relation to the changes in the number of households eligible for energy concessions. Five jurisdictions (Victoria, Queensland, SA, Tasmania, and the ACT) would experience an increase while NSW, WA and the NT would have the number of eligible households reduced. The largest increases would be in Queensland (+31%) while NSW would have the largest reduction (-15%).

In regards to fiscal implications, there would be an overall 8 per cent reduction in total water concession expenditure, but a 67 per cent increase in energy concession expenditure across all jurisdictions under Scenario A (Table 6.16). Not all jurisdictions would see a savings in water concession budgets. Both Queensland (+141%) and Tasmania (+22%) would experience an increase in water concession expenditures. The NT would achieve a78 per cent saving in water concession budgets under Scenario A. For energy concession budgets, only Tasmania (-14%) and the NT (-57 %) would see savings if concessions were reformed to Scenario A. Other jurisdictions would realise increases in utility concession expenditures, with SA having the largest increase (+156%).

### *Scenario B*

If the concession scheme is reformed to Scenario B, then targeting would affect households at risk of utility stress only. In this model, all jurisdictions would experience a substantial reduction in both the water and energy concession eligible households. There would be a 78 per cent reduction in the number of households eligible for water concessions and a 92 per cent reduction in the number of households eligible for energy concessions across Australia. WA would have the largest reduction in both water concession households (-88%) and energy concession households (-95%).

A tightening of concessions towards utility stress households would result in a large reduction in government expenditure (Table 6.16). There would be an overall 67 per cent reduction in both water concession and energy concession expenditures when compared to current concession schemes. In Scenario B, all state and territory governments would enjoy water concession savings of over 50 per cent, except for Queensland which would experience a 33 per cent increase in water concession expenditure. In regards to the energy concession targeted to HBEAS households only, all state and territory governments would have fiscal savings with the NT government experiencing the largest reduction in energy concession expenditure (-94%).

### *Scenario C*

If eligibility for concessions were to be applied to LER households only, there would be a 55 per cent reduction in both water and energy concession recipient households. The ACT would experience the largest reduction in the number of water concession households (89 per cent reduction) and NSW the smallest reduction (37 per cent reduction). WA would have the largest reduction in the number of energy concession households (65 per cent decrease) and Queensland the smallest reduction (35 per cent reduction).

When the fiscal implications of LER targeting are compared to current state concession schemes, there is an overall 72 per cent reduction in total water concession expenditure and 25 per cent reduction in total energy concession expenses. The NT and ACT governments would have more than 90 per cent savings in water concession spending, while the Queensland government would have the smallest savings (-31%). The overall national fiscal saving in energy concessions would be approximately 25 per cent. The NT government would have the biggest saving (-79%) while SA would have to increase its budgeted energy concession by 32 per cent if it was provided to LER households as a 22 per cent discount on energy bills.

## 6.8 Policy implications of alternative scenarios

It is common to evaluate the distributional impacts of different social policies and income maintenance programs by holding the total government expenditure constant (Hill 2000; Mitchell 1990). The evaluation assists to identify opportunity for improve target efficiency and effectiveness of existing programs versus alternative scenarios. Given that both the Australia federal and state and territory governments are looking for opportunity to reduce government expenditures and, concurrently, to address the problem of utility affordability, this research aims to evaluate the fiscal implications of alternative concession targeting scenarios and without holding the state utility concession budget constant.

To achieve a nationally consistent scheme and achieve principles of horizontal and vertical equity, three alternative concession scenarios are considered and their targeting outcomes and fiscal implications are modelled. In Scenario A, I consider the case where water and energy concessions are provided as a percentage reduction of water and energy bills with a consistent rate across different jurisdictions. Using a percentage-based concession would reduce the likelihood of over-compensation among households who have low utility burdens. This is not a substantial change from the current concession eligibility, but eligibility would be consistent across jurisdictions and be based on the PCC, DVA Gold Card, and

HCC. At present, not all HCC holders and FTB-Part A recipients are eligible to state water and energy concessions. To be eligible to HCC requires an individual or households to receive a specific payments or supplements from the Centrelink or receiving the maximum rate of FTB-Part A payments. (DSS 2016). From the results of Chapter 4, both HCC holders and FTB-Part A recipients were more likely to encounter utility stress and financial and material hardship. Therefore, including these two groups of households would achieve better concession targeting to those in most needs and are better screening mechanism for policy makers.

Refer to Table 6.6, it is noted that using the eligibility criteria in Scenario A would result in a decrease of eligible households in Queensland, Western Australia, and Northern Territory where SSC holders, and sometimes CSHC holders, are currently eligible to state energy concessions. Nonetheless, except in NSW where all FTB recipients are currently eligible to Family Energy Rebate, there would be more low income family who are receiving FTB-Part A who would benefit from the change around Australia. Water and energy concession can be delivered by the water and energy retailers and be reimbursed via the Community Service Obligations payment from the state governments. Therefore, this scenario would have minimum change of the current administration of state utility concessions. Nonetheless, the change in the number eligible household in different jurisdictions would have a implication on the forecast concession budgets to be allocated by governments.

Scenario B demonstrated a hypothetical scenario that both target vertical expenditure efficiency and equity can be improved if concessions can be targeted to HBWAS and HBEAS households. The advantage of Scenario B is that payments are targeted to households specifically at risk of utility stress. Ideally, the method would also reduce the likelihood of overpayments, where payments will cease once households achieve the affordability benchmark. This hypothetical optimum may be achieved only if perfect information such as comprehensive household income and utility expenditure data can be obtained. A more realistic approach that policy makers can consider is to provide state water and energy

concessions via Commonwealth welfare payments – Utility Assistance – by adapting the current approach to provide Commonwealth Rent Assistance or Child Care Benefits (CCB)/ Child Care Rebate (CCR) combination to targeted households/families. In this scenario, the amount of utility rebate is calculated based on factors including disposable household income, household size, housing costs, and utility bill expenditures.

Scenario C demonstrates the scenario that water and energy concessions were targeted to the most vulnerable LER households in Australia, those having both low incomes and low wealth. In 2012-13, around 18 per cent of Australian households were identified as LER. These households are most vulnerable to poverty, financial stress, and material hardship (ABS 2012b, 2013e). Nonetheless, it is difficult to identify LER households via any Commonwealth concession cards or other income support payments. One possibly way to administer concession targeting to LER households is via Australia's tax and transfers system. In this situation, eligibility to utility concession payments requires a means test, such that household's equivalised disposable income after housing cost is below a defined income threshold and household wealth was below the asset value threshold. The thresholds would be adjusted quarterly or annually with CPIs. In this case, the existing state level administered and funded water and energy concessions would not be required, but an additional utility assistance payments would be funded and administered by the federal government.

Australian governments face pressure to reduce fiscal burdens. Thus, the role of utility concessions and equitable targeting is of critical and growing importance. In particular, the potential withdrawal of federal funding to support state governments' core concessions would reduce the ability of jurisdictions to provide various concessions to the community. In addition, tightening the means test and the requirements of various Commonwealth income support schemes, and abolishing certain supplements may result in reduced welfare payments for some low-income and vulnerable groups. Accordingly, to reform the state utility concession towards a cost effective, fiscally robust, and equitable and efficient scheme is crucial to assist low-income and vulnerable households to afford

essential utility services in the sustainable manner. A more proactive and collaborative policy strategy is discussed in Chapter Two.

## 6.9 Conclusions

At the present time, Commonwealth Pensioner Concession Cards are used as the eligibility criterion for state utility concession, which makes the utility concession schemes less costly to administer. This is achieved at the cost of poor targeting and inequitable outcomes. The initial purpose of issuing Commonwealth concession cards was for the delivery of Commonwealth social welfare programs, and not to respond to water and energy utility affordability challenges. Changing the eligibility rules for Commonwealth income support payments will indirectly impact on the number of households eligible for state concession, and consequently affect state concession expenditure.

My overall conclusion is that current state concession policies in Australia that are dependent on various Commonwealth concession cards as the basis of eligibility criteria, generates a poor targeting outcome. In particular, it has high inclusion errors, for example, households who are neither income poor nor suffering from utility stress are eligible for concessions. In addition, current schemes have also excluded some households with a low equivalised disposable income after housing costs. This is because using Commonwealth concession cards as eligibility criteria does not account for housing costs or residual income, thus low-income renters and working families with high mortgage payments are excluded.

Reforming concession schemes to a nationally consistent framework could achieve consistency but may result in reduced flexibility to address local needs. In the case of water and energy affordability, a household’s utility burden is dependent on climate, seasonality, and utility prices. Subsequently, a percentage-based concession would be most effective way to mitigate households' utility burdens equitably.

The current concession schemes have provided too much assistance for some households and too little for others. More equitable concessions could be varied in accordance to individual circumstances and household needs. If this scenario were adopted, providing payments through Australia's tax and transfers system would be the most efficient and equitable method (PC 2011a).

## Appendix 6.1. Early development of Pensioner Concessions 1950 to 1988

| Year | Details | Government |
|---|---|---|
| **1933** | Free radio licences were introduced for blind people | **Lyons, UAP** |
| **1946** | Concessional rate radio licences were provided to age and invalid pensioners. These were later extended to widow pensioners and also to television licences. Eligibility was based on that for telephone rental concession as described below. | **Curtain, ALP** |
| **1951** | From February a Pensioner Medical Service scheme of free general practitioner medical services and medicines was established. Age, invalid, widow and service pensioners, tuberculosis allowees and their dependents were eligible to use the Service. | **Menzies, LIB-CP** |
| **1955** | From November a special means test limited access to the Pensioner Medical Service to those who would have qualified for a full rate pension under the income test in force at 31 December 1953. Pensioners with more income of more than two pounds per week were excluded. Tuberculosis allowees and those already enrolled were not excluded. | **Menzies, LIB-CP** |
| **1964** | From October telephone rental concession was introduced. A one-third reduction of the annual rental for a telephone was available to age, invalid or widow pensioners who lived alone, or with other eligible people or with other low-income people. | **Menzies, LIB-CP** |
| **1966** | From January the special means test was abolished and all pensioners were eligible to use the Pensioner Medical Service. | **Menzies, LIB-CP** |
| **1969** | From September following the introduction of the tapered means test, those who were eligible for pension only because of the new test were not eligible to use the Pensioner Medical Service or any other fringe benefits. | **Gorton, LIB-CP** |
| **1973** | From June Supporting Mother's Benefit was introduced. Recipients were eligible for telephone rental concession but not to use the Pensioner Medical Service.<br><br>From September eligibility for the Pensioner Medical Service and fringe benefits was restricted to pensioners with means of less than $1716 per annum ($2990 for a couple). | **Whitlam, ALP** |
| **1975** | From July:<br><br>• the Pensioner Medical Service was superseded by the introduction of Medibank. Pensioners were entitled to the full range of medical services. Free pharmaceuticals continued as under the Pensioner Medical Service and eligible pensioners were issued with a Pensioner Health Benefit Card.<br>• the Department of Social Security *Annual Report* for 1974-75 mentions fare reductions available to pensioners travelling on Australian Government rail and shipping services. | **Whitlam, ALP** |
| **1976** | From September:<br><br>• Pensioner Health Benefit Cardholders were exempt from | **Fraser, LIB-NCP** |

| | | |
|---|---|---|
| | the Health Insurance Levy introduced in October 1976. They remained entitled to standard Medibank medical and hospital cover.<br>• the Department of Social Security *Annual Report* for 1975-76 mentions mail redirection concessions for pensioners and a range of concessions offered by state governments for the first time. State concessions had however existed at least since 1972. | |
| **1983** | From January pensioners who did not qualify for a Pensioner Health Benefit Card were made eligible for concessional rate pharmaceuticals, paying $2.00 per item. | **Fraser, LIB-NCP** |
| **1983** | From November the basic income limits for the fringe benefits income test were indexed on a similar basis to the indexation of pension rates. | **Hawke, ALP** |
| **1988** | From January holders of Pensioner Health Benefit Cards were able to retain fringe benefits for three months where their income rose no more than 25 per cent above the income test limits. | **Hawke, ALP** |
| **1990** | From October access to free pharmaceuticals for Pensioner Health Benefit Card holders was replaced by pharmaceuticals at a concessional rate of $2.50 per item. Once expenditure per family reached $130 per annum there was no charge for additional items. A Pharmaceutical allowance was introduced to compensate pensioners for their reduced entitlements to free pharmaceuticals. The allowance was paid at the rate of $2.50 per week and indexed annually. | **Hawke, ALP** |
| **1992** | From July Telephone allowance was introduced to replace the telephone voucher scheme. Quarterly payments totalling $51.80 per annum were paid to pensioners who qualified for fringe benefits and were telephone subscribers. | **Keating, ALP** |
| **1993** | From April the separate income and assets tests for fringe benefits were abolished. All pensioners were given eligibility for fringe benefits. | **Keating, ALP** |
| **1994** | From July the Commonwealth Seniors Health Card (CSHC) was introduced. The card gave access to concessional prescription medicines under the Pharmaceutical Benefits Scheme, free hearing aids and certain free basic dental services. The card was available to people of age pension age who were not eligible for Age Pension (AP) for some reason such as insufficient length of residence or high asset holdings, but whose incomes would qualify them for AP under the income test. | **Keating, ALP** |
| **1995** | From September Disability Support Pension (DSP) recipients could retain fringe benefits for 12 months after losing eligibility due to earnings. | **Keating, ALP** |
| **1999** | From January the income test for the CSHC was changed to one based on taxable income and the income limits were increased to $40 000 per annum for a single person and $67 000 for a couple. Taxable income would be adjusted to include foreign income, certain employer-provided fringe benefits and the value of net rental property losses. | **Howard, LIB-NPA** |

Source: Daniel (1999). Section – Pensioners Concessions 1950 to 1998

## Appendix 6.2: State water and sewerage concessions, 2012-13

| Cities | Eligibility | Concession entitlements | Type of entitlements |
|---|---|---|---|
| ACT | Centrelink Pensioner Concession Card holder (PCC); Veterans' Affairs Gold Card holder (DVA); | 68% discount in water and sewerage supply charge for pensioner and DVA card holder<br><br>Fixed water service charge=$99.83<br><br>Fixed sewerage charge =$600.65<br><br>Total rebate = 476.32 | Fixed rebate |
| | HCC holder (HCC) | Rebate on water charges only for HCC holder<br><br>Total rebate=$67.88 | Percentage discount |
| NSW | Owner-occupiers with Pensioner Concession Card, Dept of Veterans' Affairs Gold Card, Veterans' Affairs Blue Card – Pensioner Concession, or receiving DVA intermediate rate pension | Sydney: Water: 100% discount on water service charge to maximum of $36.22 per quarter and 83% on wastewater service charge.<br><br>Sydney Water: Fixed water charge = $135.12, sewerage charge=$555.08<br><br>Sydney Water Rebate=135.12+460.71=$595.83<br><br>Hunter Water: water rebate $258 | Percentage discount with a maximum cap |

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| Victoria | Centrelink Pensioner Concession Card, Centrelink Health Care Card, DVA Concession Card, DVA Gold Card | 50% discount on water and sewerage charges up to max of $277 per year<br><br>Water only: 50% discount on water charges up to max of $138.5 per year<br><br>Fixed water charge(YVW)=$120.26<br><br>Fixed sewerage charge(YVW)=$321.50 + usage charge | Percentage discount with a maximum cap |
| South Australia | Owner-occupier or tenants with Pensioner Concession Card; Seniors Card; DVA Gold Card; full-time student; Centrelink benefit or allowance receiver; low-income earner | Owner occupiers: 25% discount on total water bill a year ($155 minimum, $265 maximum) plus $105 for sewerage rates<br><br>Tenants: 25% discount on total water bills ($90 min, $200 max)<br><br>**Uniform water tariff policy**<br><br>Water service charge=$293<br><br>Sewerage charge=$336 | Percentage discount with a minimum and maximum cap |
| Queensland | Owner-occupier or life tenant with Pensioner Concession Card or DVA Gold Card | SE Queensland: $120 on water and service charge<br><br>SEQ :Water service charge=$167.16; Sewerage charge=$475.92<br><br>Gold Coast: Water service charge=$201.5; Sewerage charge=$688.88 | Fixed lumpsum rebate, and percentage discount with a maximum cap |
| Western | Owner | For Commonwealth Concession Cardholders or State Concession Card: | Percentage discount with a |

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|---|---|---|---|
| Australia | occupier or life tenants - Pensioner Concession Card, state concession card; WA Seniors Card; Commonwealth Seniors Health Card (CSHC) | Rebate of up to 50% of annual service charges and 50% of water usage charge up to 150 kL per year in Perth, 400kL in South of WA, 600 kL for north of WA. | maximum cap |
| | | WA Seniors Card and CSHC: up to 50% rebate on water service charge<br><br>For State Seniors Card holders: Rebate of up to 25% of annual service charges (cap $46.65 for water charges, $175.75 for sewerage charges)<br><br>**Water Corporation - Perth**<br><br>Water service charge=$188.1<br><br>Sewerage charge=$313.2<br><br>User charge: <150kL: $1.34; 150-500kLL $1.75; Step3: $2.4 | |
| | | | |
| Northern Territory | NT Pensioner and Concession Card (not cover all HCC holders) | Rebate: water service charge $0.913 per day ($333.2 p.a.), usage charge $0.8610 per kL, concessional wastewater service charge $1.213 per day (442.75 p.a.).<br><br>**Power and Water - Darwin**<br><br>Water service charge=$263.71 | Consumption based rebate |

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| | | Sewerage charge=$728.69<br><br>Usage charge = $1.73 per kL | |
| Tasmania | PCC, HCC, DVA | $79.5 on water fixed charge and $79.5 on wastewater fixed charge<br><br>**TASWATER - Southern Region**<br><br>Water service charge=$272.32<br><br>Sewerage charge=$488.71 | |

Source: DCSI (2013b); Department of Health (Northern Territory) (2015); State of Victoria (2015).

## Appendix 6.3: State energy concessions and rebates, 2012-13 (Nov 2012, based on Deloitte 2013)

| Cities | Eligibility | Concession entitlements (Nov 2012) | Type of entitlements |
|---|---|---|---|
| ACT | Centrelink Pensioner Concession Card holder (PCC); Veterans' Affairs Gold Card holder (DVA); HCC holder (HCC) | Energy Concession and Utilities Concession: The max electricity concession is $292.82 per year which can be combined with the utility concession which provides up to an additional $82 per year to offset basic utility costs, including water bills.<br><br>Combined rebate applied to bill of 48.38 cents per day from 1 November to 31 May, and 177.93 cents per day from 1 June to 31 October<br><br>Life Support Rebate: 0.3258 cents per day up to a maximum of $121.87 per annum | Consumption-based rebate with max cap |
| | | | Percentage discount |
| NSW | Low Income Household Rebate (LIHR): Pensioner Concession Card, Dept of Veterans' Affairs Gold Card, Veterans' Affairs Blue Card – Pensioner Concession<br><br>Family Energy Rebate (FER): have received and are eligible for Family Tax Benefit Part A or Part B<br><br>Medical Energy Rebate: Commonwealth Concession Card and a medically diagnosed inability to self-regulate body temperature when exposed to extremes (hot or cold) of | Low Income Household Rebate (LIHR): $215 per year made as instalments on each electricity bill (same rate in regards whether customer has electricity and/or gas bill).<br><br>FER: $75 per year; $35 if also receiving LIHR (intro in July 2012)<br><br>Life Support Rebate (LSR): Certified life support equipment. Daily amount for different equipment are varied.<br><br>Medical Energy Rebate: $215 a year in addition to other energy concessions | Lumpsum rebate |

| | | | |
|---|---|---|---|
| | environmental temperatures | | |
| Victoria | Centrelink Pensioner Concession Card, Centrelink Health Care Card, DVA Concession Card, DVA Gold Card | Annual Electricity Concession (AEC): 17.5% discount on household electricity bills (above $171.6 of annual bill)<br><br>Winter Energy Concession (WEC): 17.5% discount of mains gas between 1 May to 31 Oct annually (above $62.4 of winter bill)<br><br>Off Peak Concession (OPC): 13% discount on the off-peak tariff of electricity bills for households with separate metered electric hot water or slab heating<br><br>Electricity Transfer Fee Waiver: Provide a full waiver of the fee when there is a change of occupancy at a property<br><br>Service to Property Charge Concession (SPCC): Provide a reduction on the supply charge for concession holders with low electricity consumption. The concession is applied if the cost of electricity used is less than the supply (or service) charge. The service charge is then reduced to the same price as the electricity usage cost.<br><br>Non-Mains Energy Concession: Provides a rebate for those who are not connected to mains gas and use LPG for domestic heating or cooking or pay electricity to caravan park or accommodation proprietor.<br><br>Medical Cooling Concession: 17.5% discount off electricity costs over a six month period from 1 November to 30 April for concession cardholders with multiple sclerosis and | Percentage discount |

| | | | |
|---|---|---|---|
| | | other qualifying medical conditions. This payment is provided in additional to AEC<br><br>Life Support Concession: provides a quarterly discount on electricity and/or water bills where a household member uses an eligible life support machine. The concession is available all year round. | |
| South Australia | Pensioner Concession Card; DVA Gold Card, Health Care Card | Customer Concession Scheme for Energy (CCSE): $165 discount per year on household energy bills<br><br>Medical heating and cooling concession: $165 per year in addition to the CCSE concession<br><br>Home Dialysis Electricity Concession: $165 per year for all home dialysis patients | Percentage discount with a minimum and maximum cap |
| Queensland | Pensioner Concession Card or DVA Gold Card, Health Care Card, Queensland Seniors Card | Electricity Rebate: $230.46 per year.<br><br>Reticulated Natural Gas Rebate: $64.23 per year<br><br>Medical Cooling and Heating Electricity Concession Scheme: $234.46 per year<br><br>Electricity Life Support Concession Scheme: $39.12 per month for oxygen concentrators and $26.20 per month for kidney dialysis machines | Fixed lumpsum rebate, and percentage discount with a maximum cap |
| Western Australia | Dependent Child Rebate – Electricity (DCRE): PCC, DVA, HCC<br><br>Cost of Living Assistance (CLA): PCC, DVA, HCC, CSHC<br><br>Air-conditioning rebate (ACR): eligible | Dependent Child Rebate – Electricity (DCRE): Rebate is calculated daily, according to number of dependent children.<br><br>- 1 child: 61.3 cents/day; 2 children: 77.89 cents/day; 3 children: 94.48 cents/day; 4 children: 111.07 cents/day | Percentage discount with a maximum cap |

| | | | |
|---|---|---|---|
| | locations + WA Seniors Card, PCC, DVA, HCC, CSHC | Cost of Living Assistance (CLA): $200 per year, in additional to DCRE (introduce in July 2012)<br><br>Air-conditioning rebate: $43.76/month for eligible locations for summer months<br><br>Thermoregulatory Dysfunction Energy Subsidy Scheme: $545 per year<br><br>Life Support Rebate: rebate varied with equipment | |
| Tasmania | Commonwealth Concession Card: PCC, DVA, HCC | Electricity Rebate: $1.235 per day up to a max $450.78 per year<br><br>Heating Allowance: $56 a year to eligible pensioners to assist with heating costs<br><br>Life Support Machine Rebate: Pay different rate for different medical equipment | |
| | | | |
| Northern Territory | Pensioner and Carer Concession Scheme (incl. PCC, DVA, HCC, State Seniors citizens (female 60+ or male 65+) | A daily rate concession of $1.201 per day as well as consumption concession of 0.058 per kL hour. | Concession water rate |

Source: ERA (2012); Government of South Australia (2014); Queensland Government (2014b); Trade & Investment (NSW) (2013).

## Appendix 6.4: Types of Commonwealth concession cards and selected income support payments

| **Pensioner Concession Card** |
|---|
| To get a Pensioner Concession Card (PCC), one must meet residence requirement and must also be one of the following.<br><br>• assessed as being able to work part-time and receiving Newstart Allowance, Youth Allowance (job seeker) or Parenting Payment.<br>• a single principal carer of dependent children and receiving Newstart Allowance or Youth Allowance (job seeker)<br>• receiving a pension such as Age Pension, Disability Support Pension, Parenting Payment (Single), or Carer Payment, or<br>• 60 years of age or over and receiving one (or a combination) of the following payments continuously for at least nine months:<br>  ○ Newstart Allowance<br>  ○ Sickness Allowance<br>  ○ Widow Allowance<br>  ○ Parenting Payment (Partnered)<br>  ○ Special Benefit, or<br>  ○ Partner Allowance.<br><br>Eligibility of the above income support payments depend on asset test and income test. |
| **Health Care Card** |
| To get a Health Care Card (HCC) one must meet residence requirements and must also be receiving a qualifying payment from Centrelink, or be:<br><br>• getting the fortnightly maximum rate of Family Tax Benefit Part A by instalment<br>• getting Carer Payment due to either episodic or short-term care<br>• a carer receiver of a carer or parenting getting Carer Allowance (child), or<br>• a Mobility Allowance customer who cannot get a PCC.<br><br>*Ex-Carer Allowance (Child) Health Care Card* - the card is available to people who are aged between 16 and 25 years, are a full-time student, were receiving a Carer Allowance Health Care Card on t he day before he/she turned 16 years of age. The card helps the eligible person with cheaper medicines under the Pharmaceutical Benefits Scheme and some other concessions.<br><br>*Foster Child Health Care Card* - the card is available to person who is a foster carer, or caring for someone else's child. Both formal and informal foster carer may be eligible. The card assist the foster carers with cheaper Pharmaceutical Benefit Scheme medications for foster children in their care and other |

concessions.

*Low Income HCC* - the card is available to people with income below set levels. The income test applies to average gross income for the eight weeks immediately prior to applying for or renewing the card.

**Commonwealth Senior Health Card**

The Commonwealth Senior Health Card (CSHC) is available to self-funded seniors who are not receiving a Human Services or Department of Veteran's Affairs (DVA) income support payments. One may get a CHSC if he/she:

- meet residence requirements
- is of age pension age
- provide the Tax File Numbers of himself/herself and their partner's
- meet an annual adjusted taxable income test.

No assets test is required. The person does not need to be retired to get CSHC, but his/her income must be below the limits. Holders of CSHC are entitled to the Seniors Supplement.

**Veterans' Health Cards**

Department of Veterans Affair (DVA) issues health cards to eligible veterans and former members of Australia's defence force, their widows/widowers and dependants. There are different eligibility requirements for each type of card.

There are 3 categories of DVA health cards. They include Gold, White and Orange.

**Gold card - 'DVA health card - For all conditions'**

The **Gold Card** - 'Repatriation Health Card - For All Conditions' gives you access to a wide range of public and private health care services, for the treatment, at the department's expense, of all your health care conditions whether war or service related or not.

A Gold card entitles the holder to DVA funding for services for all clinically necessary health care needs, and all health conditions, whether they are related to war service or not. The card holder may be a veteran or the widow/widower or dependant of a veteran. Only the person named on the card is covered.

**White card - 'DVA health card - For specific conditions'**
A White card entitles the holder to care and treatment for:

- accepted injuries or conditions that are war caused or service related;
- malignant cancer, pulmonary tuberculosis, posttraumatic stress disorder, anxiety and/or depression whether war caused or not; and
- the symptoms of unidentifiable conditions that arise within 15 years of

service (other than peacetime service).

Services covered by a White card are the same as those for a Gold card but must be for treatment of war caused or service related accepted conditions. The card also entitles the holder to transport related to treatment and access to the Repatriation Pharmaceutical Benefits Scheme (RPBS) for their accepted conditions.

**Orange card - 'DVA health card – For pharmaceuticals only'**
The Orange card enables the holder to access the range of items available under the Repatriation Pharmaceutical Benefits Scheme (RPBS). The Orange card is for **pharmaceuticals only**, and cannot be used for any medical or other health care treatment.

**Family Tax Benefits**

Family Tax Benefits (FTB) include two part payments that help with the cost of raising children. To be eligible to FTB, the person must:

- have a dependent child or secondary student younger than 20 years of age who is not receiving a pension, payment or benefit such as Youth Allowance

- provide care for child for at least 35% of the time

- meet an income test.

FTB - Part A is paid for each child. The amount received is based on one's family's individual circumstance. The family must satisfy an income test, meet residence requirements and carer for the child at least 35% if the time. The income test in FTB-Part A is tighter than in FTB-Part B.

FTB - Part B gives extra help to single parents and families with one main income. The rate of FTB Part B is based on an income test and the family need to meet residence requirements. To be eligible for FTB- Part B, income threshold for a single parents or couples where the primary earner is an adjusted taxable income of $100,000 or less per year (as of February 2015).

**Commonwealth Rent Assistance**

Commonwealth Rent Assistance (CRA) is to provide financial assistance to people who pay rent and receive a Centreline payment.

To be eligible for CRA if the person must be paying more than the minimum amount of rent in the Centrelink payment rate table and are:

- receiving a pension - special rules apply if the person is under 21 and receive Disability Support Pension

- receive an allowance or benefit - special rules apply if the person is under 25

| |
|---|
| - receive more than the base rate of Family Tax Benefit<br><br>CRA is not payable if the person is a tenant of the state or territory housing authority or a homeowner who are travelling away from their principal place of residence for less than 12 months.<br><br>CRA payment rates are undated twice a year and they vary depending on a person's circumstance.<br><br>If a person has dependent children and pays rent, he/she will get CRA with Family Tax Benefit Part A. |
| **Supplementary payments related to utilities expenses** |
| The Pension Supplement and the Seniors Supplement were introduced on 20 September 2009.<br><br>*Pension Supplement* - The Pension Supplement replaced Utilities, Telephone and Pharmaceutical allowances for recipients of Age Pension, Carer Payment, Wife Pension, Widow B Pension, Bereavement Allowance, Disability Support Pension, Parenting Payment and Service Pensions, as well as other income support payments if a person has reached Age Pension age.<br><br>*Seniors Supplement* - The Seniors Concession Allowance and Telephone Allowance were combined into the Seniors Supplement which is targeted at self-funded retirees of Age Pension age who do not qualify for an Age Pension because of assets or income levels.<br><br>*Utilities Allowance* - The Utilities Allowance was paid to recipients of the Widow Allowance and Partner Allowance who are under Age Pension age and to Disability Support Pension recipients younger than 21 years without children, to assist with the cost of utility bills. |

Source: DHS (2015a-2015h); DVA (2015).

## Appendix 6.5: State Seniors Card eligibility criteria, 2014-15

| State | Eligibility |
|---|---|
| **ACT** | The ACT Seniors Cards are available to persons who are permanent residents of the ACT and, of the age 60 years or over and, not in paid employment for more than 20 hours per week. |
| **NSW** | To be eligible for a NSW Seniors Card, the person must be a New South Wales permanent resident, aged 60 or over and work no more than 20 hours a week in paid employment. |
| **Victoria** | Eligible for State Seniors Card if the residents are 60 years of age or older, fully retired or employed for less than 35 hours a week, and an Australian resident in Victoria you are eligible for a Seniors Card and loads of discounts. |
| **Queensland** | To be eligible for a Seniors Card, one must be:<br>• 65 years or older and working less than 35 hours a week in paid employment, *OR*<br>• 60–64 years, working less than 35 hours a week in paid employment and the holder of one of the below: Commonwealth Pensioner Concession Card; Commonwealth Health Care Card; Commonwealth Seniors Health Card; Department of Veterans' Affairs Gold, White or Orange card. |
| **South Australia** | To be eligible for a Seniors Card, one must be:<br>• you're aged 60 years or older<br>• you're a permanent South Australian resident<br>• you're not working more than 20 hours per week in paid employment (part-time and casual employees may average their hours over a 12 month period).<br>There is no income or pension limit and the card is issued free of charge. |
| **Western Australia** | To be eligible for a Seniors Card, one must be:<br>• aged 60 years or more<br>• a permanent resident of Western Australia (include holders of the sub class 410 or 405 Visa who have lived in WA for a minimum of 5 years and reside in WA for a minimum of 6 months each year)<br>• not in full time employment (i.e. I work 25 hours or less per week, averaged over a 12 month period). |

| | |
|---|---|
| **Tasmania** | To be eligible for a Seniors Card, one must be:<br>• A resident of the State,<br>• 60 years of age or over, and<br>• Not working more than 20 hours per week in paid employment. |
| **Northern Territory** | Any permanent Northern Territory resident 60 years of age or older is eligible for a NT Seniors Card. The Seniors Card is issued for free and provides access to savings on a range of goods and services provided by participating businesses. |

**Source:** COTA ACT (2015); Family and Community Services NSW (2015); Department of Health and Human Services (Victoria) (2015); Queensland Government (2015); Department of Local Government and Communities (Western Australia) (2015); Department of Premier and Cabinet (Tasmania) (2015); Northern Territory Government (2015).

# Chapter 7

# Conclusions

## 7.1 Summary of research findings

The experience of utility stress and hardship is not uncommon among low-income households in contemporary Australian society (Chester 2013). The real water and energy utility prices have increased faster than household incomes among low-income households in the recent time. This is congruent with statistics from the AER and state energy and water ombudsmen across jurisdictions that affirm that the number of Australian utility customers facing bill debts or disconnections due to payment difficulties has increased significantly (AER 2007, 2014a, 2014b; EWON 2013, 2014; EWOV 2014). As reviewed in this thesis, the problems of utility affordability faced by low-income and vulnerable households are increasingly complex and multifaceted under the contemporary policy and governance regimes. It is timely to rethink whether the extent of the current policies that tackle the affordability issues are effective, efficient and equitable.

Reform of the urban water and energy sectors over the last thirty years has changed the modes of governance, the roles of public utility sectors, and the policy landscape for addressing utility affordability in Australia (Chapter Two). In the past, most of the urban water and energy tariffs were controlled by state and territory governments. Multiple social and economic objectives would be considered during utility pricing decision. Thus, water and energy services were charged below average supply costs. In some circumstances, there were provision of free water allowances to make water and energy affordable to most Australian households. Nonetheless, extensive microeconomic reform occurred in the urban water sector and energy sector has re-prioritised the objectives of water and

energy pricing. Further reform such as privatisation of the energy sector, and deregulation of retail electricity and gas tariffs encourages competition among both energy generators and retailers. Thus, the role of water and energy concessions provided by state and territory governments has played an increasingly important role in assisting low-income and vulnerable households to be able to afford these essential services (Deloitte 2013; AEO, ERAA, ACOSS 2013). In sum, tackling the problem of utility affordability has become more complex and require a shared responsibility among multiple sectors and different levels of government (AEO, ERAA, ACOSS 2013).

In order to develop a more coherent, sustainable and practical strategy to address utility affordability in Australia, there is a need to establish a more robust and rigorous way to measure utility affordability and identify households in need of assistance. At present, investigations on the extent of existing policies – and the definitions and data they are based on – to reflect the principles of efficiency, effectiveness, and equity have been under-represented in the research and public policy literature.

The objective of this thesis was to evaluate whether utility affordability problems are addressed effectively, efficiently, and equitably in the current governance regimes of Australia's urban water and energy sectors. And if they are not, how could those governance regimes be reformed or improved so as to ensure greater effectiveness, efficiency, and equity in dealing with problems of utility affordability?

To answer these overarching questions, the thesis was divided into discrete research studies guided in turn by their own research questions. I reviewed the insights and findings of those questions here, before articulating my overarching conclusion at the end.

In Chapter Two, I critically assess what the consequences of reforms undertaken in the urban water and energy sectors have been on the modes of governance employed, the key actors involved, state-utility-citizen relationships evolved, and the contemporary policy settings occurred to address utility affordability. Using

the modes of governance defined by Bell and Hindmoor (2009: 2-3), I find that the two public utility sectors have transformed from 'governance-via-hierarchy' prior to macroeconomic reform towards a mixed mode of governance – 'governance-via-market' and 'governance-via-hierarchy' – in the current market-oriented framework. In addition, the energy sector has placed an increasing emphasis on 'governance-via-community engagement' through the latest market liberalisation process. In the contemporary policy and governance settings, there are diverse programs and activities to address utility affordability, and an increasing number of stakeholders involved. Nevertheless, the increased complexity of the affordability policy landscape has resulted in redundancies and gaps in sector responsibilities. To successfully tackle this emerging social challenge requires policy reform towards a proactive and collaborative approach.

In Chapter Three, I explore how social aspirations can be integrated into public utility pricing frameworks. Using the urban water sector as example, this chapter provides an overview of how social equity can be built into water pricing principles, processes, and outcomes, from international experience. To assess the effect of pricing policy and state water concession scheme, a simplified water affordability analysis was demonstrated. In the analysis, I find that state water concession can be an effective social policy tool to reduce the water burden among eligible households. Nonetheless, equity implications of the current water concession schemes are questionable, which will be discussed in Chapter Six.

Defining and measuring utility affordability is a crucial step in identifying households in need of targeted assistance and, subsequently, to inform social policy design. In Chapter Four, I examine how utility affordability standards should be defined so that households in need of assistance can be identified. Using the theory of public utility affordability (Kessides et al. 2009; Hills 2012) and housing affordability (Stone 2006; Harding et al. 2004), Chapter Four of this thesis strives to understand the application of different affordability measurements in the Australian context, so as to assess their strengths and weaknesses. I conclude that the Low Income and High Burden (LIHB) approach can be the most appropriate method to assess the trends in water and energy affordability over

time. Further, my analysis reveals that there is a strong association between households that are at risk of utility stress and their likelihood to encounter other material hardships. Therefore, using a basket of indicators, including relative affordability indicators and subjective indicators, will assist in understanding the multiple dimensions of utility stress and hardship, and counteract the deficiencies of the LIHB approach.

Concomitant with increased utility prices, state utility concessions have become increasingly important. It can be served as an additional safety net for low-income and vulnerable households (Harmer 2009; ACOSS 2014). I conduct an empirical analysis to evaluate the efficiency and effectiveness of the current category-based Victorian concession scheme in targeting households at risk of water and energy affordability stress. I use the data from the Victorian Household Utility Consumption Survey 2007 and apply the LIHB approach (in Chapter Four) to identify household at risk of utility stress. I find that the Victorian water and energy concession schemes had a low rate of exclusion error, but a very high inclusion error rate. Further, I modify the Beckerman (1979) model to evaluate the vertical expenditure efficiency (VEE) of the Victorian concession schemes. I find that only a quarter of the concession expenditures have been spent efficiently. The results demonstrate that there would be substantial efficiency gain and budget saving by improving the Victorian utility concession schemes to target towards those households at risk of utility stress.

In Chapter Six, I assess the social equity implications of current state concession schemes vis-à-vis alternative scenarios. Using the principles of horizontal and vertical equity (Herscovitch and Stanton 2008) and the ABS HEC 2012 CURF data, I evaluate the social equity implications of the state water and energy concessions offered by different Australian jurisdictions. Both horizontal and vertical inequity are found in the current concession entitlements and eligibility criteria. First, large households that have higher levels of water and energy consumption are disadvantaged under most of the current concession designs. Second, not all low-income households are eligible for concessions. For instance, certain low-income renters, those households with unemployed family members,

or those who are receiving Family Tax Benefit - Part A payment, are currently ineligible for concessions in many jurisdictions. By contrast, a large proportion of non-poor households are eligible for current state utility concessions. Furthermore, state utility concessions offered in most jurisdictions are not efficiently targeting to utility stress households. To improve equity dimension of concession targeting, I present three alternative scenarios of entitlement design and concession eligibility. I conclude that substantial savings can be made if state concession programs are reformed to a more nationally consistent, equitable, and efficient design towards households that are at risk of utility stress or those have low economic resources.

In summary, the problems of utility stress and hardship are multifaceted. At present, all three sectors have some policies and programs in place to address customer utility affordability and short term customer hardship problems. Most of these policies and programs are reactive, instead of proactive, by nature. In particular, they tend to address the symptoms - the short-term affordability problems - rather than the causes - the long term solutions. In addition, I find that the current state water and energy concession schemes, which are both inefficient and inequitable, required to reform to a more equitable and efficient approach and to target those most in need of assistance.

## 7.2 Research contributions

This thesis challenges the dominant policy views about the most effective, efficient and equitable means of addressing the affordability of essential services for low-income households. It provides additional insights to the discourse on the current debate which has been disproportionately focused on electricity pricing and overshadowed equally important 'essential services' such as gas and water in Australia. This thesis draws upon of multiple theoretical framework, and such a pluralist approach provides a much richer analysis than the reliance on a single theoretical perspective.

Findings from this thesis are valuable for future policy development to address utility affordability problem among low income and vulnerable households. First, findings of this thesis demonstrate that there is a strong association between households at risk of utility stress and other dimensions of financial stress and material hardships. Second, some households that are at risk of utility stress are not eligible to assistance in the current state energy and water concession scheme. This group includes single parents with dependent children, households that are at risk of housing stress, and households that are in low economic resources (both low income and low wealth). Third, the current state concession scheme has a high inclusion error rate and low vertical expenditure efficiency in respect to targeting at households at risk of utility stress. This leads to the question of whether the current state concession schemes that rely on the Commonwealth Concession Cards and, in some cases, State Senior Cards, are effective screening mechanism. Inconsistency of eligibility criteria and concession entitlement across jurisdictions is questionable in view of horizontal and vertical equity perspectives.

Overall, the findings of this study demonstrate that there is significant opportunity to improve the efficiency, effectiveness, and equity outcomes for the state concession schemes, and that, a nationally consistent concession framework is worthy of consideration.

## 7.3 Future research

My thesis provides both an analytical framework and a policy perspective to respond to household utility stress in energy and water in Australia. While my work offers valuable insights, especially in terms of how the efficiency, effectiveness, and social equity of concession schemes can be improved to respond to utility stress, it is by no means the last word on the subject. Further work and extensions of my analysis could include:

- Cross-country comparisons based on household data

- Tracking of households who are at persistent risk of utility stress and hardship
- Conducting social experiments that test household responses to alternative policies intended to reduce utility stress
- Strategies for broader state concession policy reform to a more equitable and efficient framework.

Nonetheless, the current policy setting, such as state concession scheme and targeted social benefits, may treat the symptoms, but not the causes of utility affordability problem among low income and vulnerable households. Policies to respond to the root causes include: enhancing capacity of utility stress households to improve energy and water efficiency of their housing stocks; empowering low income households to engage utility service providers to liaise a better market offer which is tailored to their needs and will result in lower expenses; and installing smart meters; and/or developing payment plans to assist households to better manage their utility bills. To put these responses into effect, a collaborative strategy and participation from all sectors is necessary.

In sum, my thesis provides a step forward to improved approaches to respond to household utility stress and the method to analyse and evaluate the problem.

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