THE UNIVERSITY OF MELBOURNE

SMART METERS, SMART JUSTICE?

Energy, Poverty and the Smart Meter Rollout

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This project was funded by the Consumer Advocacy Panel (www.advocacypanel.com.au) as part of its grants process for consumer advocacy projects and research proposals for the benefit of consumers of electricity and natural gas.

The views expressed in this document do not necessarily reflect the views of the Consumer Advocacy Panel or the Australian Energy Market Commission.

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Acknowledgements

The Social Justice Initiative (SJI) wishes to thank the Consumer Advocacy Panel for providing funding to carry out this research. This project was funded by the Consumer Advocacy Panel (www.advocacypanel.com.au) as part of its grants process for consumer advocacy projects and research proposals for the benefit of consumers of electricity and natural gas. The views expressed in this document do not necessarily reflect the views of the Consumer Advocacy Panel or the Australian Energy Market Commission.

SJI would also like to acknowledge the valuable contribution and support of our project partner, the St Vincent de Paul Society Victoria and in particular Mr Gavin Dufty and Ms May Mauseth Johnston, who we have had the good fortune of working closely with on this project. The authors would also like to thank Sam Butchart and Emily Trembath for proofing the final draft and for their helpful comments and suggestions.

Special thanks are also owed to the many individuals and community organizations who assisted in and supported this project, particularly in organising participants for the focus groups: Mark Henley (Wesley Uniting Care Adelaide), Mary Pennell (Mission Australia Brisbane), Mark Ludbrooke (the Public Interest Advocacy Centre), Jill Coleman (the Illawarra Forum), Sr Rosemary Graham (St Vincent de Paul Mildura), Marion Harper (Reservoir Tenants Group), Michael Simpson (Vision Australia), Michael Summers and Gayle Homann (MS Australia), Nadine Lester (Queensland Council of Social Services), Katie Florance (Shelter NSW), Patrycja Arvidssen (Tenants Union of New South Wales), and Mary Slivka (Social Housing Program, Department of Communities QLD).

Finally, this project would not have been possible without the participation of the more than 100 people who took part in the focus groups and responded to the survey.

About the Social Justice Initiative

The Social Justice Initiative was founded at the University of Melbourne in 2007. The aim of the Social Justice Initiative (SJI) is to facilitate interdisciplinary research of international standing and strengthen the growing interest in questions of social justice at the University of Melbourne and beyond. In particular, the SJI aims to build links between the different theoretical understandings and practical applications of social justice developed across a range of disciplines. These include: inequality, poverty, distributive justice, welfare and unemployment policy, the nature of work, the social justice implications of new technologies, mental and indigenous health, obesity, global justice and the social justice implications of climate change. SJI members also conduct research on key theoretical dimensions of social justice including: inequality, poverty, tolerance and distributive justice. The Initiative is funded through the Melbourne Strategic Research Initiatives Fund as well as by the Faculties of Arts, Economics and Commerce, Law, and Medicine, Dentistry and Health Sciences.

Background

In 2009, the Social Justice Initiative (SJI), in partnership with the Society of St Vincent de Paul, was awarded funding by the Consumer Advocacy Panel to investigate the potential impact of the smart electricity meter rollout on low-income and vulnerable households, especially pensioners, young families on fixed incomes, and people with disabilities.

Any policy that results in making the worst off even more worse off than they already are is, on the face of it, unjust and, at the very least, must be strenuously justified. SJI's interest in the smart meter rollout stems from a concern that all public policy initiatives take account of the interests and needs of the least advantaged members of society and from concerns expressed by community groups regarding the implications of time-of-use pricing for low-income and disadvantaged households.

To investigate the impacts of the smart meter rollout on low-income and disadvantaged households, SJI carried out an extensive analysis of available research into energy affordability in Australia and of available research on impacts of time-of-use pricing on low-income and disadvantaged households. SJI also consulted closely with community groups concerned about the smart meter rollout and conducted a series of focus groups with low-income householders in Victoria, New South Wales, South Australia and Queensland between September and November 2009. Public housing tenants, pensioners, fixed-income families and people with chronic illnesses and disabilities (amongst others) were invited to give their views on what the smart meter rollout and the introduction of time-of-use pricing would mean for their ability to afford electricity and the effect that the rollout would have on their wellbeing and quality of life. People were also asked about their current experience with energy affordability and the sorts of behaviours that they adopt today to keep their energy costs down.

More than one hundred people took part in the focus groups, the vast majority of whom were from low-income households. There was also a substantial representation of people with disabilities or chronic illnesses that affect energy use, such as MS, vision impairment and mobility impairment, as well as public housing tenants.

In addition to the focus groups, a survey gathering information about the efficiency of households' electricity use was carried out to enable more refined analysis of the potential impacts of time-of-use tariffs on the households taking part in this study. The survey was administered to focus group participants, and an extended version—including an opportunity to provide feedback on dynamic tariffs—was provided to people who were unable to attend the focus groups. A total of 71 surveys were returned. The majority of respondents (34) were public housing tenants, although a sizable number of homeowners (28) also took part. The number of private tenants was more limited (only 8 respondents). A large proportion of survey respondents also lived alone (42.3%), although around 21% of survey respondents were from households with dependent children—most of these were single-parent households.

Significantly, almost half of those participating in the survey were from households where the entire household is at home during the day-time, reflecting SJI's concern for low-income households with high peak-period occupancy rates. Similarly, government pensions or benefits were the principal source of household income for around 63% of survey respondents, with less than 20% of households deriving their main income from paid employment. Also, nearly 65% of people taking part in the

survey—and more than 75% of those providing data on weekly household income—were from households with a weekly equivalised net income of $400 or less.

The small sample size of the survey and over-representation of low-income households, people with disabilities, and public housing tenants means that generalisations cannot be made from the survey results about the wider implications of the smart meter rollout for consumers. Nevertheless, the results of the focus groups and survey still offer an important insight into the potential of the smart meter rollout to impact upon those who are already most vulnerable and disadvantaged in relation to meeting essential needs that are dependent on electricity use. In this regard, it is important to point out that this study is not an investigation of the costs and benefits of the smart meter rollout for consumers *per se*. We make no claims concerning what the overall impact of the rollout will be on consumers, or even on the average household's electricity costs (as we take this to be the roll of other groups engaged in policy discussion surrounding the smart meter rollout).

The report that follows is the product of the surveys and focus groups carried out by SJI in late 2009 and of extensive background research carried out beforehand into the smart meter rollout, time-of-use pricing, and issues of energy affordability in Australia today. The report is divided into three main sections.

- The first section discusses the functionalities of smart meters and the history and development of the smart meter rollout in Australia
- The second section explains why the smart meter rollout raises issues of social justice by situating the rollout within the context of the increasing precariousness of energy affordability today in Australia for low-income and disadvantaged households
- The final section of the report deals with the vulnerability of low-income households to time-of-use pricing and explains the factors that affect whether or not a household is penalised or advantaged by time-of-use pricing

This report forms part of a broader initiative to develop research and advocacy on issues of energy affordability in the wake of the smart meter rollout. Amongst the key contributors to this broader initiative is the Society of St Vincent de Paul, and readers interested in further exploring the issues identified in this report, or in gaining a wider perspective on the consumer impacts of the smart meter rollout, are encouraged to read their most recent series of reports, *Customer Protections and Smart Meters*. This series is the product of a sister project—also funded by the Ministerial Council on Energy (through the Consumer Advocacy Panel)—and the reports can be downloaded from the Society of St Vincent de Paul website (go to www.vinnies.org.au).

The report is also part of a larger project within SJI to conduct research on the social justice impacts of mitigating and adapting to climate change. Energy efficiency measures, such as the smart meter rollout are in art a response to climate change. For further details of SJI's research visit www.socailjustice.unimelb.edu.au.

Glossary

- **Accumulation meters**: electricity meters that only measure total electricity use between meter readings (which usually have to be done manually). As a result, consumers on accumulation meters are usually billed according to a flat or inclining block tariff as there is no way to calculate the time of their electricity consumption.
- **Critical peak pricing tariffs**: Under critical peak pricing, electricity prices are increased sharply—in pilots of CPP in NSW the critical peak price charged has been between 11 and 31 times higher than the flat tariff—for a limited duration in certain times of unusually high demand. This is to reflect the fact that it costs more to supply energy during periods when the system is near peak capacity, and also to encourage consumers to reduce their consumption in order to avoid an overload of the system. Companies in Australia that have so far offered critical peak pricing tariffs to customers have agreed to limit the number of times critical peak pricing events can be called in a year (usually 8-12 times) and to limit the duration of each critical peak event to only 4 to 7 hours. As an incentive for taking up a critical peak tariff, consumers are usually given a discount on the remainder of their electricity use.
- **Direct Load Control**: Under direct load control, heavy usage appliances, such as pool pumps and air-conditioners are cycled on-and-off during peak periods to reduce network load, either directly through the home area network or remotely by a third-party—for instance, a network business or retailer—using the communications infrastructure of the smart meter.
- **Distribution (Network) businesses**: the companies that own and are responsible for the management of the power lines that deliver electricity to homes and businesses as well as the metering infrastructure that records consumers' electricity usage. Distributors do not sell electricity to consumers; they merely provide the pathways through which generated electricity can be transmitted to consumers. Distributors in Australia are treated as monopoly businesses and distribution charges are regulated by the Australian Energy Regulator. In Victoria, the five distribution companies are Citipower, Jemena, SP AusNet, Powercor, and United Energy. EtSA Utilities is the distributor in South Australia. And Ergon Energy and Energex are the distributors in Queensland. In New South Wales, the three distributions are Energy Australia, Integral Energy and Country Energy.
- **Flat (single rate) tariffs**: electricity tariffs with a fixed price for electricity use that neither varies according to the time of this electricity use nor according to the quantity of electricity used.
- **Inclining block tariffs**: tariffs whereby the per kWh cost of electricity consumption increases once a certain threshold of electricity use has been reached. Typically this will be 1,750 kWh per quarter, with consumption above this level attracting a higher rate.
- **Retail businesses**: the companies that manage consumers' electricity accounts and who consumers' ultimately purchase their electricity from. Retailers purchase electricity in bulk from the wholesale market and 'rent' distribution infrastructure to deliver this electricity to consumers who are then billed by the retailer for wholesale, distribution, and retail costs of their electricity use. These wholesale (generation), distribution(network) and retail (account management) costs respectively account for around 44%, 47% and 9% of the eventual tariff rate charged to consumers. South Australia, Queensland and Victoria have privatised retail markets, while other state governments retain a share of the retail market. Each state and territory is responsible for the economic regulation of retailers, and Victoria is the only state to have removed price regulation for residential customers. There are more than 20 retailers in some states (e.g. Victoria and Queensland), although largest private retailers in Australia are AGL Energy, Origin Energy and Tru Energy.
- **Smart meters**: electricity meters with advanced communications capabilities that allow them to be remotely read and to record consumption data over regular (usually half-hour) intervals. Furthermore, smart meters have the ability to interact with appliances in the home through a home area network (HAN) to allow for the **direct load control** of heavy usage appliances, such as heat pumps, pool pumps and air-conditioners. They also facilitate the use of supply capacity control limits.

- **Standard tariff**: the basic, no frills tariff offered to consumers who choose not to negotiate a market contract with a retailer. Currently, standard tariffs have the shape of either a flat or inclining block tariff. Moreover, standard tariff prices are regulated in states other than Victoria. In Victoria, retailers are required to publicise a standing tariff offer, but the rate of this tariff offer is not regulated except that tariff rates may only increase once every 6 months.
- **Supply capacity control**: This is where a distributor sends a message to the smart meter to cut supply to that premises temporarily for a limited period of time (for example, 30 or 60 minutes) if demand from that premises exceeds a certain threshold that can be specified by the distributor. Currently, distributors load shed using rolling blackouts whereby the supply of electricity to entire geographical areas is temporarily suspended. The supply capacity control capabilities that smart meters are equipped with, however, enable distributors to load shed in emergency situations by temporarily limiting the supply of electricity to a wide group of customers instead of blacking out entire areas on a rolling basis. In this way distributors can continue to provide customers with a continuous supply of electricity during emergency situations, albeit on a limited basis, instead of having to interrupt the supply of electricity altogether to geographical areas. So while consumers who exceed their individual capacity limits will lose their supply temporarily when supply capacity control limits are initiated, remaining customers who have keep their electricity use within capacity limits will continue to enjoy a continuous supply of electricity. It has also been suggested that the supply capacity control capability of smart meters could be used to provide customers with new retail products. For example, retailers may offer consumers pricing plans based on different capacity limits. Here it has been suggested that retailers could offer supply capacity products to low-income customers struggling with the management of their electricity costs 'or as an alternative to disconnection for defaulting customers.' Instead of being threatened with disconnection, defaulting customers could have their electricity supply limited to only a few kilowatts per day until such day as they have caught up on their bills.
- **Time-of-use pricing**: pricing electricity in such a way where the cost of electricity use varies depending on the time of this electricity use. As used in this report, time-of-use pricing refers to critical-peak-pricing and time-of-use tariffs.
- **Time-of-use (TOU) tariffs**: a time-of-use pricing structure with set daily peak and off-peak periods and, occasionally shoulder periods. Peak, shoulder, and off-peak periods may vary between seasons and between states. For example, Victorian retailers offer a two-part TOU tariff with a peak rate from 7am until 11pm in some cases, while NSW retailers offer three-part TOU tariffs with a peak period from 2pm to 8pm. Under TOU tariffs, peak tariff rates will generally be about twice the tariff rate of the flat tariff and off-peak rates about half the flat tariff rate. The shoulder tariff rate will typically be set at a level close to the flat tariff rate.

Executive Summary

Key Points

- Any policy that causes the most disadvantaged and vulnerable members of society to be even worse off than they already are is, on the face of it, unjust and *at the very least* must be rigorously justified.
- Unless suitable protections and policies are put in place to shelter vulnerable and low-income households from the cost impacts of time-of-use pricing and increased fixed charges, the smart meter rollout will cause groups such as pensioners, people on disability support pensions and fixed-incomes, and single parents with dependent children to be significant worse off, potentially adding in the region of $300 to their annual electricity costs.
- Through increases in fixed charges alone, the smart meter rollout could add more than $120 to Victorian households' electricity costs this year, with further increases in 2011-13. These increases in fixed charges impact especially severely on low-income households because of the low-volume of their electricity use and inability to take advantage of time-of-use pricing and direct load control technologies to off-set cost increases. Also, because of the low-volume of their consumption, fixed charges account for a much larger proportion of low-income household's overall costs—so increases in fixed charges cause a more significant increase in their overall electricity costs.
- The affect of the rollout on energy affordability could be even more severe if households are put on TOU pricing once smart meters are introduced. Two key time-of-use pricing initiatives here are time-of-use (TOU) tariffs and Critical Peak Pricing (CPP) tariffs.
- These tariff structures will penalise low-income households, who tend to be **peaky households** with **inelastic electricity use:** households that mostly need to use electricity during the day-time because of (e.g.) disability, unemployment, retirement, or caring for young children or a relative; and which have a limited ability to shift their electricity usage in response to price signals because of their household circumstances, the types of appliances they have, the fact that little of their electricity use is discretionary consumption, or because of disability.
- An average pensioner household in Victoria that uses electricity for heating could face an annual electricity cost increase of $158 if put onto a time-of-use tariff, such as Energy Australia's (NSW) Powersmart tariff.[1] This is on top of the increases in fixed charges they may have to pay because of the rollout.

Because of the perceived advantages of smart meters in contributing to network load management and allowing for time-of-use related pricing, the Council of Australian Governments (COAG) decided, in April 2007, to commit to a national mandated rollout of smart meters in jurisdictions where the potential benefits of the introduction of smart meters were estimated to outweigh costs. A key reason behind this decision was the recognised need to curtail the growth of peak period demand for electricity in order to avoid additional investment in costly generation and transmission infrastructure.

The rollout of smart meters and the introduction of time-of-use pricing will radically reshape the way in which electricity is priced and sold in Australia and could potentially have major ramifications for the ongoing ability of low-income households to afford the electricity that they need to meet essential needs.

[1] This claim is based on the case studies in this report and those in the St Vincent de Paul Society report. See May Mauseth Johnston, "New Meters, New Protections: A National Report on Customer Protections and Smart Meters " (Melbourne: St Vincent de Paul Society, 2010), appendix 2.

Key points continued

- Peaky households with inelastic electricity could be even further disadvantaged by TOU pricing as a result of the **poorer quality of their housing** and **inefficiency of their appliances**. Many low-income households are unable to afford modern and efficient appliances and have to rely on donated or purchased second-hand appliances instead, while the efficiency of low-income households' electricity use is also affected by the generally poorer quality of their housing stock. Figures from the United States suggest that lower-income families living in older, more poorly constructed, homes consume an average of 28% more energy per square foot than higher-income households.[2]
- Pensioners are penalised by TOU pricing because the time of their electricity use. But pensioners who live in public housing without any insulation, and who use electric bar heaters, will face even higher heating costs in winter under TOU tariffs, as the quality of their housing and appliances means that they need to use greater amounts of electricity for heating in the first place. TOU pricing exacerbates these extra costs by exposing households with inefficient electricity use to even higher per unit costs so that the amount extra they need to spend on (say) heating compared to other households is even greater.
- The vulnerabilities that expose households to the cost impacts of TOU pricing—peaky consumption, inelastic electricity use, poor housing, inefficient appliances—tend to overlap, especially amongst low-income households. For example, someone with MS will have a greater need to use cooling in summer because of their illness. But they are also more likely to need to use cooling in their home in summer because of unemployment. The majority of people with MS are unable to work because of their illness—80% of MS sufferers are unemployed 10 years after diagnosis despite being of working age—and so spend a greater proportion of their time at home than most non-MS sufferers. So not only do they need to use air-conditioning at lower temperatures than those without MS, they also are more likely to be at home for longer periods and therefore to have to fund climate control for longer periods (when others benefit from climate control at work). Also, because they are unemployed through chronic illness, there is an increased likelihood that they will be on a low- or fixed-income and live in poorer quality housing or public housing. They may also be more heavily reliant on electricity for heating, cooking and hot water, while older, less efficient appliances may be all they are able to afford to use to heat and cool their homes. All of this adds to the hardship that they are likely to face under time-of-use pricing.

Social Justice and the Smart Meter Rollout

Any policy that causes the most disadvantaged and vulnerable members of society to be even worse off than they already are is, on the face of it, unjust and *at the very least* must be rigorously justified. Policies that worsen anybody's quality of life need to be coherently argued for. But policies that worsen the quality of life of those who are already worst off require additional—and far more robust—justification. Such policies not only make people worse off; they exacerbate social inequality as well.

Unless suitable protections and policies are put in place to shelter vulnerable and low-income households from the cost impacts of time-of-use pricing and increased fixed charges, the smart meter rollout will cause groups such as pensioners, people on disability support pensions and fixed-incomes, and single parents with dependent children to be significant worse off, potentially adding in the region of $300 to their annual electricity costs. This would be an alarming outcome of the rollout because access to a reliable and affordable supply of energy is an essential good without which people would struggle to meet essential needs for heating, cooling, lighting, cooking, and hygiene (amongst other things), all of which are crucial to people's long- as well as short-term health and wellbeing. Moreover, low-income households are already struggling with energy affordability and frequently have to forgo expenditure on essential items such as food and clothing merely to be able to afford essential electricity use.

[2] "Income, Energy Efficiency and Emissions: The Critical Relationship", Energy Programs Consortium (February 26, 2008). Cited in Williams, Stockton. "Bringing Home the Benefits of Energy Efficiency to Low-Income Households: The Case for a National Commitment." (Enterprise, 2008), p.10.

Key points continued

- Energy affordability in Australia is becoming increasingly precarious. Since 1999, electricity prices have risen by 82% compared to an average increase of just under 37% across all consumer goods. In the last year alone, prices have increase by nearly 16%.
- These price increases are hitting low-income households particularly hard. Pensioner households and low-income households have only experienced a 2.5% increase in their income (in real terms) since 1999,[3] and low-income households spend more than double the proportion of their income on energy costs as the average household, and nearly five times as much as higher-income households, even though they consume significantly less electricity.[4]
- Already 4 in 10 low-income households are regularly behind in paying their energy bills (according to the ABS 2003-04 Household Expenditure Survey) and 6 in 10 households surveyed for this study reported that they were unable to heat and cool their homes as they would like. Many are going without heating, hot water, lighting and even cooked meals, simply to be able to afford their electricity bills.
    - one participant in Richmond who had to stop working because of illness, hasn't been able to afford to use her heating in twelve years: 'I don't have my heater on over the winter. Since I got sick, I don't switch it on. I used to get really massive bills because all my flat is electric and I just find the bills are too much for me'.
    - Others are resorting to using their gas ovens as heaters because they couldn't afford to run their electric heating.

Because of the particular vulnerability of low-income households to time-of-use pricing and increases in fixed charges (due to the low-volume of their consumption and household circumstances), the smart meter rollout represents a substantial threat to the future of energy affordability in Australia.

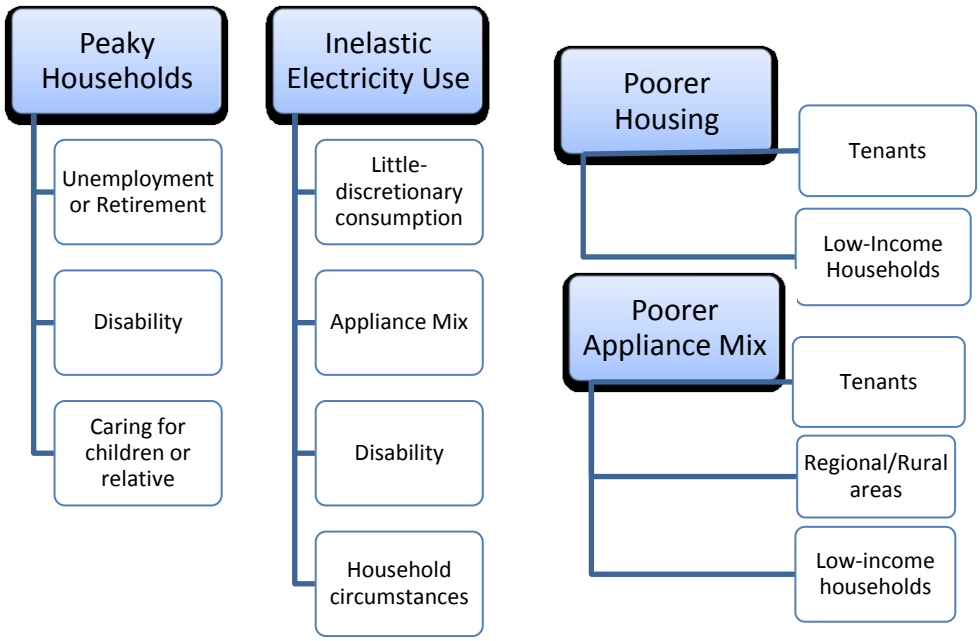

Figure 1: Factors Affecting Households Exposure to time-of-use pricing

[3] Jeff Farmer, "Pension Review: Background Paper," (Canberra: Department of Families, Housing, Community Services and Indigenous Affairs 2008), 15.
[4] Source: ABS, Household Expenditure Survey 2003-04 (Reissue), Summary of Results, Cat 6530.0.

Benefits of a Smart Meter Rollout

A key reason behind COAG's—and the Victorian government's—original commitment rolling out smart meters was the expected benefits that smart meters would deliver in terms of curtailing peak demand and in enabling customers to better manage their electricity costs and demand. If peak demand could be curtailed as a result of the rollout, it was hoped that electricity costs would be cheaper in the long run because avoided infrastructure investment to cope with rising peak demand. It was believed that the rollout of smart meters could help stem growth in peak demand in two ways:

- through smart meters' enhanced load management capabilities (e.g. direct load control of heavy usage appliances); and
- through time-of-use pricing providing consumers with an economic incentive to reduce their demand for peak electricity[5]

Unfortunately, the cost-benefit analysis carried out for the Ministerial Council on Energy found that the smart meter rollout is unlikely to achieve a significant enough reduction in peak demand to off-set the need for additional infrastructure investment to cope with rising peak demand.[6] Moreover, the cost-benefit analysis found that a smart meter rollout was unlikely to be net beneficial in all states. Although it was expected that NSW, QLD, and WA would all benefit from the smart meter rollout, the rollout was only expected to deliver net benefits to Victoria, ACT, TAS, and NT if the cost of the rollout fell in the lower bound of estimates and if the benefits of the business efficiencies achieved were in the upper bound.[7] In the case of SA, the benefits of a smart meter rollout were unclear.[8]

Instead, the principal benefit that the rollout of smart meters is expected to deliver is operational cost savings to electricity distribution (network) businesses through (a) avoided manual metering and connection/disconnection costs and through (b) avoided meter stock replacement costs. These cost savings alone are expected to account for 80% to 99% of total benefits.[9]

The benefits of smart meters to customers are less clear, although a key assumption of policy makers is that consumers will benefit from lower network tariffs in the long run as distributors' operational cost savings are passed on by regulators. However, the recent audit of the Victorian Advanced Metering Infrastructure (smart meter) rollout by the Victorian Auditor-General has questioned the feasibility of these cost savings being passed on:

> Achieving full pass-through of AMI's 'bankable benefits' to consumers will require significant effort from the regulators. This is because, unlike many network investments, the expected benefits of the AMI project apply across many distribution functions and services, ranging from meter reading to connection and disconnection costs. Also, the full realisation of AMI benefits related to improved industry efficiency could potentially take several years to become apparent.[10]

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[5] See, for instance, Standing Committee of Officials of the Ministerial Council on Energy, "Cost-Benefit Analysis of Options for a National Smart Meter Roll-out (Phase Two - Regional and Detailed Analysis): Regulatory Impact Statement for Decision," (2008): 24, 32. 'The initial driver for investigating smart meters was to reduce peak demand.' Also, NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," (Sydney 2008), 47.

[6] 'We note that CRA has concluded that the relatively small size of the overall system demand reductions that have been estimated to follow a rollout of smart meters or a DLC alternative would not be sufficient to defer generation investment in practice.' NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," xv.

[7] Ibid., xviii.

[8] Ibid., xvi-xix.

[9] Ibid., xiv-xv.

[10] Victorian Auditor-General, "Towards a 'Smart Grid' - *the Roll-out of Advanced Metering Infrastructure*," (Melbourne: Victorian Auditor-General's Office, 2009), 17.

Certainly, some consumers will benefit from the smart meter enabled direct load control (DLC) of their appliances, through receiving discounts on their electricity use to allow distributors to cycle their appliances during peak periods. However, consumers with older appliances—or without an air-conditioner or pool pump that can be controlled by a smart meter—will be unlikely to be benefit from DLC capabilities.

The use of supply capacity control limits in emergency situations (e.g. during network outages) should ensure that rolling blackouts become less frequent. This could be tremendously advantageous to consumers reliant on electricity use for life-support and other essential medical devices. However, the supply capacity control function of the smart meter could be used as a debt management tool, or as a way of curtailing the electricity use of hardship consumers. This would be a worrying use of the supply capacity control limit function, which could give rise to a second class of electricity user.

Some consumers may benefit from the introduction of time-of-use (TOU) pricing, which unwinds the existing cross-subsidies between peaky and non-peaky consumers. However, TOU pricing penalises consumers who, because of their circumstances (e.g. disability, retirement, unemployment, caring for a relative or young child), use electricity mostly during the day time (peak period). TOU pricing also penalises consumers with older appliances that cannot be easily programmed to take advantage of off-peak rates.

Combining the billing impacts of time-of-use tariffs and higher-fixed charges, a peaky household with inefficient appliances and inelastic electricity usage—such as a young family in public housing or a household where someone has a disability that requires additional electricity usage—could face an annual cost increase of around $300 because of the smart meter rollout. This increase in electricity costs could push many low-income and disadvantaged households further into poverty and debt, especially because *electricity use is price inelastic*: because households regard electricity as an essential utility that they can't go without, they continue to use electricity even after increases in the price of electricity mean that they can no longer really afford it. This can mean that households who are struggling with energy may have to forgo other essential goods fundamental to their health and welfare simply to be able to continue to use electricity after a sizeable price increase.

Therefore, if suitable protections and policies are not put in place to shelter disadvantaged and low-income households from the billing impacts of increased fixed charges and time-of-use tariffs, the smart meter rollout could cause significant harm to some of the most vulnerable and disadvantaged individuals and households in Australia. This would be an alarming outcome of the smart meter rollout, the need for which has yet to be sufficiently justified especially in light of:

- the pessimistic findings of the national cost-benefit analysis regarding the ability of smart meters to curtail growth in peak demand and
- the concern expressed by the Victorian Auditor-General's report regarding the pass through of electricity businesses' operational cost-savings to customers.

Key Recommendations

Exemptions from Increases in Supply Charges for Low-Income Households

One way in which some of the harm of the rollout could be alleviated is through exempting concession card holders from having to pay the increase in fixed charges resulting from the rollout. While the details of such a scheme would need to be worked out, one option is for retailers to apply a separate supply charge rate to concession card holders; a rate that excluded smart metering charges. This would not be particularly difficult to do since retailers already have mechanisms in place to identify these consumers.

Indeed, a supply charge concession scheme already exists in Victoria. Low-income, low volume consumers who spend less on their electricity usage than on the supply charge currently have their supply charge capped at whatever their expenditure level is under the *service to property concession charge*.[11] The appropriateness of this concession scheme will need to be carefully reviewed when smart meters are rolled out, as there is cause for concern that the service to property concession charge will not do enough to protect vulnerable households. For instance, if time-of-use pricing is widely introduced and retailers no longer offer flat or inclining tariffs to consumers, many low-income households' electricity consumption costs will increase significantly. Depending on the extent of this increase, many low-income households could find that they are no longer eligible for the concession on their supply charge because the costs of their electricity usage will exceed the supply charge.

Another issue is that the way in which the supply charge concession scheme is currently structured places tremendous pressure on low-income households to keep their electricity usage to an absolute minimum, since non-essential electricity usage not only increases their electricity usage costs but also puts households at risk of having to pay higher supply charges if they fail to keep their electricity usage within supply charge limits. For all-electric households with very inefficient appliances, this may mean that they have to forgo electricity usage on essential heating, cooking, or hygiene (e.g. hot-showers) needs simply to keep their supply costs down. Time-of-use tariffs could make it even more difficult for these households to keep their electricity usage within eligible limits, forcing them to forgo further essential electricity usage. Hence, a better scheme may be to offer concession card holders a discounted supply charge rate that excludes smart metering charges and does not depend on keeping their electricity usage within narrow limits.

Continued Regulation of Standard Tariff Offers

A second way in which low-income and vulnerable households ought to be protected from the price impacts of a smart meter rollout is through the robust regulation of standing tariff offers to ensure that they continue to have the opportunity of remaining on a flat tariff.

Standing tariff offers are the no frills tariff structures that households who choose not to negotiate an individual market contract are put on by retailers who are obliged to publicise these standing tariff offers to allow consumers to more easily compare retail offers. Because the vast majority of meters in Australia are still accumulation meters, standing tariff offers have broadly retained the shape of the flat tariff, although this could change once smart meters are installed across households.

In Victoria, the only protection that low-income households have against being put onto time-of-use tariffs is the extent of retail competition in the state. The Essential Services Commission no longer regulates retail electricity prices as a result of the deregulation of the retail market in January 2009.

[11] For details of this scheme see www.dhs.vic.gov.au/concessions/entitlements/view-all/energy/service-to-property-charge

Although retailers are still obliged to offer all customers a publicised standing tariff and can only change this tariff once every six months, there is no requirement that the standing tariff be a flat tariff.

Stricter regulation of price inflation for customers on standard tariffs in other states currently makes it more difficult for retailers in those states to cease offering flat or inclining tariffs, although further deregulation of the retail electricity market may remove these regulatory obstacles in coming years.

The Australian Energy Market Commission has been tasked with reviewing the effectiveness of retail competition in states where retail prices are currently regulated, such as Queensland, South Australia and New South Wales, with a view towards phasing out regulated prices once the retail competition is deemed effective. The assumption behind this review by the Australian Energy Market Commission is that healthy retail competition is a stronger bulwark against price inflation than government regulation. That may be so for some consumers, but **retail competition cannot be relied upon to protect vulnerable consumers from time-of-use and critical peak pricing tariffs**. This is because it is unlikely to be financially viable or profitable for a retailer to continue to offer 'peaky' consumers a flat tariff rate once they have been put onto a time-of-use network tariff by their distributor (see sec 3.4). Hence the need for continued and more robust regulation of standard tariffs in a smart meter environment.

1. The Smart Meter Rollout

Chapter Overview

- In 2007, the Council of Australian Governments committed to a mandated rollout of smart meters in states where the benefits of a rollout are expected to exceed costs. A key reason behind the rollout is the expected benefits that smart meters will deliver to electricity businesses in curtailing peak demand and in enabling customers to better manage their electricity costs and demand. If peak demand can be curtailed, electricity costs should be cheaper in the long run as a result of avoided infrastructure investment to cope with rising peak demand.
- Smart meters are expected to elicit a reduction in peak demand through their ability to allow for time-of-use pricing and through their enhanced demand side technologies, in particular the ability to cycle heavy usage appliances on and off during peak times to reduce network load (Direct Load Control). Smart meters are also expected to deliver cost savings to electricity distributors as a result of their ability to be remotely read and to allow households' electricity supply to be remotely connected and disconnected.
- The cost-benefit analysis carried out for the Ministerial Council on Energy indicates that the smart meter rollout is unlikely to achieve a significant enough reduction in peak demand to off-set the need for additional infrastructure investment to cope with rising peak demand. The cost-benefit analysis also found that smart meters would not be beneficial in all states (e.g. SA).
- The principal benefit of the smart meter rollout will be the operational cost savings that smart meters will deliver to distribution businesses through avoided manaul metering and connection/disconnection costs and through avoided meter stock replacement costs. Indeed, distributors will derive more than 80% of the initial benefits (although it is expected that these cost savings will eventually be passed on to customers). The benefits to customers are less clear.
- Some consumers will benefit from the direct load control (DLC) of their appliances through receiving discounts on their electricity use to allow distributors to cycle their appliances during peak periods. However, consumers with older appliances—or without an air-conditioner or pool pump that can be controlled by a smart meter—will be unlikely to be benefit from DLC capabilities.
- The use of supply capacity control limits in emergency situations (e.g. during network outages) should ensure that rolling blackouts become less frequent. This could be tremendously advantageous to consumers reliant on electricity use for life-support and other essential medical devices. However, the supply capacity control function of the smart meter could be used as a debt management tool, or as a way of curtailing the electricity use of hardship consumers. This would be a worrying use of the supply capacity control limit function, which could give rise to a second class of electricity user.
- Some consumers may benefit from the introduction of time-of-use (TOU) pricing, which unwinds the existing cross-subsidies between peaky and non-peaky consumers. However, TOU pricing penalises consumers who, because of their circumstances (e.g. disability, retirement, unemployment, caring for a relative or young child), use electricity mostly during the day time (peak period). TOU pricing also penalises consumers with older appliances that cannot be easily programmed to take advantage of off-peak rates.
- A further risk of the rollout to consumers is the increase in fixed charges that people will have to pay to cover the costs of the rollout. For instance, in Victoria, some consumers will have to pay up to $150 in smart meter charges this year to allow businesses to recover rollout costs, with further increases expected in 2011-13.

Smart meters are electricity meters with advanced communications technologies that can be remotely read and which record consumption data over regular (usually half-hour) intervals.[1] As a result of the decision by the Council of Australian Governments (COAG) in April 2007 to go ahead with a mandated rollout in states where cost-benefit analysis indicates smart meters are net beneficial, many households in Australia can expect to be switched over to a smart meter in the next 4 to 6 years.[2] This decision

[1] See Standing Committee of Officials of the Ministerial Council on Energy, "Cost-Benefit Analysis of Options for a National Smart Meter Roll-out (Phase Two - Regional and Detailed Analysis): Regulatory Impact Statement for Decision," 8.
[2] Council of Australian Governments, "April 13 2007 Meeting Communiqué," (2007).

followed an earlier commitment to introduce smart meters on a new and replacement basis.[3] However, in opting for a mandated rollout, COAG gave electricity distributors the green light to introduce smart meters more rapidly—no longer needing to wait until households' existing meter needed replacing—and to pass on the costs of introducing smart meters to consumers in the form of higher network charges (at least in the short term). This will facilitate a number of highly significant changes to the national electricity market, not least the more widespread use of time-of-use pricing.

The rationale behind the rollout of smart meters is the belief that smart meters 'will improve energy supply reliability, enable consumers to manage better their energy use…and help maintain Australia's relatively low energy prices.'[4] Here, a key reason behind the rollout is the need to stem the growth in peak demand and the perceived limitations of the existing meter stock in achieving this.[5]

1.1 The Problem of Growing Peak Demand

Electricity is a time critical resource. This means that once electricity has been generated it must be used quickly as it is difficult to successfully store electricity in large quantities. Because electricity is a time-critical resource, peak demand for electricity is very costly to supply as additional generators have to be switched on to meet this demand, and more robust transmission infrastructure has to be built to cope with increased volumes of network traffic. This additional infrastructure is costly to build, as well as being largely redundant during non-peak periods. So if growth in peak-demand can be curtailed, investment in augmenting generation and supply infrastructure could be avoided with the result that electricity prices should be lower in the long-term since businesses will no longer need to recover the costs of infrastructure augmentation through tariff increases.

Unfortunately, the existing meter stock in Australia makes it difficult to control growth in peak demand. This is because most electricity meters currently installed in Australian homes are manual **accumulation meters**: meters that only record the total amount of electricity that households use between meter readings, not the time of day when this electricity use happens.

Because of accumulation meters, most residential consumers in Australia pay either a flat or inclining block rate—where the cost of electricity use increases once a certain consumption threshold is reached (usually, 1,750 kWh per quarter)—for their electricity usage that takes no account of variations in the cost of supplying electricity at different times.[6] The exception to this is homes with hot water systems or slab heaters that are metered separately at off-peak rates, either using a two-element meter with a dedicated circuit hard-wired into these devices (as in Victoria), or a separate off-peak meter for that exclusively meters these appliances (as is common in New South Wales). But even here, this off-peak hot water and storage heating electricity use has to be read manually and any other appliances that households use continue to be billed at the flat or inclining tariff rate, even if they are generally only used during the night-time (for example, running the dishwasher only when the household goes to bed).

When electricity use is billed according to a flat or even inclining tariff rate, there is little incentive for customers to avoid electricity use during peak periods. Consequently, demand for electricity use during peak periods has continued to grow in Australia, straining the capacity of the system and forcing

[3] Council of Australian Governments, "February 10 2006 Meeting Communiqué," (2006).
[4] Council of Australian Governments, "April 13 2007 Meeting Communiqué."
[5] Ibid. Also, Council of Australian Governments, "February 10 2006 Meeting Communiqué."
[6] The exception to this is consumers with off-peak hot water systems that are hard wired to run during the night. In this case, the hot water system is metered separately to the rest of the household appliances and devices. Nevertheless, the meter used for this purpose in most cases continues to be an accumulation meter, though this meter is billed at a lower rate.

generation and distribution businesses to invest in costly generation and transmission infrastructure: costs that have filtered through to consumers in the form of higher tariff rates and supply charges.

It is hoped that the ability of smart meters to measure households' electricity usage over half-hour intervals, thereby allowing for **time-of-use pricing**, will enable electricity businesses to better manage growth in peak demand by allowing them to communicate price signals to customers, encouraging them to the shift their electricity usage away from the peak period.[7] For instance, by charging higher tariff rates during peak times and lower tariff rates during off-peak times, electricity businesses may be able to elicit a reduction in peak demand resulting in future cost-savings through avoided infrastructure costs. A second way in which smart meters are believed to be advantageous in abating growth in peak demand is through the enhanced demand side technologies with which they are equipped. For instance, the smart meters that are being rolled out in Victoria have the ability to communicate with appliances in the home via what's called a **Home Area Network (HAN)**. This allows for the **direct load control** of heavy usage appliances, such as heat pumps, pool pumps and air-conditioners, where such appliances can be programmed to cycle on-and-off during peak periods so as to reduce network load. Appliances could be controlled in this way either directly through the home area network or remotely by a third-party—for instance, a network business or retailer—using the communications infrastructure of the smart meter.

1.2 The Benefits of a Smart Meter Rollout

Following COAG's decision to commit to a mandated smart meter rollout, a cost-benefit analysis of a national smart meter programme was undertaken on behalf of the Ministerial Council on Energy by a consortium of consultants, led by NERA Economic Consulting and including KPMG, CRA International, and Energy Market Consulting Associates. This analysis considered a range of different options for a smart meter rollout, including:

- whether retailers should lead the rollout
- whether distributors should lead the rollout
- the minimum functionalities that smart meters should be equipped with (should a national rollout include smart meters with direct load control capabilities as in Victoria?)

The second phase of the national cost-benefit analysis was completed in February 2008. The analysis concluded that a *distributor led rollout* of smart meters that included the ability to interface with appliances via the home area network to allow for their direct load control was the best option. The cost-benefit analysis put the cost of a distributor led rollout at between $2.7b and $4.3b, with the benefits from the roll out estimated to be $4.5b to $6.7b, depending on whether the costs of the rollout and the savings achieved through greater business efficiencies fall into the upper or lower bounds.[8] The inclusion of direct load control capabilities alone was expected to deliver net benefits of $39m to $392m and the cost-benefit analysis claimed that the ability of smart meters to enable the direct load control of heavy usage appliances would be the most significant aspect of the smart meter rollout as far as curtailing growth in peak demand is concerned.[9] Overall, the net benefit of a distributor led rollout of smart meters with HAN capabilities was estimated to be between $146 million and $4.6 billion over the

[7] In this regard, it was claimed that the roll out of smart meters 'will improve energy supply reliability, enable consumers to manage better their energy use…and help maintain Australia's relatively low energy prices.' Council of Australian Governments, "April 13 2007 Meeting Communiqué."
[8] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," xiii-xiv.
[9] Ministerial Council on Energy Smart Meter Decision Paper, 13 June 2008. Ibid., xii.

next 20 years, depending on the take up rates of direct load control technologies and the response rate to time-of-use tariffs.[10]

Significantly, however, the cost benefit analysis did not show that a smart meter rollout would be net beneficial in all states and territories. Although it was expected that NSW, QLD, and WA would all benefit from the smart meter rollout even without demand side response benefits being realised, the smart meter rollout was only expected to deliver net benefits in Victoria if the cost of the rollout fell in the lower bound of estimates and if the benefits of the business efficiencies achieved were in the upper bound. A significant demand side response would also have to be achieved in Victoria to justify the rollout if rollout costs were even marginally above the lowest estimate.[11] Likewise in ACT, TAS, and NT, the smart meter rollout was only expected to lead to net benefits if actual costs were equivalent to the lowest estimate bound and actual benefits fell in the highest estimate bound. But unlike Victoria, it was not expected that any deficit between the costs of the rollout and the savings achieved in improved business efficiencies could be made up through realising demand side response benefits.[12] In the case of SA, the benefits of a smart meter rollout were unclear since the savings that could be achieved through avoided manual metering costs in SA were expected to be much less. Instead, it was proposed that the South Australian government should consider the possibility of introducing direct load control technologies independently of smart meters.[13]

Broadly, the estimated benefits of the smart meter rollout can be divided into four categories:

1. Benefits to distributors
2. Benefits to retailers
3. Benefits to customers
4. Public (or societal) benefits

1.2.1 Operational Cost Savings to Network (Distribution) Businesses

By far and away the biggest benefit of the rollout was considered to be the cost savings that smart meters would deliver to distributors. It is currently very costly for electricity businesses to carry out regular manual meter readings of every household's electricity use and households electricity use occasionally has to be billed using an estimated meter reading because of difficulties accessing the meter. Because smart meters can be read remotely and can be remotely connected and disconnected, distributors will achieve significant operational cost-savings as a result of the smart meter rollout. The operational cost savings that distributors would receive through avoided manual metering, connection, and disconnection costs and better detection of faults and leakages are alone expected to account for between 41% and 55% of net benefits. A second benefit of the rollout for distributors is the cost savings that they will achieve through avoided meter stock replacement. This is because under a mandated rollout, distributors (who ultimately own households' meters and are responsible for their maintenance and replacement) effectively benefit from having their meter stock replaced for free as they are allowed to pass on all the costs of installing new meters to customers. The savings that distributors are

[10] Smart Meter Decision Paper, MCE 13 June 2008.
[11] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," xviii.
[12] Ibid., xix.
[13] Ibid., xvi-xix.

expected to realise as a result of avoided meter stock replacement are expected to account for 39% to 44% of the total benefits of the rollout.[14]

1.2.2 Benefits to Electricity Retailers

The benefits for smart meters to retail businesses are less clear, although smart meters should enable retailers to offer a wider range of retail products and to introduce innovative electricity tariff structures that may enable better competition for customers. A significant development for retailers following the rollout of smart meters, however, will be the enabling of more cost-reflective pricing as a result of time-of-use pricing. This in turn will enable more accurate wholesale market settlement and more reliable forecasting of customer demand patterns. Improved forecasting as a result of more reliable consumption data is expected to reduce retailers' hedging costs (costs that retailers pay to manage exposure to high peak prices in the wholesale market).[15]

Consumers in Australia do not purchase their electricity directly from electricity distribution (or network) businesses but from retail businesses that in turn purchase electricity in the wholesale market. However, the way in which electricity prices are settled in the wholesale market differs substantially from the way in which electricity prices are settled between customers and retailers as the prices charged to retailers by suppliers in the wholesale market are time-sensitive and adjusted at half-hourly intervals. Consequently, the tariff that retailers generally charge consumers for their electricity use falls somewhere between reflecting the high wholesale price that retailers have to pay during periods of high demand and the low spot price that retailers pay during periods of low demand. Because retail businesses purchase wholesale electricity at prices that vary across time intervals—even though the actual energy consumption of particular retailers' customers cannot be determined for these times—the total cost that retailers pay suppliers for their customers' electricity is not actually based upon the actual consumption patterns of their customers. Instead, retailers purchase electricity from the wholesale market based upon an assumed load profile that is worked out according to what the average load profile is within a given distribution area for all residential customers on accumulation meters. Distributors gather information about the total quantities of electricity supplied to given distribution areas over half-hourly intervals but without smart meters, the total electricity demanded by individual retailers' customers during this period cannot be worked out. Therefore, an assumed load profile for all customers within a given network area is used to apportion a share of the overall amount of electricity demanded during given half-hourly intervals to particular energy retailers.[16] Since this assumed load profile is based upon the average load profile for all residential customers in the network area, it does not necessarily reflect a particular energy retailers' average customer load profile. Certain retailers may have a greater proportion of 'peaky' customers than others. But using an assumed load profile that is based on the demand profile of all customers in that area to bill retailers for wholesale supply costs ensures that all retailers share the costs of peaky customers. Accordingly, the wholesale market settlement that retailers currently pay may be artificially high or low depending upon whether or not their customers are more or less 'peaky' than the average for that distribution area.

1.2.3 Customer Benefits

Originally, it was expected that the principal way in which consumers would benefit from a smart meter rollout would be through lower electricity prices in the long run as a result of the affect that the smart

[14] Ibid., xiv-xv.
[15] Ibid., xv.
[16] For more detailed discussion of how deemed load profiles are arrived at and how energy retailers are billed by wholesale suppliers see Energy Market Consulting Associates, "Smart Meter Consumer Impact: Initial Analysis," (St Leonards: 2009), 9-11.

meter rollout would have on peak demand and the long-term savings that could be achieved in terms of avoided infrastructure costs. **Unfortunately, the cost-benefit analysis concluded that the reduction in peak demand that the smart meter rollout would elicit would not be sufficient to defer further investment in additional generation infrastructure.**[17]

Rather, the principal way in which it is now expected that most consumers will benefit is from distributors passing through the operational cost savings that they are expected to achieve as a result of the rollout (e.g. from avoided manual metering costs and meter stock replacement costs).[18] There will also be additional benefits to some consumers from the inclusion of direct load control technologies and supply capacity control capabilities in smart meters and from the introduction of time-of-use pricing.

Benefits from Direct Load Control

Some customers will be able to benefit from the enhanced load management technologies that smart meters will enable, such as the ability of smart meters to communicate with appliances via the Home Area Network to enable Direct Load Control of heavy usage appliances (e.g. air-conditioners and pool pumps) during peak periods. One reason for this is that energy retailers are likely to offer consumers either direct cash benefits or lower tariffs for allowing their appliances to be cycled on and off during peak periods. A further reason is that consumers who take up DLC offers will see significant reductions in their overall electricity use (and therefore energy costs) as a result of the cycling of their appliances, since DLC is usually applied to energy intensive appliances and can reduce the consumption of these appliances quite significantly without customers noticing too much difference in their functioning.

Supply Capacity Control Benefits: less blackouts

Another major benefit that consumers can expect to see as a result of the enhanced load management capabilities of smart meters is less rolling blackouts during emergency situations—for example, periods of extreme heat when heavy air-conditioner use strains networks—where distributors need to shed some of the load in the network.

Currently, distributors load shed using rolling blackouts whereby the supply of electricity to entire geographical areas is temporarily suspended. The supply capacity control capabilities that smart meters are equipped with, however, enable distributors to load shed in emergency situations by temporarily limiting the supply of electricity to a wide group of customers instead of blacking out entire areas on a rolling basis. The supply capacity control feature of smart meters allows a distributor to sends a message to the smart meter to cut supply to a particular household or business temporarily (for example, one hour or 30 mins) if demand from that premises exceeds a certain threshold that can be specified by the distributor. In this way distributors can continue to provide customers with a continuous supply of electricity during emergency situations, albeit on a limited basis, instead of having to interrupt the supply of electricity altogether. So while consumers who exceed their individual capacity limits will lose their supply temporarily when supply capacity control limits are triggered, remaining customers who have kept their electricity use within capacity limits will continue to enjoy a continuous supply of electricity.

[17] 'We note that CRA has concluded that the relatively small size of the overall system demand reductions that have been estimated to follow a rollout of smart meters or a DLC alternative would not be sufficient to defer generation investment in practice.' NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," xv.
[18] Ibid., 150.

This is a significant development for consumers who depend on electricity use for the operation of medical devices and life-support machines, as these consumers are currently at risk of losing their power during rolling blackouts because of the difficulties that distributors face in isolating these customers during rolling blackouts. The use of supply capacity control limits may also ensure that all households have access to the electricity they need to run essential devices (e.g. refrigerators and freezers) during emergency situations (although this will depend on what the set limit capacity limit is and whether households know that a capacity limit has been placed on their supply).

Unwinding of cross-subsidies

The existing use of flat tariff pricing structures results in some consumers effectively subsidising the electricity use of other consumers with a heavier peak load. This is because retailers pay wholesale prices that reflect differences in the cost of supplying electricity at different times whereas the flat tariffs charged to customers fail to properly reflect differences in supply cost between times of the day. The tariff that retailers generally charge consumers for their electricity use consequently falls somewhere between reflecting the high wholesale price that retailers have to pay during periods of high demand and the low spot price that retailers pay during periods of low demand. Thus, depending on the time of their electricity use, consumers will either pay a price that is inflated above the supply cost or pay a price that fails to properly reflect the supply cost. The fact that some consumers benefit from paying lower-than-market prices during peak-periods is offset by the fact that consumers pay higher than market prices during off-peak periods. In effect this means that consumers who consume most of their electricity during off-peak periods are partly funding the electricity consumption of consumers with high volumes of peak period consumption. Moreover, because electricity is a time critical utility—once generated it must be used immediately and cannot be stored for lengthy periods—meeting the electricity demand of high peak period consumers requires additional investment in generation, supply, and distribution infrastructure so as to ensure available capacity when demand is high. This extra system capacity is typically only needed during peak periods and would not even be needed if peak demand were lower. So, not only do largely off-peak energy users subsidise the energy use of peak-period consumers by paying inflated off-peak prices to cover deflated peak-period prices, they also contribute towards the cost of additional generation, supply, and distribution infrastructure that is only required to meet the energy needs of peak period consumers.

The value of this cross-subsidisation can be large. For example, according to a 2003 study of the Energy Australia network in NSW, households that use air-conditioners consume between 200% and 250 % more energy during summer peak periods than households that don't use air-conditioning, although though they only consume 40% more energy overall.[19] In a flat tariff retail market, households with air conditioners in NSW merely pay an additional 40% for their energy use even though the actual cost of this consumption to retailers is much higher because of the time in which it occurs. Accordingly, under a flat tariff structure, households without air-conditioners and with relatively low volumes of peak period consumption are effectively paying for other people's air-conditioner use. Indeed, according to Energy Australia, the average consumer without air-conditioning is paying $70 too much per year for their electricity use while the average air-conditioning user is paying $86 too little

The introduction of smart-meter enabled time-of-use pricing structures is expected to unwind these cross-subsidies between consumers, so that consumers with a mostly off-peak load profile will achieve an overall reduction in their electricity costs. However, the consequence of this unwinding of cross-

[19] Study cited in Standing Committee of Officials of the Ministerial Council on Energy, "Cost-Benefit Analysis of Options for a National Smart Meter Roll-out (Phase Two - Regional and Detailed Analysis): Consultation Regulatory Impact Statement," (2008): 25.

subsidies is that electricity costs will increase for households with a mostly peak load ('peaky' households).

1.2.4 Public (societal) benefits

The smart meter rollout may improve the efficiency of households' and businesses' electricity use as a result of smart meters enabling the direct load control of heavy usage appliances and as a result of households' being able to access real-time feedback on their electricity consumption via an in-home display unit connected to the home area network and smart meter. Similarly, the communications infrastructure of smart meters should enable distributors to more efficiently detect and repair leakages and faults, all of which should reduce electricity wastage which, in turn, should reduce greenhouse gas emissions. Here, consultants estimated the emissions abatement potential of the smart meter rollout to be between 597,000 and 31 million tonnes of carbon over 20 years.[20] However, this estimate is controversial because off-peak electricity generation in Australia is currently more carbon intensive than peak-period generation. Therefore, if the rollout of smart meters merely causes consumers to shift demand away from the peak period without actually reducing their overall electricity use smart meters may actually increase overall emissions. As the cost-benefit analysis of the smart meter rollout reported, 'while shifts in demand from peak to off-peak periods may result in deferral of the need for additional investment in peak generation or peak network capacity…they may also result in a higher level of carbon emissions.'[21]

1.3 The Downsides of a Smart Meter Rollout

Notwithstanding the many benefits that the rollout of smart meters could deliver to electricity businesses and customers, there are a number of concerns regarding the potential for the rollout to (a) increase electricity costs in the short term and (b) for time-of-use tariffs to disadvantage low-income households that need to be addressed. Another concern is that the rollout may lead to job losses.

1.3.1 Increased Charges

The smart meter rollout represents a very substantial investment, the costs of which will have to be borne by consumers in the form of increased charges (at least in the short term). In Californian (where a smart meter rollout has already been underway for some time), consumers have had to pay an additional 15 cents per kWh to cover the costs of installing the smart meters.[22] And in Victoria—where the smart meter rollout began in September 2009—the Australian Energy Regulator has ruled that distribution businesses can increase their network charges for 2010 by $68 on average—although consumers in the Jemena area will have to pay $135 in smart meter charges—as part of the cost-recovery process, with further network charge increases expected in future years as the rollout progresses.[23] These higher network charges are being passed on to customers by retailers (with some change).

Households can expect to pay up to 42 cents per day in smart meter charges for 2010 (or $152 for the year).

According to the latest gazetted tariff offers in Victoria, households can expect to pay up to 42 cents per day in smart meter charges for 2010 (depending on the retailer and network area) to pay for the rollout. In the Jemena distribution area in Melbourne, some electricity retailers have increased their

[20] Smart Meter Decision Paper, MCE 13 June 2008.
[21] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," 49.
[22] Ibid.: 20.
[23] Australian Energy Regulator, "Victorian Advanced Metering Infrastructure Review: 2009-11 Ami Budget and Charges Applications," Final Determination, no. 30 October (2009).

annual supply charges by more than $120. Such an increase in supply charges amounts to more than a 17% increase in the annual electricity costs recorded for the average pensioner household in the 2007 Victorian Utility Consumption Survey.[24]

	Increase in daily supply cost	Annual Increase
AGL (Jemena Area)	34.37 cents per day	$125.45
Energy Australia (Jemena Area)	33.2 cents per day	$121.18
Energy Australia (Citipower area)	20.9 cents per day	$76.29
Origin (Citipower area)	33.46 cents per day (smart meter charge)	$122.13
Origin (Jemena area)	41.56 cents per day (smart meter charge)	$151.69

Table 1: Increases in Supply Charges for 2010 (VIC)[25]

The cost increases that retailers in Victoria are passing on to their customers clearly exceed the increase in distributors' network charges that the Australian Energy Regulator has sanctioned. One reason for this is that retailers will have to shoulder additional costs of their own as result of the rollout, including investment in additional IT infrastructure and staff to cope with more frequent and extensive data processing.

Electricity retailers currently process individual consumers' electricity consumption data around 3 or 4 times per year. When smart meters come online, this may increase to around 17,500 times per year for each household if the capacity of smart meters to record consumption data over every half hour is optimised. Customer service calls are also expected to increase following the rollout, as customers search for information on new tariff products and on the implications of the rollout for their electricity bills.[26] This will mean that retailers will have to employ additional call centre staff to cope with the additional customer inquiries. This has been the experience in California, where Pacific Gas and Electric had to establish a dedicated "answer centre" in Bakersfield to deal with customer complaints and queries regarding smart meters.[27] Another source of cost-impact to retailers is the additional risk that retailers may be exposed to in the wholesale electricity market following the introduction of smart meters.

Currently, retailers' wholesale purchase costs are based on the average load profile for all domestic electricity consumers in given network areas and are not calculated according to the actual load profile of their own customers. This means that all retailers share the costs (and risk) of meeting domestic peak period electricity demand, irrespective of whether or not their customers are heavy, average, or only light peak electricity users. But once smart meters are introduced it is expected that this practice of using deemed load profiles to settle wholesale market costs will end as distributors place customers on time-of-use *network* tariffs. It is up to retailers whether or not they want to pass on the shape of the network tariff (i.e. peak, shoulder, off-peak period etc.) to their customers by transferring them to time-of-use retail tariffs. But even if a retailer chooses not to place its customers on time-of-use retail tariffs, the placing of its customers on time-of-use network tariffs by the distributor is likely to affect the costs that retailers are exposed to in meeting their customers' demand. A retailer with an above average number of peaky customers will face higher supply costs as a result of the smart meter rollout, costs that will have to be passed on to its customers either in the form of higher retail tariffs or an

[24] Roy Morgan Research, "Victorian Utility Consumption Household Survey 2007, Final Report," (Melbourne: 2008), v.

[25] Figures based on daily supply charges for (i) AGL North of $47.16 per quarter in July 2009 and 86.05 cents per day in January 2010; (ii) Energy Australia supply charges in Jemena area of 79.2 cents per day in January 2010 and 46.2 cents per day in April 2009; and (iii) Energy Australia supply charges in Citipower Network Area of 48.4 cents in 2009 and 69.3 cents in 2010. (iv) Figures for Origin based on Origin's advertised daily smart meter charges for the Citipower and Jemena distribution areas.

[26] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," xv.

[27] See Jon Hood, 'Class Action Accuses PG&E of Overcharges,' *Consumer Affairs*, November 8th, 2009. (available at http://www.consumeraffairs.com/news04/2009/11/pge_suit.html

increase in the supply charge. Consequently, as the rollout progresses and more and more households are put onto time-of-use *network* tariffs, retailers may be forced to increase tariffs to cope with their additional exposure to peak wholesale electricity price volatility.

1.3.2 Pass through of distributors' operational cost-savings

The assumption of COAG and of the Victorian government—which has already commenced its own smart meter rollout—is that the increases in supply charges and retail tariffs caused by the initial smart meter rollout will only be short term. It is expected that these increases will eventually be off-set by the future pass through of the operational cost-savings that electricity businesses will achieve as a result of smart meters. This pass through of distributors' cost-savings to consumers is a key assumption of government and of the cost-saving analysis, as far as the benefits to consumers of the rollout are concerned.[28]

However, a concern that has been raised by the St Vincent de Paul Society and the Consumer Utilities Advocacy Centre is that a mandated rollout and cost-recovery process creates little incentive for businesses to ensure that the costs they incur during the rollout are kept to a minimum (given that distributors are permitted to pass on whatever costs they incur).[29]

Given that the smart meter rollout is likely to deliver net benefits in many states only if actual costs fall within the lowest range of estimates and business efficiency benefits within the highest range, a failure to keep costs down could result in the rollout becoming disadvantageous in jurisdictions such as Victoria, South Australia, Tasmania, the Australian Capital Territory and the Northern Territory. And with consumers being the ones who will ultimately have to pay for the rollout, this would lead to higher electricity costs over the short to medium term. Here it has been pointed out that the initial budgets submitted to the Australian Energy Regulator by Victorian distributors for the recovery of costs associated with the Victorian rollout exceed the highest range of cost estimates in the national cost-benefit analysis by more than 5%.[30] This is significant since the cost-benefit analysis notes that 'were the actual costs to be 5 per cent higher than the high end estimate presented in this report, or benefits were to be 5 per cent lower than the low end estimates…the positive minimum net benefit case becomes a negative minimum net benefit case in the lower bound [most conservative estimate scenario: high costs vs. low benefits]'.[31]

In a related criticism, the recent audit of the Victorian smart meter rollout by the Victorian Auditor-General has highlighted cost and reliability uncertainties around the technology that is being used to provide the communications infrastructure and the home area network platform for the smart meters, suggesting that the viability of these technologies is far from proven and that '[t]he high technical risks of mass-scale implementation of two-way communications technology over an aggressive schedule have been consistently underestimated through the project'.[32] The Auditor-General warns that this underestimation could lead to a cost blow out as distributors either delay installing meters because the technologies fail to meet the mandated minimum requirements and jeopardise community service obligations or have to spend additional resources developing the technologies to the appropriate level.

[28] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," 150.

[29] See May Mauseth Johnston, "Customer Protections and Smart Meters: Background Paper," (Melbourne: St Vincent de Paul Society, 2009), 8. For related criticisms of the cost-recovery process see Victorian Auditor-General, "Towards a 'Smart Grid' - *the Roll-out of Advanced Metering Infrastructure*," 15-8.

[30] This figure is reported in NERA's report on the cost-benefit analysis. NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," 12.

[31] Ibid.

[32] Victorian Auditor-General, "Towards a 'Smart Grid' - *the Roll-out of Advanced Metering Infrastructure*," 40.

And '[i]f the project's emerging risks delay the installation of smart meters it is likely that consumers will face further cost increases and gain fewer benefits.'[33] The audit also questions whether (and how) the cost-savings that the rollout is expected to deliver to network business—the lions share of the estimated benefits in both the national and Victorian cost-benefit analyses—will be passed on to consumers. Unless these cost-savings are passed on 'the benefits [of smart meters] may not accrue to consumers who then ultimately fund the implementation costs of [smart metering infrastructure' and the rollout ends up becoming little more than a public subsidisation of network businesses.[34] But the report goes on to suggest that the disjointed nature of the operational cost-savings that smart meters will deliver will make it difficult to ensure that these cost-savings will be passed on efficiently to consumers:

> Achieving full pass-through of AMI's [smart meters] 'bankable benefits' to consumers will require significant effort from the regulators. This is because, unlike many network investments, the expected benefits of the AMI project apply across many distribution functions and services, ranging from meter reading to connection and disconnection costs. Also, the full realisation of AMI benefits related to improved industry efficiency could potentially take several years to become apparent.[35]

Consumers in Australia could therefore face higher electricity costs as a result of the smart meter rollout if costs blowout as warned by the Victorian Auditor-General or if regulators fail to efficiently pass through distribution businesses' operational cost-savings to customers.

1.3.2 Use of Supply Capacity Control Limits as a Debt Management Tool

Another concern that consumer groups have expressed regarding smart meters is the potential for the supply capacity control function of smart meters to be used as a means of limiting the electricity use of consumers in financial hardship. While the supply capacity control function of smart meters is highly advantageous as a means of more evenly shedding load during emergency situations and as a way of preserving essential services during network outages, policy makers have suggested that this function of smart meters could also be used as a way for retailers to offer supply capacity products to low-income customers struggling with the management of their electricity costs 'or as an alternative to disconnection for defaulting customers.'[36] Instead of being threatened with disconnection, defaulting customers could have their electricity supply limited to only a few kilowatts per day until such time as they have caught up on their bills. Community groups have raised these supply capacity control retail products will be used to punish low-income and vulnerable households who can't afford to pay their electricity bills and that these products will give rise to a second-class of electricity consumer who "chose" to accept a reduced supply of electricity because they cannot afford not to:

> The notion that supply capacity products could be tools to assist low-income households is a step back to the dark-ages of consumer protections in relation to essential services…Allowing retailers to limit the supply capacity (which is effectively placing a choker on a household's electricity supply) would set a dangerous precedent and undermine the principle of universal access to essential services. At what point is a supply capacity limit effectively a disconnection? How much electricity does a household need? Is it acceptable to request low-income households to watch television in the dark or chose between running the fridge or the heater?[37]

[33] Ibid., ix.
[34] Ibid., 17.
[35] Ibid.
[36] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for the Ministerial Council on Energy Smart Meter Working Group (Phase 1 Overview Report)," (Sydney 2007), 16.
[37] May Mauseth Johnston, "New Meters, New Protections" (Melbourne: St Vincent de Paul Society, 2010), 15.

The issue of the use of the supply capacity control function of smart meters to enable the provision of retail products is discussed more comprehensively at appendix B.

1.3.3 Impact of Time-of-Use Pricing Structures

Perhaps the biggest risk of the rollout to consumers is the danger that the introduction of time-of-use pricing poses to the ability of low-income and vulnerable households to afford electricity-use.

Time-of-use electricity pricing affects different households in very different ways and some households will be better off on time-of-use pricing structures, while others will be worse off. As one participant in a Melbourne focus group who had been on a time-of-use tariff for more than a decade put it:

> *We've got off-peak electricity now for the past 13 years. We find that it saves us money because during the day there's nobody home. The fridge is running, the freezer's running, but that's OK. We've got our dishwasher set on a time clock, so you load the dishwasher up, turn it on, but it doesn't come on until the time clock says, such as 1 o'clock in the morning, so we're using off-peak rates and it's costing us next to nothing to run the dishwasher. During the weekends, when everyone is home, we're still paying off-peak rates…So for us it works because there's nobody home during the day and we're all abled people…But it won't work for everybody; [for] people who are home are going to have to have breakfast and lunch and tea during that [peak] time. For us it works because we're a normal family if you like. But most people—a lot of people—aren't normal families and that's where it's going to affect you.*

Because of the substantial increase in the costs of electricity use during the day-time under time-of-use pricing, time-of-use and critical peak pricing tariffs penalise:

- **Peaky Households:** housesholds that need to use higher volumes of electricity during the day-time because of unemployment, disability, or caring for young children or an elderly relative
- Households with **inelastic electricity use**: households that are unable to successfully shift the time of their electricity because none of their electricity use is discretionary, or because the households' appliances can't be programmed to run during the off-peak period, or because the household is reliant on home help (because of disability or chronic illness) to do many tasks which therefore can't be shifted to the late evening.

Unfortunately, many of the households struggling most with energy affordability in Australia today because of lack of income, poorer housing and less efficient appliances (which increase their relative electricity costs)[38] are likely to be peaky households with inelastic electricity use.

Table 2 illustrates how time-of-use tariffs affect different households' electricity costs in very different ways. The table is based on a series of analyses of the billing impacts of TOU tariffs on hypothetical household types carried out by the St Vincent de Paul Society. The analyses looked at what the affect of applying Energy Australia's Powersmart tariff—a three-part time-of-use tariff with off-peak, peak, and shoulder periods—would be on various household types compared to what each households'

[38] For instance, low-income households and households in regional areas are generally those households most reliant on electricity as their principal form of energy, especially for space heating, cooling and hot water—(mostly) non-discretionary instances of energy use that together account for 60% of average household energy consumption. Meeting such households' heating and cooling needs is therefore more energy intensive (and costly), with the result that they are more exposed to the impacts of rising electricity prices. Similarly, the construction of the household dwelling is again likely to be poorer in the case of low-income households due to a lack of roofing and wall insulation, poorer building materials, and single-glazed windows all of which will affect the efficiency of household energy use. While it is difficult to numerically quantify the extent of the impact that sub-standard dwelling construction can have on a household's energy needs in Australia, figures from the United States suggest that lower-income families living in older, more poorly constructed homes consume an average of 28% more energy per square foot than higher-income households.("Income, Energy Efficiency and Emissions: The Critical Relationship", Energy Programs Consortium (February 26, 2008). Cited in Williams, Stockton. "Bringing Home the Benefits of Energy Efficiency to Low-Income Households: The Case for a National Commitment." (Enterprise, 2008), p.10).

annual electricity costs would be if billed using the current standing tariff offer for their network area.[39] For purposes of brevity, the discussion in this report is limited to only a narrow selection of the original case studies. Those seeking a more comprehensive analysis of the billing impacts of TOU tariffs on various household types across different states should refer to section 2 of the final report of St Vincent de Paul Society's Customer Protections and Smart Meters Project, *New Meters, New Protections: A National Report on Customer Protections and Smart Meters*.[40]

	Load Profile	Annual Bill on Current Tariff	Annual Bill on TOU Tariff	Net Change	% Change
DINKY Couple (QLD): couple in their 30s with no children and both in full-time employment. All-electric household as they have no access to reticulated gas. Annual consumption is 8000 kWh, with an off-peak hot water system.	20% off peak 20% peak 60% shoulder	$1,188	$1,116	-$72	-6%
Single Mother (NSW): stay at home parent with two young children (the youngest is not in school). The household is connected to gas for hot water and so only uses 5832kWh per year.	30% off-peak 35% peak 35% shoulder	$1,173	$1,326	+$169	+15%
Family with teenage children (NSW): both parents work and the children are at school during the day-time. The household is all-electric, with no access to gas and no off-peak hot water system. Net annual consumption is 9,680 kWh.	40% off-peak 20% peak 40% shoulder	$2,039	$1,719	-$320	-16%
Average Pensioner household (VIC): uses gas for heating and hot water and hence has an annual consumption of only 3,946kWh.	30% off-peak 40% peak 30% shoulder	$896	$1,008	+$113	+13%

Table 2: Impact of Time-of-Use Tariffs on Different Household Types[41]

As is clear from Table 2, households with a more peaky load—such as pensioner and single parent households—are more likely to be made worse off by time-of-use tariffs whereas those households using relatively little electricity during the peak period—for example, the family with teenage children in New South Wales—are likely to be better off on time-of-use tariffs. This family uses relatively little electricity during the peak period because both parents are at work, while the children are at school for much of this period. As a result, they benefit from lower electricity rates during the evenings, night-time and weekend, without suffering much exposure to the higher electricity rates during the weekday afternoons that the pensioner and single parent household face. Furthermore, because their electric hot water system is not currently running on off-peak rates, they also benefit from paying lower rates for their hot water as a result of being put onto a time-of-use tariff since they can now run their hot water system on a timer during the off-peak period to save on their electricity costs. However, because

[39] At the time of print, the Powersmart tariff rates (incl. GST) were 8.14 cents for off-peak (10pm to 7am on all days), 35.64 cents per kWh for peak period (2pm to 8pm on weekdays) and 14.08 cents per kWh during the shoulder period (all other times).

[40] See Johnston, "New Meters, New Protections: A National Report on Customer Protections and Smart Meters ", 20-9, appendix 2.

[41] Data in table based on a selection of the hypothetical case studies in the *Consumer Protections and Smart Meters* series of reports by May Mauseth Johnston. Details for the average pensioner household in Victoria have been updated to reflect tariff changes. The Origin Citipower GD/GR 2009 tariff rate has been used to calculate impact on pensioner household in Victoria. For a more complete analysis of the billing impacts of TOU tariffs on different household types and for a detailed discussion of the assumptions used in each of the case studies see May Mauseth Johnston, "Customer Protections and Smart Meters: Issues for New South Wales," (Melbourne: St Vincent de Paul Society, 2009), 48-63, May Mauseth Johnston, "Customer Protections and Smart Meters: Issues for Queensland," (Melbourne: St Vincent de Paul Society, 2009), 46-61, May Mauseth Johnston, "Customer Protections and Smart Meters: Issues for Victoria," (Melbourne: St Vincent de Paul Society, 2009), 45-51, Johnston, "New Meters, New Protections: A National Report on Customer Protections and Smart Meters ", 5-15.

both the pensioner and single parent households use gas to power their hot water systems, neither household is able to take full advantage of the lower off-peak electricity rates to save on their hot water costs. The same is true for households currently using dedicated off-peak hot water systems, such as the DINKY household. And yet, because these households have access to gas for heating and cooking, their exposure to the billing impacts of time-of-use tariffs is less than it might have been had they been entirely reliant on electricity for all their energy needs. We see this in the table below, which shows that **annual electricity costs could increase by $158 from time-of-use pricing for pensioner households in Victoria that use electricity instead of gas for heating**.

Current Tariff	Time-of-use Tariff
Total consumption 5,459 kWh (3,946 kWh per table 1 + 1,513 kWh for heating)	1,638 kWh @ 8.14 cents = $133
5,459 kWh @ 18.04 cents per kWh = $985	2,183 kWh @ 35.64 cents = $778
50.38 cents per day in fixed charges = $184	1,638 kWh @ 14.08 cents = $231
	50.38 cents per day in fixed charges = $184
Total annual bill = $1,168	Total annual bill = $1,326 (+$158)

Table 3: Billing impacts of TOU on pensioner household in VIC with electric heating[42]

An annual increase in electricity costs in the order of $113 to $158 could cause significant hardship to a low-income pensioner household in Victoria, while an annual increase in electricity costs of $169 resulting from being put onto TOU tariffs could likewise cause major hardship for a single parent living on a fixed income in New South Wales.

In Victoria, retailers have adopted a time-of-use tariff with a peak period that runs from 7am in the morning until 11pm at night

But the cost impacts of time-of-use tariffs could be even more severe if retailers choose to go for a two-part time-of-use tariff (peak and off-peak) instead of the three part tariff that Energy Australia in NSW uses. This is currently the case in Victoria, where retailers have adopted a two-part time-of-use tariff with a peak period that runs from 7am in the morning until 11pm at night.

This potential for the smart meter rollout to cause significant disadvantage to the some of the poorest and most disadvantaged households in Australia is the central concern of this report and the focus of the next two chapters.

Any policy that results in making the worst-off even more worse off than they already are is on the face of it unjust and, at the very least, must be strenuously argued for on the basis of the overall advantages that it will bring and the strategies that can be put in place to minimise the potential harm that can be caused by it.

What is absent from the policy discussions surrounding the smart meter rollout—both nationally and in Victoria—is sufficient justification that the overall benefits of a smart meter rollout outweigh the risks that it poses to the welfare and wellbeing of the most vulnerable and disadvantaged in the community.

[42] The standard tariff is based on Origin's 2009 single rate tariff (GD/GR) for the Citipower area. Consumption data is based on the profile of the hypothetical pensioner household (VIC) used in Johnston, "Customer Protections and Smart Meters: Issues for Victoria", 45-9, with the addition of a further 1,513 kWh of annual electricity usage for heating needs. This figure is based on heating/cooling needs representing 23% of a household's electricity usage (a household using gas for heating and hot water would typically only use 60% of the electricity that an equivalently sized all-electric household would use). For a breakdown of the average household's electricity consumption by end use see www.energyusage.energyaustralia.com.au/

Even policies that are net beneficial can result in poor social justice outcomes if those policies cause harm to the most vulnerable and disadvantaged on the way to the realisation of overall benefits. This is one of the classic objections to utilitarianism—the view that we ought to act always so as to bring about the greatest good to the greatest number—as the example of the *spare parts surgeon* illustrates.

In this example, five people who are chronically ill are in hospital under the care of a surgeon and each needs a separate organ in order to live. Also in the hospital receiving treatment for a minor injury is a sixth person who has all the healthy organs needed to save the life of the five chronically ill patients. Faced with this situation, a utilitarian surgeon should harvest the organs of the sixth patient (which would kill him) so as to save the lives of the five chronically ill patients. But this seems obviously unjust on the grounds that the surgeon has no right to harm the relatively healthy patient, even if so doing would bring about the greatest good for the greatest number. Similarly, even though the rollout of smart meters and the introduction of time-of-use tariffs may ultimately benefit consumers and electricity businesses, it may still be unjust if the rollout causes the vulnerable and disadvantaged to be even worse off than they already are.

1.3.4 Job Losses

A final potential disadvantage of the smart meter rollout is the job losses that may result as a result of the ability of smart meters to be read remotely and to enable households' electricity supply to be remotely connected and disconnected. Currently these tasks have to be done manually, and although this is costly, it also creates employment.

It is difficult to say what the net effect of the rollout will be on jobs. The rollout may even result in job creation in the short term as additional workers are needed to carry out the meter installations and additional staff required to deal with customer queries and more regular processing of consumers' consumption and account data. In the long run, however, fewer workers may be needed to process households' meter data as reads become automatic and business systems develop to enable more streamlined processing of consumers' account information.

1.4 Where things stand

The Ministerial Council on Energy has now established a National Stakeholder Steering Committee (NSSC) comprising representatives from network businesses, retail businesses, the Australian Energy Market, the Ministerial Council on Energy, the Western Australian Independent Market Operator, and a consumer representative to carry out further work on the development of the National Smart Meter Program, especially finalising the technical and operational specifications for smart meters and amending and developing regulatory policy to accommodate the rollout. Meanwhile, the Ministerial Council on Energy is also working on the development of a National Energy Customer Framework (NECF). The NECF will shift responsibility for the *non-economic* regulation of retail and distribution businesses away from states to allow for the harmonisation of consumer protections and community service obligations across states (although states where retail competition is weak will continue to be responsible for regulating retail prices). It is expected that the NECF will become the principle vehicle for protecting vulnerable and disadvantaged consumers once smart meters are rolled out.

Most states have held off going ahead with the rollout until the work of the NSSC is finished and further pilots and trials of smart meter functionalities, communications infrastructure and time-of-use pricing initiatives are carried out. Tasmania and South Australia have both decided against a mandated smart meter rollout for the time being, given that the cost-benefit analysis was not clear that the benefits of a

rollout outweigh the costs in these jurisdictions. For its part, the Queensland government has acknowledged the potential benefits of a mandated rollout, but is holding off on making a firm commitment until further trials and pilots have been completed. The New South Wales government, on the other hand, has affirmed its commitment to a mandated smart meter rollout in the state and expects that smart electricity meters will be installed in most homes and small to medium businesses in the state by 2017. However, to this date the rollout has not commenced in New South Wales although Energy Australia has been rolling out smart meters in NSW on its own initiative for the past four years. Already more than 400,000 smart meters have been installed in New South Wales and Energy Australia has now placed more than 200,000 customers on time-of-use tariffs.[43]

1.4.1 The Victorian Rollout

In contrast to the other states, the smart meter rollout is already in full swing in Victoria, beginning last September and scheduled for completion by the end of 2013. Indeed, Victoria had already decided on a compulsory rollout prior to the COAG decision in April 2007.[44] In fact as early on as 2004, the Essential Services Commission in Victoria had already committed to a rollout of advanced interval (smart) meters, although at the time it was envisaged that these would be manually read. The Department of Primary Industries, however, took the view that a rollout of interval meters would be improved by adding more advanced functions to the meters that would deliver greater net benefits, specifically secure two-way communications technologies that would enable remote meter reading and enhanced load control management. In 2005, CRA International and Impaq consulting were commissioned to conduct a cost-benefit analysis of opting for an advanced interval meter (i.e. smart meter) rollout[45] and in early 2006, following the results of this analysis, the Victorian government took the decision to opt for a compulsory rollout of smart meters (or advanced interval meters as they are being referred to in Victoria). Trials of various communication infrastructure and home area network platforms were subsequently carried out and in September 2008 the Department of Primary Industries released its decisions on the minimum functionality and service levels specifications for the advanced metering infrastructure, paving the way for the rollout. Included in the list of minimum functions for Victorian smart meters were remote meter reading, supply connection and disconnection capabilities; supply capacity control capabilities; and home area network capabilities.[46]

In December 2008, the Essential Services Commission (Victoria) drafted a revised framework and regulatory approach in response to the Department of Primary Industry's specifications and the Australian Energy Regulator (AER) has subsequently taken over the work of developing regulatory policy around the Victorian rollout. Late last year the AER ruled that distributors in Victoria could increase their annual fixed supply charges by an average of nearly $68 in 2010 and more than $76 for 2011 in order to recover the costs of the rollout (these charges will be passed on to customers by their retailers, although retailers too are expected to pass on further additional costs of their own associated with the rollout). Distributors will also be permitted to reassign households to time-of-use network

[43] Energy Australia, Annual Report 2007/08 (full version), p.17. Available from www.energy.com.au/energy/ea.nsf/Content/NSW+Annual+reports

[44] See the Department of Primary Industry's website for further details. http://www.dpi.vic.gov.au/DPI/dpinenergy.nsf/childdocs/-384C1AC0F3D5716CCA25729D00102547-A8BAF6E4E66C900FCA2572B20004C403-4EC2E4EA42B821FCCA2572B10079A930?open

[45] Charles River Associates, "Advanced Interval Meter Communications Study: Report for the Victorian Government Department of Infrastructure," (Melbourne: 2005).

[46] See Department of Primary Industries, "Advanced Metering Infrastructure: Minimum Ami Functionality Specification (Victoria)," (Melbourne: Department of Primary Industries, Victorian Government, 2008). and Department of Primary Industries, "Advanced Metering Infrastructure: Minimum Ami Service Levels Specification (Victoria)," (Melbourne: Department of Primary Industries, Victorian Government, 2008).

tariffs immediately following connection to a smart meter and, depending on the nature of its contract with that customer, a retailer may then choose to place the customer on a time-of-use retail tariff.[47]

Here, a key difference between the Victorian regulatory environment and the regulation of electricity prices in other states is that retail price increases in electricity tariffs are no longer regulated in Victoria, so there is little protection to shelter vulnerable consumers from the price impacts of time-of-use tariffs (the network component of the tariff—which accounts for nearly half the tariff rate—is regulated by the AER, but not retailers' proportion of the final tariff rate).

In other states such as NSW, QLD, and SA, increases to the standing tariff—the 'no frills' tariff that is offered to consumers who don't want to actively negotiate a market contract—must be approved by state regulators. In South Australia and Queensland this takes the form of the Essential Services Commission of South Australia and the Queensland Competition Authority setting the regulated tariff price, and in New South Wales the Independent Pricing Authority and Regulatory Authority sets a price cap on any increases to the bills of an average customer on a regulated tariff with one of the state's retailers of last resort—Energy Australia, Integral Energy and Country Energy. However, in Victoria, there is no cap on the extent to which retailers can increase regulated tariffs. While retailers in Victoria are obliged to offer non-market participants a standard tariff that must be publicised in the Victorian Government gazette and cannot be increased any more than once every six months, beyond that retailers are permitted to determine both the shape—whether it is a flat, two-part or three-part time-of-use tariff—and the price of the standard tariff as they see fit. In other words, retailers are free to offer time-of-use tariffs as their standing tariff offer should they choose to do so. Although there is no formal requirement in other jurisdictions that the standing tariff offer must have the shape of a flat tariff—this has so far not been an issue because of the absence of interval meters—the heavier regulation of price increases to the standing tariff offer nevertheless makes it more difficult for a retailer to switch consumers on standing tariffs over to time-of-use tariffs. Additionally, many of the market contracts that residential electricity customers in Victoria are currently on include a clause that allows retailers to stop offering customers the contracted tariff rate if a smart meter is installed in their premises. Consequently in Victoria the only protection against retailers deciding to assign customers to time-of-use tariffs following the smart meter rollout is the level of retail competition in the state and the worry that a customer who does not want to be billed according to a time-of-use tariff may move to a competitor that continues to offer a flat tariff rate.

[47] For further details see Australian Energy Regulator, 'Interval Meter Reassignment Requirements: Draft Decision' (13 March 2009) and Australian Energy Regulator Final Determination on Victorian smart meter costs and charges (http://www.aer.gov.au/content/index.phtml/itemId/731476)

2. Smart Meters, Energy Affordability and Justice

Chapter Overview

- Electricity is an essential utility. Without access to an affordable and reliable supply of electricity people would struggle to meet basic needs for heating, cooling, cooking, and hygiene (amongst other things), all of which are crucial to people's health and wellbeing.
- Energy affordability in Australia, however, is becoming increasingly precarious. Since 1999, electricity prises have risen by 82% compared to an average increase of 37% across all consumer goods. In the last year alone, prices have increase by nearly 16%.
- These price increases are hitting low-income households particularly hard. Pensioner households and low-income households have only experienced a 2.5% increase in their income (in real terms) since 1999. Low-income households spend more than double the proportion of their income on energy costs as the average household, and nearly five times as much as high-income households.
- One of the reasons why low-income households spend such a high proportion of their income on energy costs is their greater reliance on electricity for heating, cooking and hot water, as well as the poorer quality of their housing and the inefficiency of their appliances. Together, these factors mean that lower-income households need to use more electricity than average or higher-income households to get the same value from their electricity use. For instance, according to figures from the US, lower-income households in poorer housing need to use 28% more electricity to heat the same amount of space as higher-income households in better housing.
- Already, low-income households are struggling with energy costs, with 4 in 10 regularly behind in paying their bills and 6 in 10 of low-income households surveyed for this study unable to heat and cool their homes as they would like. Many of the people taking part in this study were going without heating, hot water and even cooked meals, simply to be able to afford their electricity bills. Some participants on disability support pensions in Melbourne hadn't used their heating in twelve years because of cost-concerns, while others were resorting to using their gas ovens as heaters because they couldn't afford to run their electric heating.
- Through increases in fixed charges alone, the smart meter rollout will add up to $125 to households electricity bills in Victoria in 2010, with further increases in 2011-13. These increases in fixed charges impact especially severely on low-income households because of the low-volume of their electricity use and inability to take advantage of TOU pricing or DLC to off-set cost increases. Also, because of the low-volume of their consumption, fixed charges account for a much larger proportion of their overall electricity costs. So increases in fixed charges cause a much more significant increase in their overall electricity costs.
- Given the struggles that they are already facing in affording essential electricity use, and given the fact that low-income and fixed-income households are already typically getting into debt each week in trying to meet their household costs, the fixed charge increases needed to pay for the smart meter rollout have the potential to considerably exacerbate the hardship and poverty that low-income and disadvantage households already face. The rollout therefore has the potential to make the least advantaged households in Australia even more disadvantaged than they already are. This would be an alarming social justice outcome of the rollout and the need for smart meters has not been sufficiently justified to allowfor this possibility.

Depending on (a) the extent of the increase in fixed charges that network businesses are permitted to pass on to consumers to pay for the rollout and (b) the length of the peak period on time-of-use tariffs and the extent of the increase that the peak tariff represents, the smart meter rollout has the potential to substantially raise electricity costs for certain consumer groups who, because of their household circumstances, have a peaky load and a limited ability to shift their electricity use to the off-peak period. For low-income households in such circumstances who are already struggling to meet their electricity costs because of lack of income, poor housing and inefficient appliances, the smart meter rollout could result in major financial hardship, potentially jeopardising their ability to afford essential electricity usage.

2.1 Electricity as an Essential Utility

Access to a reliable and affordable supply of energy is an essential good without which people would struggle to meet essential needs for heating, cooling, cooking, and hygiene (amongst other things), all of which are crucial to people's long- as well as short-term health and wellbeing. Furthermore, the operation of many essential medical devices depends, crucially, upon energy use. As a report by the Institute for Sustainable Futures puts it,

> Energy provides space heating and cooling to keep our homes at a liveable temperature; it provides hot water, refrigeration and cooking facilities to help people maintain basic hygiene and health; and it provides lighting to increase safety. In addition, access to energy meets important social needs; it supports economic and social exchange and helps individuals to participate in broader society.[1]

In Australia, electricity is usually, but not always, the relevant source of energy here. Electricity, is an *indirect* (or *extrinsic*) good in that electricity is not valued for its own sake, but for what the consumption of electricity enables people to do or achieve. That is, we value electricity because we value more important goods that follow from using electricity, such as being warm, being cool, being able to listen to music, or eating hot food (and so on). Electricity usage on its own holds little value. So when we talk about electricity being an essential good or utility, we are talking about things like cooking, heating, and cooling being essential activities; activities that are crucial to people's health and wellbeing and which—at least in our climatic conditions—depend on the use of electricity. Similarly, when we talk about protecting access to a reliable and affordable supply of electricity because it is an essential utility, we are talking about ensuring that all people have access to the resources that they need to be able to achieve essential functionings, such as staying warm in winter and cool in summer, eating cooked food, and so on.

The essential aspect of electricity consumption is reflected in the priority that households give to paying energy bills where, according to a survey commissioned by the Victorian Department of Human Services, electricity bills rank second only to rent/mortgage payments in terms of the priority people place on their payment.[2] It also means that electricity use is relatively price inelastic: consumers continue to use electricity even in the face of price increases because electricity use is regarded as something that they cannot go without. Higher prices therefore potentially mean that poorer and lower income households will forgo other valuable opportunities that higher income households will continue to enjoy, with consequences for their welfare and quality of life, as happened in South Australia in 2003, when electricity prices increased by 25% overnight in the wake of the introduction of full retail competition.

The price increase in South Australia had no effect on demand for electricity—aggregate demand for February 2003 was higher than for February 2002, and in February 2004 it was higher again.[3] Households with little disposable income tended to cut back on things like food, clothing and discretionary expenditure rather than cutting back on electricity use in any significant way.[4] Wesley Uniting Care Adelaide surveyed clients of their financial counselling program about their response to

[1] Chris Riedy, "Interval Meter Technology Trials and Pricing Experiments," (Sydeny: Institute for Sustainable Futures, University of Technology Sydney, 2006), 4.
[2] Roy Morgan Research, "Victorian Utility Consumption Survey 2001, Final Report," (Melbourne: 2002), xvi. Cited in Gavin Dufty, "Electricity Pricing: Delivering Social Justice and Environmental Equity," (Melbourne: St Vincent de Paul Society Victoria, 2007), 4.
[3] Jim Wellsmore, "Paying for What? The Impact of Utility Tariff Structures," (Sydney: Public Interest Advocacy Centre, 2006), 9-12.
[4] For a study of how this price increase affected some of South Australia's poorest and most vulnerable households see the *Powering Poverty* report. Western Region Energy Action Group, "Powering Poverty: A Report on the Impact of the 2002-2003 Electricity Price Rises on 12 Low-Income Households in South Australia," (Adelaide: 2004).

the price increase and found that 50% had reduced spending on food as a result of the prince increase, while nearly all (87%) had reduced their expenditure on clothing.[5] As the Powering Poverty report consequently warns, the danger of any significant increase in the price of electricity is not just that it will undermine the ability of poorer households' to use electricity, but that the inelasticity of electricity to price will lead to households' forgoing other essential goods and needs, placing these households in further poverty and affecting health: **'By effectively reducing household disposable incomes, electricity price rises will tend to increase the numbers of households living in poverty and so affect public health.'** [6]

Increases in electricity prices over the past decade

Electricity costs have increased dramatically over the past ten years with the result that energy affordability has become increasingly precarious for many low-income households. According to data from the Australian Bureau of Statistic's Consumer Price Index, **retail electricity prices in Australia are now 82% higher on average than they were a decade ago,** with most of this increase coming since 2005. This is a rate of increase that is well above inflation, with increases in the costs of all goods over the past decade averaging just under 37%. Indeed, in the last year alone average retail electricity prices in Australia have risen by 15.6%, a rate of increase that is twelve times higher than the average increase across all consumer goods. This rate of increase in the cost of electricity has far outpaced increases in the average weekly income for households reliant on government support and pensions, as well as for households on the minimum wage. For instance, over the past decade, age pensioners reliant on income support have seen a growth in their income of only 2% in real terms, while the average disposable income for low-income households has similarly only grown by 2.5% in real terms.[7]

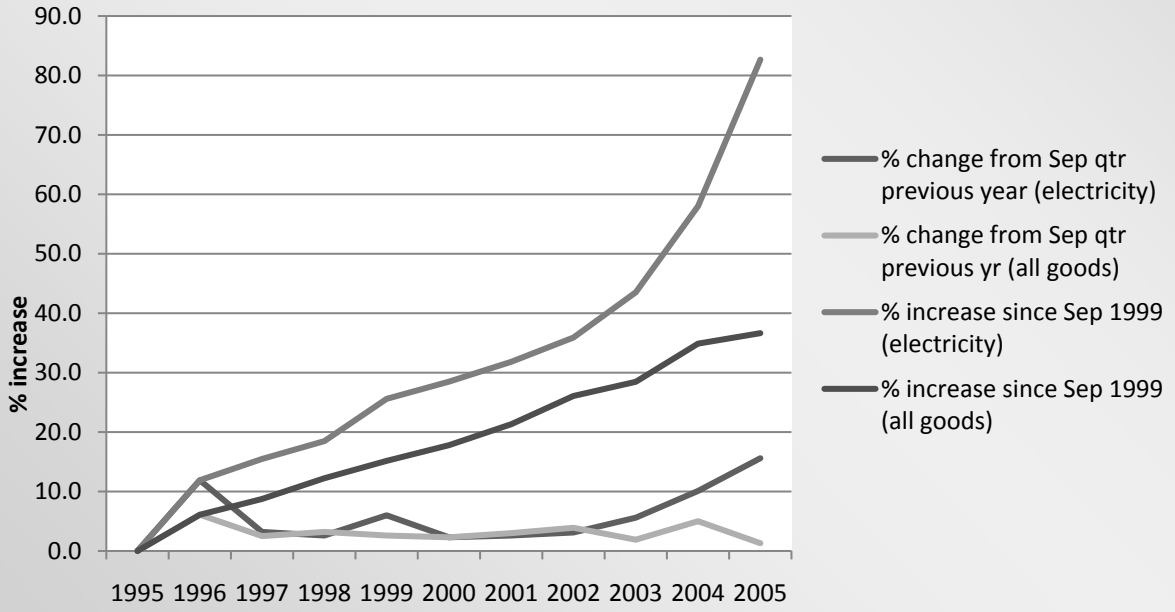

Figure 2: Electricity Price Increases Sep 1999-2009[8]

[5] Mark Ludbrooke, "Submission to the Distribution Price Review for South Australia, 2010-2015," (Adelaide: UnitingCare Wesley Adelaide, 2009), 7.
[6] Western Region Energy Action Group, "Powering Poverty: A Report on the Impact of the 2002-2003 Electricity Price Rises on 12 Low-Income Households in South Australia," 10.
[7] Farmer, "Pension Review: Background Paper," 15.
[8] Source: ABS Consumer Price Index, CAT 6401.1

2.2 Impact of Price Increases on Low-Income Households

Increases in energy costs impact especially severely on low-income households for three reasons:

- Low-income households are often more reliant on electricity as their principal source of energy use and many people on low-incomes have a disability or chronic illness that requires additional electricity use—so they are more exposed to the cost impacts of *electricity* price increases
- Because of poor housing or inefficient appliances, the amount of electricity that a low-income household may need to achieve the same level of heating or cooling, for example, is often greater than the amount of electricity that higher-income households of a similar size need
- Expenditure on energy represents a greater proportion of lower-income households' overall income so increases in energy costs have more of an effect on their ability to afford other goods

2.2.1 Greater reliance on *electricity* use

Low-income households—especially households in rural and regional areas—are the households most reliant on electricity as their principal form of energy, especially for space heating, cooling and hot water: non-discretionary instances of energy use that together account for 60% of average household energy consumption. Meeting such households' heating and cooling needs is therefore more energy intensive (and costly), with the result that they are more exposed to the impacts of rising electricity prices—especially if they need to use heating, cooling and hot water more often due to unemployment, retirement, or being at home to care for young children or an elderly relative.

For example, according to a 2006 survey of residential energy use in Sydney, the Blue Mountains and the Illawarra, households in the lowest income quintile—poorest 20% of households—are much more dependent than households in the highest income quintile—wealthiest 20% of households—on electricity for hot water (68%; 46%) and cooking (64%; 39%) in particular, but also for heating (52%; 41%).[9]

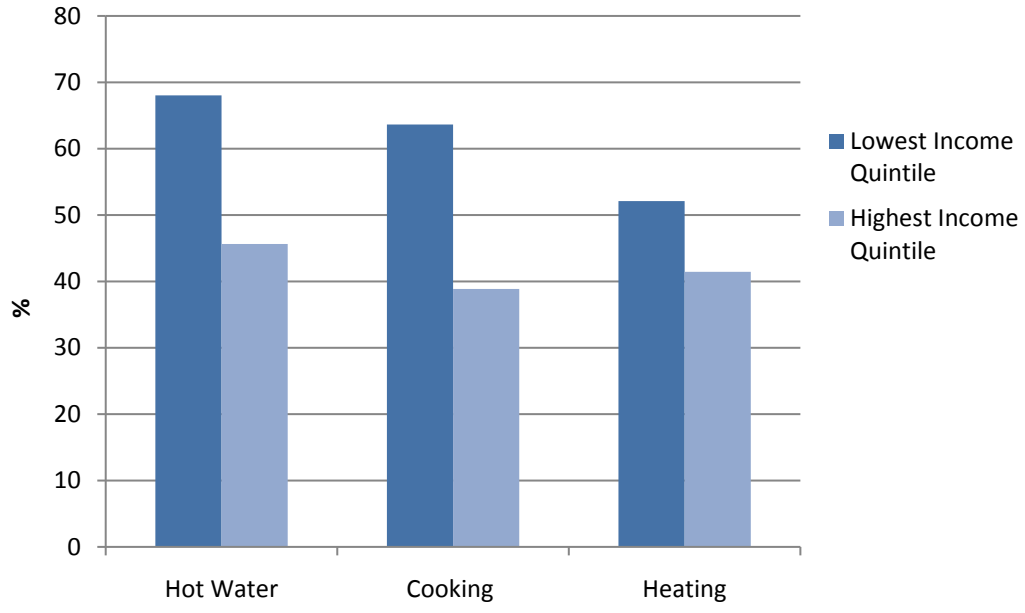

Figure 3: Proportion of households reliant on electricity in Sydney, the Blue Mountains and Illawarra (2006)

[9] Independent Pricing and Regulatory Tribunal of New South Wales, "Residential Energy and Water Use in Sydney, the Blue Mountains and Illawara: Results from the 2006 Household Survey," (Sydney: IPART, 2007), appendix A, pp.34-5.

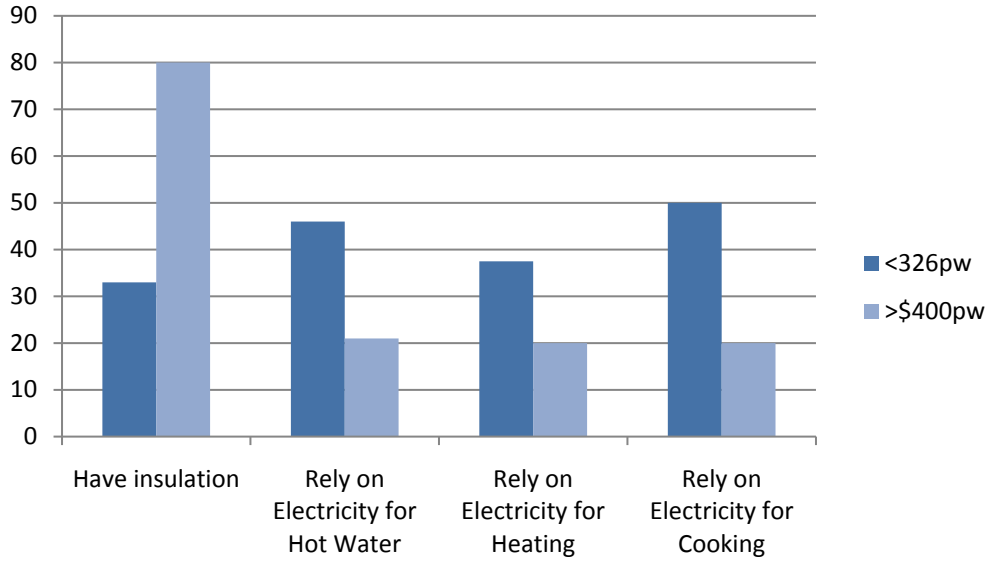

Figure 4: Energy consumption characteristics of income groups in survey

These results accord with survey responses received in this study, where differences in household income were associated with reliance on electricity as principal energy source. For instance, more than 45% of households with a weekly income of under $326 (the lowest 30% in our survey) relied solely on electricity for hot water, compared to only around 20% of households with a weekly equivalised income of $400 or more. Similarly, whereas 1 in 2 households with a weekly equivalised income under $326 relied solely on electricity for cooking, only 20% of households in the higher equivalised income bracket was depend on electricity for their cooking needs.

People with disabilities often have additional needs for electricity use that further expose them to the impacts of rising electricity prices. For example, people with MS rely heavily on the use of climate control—especially air-conditioning—because they are acutely intolerant to heat. For people with MS, an increase in core body temperature can slow down already problematic nerve transmission and exacerbate MS symptoms such as 'blurred vision, extreme fatigue, muscle weakness, pain, tremors, memory problems, loss of balance, bladder and bowel problems, numbness and tingling, decrease in cognitive function, and in severe instances partial or complete paralysis.'[10] According to a recent study of air-conditioner use by people with MS, MS households spend a further $440 - $580 per year on average on air-conditioner use (or ten times as much) than the average Australian household.[11]

[10] Michael Summers and Rex Simmons, "Keeping Cool Survey: Air Conditioner Use by Australians with Ms " (Blackburn, VIC: MS Australia, 2009), 3.

[11] For Victoria this figure is even higher again, with MS households in Victoria spending on average more than $406 on air-conditioner use in 2007 compared to an average annual expenditure on air-conditioning use of just $17-$22 across all households in Victoria. See Tables 5 & 6, Ibid., 22.

2.2.2 Poorer Housing and Less Efficient Appliances

Even where higher-income households are heavily reliant on electricity for heating, cooking, and hot water, these households have the resources to ensure that the electrical appliances they use are energy efficient. However, many low-income households are unable to afford modern and efficient appliances and have to rely on donated or second-hand appliances instead. But the appliances that are donated by people who have recently upgraded their dishwasher or washing machine can be very inefficient—their inefficiency is often the reason why higher-income households have decided to get rid of them in the first place—while it can be difficult to tell the efficiency of an appliance when purchasing it second-hand as the energy rating label may have worn off.[12]

Tenants face particular difficulties since they are dependent on the efficiency choices of their landlord or local housing commission for some of the heavier usage appliances, such as heaters, ovens, stove-tops, and hot water systems:

> *You don't get a say in the size, the brand, the energy rating, nothing at all…I got a washing machine that has a 1 and a half star energy rating…and like a 1 and a half star water rating and I was like, you're kidding me. (Public Housing Tenant, Melbourne)*

The efficiency of low-income households' electricity use—and therefore their exposure to higher electricity prices—is also affected by the generally poorer quality of their housing stock. For although higher-income households spend more on heating and cooling their homes because of their *size*, the poorer construction of the dwellings that many lower-income and disadvantaged groups live in—little or no insulation, no window shading or heavy curtains, draughts around the windows and doors—means that the amount of energy they need to heat or cool an equivalent area is higher.

While it is difficult to put an exact figure on the impact that poorer dwelling construction has on Australian household's energy needs, figures from the United States suggest that lower-income families living in older, more poorly constructed, homes consume an average of 28% more energy per square foot than higher-income households.[13]

Poor housing stock again appears to be most of an issue for tenants, as the table above shows (based on data from the 2007 Victorian Utility Consumption Survey).

> ***I've got lots of draughts around the windows and the doors…You can feel the breeze. I'm sitting in the lounge room and I can feel it coming at the back of me and then I'm up coughing all night cause the room is so cold because of all the cold air because there's all these, you know, just gaps in the windows and there's nothing that they'll do about it***
>
> ***The same thing with me, I can see daylight through some of the floor boards in my house. (Public Housing Tenants, Melbourne)***
>
> ***All my white goods are second hand, because I am poor. My washing machine is faulty and I cannot leave it unattended or it will flood the premises. (Public Housing Tenant, Sydney)***

[12] For example, a partnership project in Victoria between community organisations, charities and the Moreland Energy Foundation to collect unwanted refrigerators and to provide these to low-income households found that many of the refrigerators that had been donated were highly inefficient and unsuitable to be passed on to a low-income household. Australian Conservation Foundation, Australian Council of Social Services, and CHOICE, "Energy and Equity," (2008), 13.

[13] "Income, Energy Efficiency and Emissions: The Critical Relationship", Energy Programs Consortium (February 26, 2008). Cited in Williams, Stockton. "Bringing Home the Benefits of Energy Efficiency to Low-Income Households: The Case for a National Commitment." (Enterprise, 2008), p.10.

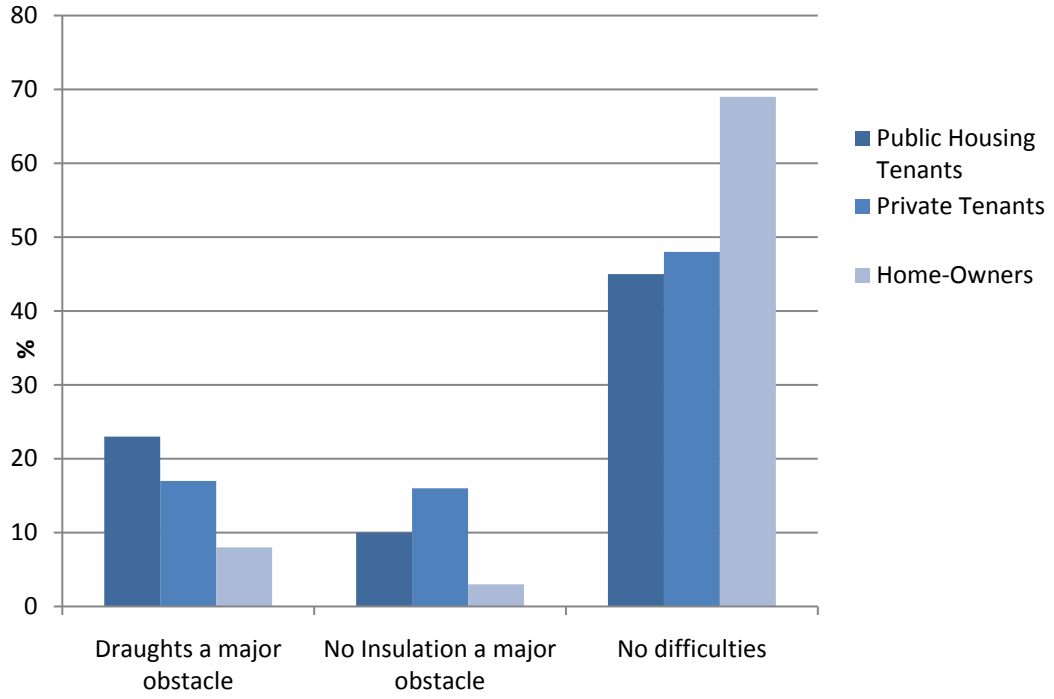

Figure 5: Perceived Difficulties with heating home in Victorian Utility Consumption Survey 2007

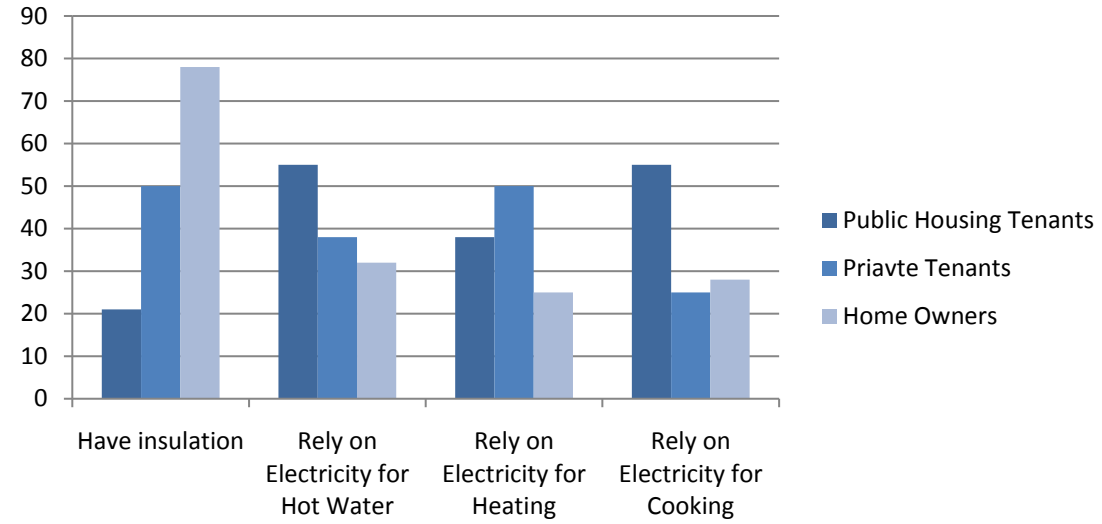

Figure 6: Energy consumption characteristics between household types in survey

Differences in the quality of housing stock between tenants and home-owners were even more pronounced in the survey responses gathered for this study. Indeed, very few of the public housing tenants taking part in the focus groups had ceiling insulation in their homes and most had gaps around their windows and doors. Whereas 78% of home-owners surveyed reported that they had ceiling insulation, only around 1 in 5 public housing tenants had ceiling insulation. What was also significant was the fact that people living in public housing were much more likely to be reliant on electricity for heating, cooking, and hot water than home-owners in this study.

Whereas higher-income households and home-owners are in a legal and financial position to make improvements to their homes—e.g. put in insulation, heavy window shading, install solar— lower-

income households aren't in a financial position to be able to afford to make these sorts of energy saving improvements.

> *I mean, certainly, if you've got the money you can set up your house very well. You know, you can put [in] double glazing, good drapes, good insulation etc. etc., solar heating. But when you are struggling, or when you're just keeping ahead of things by the stub of your toes or whatever, it becomes harder (Person living on Disability Support Pension, Melbourne)*

Here, the problem that many tenants face is that they don't even have the authority—because they don't own their homes—let alone the resources to make efficiency improvements to their homes. And even when they do have the authority to make improvements, they risk losing out on the benefits of any investment in improving their housing because they might not be there in the long-term to take full advantage of these improvements. For instance, a family living in public housing or private rental accommodation may take out a loan to fit their home with insulation and to upgrade to a ducted gas heating system only to have to relocate to another unit without insulation or gas heating.[14]

> *I suppose we could [put in extra insulation], but again how would you afford it? And again, would they rip it out?...You know you have to leave your homes [as you found them] when you leave. (Public housing tenant, Melbourne)*

2.2.3 Energy Costs as a Proportion of Income

A third factor that affects the exposure of low-income households to any increases in electricity prices is the fact that although low-income households are relatively small users of energy—concession cardholder households consistently use 15% less energy than non-concession cardholder households across all household sizes[15]—their energy costs as a proportion of household income are the highest. For instance, according to the *2003-04 ABS Household Expenditure Survey*, households in the lowest equivalised income quintile (the poorest 20% of households) spend more than 5.5% of their weekly income on energy costs whereas households in the top income quintile spend just over 1% of their weekly income on energy costs. Significantly, **public housing tenants, people on government allowances, and pensioners spend nearly double the proportion of their weekly household income on energy costs than the average household**, even though they use less energy. Conversely, homeowners and people in paid employment consume above the average household but spend less on this consumption (as a proportion of household income).[16]

[14] For a more detailed discussion of this point see Western Region Energy Action Group, "Powering Poverty: A Report on the Impact of the 2002-2003 Electricity Price Rises on 12 Low-Income Households in South Australia," 10-1.
[15] Department of Human Services, *Response to the Review of Effectiveness of Retail Competition and the Consumer Safety Net for Electricity and Gas Issues Paper*, 2003, p.4. Cited in Dufty, "Electricity Pricing: Delivering Social Justice and Environmental Equity," 6.
[16] Source: ABS, Household Expenditure Survey 2003-04 (Reissue), Summary of Results, Cat 6530.0.

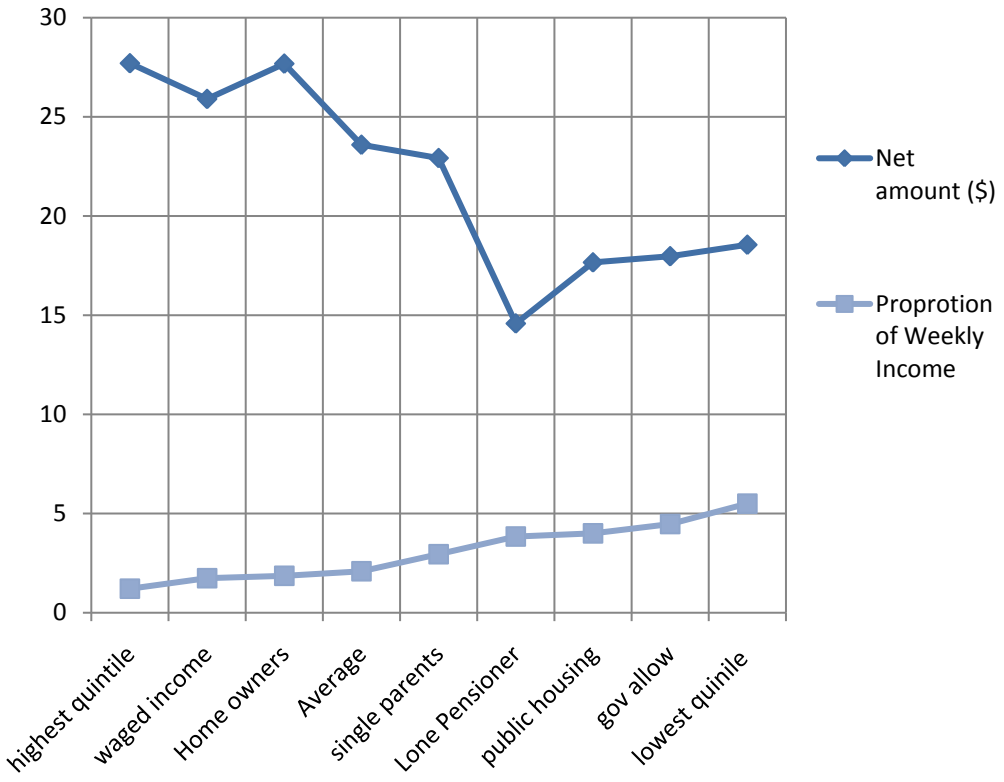

Figure 7: Average weekly expenditure on energy 2003-04[17]

Given the rate of increase in the cost of electricity since the *2003-04 Household Expenditure Survey* it is reasonable to expect that most low-income households are now spending an even higher percentage of their income on energy costs. This is worrying because, as the table below illustrates:

- **households in the lowest income quintile and households reliant on income support for more than 90% of their income were already unable to meet their weekly household costs in 2004, and**
- **single parents, public housing tenants and retirees living alone were only just managing to stay on top of costs.**

Household Type	Av. Income	Av. Expenditure	Balance
Lowest Income Quintile*	337	489	-152
Reliant on Income Support*	346	399	-53
Single Parent with dependents	778	702	76
Lone Person +65	380	351	29
Wage Earners	1490	1091	399
Public Housing Tenant	441	408	33
Private Tenant	1048	854	194
Home Owner (with mortgage)	1487	1148	339
Highest Income Quintile	2280	1320	960
All households	1128	892.83	235.17

Table 4: Average Weekly Income vs. Expenditure 2003-04[18]

[17] Source: ABS, Household Expenditure Survey 2003-04 (Reissue), Summary of Results, Cat 6530.0.
[18] Source: ABS, Household Expenditure Survey 2003-04 (Reissue), Summary of Results, Cat 6530.0.

So any further significant increases to the cost of electricity could push low-income and disadvantaged households further into poverty and debt, especially because electricity use is price inelastic: because households regard electricity as an essential utility that they can't go without, they continue to use electricity even after increases in the price of electricity mean that they can no longer really afford it. This can mean that households who are struggling with energy may have to forgo other essential goods fundamental to their health and welfare simply to be able to continue to use electricity after a sizeable price increase. The focus group in Wollongong, for instance, took place soon after a 20% increase in electricity prices in the area. People were only managing to survive this increase because of the concessions that they were receiving from the government:

> *The way they are increasing the electricity, without the government assistance for your energy, we would be struggling, really struggling…You would be going without heating.*
>
> *It's getting to the point where you are sweating on every bill that comes in and wondering have you enough to cover it.*

These sorts of price increases can hit larger households and households where people have a disability related energy need particularly hard.

Jason's Story[19]

Jason is a quadriplegic man who lives with his parents, near Wollongong. The household survives on a weekly income of around $650, which mainly comes from Jason's disability support pension and his father's aged pension (in 2003-04 the average weekly expenditure for a couple with a dependent was $1,231). Jason's mother is too young to receive the age pension, but she can't afford to take a full-time or part-time job because she needs to care for Jason and his father is too old now to be able to help look after Jason.

While Jason and his parents use mainly gas for hot water and cooking, as well as some heating, the household's energy costs are still around $800 a quarter (gas and electricity) or around $62 per week (according to the 2003-04 ABS Household Expenditure Survey, the average Australian household spends $23.59 per week on energy costs, although this figure is now likely to be higher). The family's high energy costs are caused by Jason's dependence on electricity.

In order to have any reasonable quality of life Jason relies heavily on electricity consumption. He needs an electric hoist to get in and out of his bed, as he is too heavy for his mother to lift. He also needs an electric wheelchair to move around and he has an electric bed to enable him to sit up when in bed. Jason also relies on the use of a computer for communication and in summer the family's reverse cycle air-conditioner is on for more than 6 hours on most days, as Jason is unable to regulate his body temperate and can get extremely hot without the aid of climate control.

In winter, the family use heating for 2 to 4 hours on cold days. This isn't a lot of heating use given that the entire household is at home for most of the day during winter. While Jason and his parents would like to be able to use their heating more frequently, energy costs are already prohibitive for the family and they have to cut back wherever they can, especially as they estimate that their next quarterly bill will increase by $200 following a recent increase in electricity prices in their area. This will take their average quarterly household energy bill to $1000, or nearly $77 per week. As a result, their weekly energy costs will be around 12% of their household income (compared to 2.6% for the average Australian household).[20]

[19] Jason's story is based on the survey responses of a person with quadriplegia living in the Wollongong area.
[20] Based on ABS, Household Expenditure Survey 2003-04 (Reissue). CAT 6530.0.

2.3 The Struggle with Energy Affordability

Given their greater reliance on electricity use, the often inefficient nature of their electricity use and the substantial increase in the cost of electricity use over the past decade, it is not surprising to find that low-income households are struggling more than any others with energy affordability

According to the *2003/4 Household Expenditure Survey*, nearly 4 out of every 10 low-income households reported that they could not afford to pay their electricity bills on time, compared to only around 1 in 10 middle to high income households.[21] In Independent Pricing Authority and Regulatory Tribunal's most recent survey of residential energy use in Sydney, the Blue Mountains and Illawarra, the proportion of households in the lowest income bracket who had approached their electricity retailer in the previous three years because of financial difficulties was five times higher than in the highest income bracket, while in the survey of low-income households carried for this study**, more than 60% of households reported that they could not afford to heat or cool their homes as they would like and more than a quarter had missed paying their energy bills** in the past 3 years.[22]

Financial Stress Indicator	% Low-income Households	% All other households
Unable to raise $2000 in an emergency	52	8.6
Could not pay electricity, gas or telephone bills on time	38	11.5
Pawned or sold something	12	2.3
Went without meals	12	1.8
Unable to heat home	9	1.2
Sought assistance from welfare/community organisations	15	1.2

Table 5: Selected Inidcators of Financial Stress 2003-04[23]

Many who took part in the focus groups were regularly behind in paying their energy bills, with some on the verge of disconnection. In Mildura, for example, one of the participants who had a young family had been disconnected because of falling too far behind in her payments, while another lady in the group living on a disability support pension has to ring up every time she gets a bill to ask for more time to pay it off. She is now at the point where her electricity company will no longer send her a notice of late payment if she misses another bill but will simply threaten to disconnect her instead.

2.3.1 Coping with energy costs on a fixed income

People on income support were finding that by the time they have paid for their rent and food for their children, there isn't much left over to cover energy costs. They are at the point now where their payments are just enough to barely survive. They can't afford to spend money on discretionary items and have to go without to cover their rent, food, and energy costs.

> *Survival is gerenally an austere experience on a benefit, and often I go without food. Survival rations twice a day is common, to keep solvent. The fixed phone line went first—too much line rental (Disability Support Pension recipient, NSW)*

> *The level of income support for me doesn't allow for me to use utilities because I'm cold or want a hot shower—I just think about what it's going to cost me (Public housing tenant on disability support pension in Melbourne)*

[21] Data reported in Ludbrooke, "Submission to the Distribution Price Review for South Australia, 2010-2015," 5.
[22] Independent Pricing and Regulatory Tribunal of New South Wales, "Residential Energy and Water Use in Sydney, the Blue Mountains and Illawarra: Results from the 2006 Household Survey," 59. Based on figures of 15% and 3% respectively for proportion of households in lowest and highest income brackets approaching their electricity retailer in the previous three years.
[23] Source: ABS 2003-04 Household Expenditure Survey as reported in Australian Social Trends 2007 (CAT 4102.0)

Well, what you get paid off Centrelink and off the government is just survival…You haven't got extra money to sort of go out and have fun. It's living…I've got this thing now where I've got paid, and I get the rent taken out through Centrepay, and it's two weeks they take out, and I've got other bills that come out of that pay as well. And by the time I get all that done, I don't even get paid for that week, it's gone, you know…What you get paid, it doesn't [go far] at all. (Parent, Brisbane)

Like being on a sole parent, cause I'm a single mum, or any sort of government pension, by the time you've paid your rent and buy food, there's nothing left. There's absolutely nothing. (Single Parent, Brisbane)

A financial counsellor in Adelaide commented that families struggling with high energy costs are a major issue in the state, with energy bills a repeated source of financial pressure for his clients:

We have around 900 clients each year and, you know, we have 6 financial counsellors and we are constantly dealing with this. There are other issues of course, like rent, but power is a major element. Sometimes with people if you put power costs and rent together, you've taken all their income for the fortnight.

Those who were managing to stay on top of their energy bills were generally only doing so because of retailers agreeing to give them extensions on their bills and putting them on debt management plans that allowed them to pay off their bills gradually in increments. As Brian, a public housing tenant in Melbourne commented,

In my case, I'd probably find it difficult if I didn't have a repayment plan [where I] pay regularly very two weeks. If that wasn't in place I'd probably be in trouble, and I have been in trouble a few times where a big bill just comes along and, yeah, the money's not there to pay it.

Brian had to go on a repayment plan after his electricity company didn't send him a bill for more than 6 months. When he finally did get the bill, it was too big for him to pay off in one go and so he had to negotiate a repayment plan, which he found 'just a nightmare trying to get a payment plan going'.

2.3.2 Going without to keep costs down

Others were keeping their heating and cooling use to an absolute minimum—sometimes even going without altogether—simply to avoid losing their supply. For instance, Samantha in Richmond, who had to stop working because of illness, hasn't been able to afford to use her heating in twelve years:

I don't have my heater on over the winter. Since I got sick, I don't switch it on. I used to get really massive bills because all my flat is electric and I just find the bills are too much for me.

Miriam, a participant in the Mildura focus group, told the story of how a good friend of hers had recently bought her a heater as a present because she and her husband were sick of coming over to Miriam's house and being cold. But Miriam already had heating. She just never used it because she found it too expensive to run in winter.

While not everyone would go so far as Samantha or Miriam and stop using heating altogether in winter, most would still try to keep their heating use to a minimum or find innovative ways of keeping warm that avoided having to use electric heating. The sort of simple things that participants in the Adelaide focus group regularly do to avoid using heating as much as possible are characteristic of these sorts of strategies. Robert and his wife, who are both pensioners, put on jumpers to stay warm and only use the heating for an hour or two before bed, while others such as Linda and Rachel (university students from

a refugee family) use hot water bottles and blankets instead of the electric heaters installed in their home which they find too costly to run:

> *Usually, myself at home with my wife, usually just after we've had dinner in the evening or something, I might say 'oh, I'm feeling a bit cool now', so I'll go and put a jumper on. And then later on, about an hour's time, we might just put the heater on for maybe an hour—just to warm up the place—and then turn it off because we know it's too expensive to keep it running all the time. (Robert, Adelaide)*

Katherine's Story[24]

Katherine is a public housing tenant in Melbourne living on a disability support pension. She lives by herself and is enrolled as a part-time university student. Her weekly income is just over $300, which has to cover her housing, utility, food, clothing and transport costs as well as the books she needs for her course. She has quarterly electricity bills of around $140, which are helped by the fact that she has a portable gas heater, has gas hot water and a gas cooker and receives energy concessions in winter. So far she is managing to stay on top of energy bills, but only because she carefully monitors her energy usage and has cut back wherever she can. Energy costs are so far not a problem for her only because

> *I forgo other things in life, including utility usuage (i.e. occassional cold showers, cooking less often and limited lighting) and regularly read my meters so that I only use a certain amount. I also don't like debt – so paying my rent and bills is a priority even if I feel I go without to do it and in effect live in poverty as a result of limited usuage and paying on time.*

In summer, she uses cooling for at most two hours a day on really hot days, and when she does it is only a pedestal fan. She almost never uses heating in winter anymore—she last used her gas heater in April 2008—even though her house gets quite cold because of high ceilings, draughts, and no doorways.

> *High ceilings, no doorways, and draughts make it harder but I would at least attempt and be able to feel like I'm not living in poverty, you know, in my own home by being able to utilise the heating if the cost wasn't so high. At least I could sit right in front of it even if it wasn't going to warm the whole room…that would make my life more comfortable.*

To save on her electricity costs Katherine now only uses a single fluorescent globe in the hallway to light her whole house because she can't afford to use additional lighting. She also occasionally takes cold showers to cut back on her gas bill and since returning to university tries to shower on campus whenever she can to keep her hot water costs down. Because of recent increases in supply charges, Katherine is now at the point where,

> *I'm now out there reading the meter to see how much I've used, and I don't let myself go over a certain amount each week of kilowatts. And I find it ridiculous in way that I have to go and do that, but with all the increases in price I've got to factor that in that when the tariff thing went up on the supply charge that even though my usage might be the same or less than what it was last year, it's increased by $20 or $30 and now I think I've got to use less to compensate for the increase in the supply charges.*

She is now seriously thinking about having her electricity cut off altogether because she has cut back so much already that she no longer sees the benefit in remaining connected, especially since higher supply charges in recent years have meant that she is only able to afford a bare minimum of electricity usage without getting into debt.

> *I just feel like the next cut back is getting it disconnected for me. I can't do anything more…I've thought about it already. What's the point, I'm going without so much already. It's the most expensive thing I pay for…I'm already living like shit basically in my home and going without so much, what do I need it for. I'll use candles if I have to, I don't care; get one of those wind up radio batteries.*

[24] This is the true story of a participant who atteneded a focus group in Melbourne.

Another way in which people try to stay warm while keeping their costs down is to use their ovens as heaters:

> *I do something terrible. I switch the gas oven on and leave the door open. And I have forgotten one time [to turn it off]…But it works very effectively and a lot cheaper than electricity. (Susan, pensioner, Adelaide)*

Trish, a public housing tenant in Melbourne who last year had her daughter and newborn grandchild come to live with her, also uses her oven to stay warm in winter, although when her daughter and grandchild were living with her earlier last year she had to go back to using the electric heater in her lounge room to keep the household warm. This doubled her electricity costs. Now that her daughter and grandchild are no longer living with her she has gone back to using her oven for heat.

Another thing that Trish and her family have also found helpful in keeping their electricity costs down is to try to take a shower outside the home whenever they get the chance. They are members of the YMCA and they try to use the shower facilities there whenever they can to save on electricity and water costs. Other households do something similar. Rachel, a tenant in inner Melbourne living on the minimum wage, admitted that she only showers on alternate days to save money while Daniel, a pensioner living alone in Adelaide, uses a 'submarine shower' to try to save on electricity and water costs:

> *I turn the shower on and put the water into a bucket which I use later to flush the toilet and then when it gets warm I switch it off and I get in the shower and I quickly wash myself down, turn off the water, use a wet face washer, soap over, and that way I save quite a few litres of water and electricity at the same time.*

Many people were also going without cooling in summer because the costs of running their air-conditioning appliances was too expensive. For instance, one mother on Centrelink payments in Mildura had found that her electricity costs for the summer quarter almost doubled when she put in air-conditioning, so she no longer is willing to use it because she can't afford it:

> *Mine was $198, and then I got the air-con on, and then it jumped from $198 to $380. And I went, nah—got rid of that. The bill went right down.*

> ***In the hot weather last year, a lot of people went up to the Centro to sit in the cool (Public housing tenant, Mildura)***

In Adelaide, a focus group participant who works with the Council of the Aging (COTA) reported the difficulty that his organisation has getting pensioners in South Australia to use air-conditioning. COTA has a program where pensioners are provided with cheap home maintenance and COTA instructs its home maintenance workers to check that the air-conditioners are working in the homes that they visit and to remind people to use their air-conditioners during the summer. But people refuse to switch their air-conditioners on because they find them too expensive to run. Instead, people try to cope with the heat by going to an air-conditioned supermarket or shopping centre; or if the air-conditioner must be used, families try to share the costs by visiting in each other's houses during the hot weather, as a financial counsellor in Adelaide reported that his clients do:

> *There are some people who have a visiting regime so that they, you know, two other friends will go and join a third so that they are only using the air-conditioning in one place. So they'll sit and watch television all night and maybe play cards or something and then go home to a cold house, straight to bed when they go home. (Financial Counsellor, Adelaide)*

If it's going to be really hot, you know, we're not far from Westfield, and I'd just put a book under my arm and walk across to the shopping centre and sit down on a seat and have a read of my book. A lot of people do that. (Pensioner, Adelaide)

The worry with the smart meter rollout as far as energy affordability is concerned is that the increases in supply charges needed to pay for the rollout and the introduction of smart-meter enabled time-of-use pricing could significantly add to the difficulties that low-income households clearly already face in affording essential electricity use.

2.4 Impact of Higher Fixed Charges

According to the latest gazetted tariff offers in Victoria, households can expect to pay 20 to 42 cents per day in smart meter charges this year to pay for the rollout, with further increases expected in 2011-13.[25] Some retailers in the Jemena area have increased their annual supply charges by more than $120. Understandably, the thought of having to pay higher fixed charges to cover the costs of the rollout caused major concern amongst the focus group participants, who complained that they had been given no say whatsoever in whether or not to proceed with the smart meter rollout:

That's outrageous. I mean some of us will be, and I hope it wouldn't be me, a lot of people will be getting their power disconnected simply because they can't afford to pay the bill. And then what happens: they got no fridge, they got no freezer, no TV – they got nothing, they can't pay their power bills. I mean the government gives the pensioner's the rise, somebody wants a bit here, somebody wants a bit there, and now the power's going up. What's the point of giving the pensioner the rise?

I reckon if the government wants to put it there they should pay for that…Why should we have to pay for it when it's not us that wants it anyway

It's like every bill, as I said, it's going up, up, up. And the charges are going up, up, up, up. Unless the government gives you, you know, help, a lot of people will be affected because they won't be able to afford to pay it…How the government can give, you know, sort of give on one hand and take back on the other, which they are doing all the time, it makes it very very difficult

People were especially annoyed about the lack of consultation with consumers and felt that they were being given no say at all about whether or not smart meters should be introduced. Indeed, with a few exceptions—namely, participants in Melbourne from tenant advocacy groups—most focus group participants knew very little about smart meters or the Victorian rollout before becoming involved in this project. In fact, one of the reasons why a lot of people were taking part in the focus groups was to find out more about smart meters and what they would mean for their electricity use.

I think the biggest bone of contention that everybody that I've spoken to, and we've run campaigns just about everywhere among the people who know, is that people weren't informed. That's the biggest [concern]. Everybody that I've spoken to has said 'how long have they been working on this, 2 years, how come we don't know anything about it? Why didn't the government say to us, we're working on a new program. This is how it's going to work, so that people have time to think about it, to talk about it. (Tenant advocate, Reservoir)

Well I think personally, if the electricity company, if they want to charge in that way, in that manner [time-of-use tariffs], and bill the amount of electricity we use, they should provide us with free meters…The people aren't asking to change the meters, you know. We're quite happy with the meters we've got…So what's so special about the power company that we have to foot the bill for all their infrastrucutre. (Disability support pensioner, Melbourne)

[25] Roy Morgan Research, "Victorian Utility Consumption Household Survey 2007, Final Report," v.

The common feeling amongst focus group participants was that the only people who would benefit from smart meters would be the electricity businesses and that the cost savings that these businesses would achieve would never be fully passed on to customers:

> *The only person I can see being financially advantaged, we're going to pay more for our smart meters…but they're going to save the cost in the middle man coming round to read your meter. It's not passed on to us. (pensioner with MS in Melbourne)*

> *Why do we have to pay for private companies' infrstructure? We don't' gain the profit from it, they do…It never comes true [passing on cost savings to customers] (publc housing tenant, Reservoir, Melbourne)*

They were also sceptical that the costs of the rollout would be as low as estimated, drawing the comparison with the cost blowout of the MyKi system in Victoria:

> *They've said how much it's going to cost to do, but also that Myki system for the transport, how much was tht supposed to cost? But how much [did it cost]?…They might say, OK it's going to cost $200 per household to do this and then unfortunately, oops, it goes up to $1000 per household, well you're going to pay for that too.*

2.4.1 Additional Vulnerability of Low-Income Households

Increases in fixed charges hit low-income households particularly hard, not merely because of the difficulties that they already face in meeting their electricity costs, but also because fixed charges generally account for a much larger proportion of low-income households' overall electricity costs.

Most low-income households use considerably less electricity that the average household even though:

- they are more reliant on electricity as their principal form of energy
- their appliances are typically less efficient, and
- the quality of their housing is often poorer

Typically, this is because low-income households have already cut back on non-essential electricity use due to cost-concerns; so they therefore have very little discretionary electricity usage. Consequently, because supply charges represent a greater proportion of their overall electricity costs, any increases in these charges have a much more significant impact on their overall electricity costs.

For focus group participants, the substantial increases in fixed charges in recent years was one of the more frustrating aspects of the increases in electricity costs that they had witnessed over the past decade. People felt that they were doing all that they could to cut back on their electricity costs, but their efforts were being thwarted by the increases they were being forced to pay in supply charges, which they had no control over and which they could do little to avoid.

> *[E]very electricity company or gas company, their bills are just going up, up, up…You might be aware of your charge for electricity is only this, right you haven't used it; but why are the companies putting so much extra in charges? Because every bill you get now is like, 'God, $75 worth of charges'…You're very efficient in what you are doing but you're paying an absolute fortune, you know, in electricity, gas. (Retiree with MS, Mebourne)*

> *Maybe we're not using as much power, but the bills we get seem to be higher. Well the kilowatt hours might be the same or similar, but you look at the hidden charges, access charge, meter rental, da da da da da, they've increased those and added it on top of your usage…And you don't get concessions*

on those hidden charges. You only get concessions on the amount you use. (Disability Support Pensioner, Melbourne)

Even if you can keep your energy use down the supply charges are hitting you…It's taking [it] out of our hands, that with the fixed charges increasing, how much we can control the cost of electricity…Whereas you can control it by saying we'll use less, and I won't have the radio on and I won't do this, you can control all that, but if they're increasing all the fixed prices, the service charges…you've got no way of trying to deal with that…. (Retired home-owner, Melbourne)

2.4.2 Inability to offset supply charge increases

The increases in supply charges to pay for smart meters could be offset by households taking advantage of time-of-use pricing and the enhanced functionalities of smart meters to better manage their electricity usage and reduce costs. For instance, some households may be able to offset increases in supply charges by cutting back on non-essential electricity use or shifting the time of their discretionary electricity consumption to the off-peak period.

However, lower-income households are unlikely to be in a position to offset increases in fixed charges in this way because of the relatively little amount of their electricity usage that is discretionary. Cutting back any further on their electricity usage would mean having to forgo essential consumption, such as hot meals and heating in winter.

Taking Advantage of Direct Load Control to Reduce Costs

Another thing that households can do to off-set supply charge increases is take advantage of the ability of smart meters to enable the direct load control of heavy usage appliances, such as pool pumps and air-conditioners.

Out of all the functionalities and pricing initiatives enabled by smart meters, the direct load control of heavy usage appliances is expected to deliver the most cost-savings to consumers. One reason for this is that energy retailers are likely to offer consumers either direct cash benefits or lower tariffs for agreeing to allow their heavy usage appliances to be cycled on and off during peak periods. For instance, in consumer consultations for the national cost-benefit analysis, consumers were presented with a DLC offer that included a cash benefit of $75 for taking up the offer.[26] So, for consumers in a position to take up DLC, the increase in electricity prices and standing charges caused by the smart meter rollout could be negated by the monetary incentives and concessions offered to them by retailers to take up DLC. Moreover, consumers who take up DLC offers will see significant reductions in their overall energy use, as DLC is usually applied to energy intensive appliances and can reduce the consumption of these appliances quite significantly (usually without any discernable difference in their functioning). So, consumers in a position to take up DLC offers stand to benefit greatly from doing so.

You might have an in-home display and say, 'wow look at what we are using, let's turn off three of the plasmas, and only run the one LCD TV', whereas the low-income person's only got the one telly anyway; so what advantage are they going to take of it?…

You've got more options when you are using more, but if you're just using the basic you need to get away with you haven't really got much choice. (Pensioner, Melbourne)

However, not all consumers are in a position to take up or benefit from DLC offers. Only heavy usage consumers with air-conditioners and pool-pumps are likely to be offered incentives

[26] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts " (Sydney 2008), 24.

by retailers to take up DLC. Moreover, not all appliances have the ability to interface with smart meters to allow them to be remotely controlled by a distributor. Consumers with older appliances are unlikely to be able to avail themselves of DLC because their appliances will be incompatible with smart meter technologies. The inclusion of DLC functionalities will therefore be of much greater benefit to higher-income consumers as they more likely to have air-conditioners and pool pumps, and they are more likely to have newer appliances compliant with DLC standards.[27]

Notably, less than half of the people surveyed for this study used air-conditioning and those who used air-conditioning tended to either be home-owners or private tenants (less than 1 in 3 public housing tenants used air-conditioning). And of those who frequently used air-conditioning, more than a third did so only because of a medical need to use climate control devices to regulate their body temperature. While these people are formally in a position to take advantage of DLC because of their regular air-conditioner use, nearly all were extremely reluctant to hand over control of their temperature regulation to a third party because of the severity of the risk for them of not having their temperature regulated properly. As one pensioner with MS commented:

> *I would like to manage my own air-conditioning, right. Because the smart meter, the electricity company, they're not going to know when I'm at the end of my tether and how I'm feeling. So for me, to turn off and turn on whenever I like, it's much better. For other people maybe, because they're nice and healthy, and they can just say oh yeah, the electricity can swtich em on and off*

Participants with MS pointed out that a person with MS's need for cooling is affected by a variety of factors: the aspect of the house, whether or not they have window shading, the condition of the walls, and so on. So individuals are best placed themselves to manage their own climate control:

> *But also it's the quality of the house, you know, how well insulated you've got it and everything, you know, how quickly it's going to heat up and cool down and those sort of things. So it would be very hard for me to say, 'oh yeah, I'll give the power to the power company to keep going [and cyle my air-con]'*

The consumers who are most likely to take up and benefit from DLC offers are higher-income households with modern heavy usage appliances. This was confirmed in consumer consultations for the national cost-benefit analysis where 'high income earners more broadly expressed the greatest interest in the DLC option.'[28] These are the same consumers that stand to be least adversely affected by the introduction of time-of-use pricing (see chapter 3) and the consumers who have the greatest ability to cope with increases in their fixed charges. Conversely, the households that stand to be most adversely affected by increases in supply charges to pay for smart meters are the households that are most likely to be excluded from the benefits of direct load control.

With energy costs already accounting for a disproportionately a high share of their household expenditure despite the low-volume of their consumption, a substantial increase in annual supply charges could cause major hardship to low-income households, such as lone pensioners and people living on disability support pensions to the point of exacerbating the poverty that many already find themselves in. For instance,

- around two-thirds of people surveyed for this project came from households with a weekly equivalised income of less than $400

[27] Standing Committee of Officials of the Ministerial Council on Energy, "Cost-Benefit Analysis of Options for a National Smart Meter Roll-out (Phase Two - Regional and Detailed Analysis): Consultation Regulatory Impact Statement," 50.
[28] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts ", 23.

- people living alone on a disability support or aged pension currently have to survive on around $335 per week

But the effect of the smart rollout on low-income household's energy affordability could be even more sever if consumers are placed on time-of-use pricing structures as well.

3. Time-of-Use Pricing and Disadvantage

Chapter Overview:

- Increases in fixed charges alone could cause considerable hardship to low-income households, forcing them to forgo essential electricity usage or to give up other important expenditure, such as on food and clothing. But the affect of the rollout on energy affordability could be even more severe if households are put on tim-of-use pricing once smart meters are introduced, such as time-of-use (TOU) tariffs and critical-peak-pricing (CPP) tariffs.
- The affect of TOU and CPP tariffs on households' electricity costs will vary but TOU pricing is likely to penalise low-income households as these households tend to be **peaky households** with **inelastic electricity use**
- Because peaky households use most of their electricity on weekdays, they are unable to off-set higher peak prices by shifting their electricity use to the off-peak period. Households with **inelastic electricity use that** cannot be delayed, cutrailed or postponed in response to price signals will be further penalised by TOU pricing. There are a number of reasons why a household's electricity use might be inelastic.
    - *Household circumstances*: parents with young children, for example, have to fit household chores (that require electricity use) around their children's sleeping patterns and therefore are not flexible in the times that they can use electricity.
    - If a household has very little *discretionary consumption*—consumption directed at life-style pursuits and past-times—it can be difficult to shift their electricity use to the off-peak period.
    - *Quality of appliances*: households with modern appliances with timers can programme dish-washers and washing machines to come in the off-peak period and they can install storage heaters to take advantage of lower off-peak rates. Households with appliances that can't be programmed, however, or who don't have the resources to purchase off-peak storage heaters don't have these options.
    - *Disability*: people with disabilities reliant on carers or home help to do household tasks don't have flexibility in much of their electricity usage. This is especially an issue with critical peak pricing tariffs. Whereas people without disabilities may be able to go to a nearby shopping centre or supermarket to escape the heat during critical periods while avoiding critial peak prices, people with a mobility impairment or accute heat intolerance aren't in a position to respond to critical peak prices in these ways. Instead, they wil be forced to pay the critical price because they can't forgo using electricity either because of the affect that this would have on their health.
- Peaky households with inelastic electricity could be even further disadvantaged by TOU pricing as a result of the **poorer quality of their housing** and **inefficiency of their appliances**. Pensioners are penalised by TOU pricing because the time of their electricity use. But pensioners who lives in public housing without any insulation, and who use electric bar heaters, will face even higher heating costs in winter under TOU tariffs as the quality of their housing and appliances means that they need to use greater amounts of electricity for heating in the first place. TOU pricing exacerbates these extra costs by exposing households with inefficient electricity use to even higher per unit costs so that the amount extra they need to spend on (say) heating compared to other households is even greater.
- The vulnerabilities that expose households to the cost impacts of TOU pricing—peaky consumption, inelastic electricity use, poor housing, inefficient appliances—tend to overlap, especially amongst low-income households. E.g., people with disabilities are often left unemployed as a result of their disability, which increases their chances of living in poorer housing (because of lack of income) and of being unable to afford efficient appliances that can improve the elasticity of their consumption.

Table 6 illustrates the difference in the cost of electricity use at different times of the day between a time-of-use tariff and a standing tariff offer in NSW, SA, VIC, and QLD. The tariff estimates have been arrived at by averaging the time-of-use and standard tariff rates offered by a number of retailers in these states (although the standard tariff rate for QLD is based on the regulated tariff offer). The length of the peak, shoulder, and off-peak periods are based on estimates of these tariff periods across states

prepared by KPMG for the national cost-benefit analysis, taking into account that retailers in some states are expected to introduce only a two-part time-of-use tariff.[1]

	Standard Tariff	Time-of-use Tariff		
NSW	Single Rate	Peak 2pm to 8pm weekdays	Off-Peak 10pm - 7am everyday	Shoulder Weekdays: 7am to 2pm & 8pm to 10pm All day during weekends
	$0.18	$0.32	$0.09	$0.19
	Single Rate	Peak 7am to 9pm on weekdays	Off-Peak All other times	
QLD	$0.18	$0.26	$0.09	
VIC	$0.18	$0.24	$0.10	
SA	$0.22	$0.26	$0.10	

Table 6: Example of Time-of-Use Tariffs

Time-of-use tariffs are just one example of the sort of time-sensitive pricing initiatives that the rollout of smart meters will facilitate. **Critical Peak Pricing Tariffs** are another.

3.1 Critical Peak Pricing

The idea behind the use of critical peak pricing tariffs is to elicit a major reduction in demand for electricity during critical periods by significantly inflating the cost of electricity use during critical periods where the network is at full capacity. For instance, in pilots of critical peak pricing structures carried out by Energy Australia and Integral Energy in NSW **the critical peak price charged has been between 11 and 31 times higher than the standard tariff rate**. This is to reflect the fact that it costs more to supply energy during periods when the system is near peak capacity, and also to encourage consumers to reduce their consumption to avoid an overload of the system.

Where companies in Australia have introduced critical peak pricing tariffs they have so far:

- limited the number of critical peak pricing events to between 8 and 12 critical peak events per year, with each CPP event lasting between 4 and 7 hours
- given customers a minimum of between 2 and 24 hours notice of a critical peak pricing event

In trials of CPP, customers have also been given discounted rates on the remainder of their electricity use. For example, in the Energy Australia trial of critical peak pricing tariffs in NSW in 2005/6:

- the shoulder period tariff was 9.5 cents per kWh
- the off-peak tariff was 7.5 cents per kWh for the medium critical peak group
- the critical peak tariff was $1
- participants exposed to a $2 per kWh during critical peak periods received a discounted shoulder period tariff of 8.5 cents per kWh and a discounted off-peak tariff of 6.5 cents per kWh

These tariff rates compared with a standard tariff of 11.6 cents per kWh that most Energy Australia domestic customers were paying at the time of the trial.[2]

[1] KPMG, "Cost Benefit Analysis of Smart Metering and Direct Load Control Workstream 3: Retailer Impacts - Phase 2 Consultation Report," (2008), 121. The peak period for Victoria above has been extended by two hours compared to the KPMG estimate, which has the peak period in Victoria ending at 7pm. However, in light of the fact that the current retail time-of-use offers in Victoria have a peak period that goes until 11pm, KPMG's estimate of a 7pm finish for the peak period appears too early.

Likewise, in the Integral Energy trial of critical peak pricing in 2007/08:

- the shoulder period tariff rate was just over 10 cents per kWh and
- the off-peak tariff rate just under 8 cents per kWh.
- the critical peak tariff rate was $1.57 per kWh

These tariffs compared to a standard tariff of 13.33 cents per kWh for Integral customers.[3]

The table below illustrates what a critical peak pricing tariff might look like in different jurisdictions. The tariffs are based on the ratios between the critical peak, shoulder, off-peak and comparison (initial inclining block) tariffs used in the Integral Energy and Energy Australia trials in NSW, while the lengths and times of the respective shoulder, off-peak and critical peak periods are based on those used in the Energy Australia trial.

	Comparison Tariff	**Critical Peak Pricing Tariff**		
	Single Rate	Shoulder 7am to 10pm	Off-Peak 10pm to 7am	Critical Peak Event
NSW	$0.18	$0.14	$0.11	$1.85
QLD	$0.18	$0.15	$0.11	$1.90
VIC	$0.18	$0.14	$0.11	$1.80
SA	$0.22	$0.17	$0.13	$2.18

Table 7: Example of Critical Peak Pricing Tariffs

3.2 TOU Pricing Penalises Low-Income & Disadvantaged Groups

The ability of smart meters to facilitate the more widespread use of time-of-use pricing was a key reason behind COAG's original commitment to the rollout of smart meters.[4] This was because of the perceived advantages of time-of-use pricing over flat pricing structures in enabling consumers to better manage peak demand and in unwinding cross-subsidies between consumers:[5]

- Peak and off-peak pricing creates an incentive for consumers to limit their demand during peak periods which could lead to lower electricity prices if reduced peak demand curtails the need for generation and transmission infrastructure augmentation; and
- Time-of-use pricing unwinds the cross-subsidisation of 'peaky' consumers by consumers with more off-peak loads ensuring that people pay prices that more accurately reflect the cost of their electricity use

However, because of the substantial increase in the costs of electricity use during the day-time under time-of-use pricing, time-of-use and critical peak pricing tariffs structures penalise:

- **Peaky Households:** housesholds that need to use higher volumes of electricity during the day-time because of (say) unemployment, disability (which is also associated with unemployment), retirement, or caring for young children or an elderly relative

[2] For tariff rates in the Energy Australia Trial see NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts ", 137. Details on the inclining block tariff for the period are based on personal communications with Energy Australia staff.

[3] See Energy Market Consulting Associates, "Smart Meter Consumer Impact: Initial Analysis," 26.

[4] See Council of Australian Governments, "February 10 2006 Meeting Communiqué.". 'In recognition that past energy market reform has focussed on improving supply efficiency, COAG has agreed to improve price signals for energy consumers and investors. Actions include committing to the progressive national rollout of 'smart' electricity meters from 2007 to allow the introduction of time of day pricing and to allow users to better manage their demand for peak power'.

[5] For a fuller account of the advantages of time-of-use pricing, as perceived by COAG and the Ministerial Council on Energy, see Standing Committee of Officials of the Ministerial Council on Energy, "Cost-Benefit Analysis of Options for a National Smart Meter Roll-out (Phase Two - Regional and Detailed Analysis): Regulatory Impact Statement for Decision," 24-7.

- Households with **inelastic electricity use**: households that are unable to successfully shift the time of their electricity because none of their electricity use is discretionary, or because the households' appliances can't be programmed to run during the off-peak period, or because the household is reliant on home help (because of disability or chronic illness) to do many tasks which therefore can't be shifted to the late evening

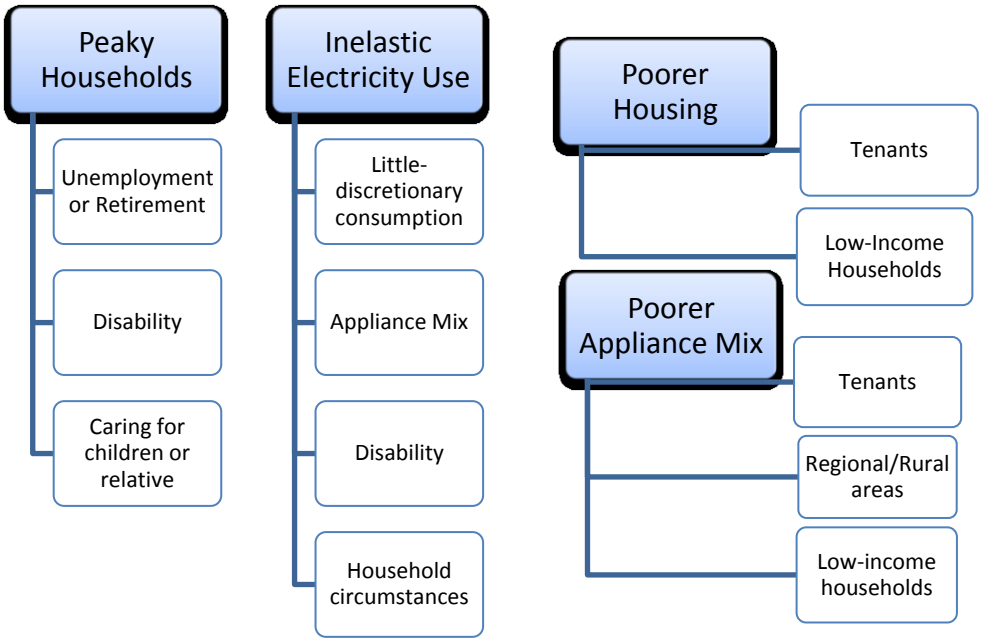

Figure 8: Factors Affecting Households Exposure to TOU pricing

3.2.1 Peaky Households

The potential for time-of-use tariffs to disadvantage households with a peaky load is obvious enough. Since time-of-use tariffs work by increasing the cost of electricity use during the peak period, households with mostly peak period consumption will face higher electricity costs if put onto time-of-use tariffs. Time-of-use tariffs, therefore, are likely to disadvantage groups such as pensioners, people on fixed-incomes, parents with young children and people with disabilities, all of whom are likely to be peak electricity users because of their household circumstances. As a tenant support worker in Melbourne working with fixed-income households commented:

> *The majority of people that we work with live their lives between 7am and 9pm, that's their day... And you know, the people we're talking about here are people whose whole life is taken up with where the next meal's going to come from, how they are going to pay the bills, how they are going to live. And they're not going to have time to sit down and think, I know what I'll do, I'll turn that off and I won't have anything on, but their lives are too full of problems to worry about that. The people who'll sit down and plan all that out are the people who can really afford [to pay the higher prices] (Tenant support worker, Melbourne)*

There was a concern amongst focus group participants in Sydney and Adelaide that pensioners would no longer be able to afford to use climate control during the summer because of time-of-use tariffs, which would have a major impact on their health. As one participant in Sydney commented,

> ***'The elderly may say, 'well, I'll fry today because I can't afford it, and that's not fair on them'***

People in Adelaide made the point that it was already an issue persuading pensioners to use their air-conditioning in summer because of the cost of electricity in South Australia—time-of-use tariffs would only exacerbate this situation.

Although households pay a lower rate (compared to a flat tariff) for their electricity use outside of peak times under time-of-use tariffs, because pensioners, young families and people with disabilities are typically at home during weekdays, most of their electricity use will take place during peak-times so the discount that they receive on their electricity use at the weekends and evenings (off-peak periods) will be unlikely to make up for the higher prices that they will have to pay for electricity use on weekdays:

> *That, what's it, 12 hours [peak period] doesn't balance out if you stay up an hour later at night, does it…[And] what's the weekend, sometimes for people like us it's just another day (Margaret, Aged pensioner, Reservoir).*

> *You'd use probably a steady amount of power from 7 till 9, cooking, radio, television etc. etc., but you're charged a bit more for it, but then we are charged a lot less when we are asleep. But then average those two out, it still adds up to more (Jim,disability support pensioner, Melbourne)*

> ***Since my illness last year I just want to go to bed at 9 o'clock at night, I don't want to be using power…I just want to curl up and go to sleep somewhere.***
>
> ***During the day I do everything, washing, ironing, watching a bit of television, use the computer…9 o'clock, I don't want to know. So that there is going to be absolutely no use to someone like myself. (pensioner, Melbourne)***

People with a chronic illness or disability that affects their electricity consumption, such as MS, are likely to be particularly badly affected by time-of-use pricing because they will have especially peaky electricity consumption patterns due to their greater reliance on, for example, heating and cooling during the day-time.

> *My issue would be, you know, I'm home a lot of the time, as a lot of us are during the day, and I need to have my air-conditioner going during the day. The heater's not such a big problem, I mean, you put a jumper on or whatever. (retiree with MS, Melbourne)*

According to the *Keeping Cool Survey* published by MS Australia in 2009 **MS households spend $440 - $580 per year extra on air-conditioner use (or ten times as much) than the average Australian household**.[6] This is because an increase in core body temperature can slow down already problematic nerve transmission and exacerbate MS symptoms such as 'blurred vision, extreme fatigue, muscle weakness, pain, tremors, memory problems, loss of balance, bladder and bowel problems, numbness and tingling, decrease in cognitive function, and in severe instances partial or complete paralysis.'[7] So it is simply not an option for someone with MS to go without air-conditioning, even at temperatures of 25 C for some MS suffers. This is evident in the fact that there is no significant difference on expenditure on air-conditioner use between lower and higher income MS households indicating that 'keeping cool is a very high priority for people with MS, irrespective of their capacity to pay.'[8] As a person with MS commented in focus groups:

[6] For Victoria this figure is even higher again, with MS households in Victoria spending on average more than $406 on air-conditioner use in 2007 compared to an average annual expenditure on air-conditioning use of just $17-$22 across all households in Victoria. See Tables 5 & 6, Summers and Simmons, "Keeping Cool Survey: Air Conditioner Use by Australians with Ms ", 22.
[7] Ibid., 3.
[8] Ibid., 22.

I have it [the air-conditioning] come on at 6 o'clock in the morning to cool it down so that when I do finally get up the house is reasonably cool for me to function. Because otherwise I'm just flat out in a chair, cannot move. My legs don't work, my hands don't work.

3.2.2 Inelastic Electricity Use

For many people with a 'peaky load', their electricity use is also inelastic meaning that they cannot easily put off doing tasks until later in the evening in response to peak prices. One of the common things that mentioned here when discussing how people could respond to peak price signals is taking advantage of off-peak prices by doing things like running the dishwasher, dryer or washing machine at night time instead of during the day.

I could see a lot of people changing a lot of their usage habits, showers at 6am in the morning, washing machines going at 6am in the morning, all those types of little things could suddenly be before breakfast jobs. (pensioner, South Australia)

Claire's Story[9]

Claire lives in a public housing unit Mildura with her 10 year old grandson, whom she has cared for since his mother died two years ago. Living in a warm climate like Mildura is difficult for Claire, who has quite well developed MS and can't function without the aid of cooling once the temperature gets to around 30 degrees. Heat exacerbates her MS, bringing on blurred vision, extreme fatigue, muscle weakness, pain and loss of balance. Claire can't afford to move elsewhere on a household income of less than $350 a week, the bulk of which comes from the disability support pension that she receives from the government.

During the summer, Claire's energy costs become extremely high, as she has to have her air-conditioner running for around 8 hours most days to enable her to cope with the summer heat, particularly as she has to look after her grandson more regularly during the summer months when he is out of school.

Claire's average quarterly bill is around $440 (gas and electricity), even though she uses gas for her hot water and cooking. Claire finds it extremely difficult to cope with such a high electricity bill, and nearly always has to call her utilities provider to ask for an extension when she gets her bill. She has been threatened with disconnection a number of times, although she has always managed to keep her power supply by explaining her circumstances.

Claire has tried to reduce her electricity costs by putting on extra clothes in winter—although she still needs to use her reverse cycle unit as a heater for 6 hours most days as she is home a lot—and her housing commission has put in roofing insulation and heavy window shading because of her illness. Her energy costs continue to remain high, however, because of her need to use the air-conditioner extensively in summer and because she is at home most days. The fact that her fridge-freezer is 20 years old doesn't help either, but she can't afford to upgrade it and, as she was only given a new wall-mounted air-conditioner last year by her housing commission, she is reluctant to ask for a new fridge.

Claire is very worried about the smart meter rollout and the possibility of being forced to pay peak-electricity prices. On the flat tariff rate of 18.88 cents per kWh that she is currently on, the cost of running her reverse cycle air-conditioner for cooling from November to March, and for heating from June until September amounts to around $460.[10] If she was put on a time-of-use tariff rate with a peak rate of 27.48 cents per kWh and an off-peak rate of 8.42 cents,[11] it would cost Claire more than $550 (+$90) *just to use her reverse cycle air-conditioner* (see Appendix A for details of costing). This would be a very substantial increase in her electricity costs that would be difficult to cope with on her fixed income.

[9] This case study is based on the experience of a focus group participant in Mildura. Although some of the case study is fictional (filling in the details about the family relative she lives), the details regarding Claire's air-conditioner usage, housing situation, and electricity costs are as reported in her survey responses.

[10] 18.88 cents is the standard domestic tariff rate offered by Simply Energy for the Mildura area.

[11] Tariff rate based on AGL's gazetted Time-of-use Interval Meter Tariff for the AGL North area in Victoria.

Some appliances allow you flexible usage, e.g. dishwasher, washing machine (home owner, Sydney)

[I]f they're proposing a time slot where after 10 o'clock the rate drops by less than half, you can actually programme your washing machine or your dishwasher to go on at these times…If you think smart yourself you can actually programme those appliances to switch on at 10 o'clock, save half your energy/power, which is going to save you money, and then just focus on what you need as an essential thing during the peak times. (retiree with MS, Melbourne)

One lady who took part in a focus group in Wollongong and who had taken part in Integral's trial of smart meters was able to programme her washing machine to come on during the off-peak period because it had a delay button. But responding to price signals in this way is often not possible for many low-income households.

Unsuitable appliances

This might be because the appliances that they have in their homes aren't conducive to being used at peak times as they are older appliances that don't have timers, which was a common complaint amongst people on fixed incomes:

I've got to hand do my washing machine, so I can't just let it run. So I have to be awake, it has to be a time when I'm awake to do it. And by the time 9 o'clock hits, whoof, I'm gone, goodbye, see you. That's it. So no off-peak time for me! (Mother and public housing tenant, Brisbane)

People on low-incomes expressed similar concerns about other suggestions people made about adapting behaviour in response to price signals. Some home-owners, for example, suggested that people could try to take advantage of the lower off-peak rates by changing the appliance mix in their house and purchasing more efficient appliances that could be programmed to run during the off-peak period:

I mean, you could get an off-peak heater, I mean something to store up heat in any sort of volume…Like a storage heater running at 10 cents at night and then you turn them off.

But fixed-income households commented that they don't have the resources or ability to upgrade their appliance mix in this way:

Yeah, and that costs a lot of money. It's hundred of dollars to buy the [off-peak] room heater in the first place. (Pensioner, Adelaide)

Smart dishwashers and smart washing machines, I can't afford to change everything. (Disability support pensioner, Melbourne)

Public housing tenants also pointed out that they don't have the authority to switch over the appliances in their homes to make their energy use more efficient and less peaky:

But if you don't have the choice, you don't have the money to do that. Or you're not allowed to do that, you don't have the choice to make the decision because you're in public housing (public housing tenant, Adelaide)

Little Discretionary Consumption

One important factor that makes the electricity consumption of many low-income households inelastic is the fact that low-income households have very little discretionary electricity use: electricity use that is directed at life-style pursuits, entertainment and pastimes and which therefore can be shifted to different times of the day without significant loss of welfare.

Discretionary electricity use consistently represents a greater proportion of higher income households' total electricity consumption than it represents for lower-income households who may have already reduced their electricity use to the bare essentials because of cost concerns.[12] As a result, higher income households have more of an ability to respond to price signals as they can postpone or delay much of their electricity use without too much of an impact on their quality of life or ability to meet essential needs.

However, when nearly all of a household's electricity use is directed at meeting essential needs that cannot be time varied, it is much more difficult to shift electricity use in response to price signals. This was reflected in the fact that **in the California State-wide pilot of critical peak pricing tariffs higher income households managed to achieve a 50% greater reduction in electricity use during critical peak periods than low-income households**.[13]

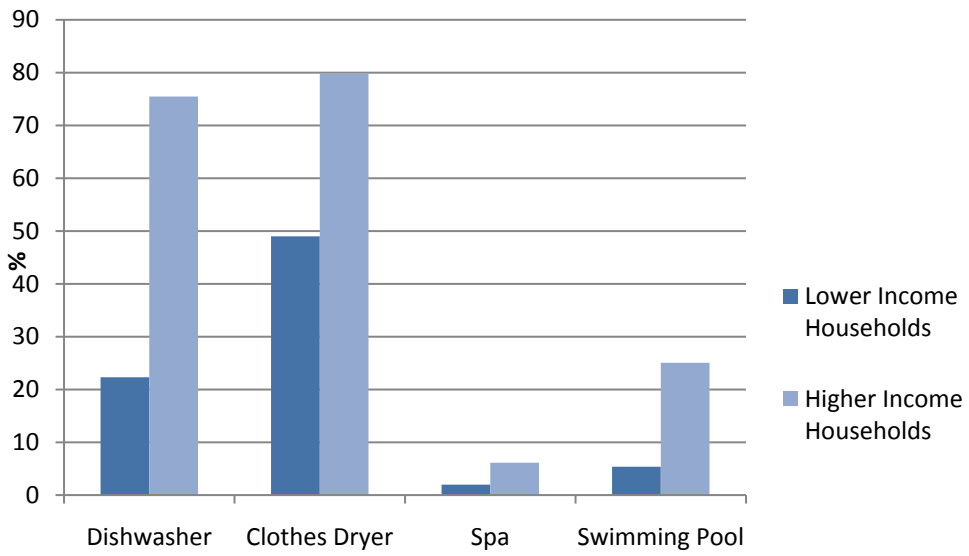

Figure 9: Proportion of Households across income groups with heavy usage discretionary appliances in Sydney, Blue Mountains, and Illawarra[14]

Household Situation

Another reason why people's electricity use could be inelastic might have to do with the fact that their household circumstances don't permit them to use electricity during the off-peak period. For example, parents with young children often have to do household chores such as cleaning and washing during the day-time when their children are at school as they will be reluctant to do these tasks at night-time when their children are sleeping. As parents in Brisbane commented:

> *Cause mainly your work times [in the house] is when your kids are gone to school. You know, and that's it. That's the time you've got to do things, when your kids have gone to school or they're asleep. You know, because you can't just work while they're awake, your tripping over em, you know, and you've got to do the vacuuming and all that kind of stuff. So the best time is when they're not around. And night time, by the time you've done all that, you just don't want to do anything else*
>
> *Well, you can't be doing vacuuming at 9 o'clock at night, your kids are asleep.*

[12] Energy Market Consulting Associates, "Smart Meter Consumer Impact: Initial Analysis," 100.
[13] Charles River Associates, "Impact Evaluation of the California Statewide Pricing Pilot," (Oakland: 2005), 74-5. Cited in NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts ", 71.
[14] Independent Pricing and Regulatory Tribunal of New South Wales, "Residential Energy and Water Use in Sydney, the Blue Mountains and Illawarra: Results from the 2006 Household Survey," appendix A, pp.34-5.

If you started the washing at 9 o'clock at night and you've got a large family, you'd be up til midnight.

Tenants and people living in apartment blocks can also be restricted in the time that they do things like the washing, either because they use a communal laundry that is only open during the peak period, or because there are restrictions against people doing noisy tasks at night time because of the discomfort that it would cause other residents.

In the public housing block where Gina lives in Sydney, the communal laundry is shut at 9pm, so she and her fellow tenants have to do their washing during peak times.

> *People in flats, you're going to have neighbours complaining about the noise of the washing machines going, so it's an unhelpful situation (public housing tenant, Reservoir)*

> *Moving to an apartment, we've got an apartment in [...] and the girl upstairs, I've just complained to the building manager because she puts her washing machine on, she's got a baby right, and she puts her washing machine on at 2 o'clock in the morning when the baby gets up. So, ok, people who have off-peak rates and things like that; I mean it's going to affect a lot of people...People who are on smart meters who are renting, and maybe not home owners and things like that, that affects people's lifestyle, you know. Having to listen to a girl putting her washing machine on at 2 o'clock in the morning because she's getting a cheaper rate, little things like that (retiree with MS, Melbourne)*

Tenants' ability to respond to peak-electricity prices may be further affected by the fact that sometimes no individual tenant is able to control their heating and hot water costs because the block they are in has a shared heating or hot water system. For example, Martin—a tenant with vision impairment who took part in a focus group in Sydney—lives in an apartment block with a shared electric hot water system. So even if Martin consciously tries to ensure he only takes showers and uses hot water during the off-peak period, there is no guarantee that he will recoup the benefits of this shift in his electricity consumption. Others in his block may continue showering during the peak period, and Martin will have to pay a share of the costs of this peak period electricity use.

Young Family in Rental Accommodation[15]

Sally and John live in three bedroom rental house in the outer suburbs of Sydney. They have three children—a newborn and two primary school age children—and John does shift work in a local factory, where he often has to work weekends.

Their house is all-electric, as they use a reverse cycle air-conditioner for both heating and cooling, with portable electric heaters and pedestal fans providing additional heating and cooling. Their electric hot water system is off-peak.

The household uses around 10,857 kWh of electricity annually[16], which costs them $1,679 on their current domestic tariff rate. However, if Sally and John were put on Energy Australia's Powersmart Time-of-Use Tariff, the cost of their annual electricity use would increase by $188 to $1,867 (for details of how these costs were worked out see Appendix A). They could try to offset this increase in electricity costs by shifting the time of their electricity use to the off-peak period (10pm to 7pm). However, they are not in a position to be able to do this easily. Their hot water system, which accounts for a third of their electricity usage, is already running on off-peak rates and they can't really change the time that they use their heating and cooling.

With a newborn, Sally often has to have either the heating or cooling going in the early morning when the baby is awake, and again in the late afternoon when the two eldest children are home from school. As a result, the household generally uses either heating or cooling for around 4 to 6 hours on most days in winter and summer.

They find it expensive using their reverse cycle air-conditioner for heating and would be worried about having to run this for heating at peak rates, especially as it's an older model with a poor energy rating. But the income that John gets from his job at the local factory isn't enough to allow them to upgrade it, or to purchase an off-peak storage heater or install gas heating and cooking. Indeed, most of the appliances they own they have either bought second had or have been given to them by a friend. They bought their washing machine and dryer from a neighbour who was upgrading his to more efficient appliances. In any case, because they don't own their own home, they aren't in a legal position to make changes to their heating and cooking appliances off-their own bat, and their landlord is reluctant to spend more money making improvements to their home when the house could easily be rented out to other tenants.

Thankfully, a family friend has recently given Sally and John a new dishwasher after the arrival of their youngest child; so the one thing that they can do to help reduce their peak electricity usage is set the dishwasher off before going to bed. Before, John would always do the dishes by hand in the evening after dinner (which would be during the peak period).

Setting the washing machine or clothes dryer off at night, however, is not an option. Their house is quite small and their laundry is in the main bathroom, which is right next to the children's bedrooms. The noise from either appliance would wake the children up. So Sally usually runs the washing machine in the early afternoon when the two eldest children are still at school and her baby gets up from her morning nap. The vacuuming either gets done by John in the late afternoons when he's not at work and Sally gets a chance to go to the supermarket with the kids, or else Sally tries to fit it in in the morning, after the two eldest have gone off to school and while the youngest is still awake. Cooking usually happens in the late afternoon again the peak-time), when the children watch television and the baby takes her afternoon nap.

[15] This is an account of the experience of hypothetical young family household based on the feedback received from parents with young children in the focus groups on being able to shift the time of their electricity usage and based on factors that tenants participating in the focus groups have identified as obstacles to their ability to respond to price signals.

[16] This figure is based on the annual electricity usage for a household with 2 adults and three children in the Sydney, Blue Mountains and Illawarra area. See Independent Pricing and Regulatory Tribunal of New South Wales, "Residential Energy and Water Use in Sydney, the Blue Mountains and Illawarra: Results from the 2006 Household Survey," 9.

3.2.3 Disability& Inelastic Electricity Use

A major factor that can affect the elasticity of a person's electricity use is disability, especially in relation to critical peak pricing tariffs.

Even though most focus group participants felt that time-of-use tariffs would cause them major hardship and disadvantage because of their peaky load and inelastic electricity use, many participants were much more positive about critical peak pricing tariffs because of the significance of the discount that they would receive on their electricity use during non-critical peak periods.

> *They are only going to last between 4 to 6 hours, aren't they. So, in a way, you're saving so much by going on that pricing. It's 4 to 6 hours maybe once a month…So that once a month you allow that [paying critical peak prices], you're going to save a lot of money when you consider that you are paying double the amount on the flat rate compared to what you are paying now.*

They did however feel that it would be lower income households who would most likely respond to critical peak tariffs. Those who could afford not to respond to the critical peak price signal would choose not to do so; whereas lower-income households would have no choice but to respond to the critical peak pricing signal because they can't afford the CPP rate. As one retiree in Melbourne commented, 'Rich people who can afford it have the choice of leaving everything running, and we have the choice of shutting down as much as we can in that time.' Others agreed: 'the people who can afford it will keep using and keep using. And the people like us who are conscientious, we'll just have to keep cutting back.'

But people felt that if the critical event was only for a short period, they could do things to make sure that they weren't exposed to the high critical peak tariffs; things they felt they would be able to sustain on a daily basis under an ordinary time-of-use tariff.

> *The critical peak event would not be a daily occurence, whereas with the time tariff it is a daily occurrence. So, you might know there is a hot day coming up, but you need to spend the day at Chadstone shopping centre or something; so you'll choose to go on that hot day so you're not running your air-conditioner. I know it's a silly example, but that type of thing; that choice. And if they're going to have SMS warnings that, you know, next Tuesday's a critical tariff period, well you work around that. (Melbourne, pensioner)*

> *You'd just have to limit your power to the bare essentials, like your fridge and stuff…As far as the air-conditioning…you know close up your house or take your book across to the shopping centre and have a read.(Pensioner, Adelaide)*

But people who had chronic illnesses or disabilities were much more sceptical about the benefits of critical peak pricing tariffs because, with their illness or disability, they didn't feel that they would be in a situation to stop using their electricity during the critical peak period or to go to the super-market or shopping centre to avoid having to pay the critical peak price:

> *We're the people who cannot react to something like this. I already go around the house and turn my blinds down. You know, during the winter I don't turn the heating up, I put an extra jumper on, I grab the blanket. I don't need to use electricity to keep warm, but I tell you what, in summer, to try and keep cool without moving south…You can't lay in the bath all that long because your skin goes wrinkly…I mean when I've got to have the air-conditioning on, I've got to have it on. And if I, like I could sit there and say I'll plug the generator in at that critical time, but it's going to be so damn hot I'm not going to want to go out and get the generator fired up; it's not going to happen .(Participant with MS, Melbourne)*

Impact of CPP events on Claire

If four critical peak pricing events lasting 5 hours each were called during an extreme heat wave in Mildura, Claire's weekly cooling costs could increase by more than 400%, pushing her weekly cooling costs out to $50.[17] Whereas others in Mildura may be able to struggle with the heat or go to a supermarket or shopping centre to escape having to pay in the region of $1.80 per kWh to use their appliances, Claire has no choice but to pay the inflated tariff rate because of her MS. With the temperature more than 40 degrees for the past week, it is too hot for Claire to go out—even to the supermarket or shopping centre. The journey could exacerbate her MS, causing memory loss, muscle pain, loss of balance, and tremors. Similarly, if she stays at home and avoids using her air-conditioner, she could also suffer seriously as a result of the heat. So she has no choice but to pay the higher tariff rate.

If ten or twelve critical peak pricing events were called during the summer quarter—when they are most likely to be called—people heavily reliant on cooling devices because of illness or disability could face a major spike in their quarterly energy costs. For instance, someone such as Claire who relies on cooling use for around 8 hours a day because of her illness could have to pay nearly an extra $120 in cooling costs (compared to the flat tariff) for the summer quarter if twelve five-hour critical peak pricing events were called during the quarter. Such a spike in electricity costs could cause significant hardship to a household on a fixed-income with little savings and whose weekly household expenditure already exceeds their income.

The critical peak period is most likely going to be at those times when it's just far too hot for people with MS, for example, to even consider leaving their homes:

> *And to go out, you're saying to go out maybe at those times we're going to be charged a lot. Well, if it's like a 38 degree day, I don't like to go out the door, I like to hibernate really*

Also, people on life-support machines or people with severe disabilities that limit their mobility—for example, spinal-cord injuries—are not going to be in a situation where they can easily leave their homes to escape the critical peak pricing event, especially if they are dependent on carers for assistance:

> *I would have concerns with this charge…If I could be exempted from this because of a medical condition it would be easier…At the moment we use the bare minimum and this would make our electricity bill soar. I would need to use the air-conditioner to control my body temperature regardless. I couldn't leave the house during peak times cos of transport issues.(paraplegic person, Wollongong)*

> *Because they can't just get around and easily go to somewhere where there is air-conditioning they'd be freaking out, how I'm going to be able to afford it. They'd be very concerned about it because you can't just up and leave. They might have a carer coming in at that time…and then they can't go to the supermarket and sit in the cool at that time.(Spinal-cord and acquired brain injury support worker, New South Wales)*

This is not only an issue with critical peak pricing tariffs, but with time-of-use tariffs more generally: **people who rely on home help or carers to do certain energy intensive tasks for them don't have flexibility in their electricity usage**.

A disability such as vision impairment can affect the efficiency of the appliances that people are able to use around the home, as people with vision impairment frequently commented upon in the focus groups. They made the point that it can be very difficult for them to manage their appliance usage because, more often than not, appliances are not designed with their needs in mind. Many energy efficient appliances have flat controls that are difficult to operate without sight, and so people with vision impairment are confined to purchasing appliances with bulkier controls that are easier to

[17] Based on cost of running a 3.5 star rated 3400 watt reverse-cycle air-conditioner for 56 hours at 18.88 cents per kWh as per www.energyrating.gov.au ($12) compared to cost if 20 of these hours were charged at $1.80 per kWh ($50).

operate, the downside of which may be that they are less efficient. As a participant with vision impairment in Sydney put it:

> *You might have to fork out extra for a microwave with big buttons, but then it uses a motherload of electricity.*

This criticism was also against devices, like timers, that can help with controlling appliances' time-of-use: the design of the controls for these demand management devices makes them almost impossible to use for people with vision impairment, as well as for people with limited use of their arms and hands.

Another significant obstacle that people with vision impairment face in managing their electricity use is being able to access information about their electricity use and consumption patterns. The text to audio converters that people with vision impairment use to read documents are often only able to read the bold print on the bill (total amount due), so people may have no idea how much electricity they are using or whether their consumption has increased or decreased since the last bill. Indeed, accessing comparative information about energy use—e.g. current consumption compared to the state average or previous year—can be especially difficult as this sort of information usually comes in the form of a graph, which text readers cannot cope with.

They could ask a sighted person to help them find out this information, but unless they have a close friend or relative nearby, people with vision impairment are often reluctant to ask a sighted person to tell them any more than the total amount due on their bill. As one participant in a Melbourne put it, 'Just tell me how much I owe and don't worry about the other three brochures that have come with the bill'.

The people with vision impairment taking part in the focus groups had hoped that the rollout of smart meters would help to overcome the difficulties that they face in efficiently using electricity and in accessing more information about their electricity costs. They had hoped that the meters would be able to relay information about their energy use in audio format and that the home area network interface could allow them to better control their appliances so that they no longer needed to rely on purchasing individual appliances with tactile controls.

Certainly, the capability is there in smart meters to help in these ways. The meters can be connected to a home area network which can feed in information about people's energy use to a software program or audio device that can relay this information in audio form.

Unfortunately, the likelihood is that those who want to take advantage of these capabilities of smart meters will have to do so at their own expense, since the costs of setting up a home area network or installing an in-home display unit will not be included in the rollout. In Victoria, all that distributors are required to do is to replace people's current meters with a smart electricity meter. Indeed, the new smart meters will be located in exactly the same place as people's old accumulation meters—usually outside the home—a fact that frustrated many of the people with vision impairment, who had hoped that the meter itself would have audio functions and would be located in their home so that they could easily access information about their electricity use.

Participants in the Sydney focus group put forward the idea of being able to push a button on the meter to tell you what the meter reading was and of the meter beeping anytime information needed to be relayed about an upcoming outage, or a forthcoming critical peak pricing period. The meter could make a beeping sound and then people could push a button on the meter which would tell them what change was about to take place that would affect their energy use and costs. It was suggested the

meter could communicate tips to help people manage their energy use better in response to the price signals being relayed. For example, one person suggested that after pushing a button on the meter upon hearing a beeping sound the meter might broadcast a message like,

> *'It's now peak period, where the cost of electriciy is X; it might be a good idea to put off using the dryer until later', or 'It's now off-peak, it's a good time to run the dishwasher, dryer etc.'*

This is an important point, particularly in relation to critical peak pricing tariffs where a household may be asked to pay tariffs that are more than ten times the usual rate.

Unless people are aware that a change to their electricity tariff has been affected they will be unable to respond to the price signal and could face significant financial hardship. This was a concern even among focus group participants without a disability, who were worried that if they weren't properly informed that a critical peak price period was coming up they could end up in a lot of financial difficulty. People have different needs, and a single method of communication would not be adequate for everybody. For instance, pensioners were very worried that electricity businesses would rely solely on SMS or email to tell people about upcoming critical peak pricing events: 'This is the thing, the perception is everybody has got a computer. It's ridiculous.' 'With mobile phones, I know there's a lot of elderly people who don't have a mobile phone.'

It was suggested that the electricity companies could leave automated messages on people's phones instead of sending an SMS or email. But some people were worried that this would exclude the Deaf and those with little English:

> *And what about people who don't speak English as a first language, or people who are deaf? Like, how are we going to accommodate them*

Those with vision impairment were understandably very worried that electricity businesses would only inform people about a forthcoming CPP event via an ad in the newspaper or via a mail drop. They wouldn't be able to read this information and could find themselves unable to avoid paying critical peak prices as a result, which could have a major affect on their electricity costs.

Amanda's Story[18]

Amanda is in her early thirties and lives alone in an older unit in the outer eastern suburbs of Melbourne. Amanda has put in gas ducted heating in her unit, although she continues to use electricity for hot water as well as for cooking (as this is safer for her). She has heavy vision impairment to the point that objects appear out of focus and she requires bright task lighting to help her perform tasks around the home and at work (she works three-days a week at Vision Australia, where electronic aids enable her to work as a receptionist). Her need for very bright lighting means that she can't install energy saving globes in her home because the light from these globes is too poor.

Amanda finds that she is able to manage quite well by herself, provided that she tries to do things like cooking, cleaning, and washing during the day-time as much as possible (and even then she still relies on the help of bright task lighting). However, despite her best efforts, Amanda has fallen behind in her energy bills because she missed two bills in a row last year. These bills of around $160 each were posted to her but Amanda mistakenly recycled them as she wasn't able to read them and thought they were junk mail. When a visiting relative discovered a late notice of payment in Amanda's mail she had accumulated more than $300 of debt, which she was unable to pay off in one go as she had other bills—phone, gas, rent—coming in at the same time and couldn't stretch her modest income from her job to cover all the bills. Amanda is now paying off these bills in instalments

Her electricity provider now sends her electronic bills via email. However, because these bills come as PDF attachments—text is compressed in PDFs making it difficult for text converters to pick up—her text-to-audio program is unable to convert much of the information. She is usually only able to find out the total amount she has owing on her bill and has no idea how many kWh of electricity she typically uses a quarter, the tariff rate that she is on, or whether her electricity use is increasing or decreasing. This has made it very difficult for her to know whether or not she is getting the best deal from her electricity provider. When salespeople from energy retailers call her to offer her alternative contracts she has no idea whether or not the rate these retailers are offering is better than the tariff rate she is currently on. She could ask a salesperson calling at her door to read her current tariff rate to her, but this would involve having to print off a bill from her email and then trusting that the salesperson would accurately report the tariff that she is currently on to her. She is very hesitant about trusting people that she doesn't know calling at her door as she lives by herself and has found salespeople uncomfortably pushy in the past. Amanda has tried to find out information about tariff rates on the internet, but again this information is difficult to access as most retailers only publish the tariff rates in PDF format. She could try getting this information by phone, but this would be very time consuming as it would involving having to ring each retailer independently.

Last August, Amanda had to throw out $70 worth of groceries because of a scheduled blackout in her area. Her neighbourhood lost power for 8 hours because the electricity distributor in the area needed to carry out maintenance work that required temporarily interrupting the power supply in the area. The distributor had written to all households in the area two-weeks beforehand to warn of the scheduled outage, but Amanda never read the letter and didn't even know whether or not she had received it. When the power did go out in her area she contacted a neighbour to find out whether or not the whole neighbourhood had lost power or just her house only for her neighbour to tell her that everyone in the area had been warned that they would be losing power for the next 8 hours. Unfortunately, because Amanda wasn't aware of the impending outage she didn't have any time to prepare for it. She had $70 worth of meat in her freezer which she had purchased the day before to last her for the next two weeks which she had to throw out because it defrosted.

[18] Amanda's story is based on the feedback received in the focus groups from people with vision impairment about the difficulties that they face getting information about their energy use and costs. Although the story is a dramatisation and not based on any one individual's experience, the difficulties that are highlighted in the story are very real and are based on the actual experiences of focus group participants.

3.2.4 Additional impact of poor-housing and inefficient appliances

The households that will be disadvantaged by time-of-use pricing are peaky households with inelastic electricity use.

- Groups such as pensioners, young families and people with disabilities are the households most likely to be peaky households
- Fixed-income households and those with disabilities are most likely to be the households with inelastic electricity use due to the inefficiency of their appliances, the fact that little of their electricity use is discretionary, or their disability or household circumstances may prevent them from shifting their electricity use to the off-peak period (e.g. they live in public housing and can't use their washing machines at night or they are reliant on home help to do the cleaning and washing and so can't alter the time of these activities in response to price signals)

However, the impact of time-of-use pricing on peaky households with inelastic consumption could be even more severe if people live in poor quality of housing and rely on using older, all-electric appliances to meet their heating, cooling and hot water needs. For example, time-of-use tariffs penalise pensioners and people with disabilities living on fixed incomes because of:

- their greater need for electricity use during the day (the peak period) and
- the inelasticity of their electricity use as a result of having little discretionary electricity usage and appliances without timers, for example.

But the impact of time-of-use tariffs on fixed-income pensioner households and people with disabilities will be even greater if they live in poor housing with draughts around the windows and doors and rely on inefficient electric fan heaters or old air-conditioning units to heat and cool their homes. This is because not only will such households be penalised under time-of-use pricing because of the *time* of the day when they use their heating; the fact that they need to use more electricity to heat and cool their homes in the first place because of (e.g.) draughts or no insulation further exposes them to the cost impacts of time-of-use pricing.

Figure 7 summarises the various factors that affect the degree to which households are penalised by time-of-use and critical peak pricing tariffs. Unfortunately, the vulnerabilities listed in Fig. 7 tend to go hand-in-hand so that not only are low-income households disadvantaged by the fact that they are 'peaky' households; the efficiency of their appliance mix and quality of the housing that they live is also likely to mean that their electricity use will be inelastic and that they will need to use more electricity than higher income households to meet equivalent needs, which further exposes them to the cost impacts of time-of-use pricing.

People with disabilities and chronic illnesses are a case in point.

Someone with MS will have a greater need to use cooling in summer because of their illness. But they are also more likely to need to use cooling in their home in summer because of unemployment. The majority of people with MS are unable to work because of their illness—80% of MS sufferers are unemployed 10 years after diagnosis despite being of working age—and so spend a greater proportion of their time at home than most non-MS sufferers.[19] So not only do they need to use air-conditioning at lower temperatures than those without MS, they also are more likely to be at home for longer periods

[19] Michael Summers, "Keeping Cool: Discussion Paper for a Nsw Medical Cooling Energy Rebate," (Melbourne: MS Australia, 2008), 3. According to Access Economics, 48% of people with MS in NSW are on an income of less than $16,000. Access Economics, "Acting Positively: Strategic Implications for the Economic Costs of Multiple Sclerosis in Australia," (Canberra: 2005). Cited in Summers, "Keeping Cool: Discussion Paper for a Nsw Medical Cooling Energy Rebate," 1.

and therefore to have to use climate control for longer periods (when others benefit from climate control at work).

Similarly, people with severe spinal cord injuries are likely to be unemployed through disability, meaning not only do they have additional electricity needs because of their limited mobility; they also need to use their own electricity for longer periods. Also, because they are unemployed through disability, there is an increased likelihood that:

- They will be on a low- or fixed-income
- Live in poorer quality housing or public housing.
- Be more heavily reliant on electricity for heating, cooking and hot water (because of their housing and income situation)
- Use older, less efficient appliances (as these may be all they are able to afford on a fixed income)

All of this adds to the hardship that they are likely to face under time-of-use pricing. Not only will they be penalised by their greater need to use electricity during peak times as a result of disability or chronic illness, the fact that they are also unemployed as a result of disability or chronic illness means that

- It is even more difficult for them to shift their electricity usage to the off-peak period because of the poorer appliances that they have
- They need to use even greater amounts of electricity during peak periods because heating and cooling their homes is so difficult because of the poor quality of their housing and the inefficiency of the appliances they are using.

The same is true for many other groups who fall into the 'peaky household' category, such as pensioners and single parents with young children. Again, many pensioners and single parents suffer additionally because of their lack of income, which increases their chances of living in poorer housing and of being more reliant on electricity usage for essential needs. It also increases their chances of having older, often second-hand, appliances that are both 'thirsty' and unable to be programmed to come on during the off-peak period.

While some households may be able to reduce their electricity costs by taking advantage of off-peak pricing, the households that are least well-off will not be in a situation to respond to price signals in this way. These are the very same households that already—*without time-of-use pricing*—struggling to afford the electricity that they need to meet essential needs, having to go without hot-meals, hot-showers, and clothing to remain connected to electricity.

The worry is that the smart meter rollout could place further pressure on the ability of these households to afford essential electricity usage, not only as a result of the increases in fixed charges needed to pay for smart meters, but also because of the particular vulnerability of low-income households to time-of-use pricing and the difficulties that low-income households face in managing their electricity use during peak times.

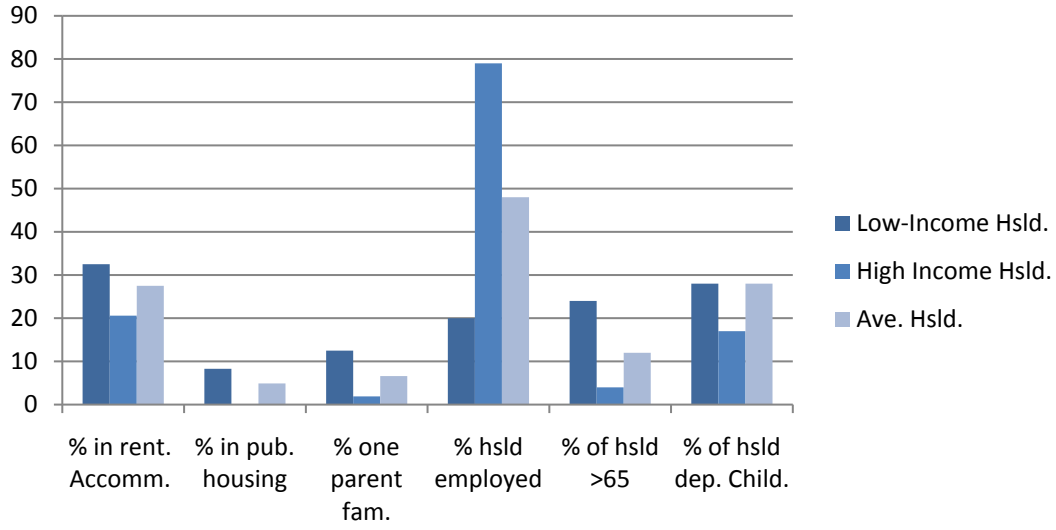

Figure 10: Household characteristics across income groups[20]

Households in Victoria are already being asked to pay up to $152 in metering charges this year to cover the costs of rolling out smart meters. But, depending on the tariff rate and length of the peak period, the introduction of time-of-use pricing could easily add a further $150 - $180 to the annual electricity costs of a larger, all-electric, household where most of the household is at home during the day (e.g. young families and carer households).

Consequently, unless suitable policies and protections are put in place (see recommendations in conclusion), the smart meter rollout has the potential to considerably exacerbate the hardship that lower-income households are already experiencing in affording the electricity that they need to meet essential needs for heating, cooling, hot water, and cooking (amongst other things)—needs that are fundamental to their health and wellbeing.

3.3 Will Time-of-Use Tariffs be Voluntary?

The high peak period prices involved in time-of-use and critical peak pricing tariffs will affect different households in different ways, with the extent of the impacts of these tariffs on households depending on a number of factors, such as whether households have a peaky load or whether their electricity use is relatively elastic. Some households may even do very well out of a move to time-of-use pricing because they either currently use electricity mostly outside of peak times, or they have the ability to successfully shift the bulk of their electricity use to shoulder and off-peak periods because of the discretionary nature of this consumption and the functionalities of their appliances. Indeed, Energy Australia has claimed that 'homes with smart meters were saving on average $45 a year compared to standard domestic tariffs' under its smart meter programme in NSW, with '85% of customers...better off under time based pricing.'[21]

However, the Energy Australia rollout of smart meters in NSW is a voluntary initiative and customers are free to decline time-of-use pricing structures should they so wish. It is therefore reasonable to expect that the Energy Australia customers who believe that they would be disadvantaged by time-of-

[20] Figures taken from ABS Household Expenditure Survey 2003-04, Cat. 6530 based on equivalised household disposable income data. Low-income households here refer to households in the 2nd and 3rd equivalised disposable income decile. High Income households refer to households in the top 20% of equivalised disposable income.

[21] Energy Australia News Release, "1.5 million customers can plug into new electronic smart meters" (9th Spetmeber, 2007)

use tariffs are not in fact taking part in its smart meter rollout, with the result that the benefits to consumers are being over-estimated.

As with the Energy Australia smart meter rollout, policy makers behind the national smart meter rollout have assumed that consumers who believe that they will be penalised by time-of-use and critical peak pricing tariffs will simply refuse to take up these tariffs. For instance, the national cost-benefit analysis bases its assessment of the net benefits of a smart meter rollout on the assumption that only 35% of households will take up TOU tariffs, with a further 7.5% of households taking up CPP tariffs.[22]

Yet it's far from clear that consumers will be able to choose to remain on flat pricing tariffs under a mandated smart meter rollout.

Less than 10% of households in New South Wales have smart meters so retailers have not yet started to widely offer time-of-use tariffs and households' wholesale electricity costs—i.e. the network component of their electricity tariff—are still mostly calculated using an average load profile, with all retailers equally sharing the risk of 'peaky' consumers. Hence, it is still financially viable for retailers in New South Wales to continue offering flat tariff structures to peaky households since the risk that these households represent is being shared by other retailers in the same network area.

But once smart meters are introduced, and most households are put onto time-of-use network tariffs, all this is likely to change. Whether households will be able to avoid TOU and CPP tariffs will ultimately depend on the extent of retail competition in each state and on the extent of market regulation.

As the St Vincent de Paul report on customer protections and smart meters warns, 'The assumption that TOU tariffs are market offers that just increase consumer choice in the electricity retail market may be flawed.'[23]

For example, in Victoria—where the retail electricity market is largely deregulated—there is little to prevent retailers from forcing consumers onto time-of-use tariffs once smart meters have been installed on their premises. Many market contracts have an exemption clause that explicitly allows retailers to stop offering customers their contracted tariff rate once a smart meter is installed on their premises, and retailers in Victoria are permitted to change customers' tariff rates every six months. Also, although retailers in Victoria are obliged to offer a standing tariff to customers who don't want to negotiate a competitive market contract, they are not obliged to ensure that the shape of this standing tariff offer reflects a flat or inclining tariff rate.

AGL has decided to no longer offer its single tariff rate to new customers with a smart meter in the United Energy Distribution area (which includes the South East suburbs of Melbourne and the Mornington Peninsula). The Residential Single Tariff rate of 19.37 cents per kWh—with 67.06 cents per day in supply charges—is only available 'to new connections where the AMI meter cannot be remotely read and interval data is not remotely collected..'[24]

We contacted AGL to find out what whether existing customers on the residential single tariff would continue to be offered this tariff once smart meters were installed but were given conflicting information, with one representative informing us that AGL would continue to offer the single tariff to

[22] See NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," 50.
[23] Johnston, "New Meters, New Protections: A National Report on Customer Protections and Smart Meters ".29
[24] See www.agl.com.au/Downloads/VIC_Standing_Offer_Electricity_Prices_2010.pdf

new customers (even though the tariffs gazetted by AGL in January make it clear that this won't be the case).

Households in Victoria who have a smart meter installed but wish to remain on a single tariff rate must rely on the willingness of either their own retailer or a competitor to continue to offer them a single tariff rate. But because distributors are likely to switch customers onto time-of-use *network* tariffs—the wholesale component of a customer's electricity tariff—as soon as smart meters have been installed, it may become increasingly difficult for retailers to continue to offer those customers a single tariff rate.

3.3.1 Unprofitable for retailers to continue offering flat tariffs to peaky customers

The wholesale electricity costs charged to retailers account for nearly half of the retail tariff that consumers pay. Consequently, once a distributor places a customer on a time-of-use network tariff, it may no longer be financially viable for a retailer to continue offering that customer a flat tariff rate, **especially if they are a relatively 'peaky' consumer**. Doing so could expose the retailer to additional risk in the wholesale market if that customer continues to demand electricity at a high rate during peak periods.

This has been an issue in NSW, where consumers have reported that retailers have refused to offer them competitive flat tariff rates once they have discovered that the customer has had a smart meter installed by Energy Australia.

Many retailers in NSW don't have the billing infrastructure to cope with regularly processing smart meter data, while even when retailers do have the ability to process smart meter data, it can still be unprofitable for them to offer customers a flat or inclining tariff rate. As has been noted by the NSW Energy and Water Ombudsman (EWON) in a submission to the Ministerial Council on Energy:

> One distributor has advised EWON that although their [smart] meters are programmed to collect data usage across differently-priced time periods and [the price] they charge the retailer for such supply addresses network charges that align with these periods, the retailer is still able to charge the customer a flat tariff if they wish. However, EWON's experience is that 2nd tier retailers are not prepared to do this, as the retail tariffs they would need to offer the customer in order to make even a modest profit margin would not be competitive or attractive to the customer.[25]

Fortunately, the retail electricity market in New South Wales is still a regulated market, where the vast majority of consumers are billed using accumulation meters. The limited penetration of smart meters in the state has so far meant that the regulated tariffs offered by the retailers of last resort—Energy Australia, Integral and Country Energy—have retained the shape of a flat tariff.

Unlike Victoria—where retailers are merely obliged to offer all customers some sort of gazetted standing tariff that they are free to vary every six months—the regulated tariff in NSW and other states (notably Queensland and South Australia) is more tightly controlled, with regulatory approval required before retailers can increase electricity costs for consumers on standing tariff offers. Consequently, customers in NSW who have had smart meters installed have not yet been forced onto time-of-use tariffs but instead have been able to remain on the regulated tariff (although they now are no longer able to choose between electricity providers).

[25] EWON, *Submission to MCE discussion papers on Smart Meters Cost Benefit Analysis, Phase 1 – National Minimum Functionality* (November 2007). Cited in Johnston, "Customer Protections and Smart Meters: Issues for Queensland," 56.

This market regulation is an important bulwark protecting vulnerable customers from the price impacts of time-of-use tariffs. But pressure is mounting from retailers to do away with this regulation, with retailers claiming that regulated standard tariffs are unviable and inefficient in a smart meter scenario. For example, in its submission to the Queensland Competition Authority Review of Electricity Pricing and Tariff Structures, Origin has argued that:

> the introduction of time-of-use metering and pricing has to be accompanied by reform in the overall regulatory framework if it is to achieve its objectives. What must be avoided are regulatory arrangements that allow, for instance, a customer who has a high peak demand (and therefore imposes high costs), to remain on flat tariff because that is cheaper to them. To do so defeats the whole purpose of the exercise.[26]

So it cannot be assumed that the new retail electricity products that smart meters will enable, such as TOU and CPP tariffs, will be products that customers can decide to either opt in or out of, **especially if the trend towards the deregulation of electricity retail markets continues**.

In a deregulated market such as Victoria, customers wishing to remain on flat or inclining tariffs will be forced to rely on healthy competition between retailers ensuring that there will always be some retailer willing to offer them a competitive flat or inclining tariff rate. But—particularly for the customers most likely to be disadvantaged by time-of-use tariffs—it will not always be financially viable for a retailer to offer them a flat or inclining tariff rate. In other states where market regulation is more entrenched, customers may have improved chances of remaining on a flat tariff once smart meters have been installed; but even then their ability to chose between retailers may be limited following the installation of their smart meter as they are forced to rely on the retailer of last resort in order to avoid time-of-use tariffs.

[26] Origin, Submission to the Queensland Competition Authority on its Requests for Comments Paper: Review of Electricity Pricing and Tariff Structures – Stage 2 (October 2009), p.13. Cited in Ibid., 66.

Conclusion

Access to an affordable and reliable supply of energy is an essential good without which people would struggle to meet basic needs for heating, lighting, cooling, cooking, health, and hygiene. Unfortunately, low-income households in Australia are already struggling to afford the energy that they need to use to meet these essential needs. At a minimum,

- low-income households are spending two to three as much on energy costs (as a proportion of their income) as the average household
- 4 in 10 are already unable to afford to pay their household electricity bills.

For households with an additional reliance on electricity use because of illness or disability, these figures are likely to be even higher, given their increased exposure to rising electricity costs.

In New South Wales regulated tariffs are expected to increase by 44% to 62% over the next three years, with households in rural New South Wales expected to pay as much as $893 extra in annual electricity costs by 2013. This is without a smart meter rollout.

Worryingly, the cost of electricity use in Australia is expected to increase substantially in coming years *regardless of any smart meter rollout*. The Independent Pricing and Regulatory Tribunal (IPART) in New South Wales expects regulated tariffs to increase by 44% to 62% over the next three years, with households in rural New South Wales expected to pay as much as *$893 extra* in annual electricity costs by 2013.[1]

Such increases in the cost of an essential service such as electricity will place enormous financial pressure on low-income households, exacerbating their exposure to the risk of disconnection from non-payment. But IPART's estimates don't even factor in the cost impacts of rolling out smart meters on households' electricity costs.

The Cost Impacts of the Smart Meter Rollout

The rollout of smart meters will undoubtedly deliver some benefits to electricity businesses and consumers. The enhanced demand side management capabilities of smart meters (e.g. supply capacity control functionalities) should improve the efficiency and reliability of the electricity network, especially during periods of network constraint, so that rolling blackouts become less common, while the ability of smart meters to be read remotely could lead to lower electricity prices in the long-run if network businesses' operational cost-savings are passed on to consumers (though, as the Victorian Auditor General's report warns, there are grounds for being sceptical that the pass through of these cost-savings will be as significant as claimed in the national cost-benefit analysis). Moreover, some households will be able to take advantage of smart meter enabled time-of-use pricing structures and direct load control offers to reduce their electricity costs in the short term.

But not all households will be in a position to benefit from the rollout in these ways, and low-income households in particular are especially at risk of suffering from the introduction of time-of-use tariffs and higher supply charges. For larger, all-electric households where much of the household is at home during the day—e.g. young families and carer households—time-of-use tariffs could easily add $150 -

[1] Independent Pricing and Regulatory Tribunal, "Fact Sheet: Regulated Electricity Tariffs for 1 July 2010 to 30 June 2013 - Draft Report," (2009).

$180 to their annual electricity costs, while pensioner households in Victoria with electric heating could have to pay an additional $158 per year in electricity costs if put on to a TOU tariff.[2]

Retailers in Victoria are asking households to pay as much as $152 in smart meter charges this year as part of the cost recovery process of the rollout, with further increases in supply charges expected in 2011-13.[3] And increases in fixed supply charges impact lower income households particularly hard, both because of their more limited ability to pay for these cost increases, but also because supply charges typically account for a larger proportion of their electricity costs (low-income households tend to be low-volume consumers) with the result that increases in fixed charges cause lower-income households electricity costs to increase by a greater percentage. Moreover, because of the mostly non-discretionary nature of their electricity usage, low-income households are not in a position to offset increases in supply charges by cutting back on non-essential electricity usage or by taking advantage of lower off-peak rates under time-of-use tariffs.

Combining the billing impacts of time-of-use tariffs and higher-fixed charges, **a peaky household with inelastic electricity usage could face *a cost increase of around $300* because of the smart meter rollout.**

By itself this increase in electricity costs would cause major hardship to a low-income household and could easily force them into forgoing essential items of expenditure, such as food and clothing. Some may be tempted to give up altogether on electricity usage because of an inability to pay, as Katherine, a public housing tenant in Melbourne was:

> *I think personally, I would be tempted just to get my electricity disconnected. I've thought about it already. What's the point, I'm going without so much already. It's the most expensive thing I pay for…I'm already living like shit basically in my home and going without so much, what do I need it for. I'll use candles if I have to, I don't care; get one of those wind up battery radios.*

But the effect of these cost-impacts could be even greater if electricity prices continue to increase in the interim, given the already precarious state of energy affordability in Australia and the worry that households could have to pay as much as $893 extra in electricity costs over the next three years regardless of smart meters. Therefore, unless suitable protections are put in place to shelter disadvantaged and low-income households from the billing impacts of increased fixed charges and time-of-use tariffs, the smart meter rollout will cause significant harm to some of the most vulnerable and disadvantaged individuals and households in Australia. This would be an alarming outcome of the smart meter rollout, the need for which is far from justified.

Any policy that causes those who are most disadvantaged and most vulnerable to be even worse off than they already are is on the face of it unjust. At the very least, such a policy needs to be rigorously argued for on the basis of the overall advantages that it will bring and in light of strategies that can be put in place to minimise its potential to cause harm. What is absent from the policy discussions surrounding the smart meter rollout—both nationally and in Victoria—is sufficient evidence that the overall benefits of a smart meter rollout outweigh the risks that the rollout poses to the welfare and wellbeing of the most vulnerable and disadvantaged members of the community.

[2] This claim is based on the case studies in this report and those in the St Vincent de Paul Society report. See Johnston, "New Meters, New Protections: A National Report on Customer Protections and Smart Meters ", appendix 2.
[3] Figure based on Origin's gazetted smart meter charge for the Jemena distribution area.

Exemptions from Increases in Supply Charges

One way in which some of the harm of the rollout could be alleviated is through exempting concession card holders from having to pay the increase in fixed charges resulting from the rollout. While the details of such a scheme would need to be worked out, one option is for retailers to apply a separate supply charge rate to concession card holders; a rate that excluded smart metering charges. This would not be particularly difficult to do since retailers already have mechanisms in place to identify these consumers.

Indeed, a supply charge concession scheme already exists in Victoria. Low-income, low volume consumers who spend less on their electricity usage than on the supply charge currently have their supply charge capped at whatever their expenditure level is under the *service to property concession charge*.[4] If the supply charge is 42.6 cents per day, for example, and a consumer on a pensioner card or health card only uses 35 cents worth of electricity, his or her supply charge will be capped at 35 cents.

The appropriateness of this concession scheme will need to be carefully reviewed when smart meters are rolled out, as there is cause for concern that the service to property concession charge will not do enough to protect vulnerable households.

Firstly, if time-of-use pricing is widely introduced and retailers no longer offer flat or inclining tariffs to consumers, many low-income households' electricity consumption costs will increase significantly. Depending on the extent of this increase, many low-income households could find that they are no longer eligible for the concession on their supply charge because the costs of their electricity usage will exceed the supply charge.

Another issue is that the way in which the supply charge concession scheme is currently structured places tremendous pressure on low-income households to keep their electricity usage to an absolute minimum, since non-essential electricity usage not only increases their electricity usage costs but also puts households at risk of having to pay higher supply charges if they fail to keep their electricity usage within supply charge limits. For all-electric households with very inefficient appliances, this may mean that they have to forgo electricity usage on essential heating, cooking, or hygiene (e.g. hot-showers) needs simply to keep their supply costs down. Time-of-use tariffs could make it even more difficult for these households to keep their electricity usage within eligible limits, forcing them to forgo further essential electricity usage.

A further issue is that the service to property concession charge offers little protection to low-income households with a need to use large volumes of electricity, either because of illness or disability, or because of there being a number of young children in the household.

For instance, total supply charges for a household taking supply with Origin in the Jemena distribution area amount to just over $200 for the year. But the average MS household in Victoria spends more than $400 on cooling costs alone.[5] The service to property charge is of no protection to such households.

Hence, a better scheme may be to offer concession card holders a discounted supply charge rate that excludes smart metering charges and does not depend on keeping their electricity usage within narrow limits.

[4] For details of this scheme see www.dhs.vic.gov.au/concessions/entitlements/view-all/energy/service-to-property-charge
[5] Summers and Simmons, "Keeping Cool Survey: Air Conditioner Use by Australians with Ms ", 22.

Continued Robust Regulation of Standard Tariff Offers

A second way in which low-income and vulnerable households ought to be protected from the price impacts of a smart meter rollout is through the robust regulation of standing tariff offers to ensure that these households continue to have the opportunity of remaining on a flat tariff structure should they wish to do so.

Standing tariff offers are the no frills tariff structures that households who choose not to negotiate an individual market contract are put on by retailers who are obliged to publicise these standing tariff offers to allow consumers to more easily compare retail offers.

Because the vast majority of meters in Australia are still accumulation meters, standing tariff offers have broadly retained the shape of the flat tariff, although this could change once smart meters are installed across households.

In Victoria, the only protection that low-income households have against being put onto time-of-use tariffs is the extent of retail competition in the state. The Essential Services Commission no longer regulates retail electricity prices as a result of the deregulation of the retail market in January 2009. Although retailers are still obliged to offer all customers a publicised standing tariff and can only change this tariff rate once every six months, there is no requirement that the standing tariff be a flat tariff, and AGL for its part has indicated that it will no longer continue to offer new customers in the United distribution area it's publicised flat standing tariff offer once smart meters have been installed on their premises.

Stricter regulation of price inflation for customers on standard tariffs in other states currently makes it more difficult for retailers elsewhere to cease offering flat or inclining tariffs, although further deregulation of the retail electricity market may remove these regulatory obstacles in coming years. The Australian Energy Market Commission has been tasked with reviewing the effectiveness of retail competition in states where retail prices are currently regulated, such as Queensland, South Australia and New South Wales, with a view towards phasing out regulated prices once the retail competition is deemed effective. The assumption behind this review by the Australian Energy Market Commission is that healthy retail competition is a stronger bulwark against price inflation than government regulation.

That may be so for some consumers, but **retail competition cannot be relied upon to protect vulnerable consumers from time-of-use and critical peak pricing tariffs**. This is because it is unlikely to be financially viable or profitable for a retailer to continue to offer 'peaky' consumers a flat tariff rate once they have been put onto a time-of-use network tariff by their distributor (see sec 3.4).[6] Hence the need for continued and more robust regulation of standard tariffs in a smart meter environment.

The protection of 'peaky' low-income households from the cost impacts of time-of-use pricing is sometimes objected to upon the grounds that:

- *Flat tariffs negate attempts to reduce peak demand*: Sheltering 'peaky' consumers from the price impacts of time-of-use tariffs undermines the rationale of using time-sensitive electricity prices to elicit a reduction in consumer demand during peak times so as to reduce the need for (and costs of) further investment in generation and network infrastructure augmentation. As Origin has commented in response to the recent review of electricity pricing and tariff structures by the Queensland Competition Authority: 'What must be avoided are regulatory arrangements

[6] This issue is also more comprehensively dealt with in Johnston, "New Meters, New Protections: A National Report on Customer Protections and Smart Meters ", sec. 8.3.

that allow, for instance, a customer who has a high peak demand (and therefore imposes high costs), to remain on flat tariff because that is cheaper to them. To do so defeats the whole purpose of the exercise.'[7]

- *Flat tariffs perpetuate cross-subsidises between consumers*: cross-subsidies arise as a result of the discrepancy between the flat (or inclining) rate that consumers on accumulation meters pay for their electricity use and the time-sensitive price that retails must pay wholesalers to supply the electricity for this consumption. Depending on the time of their consumption, consumers will either pay a price that is inflated above the supply cost or pay a price that falls short of the supply cost. The fact that some consumers benefit from paying lower-than-market prices during peak-periods is offset by the fact that consumers pay higher-than-market prices during off-peak periods. In effect, this means that consumers with a more peaky load are causing less peaky consumers to have to pay more than they should for their electricity use, which some consider unfair.

Regarding the first objection, it is important to recall that the national cost-benefit analysis was itself sceptical that the introduction of time-of-use pricing could elicit a significant enough demand side response to offset the need for infrastructure augmentation.[8]

Time-of-use tariffs have had only very modest success in eliciting demand side responses in trials both overseas and in Australia. In California, for example, TOU tariffs achieved only a 4.71% reduction *in peak demand* in a state-wide pilot during the summer months, while overall consumption actually *increased*. Moreover, the impact of TOU on consumers' energy loads waned overtime, with TOU tariffs eliciting only a 0.6% reduction in peak demand towards the end of the trial.[9]

In Australia, trials of time-of-use tariffs by both Integral Energy and Energex have achieved no statistically significant reduction in demand and in the case of the Integral energy trial, not even a significant shift in the time of electricity usage.[10]

Also, the low-income households that the robust regulation of standard tariff offers are intended to protect are precisely those households least able to respond to peak pricing signals. So even if these households are placed on time-of-use tariffs all that this would accomplish would be an increase in their electricity costs; not a reduction in their demand for peak electricity.

Regarding the importance of eliminating cross-subsidies, it is questionable whether the 'user-pays' approach underpinning this objection to the use of flat tariffs is itself a fair way of apportioning the costs of supplying electricity between consumers, especially given the essential nature of much electricity use.

Time-of-Use tariffs and the fairness of 'User Pays' approaches

In the case of other essential goods and services—for instance, education and healthcare—we generally accept that those who cannot afford to pay the full costs of their own healthcare or education should be

[7] Origin, Submission to the Queensland Competition Authority on its Requests for Comments Paper: Review of Electricity Pricing and Tariff Structures – Stage 2 (October 2009), p.13. Cited in Johnston, "Customer Protections and Smart Meters: Issues for Queensland," 66.

[8] 'We note that CRA has concluded that the relatively small size of the overall system demand reductions that have been estimated to follow a rollout of smart meters or a DLC alternative would not be sufficient to defer generation investment in practice.' NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for Consultation," xv.

[9] Charles River Associates, "Impact Evaluation of the California Statewide Pricing Pilot," 8-9. cited in NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts ", 127.

[10] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts ", 34-5. Indeed, according to modelling by NERA Economic Consulting, TOU tariffs will at most achieve a 0.15% reduction in total consumption (for Victoria only) when smart meters come fully online within national energy market jurisdictions in 2016. NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Consumer Impacts ", 42.

assisted in meeting these costs. Indeed, in the area of health insurance, a user-pays approach has been explicitly rejected in Australia. All individuals regardless of their family medical history or genetic characteristics are entitled to pay the same level of insurance premium if they take out health insurance before a certain age.

But under a user-pays approach one would expect that people with a family medical history or genetic characteristics that increase their risk of needing health care would be asked to pay higher insurance premiums to cover the additional risk that they represent. Yet, under the community model of health insurance that operates in Australia, the costs of this additional risk are shared by all premium holders. In other words, lower risk customers are subsidising the insurance premiums of higher risk customers.

It is often regarded as discriminatory to charge people more for an essential service, such as education, simply because it costs more to provide them with this service. For instance, it is illegal for schools—even private schools—to charge higher fees to students with intellectual disabilities and learning difficulties on the basis that it costs more to meet these students' learning needs. A school that did so would be in breach the *Disability Discrimination Act 1992*.

Time-of-use pricing discriminates against disadvantaged groups in a similar way (albeit indirectly): By forcing people in vulnerable circumstances to pay more for their electricity use than others in less vulnerable circumstances because it costs more to meet their electricity needs.

Some may argue this comparison is unfair because people have the ability to control the time of their electricity use, whereas people with intellectual disabilities and learning needs are not responsible for the fact that it costs more to provide them with education. Yet many of the people who use electricity during peak times do so out of necessity and through no fault of their own—quadriplegics and people with MS who are out of work through disability and who have greater electricity needs because of their dependency on climate control devices, electric wheelchairs and electrical hoists.

Continuing to allow low-income 'peaky' households with inelastic electricity use to remain on flat regulated tariffs is a reasonable proposal given the hardship that many of these households would suffer if put on to a time-of-use tariff. Failing that, at the very least concession schemes should be extended to ensure that low-income households are not disadvantaged should flat tariffs with regulated prices be phased out in response to time-of-use network tariffs. Concession card holders should also be offered a discounted supply charge that excludes rollout charges so as to further reduce the risk of a smart meter rollout causing them significant harm and hardship.

These are just two proposals as to how some of the potential harm of the rollout could be alleviated. The *New Meters; New Protections* report by St Vincent de Paul Society offers further and more detailed proposals, such as:

- protecting consumers against the use of supply capacity control limits,
- providing wider access to payment plans to help consumers cope with price shocks as a result of time-of-use pricing,
- reducing the costs for consumers of exiting contracts in light of the potential for some consumers to find themselves disadvantaged by time-of-use and critical peak pricing contracts, and
- extending billing collection periods to allow low-income consumers to better cope with spikes in their bills.

These proposals merit serious consideration in light of the gravity of the risk that smart meters represent to the ongoing ability of low-income and vulnerable households to afford the electricity that they need to meet essential needs fundamental to their health and wellbeing.

Appendix A: Cost Calculations

Details of Cost Calculations for Claire

- It is assumed that, to heat and cool her living area, Claire is using a 3.5 star wall-mounted reverse cycle unit, with a 3.4 kw output (1.2 kw input).
- From November to March, Claire uses her unit for 1208 hours (151 days x 8 hours). 864 of these hours are during the peak period (weekdays) and 344 hours are during the off-peak (at weekends).
- From June to September, Claire uses her unit as a heater for a total of 972 hours (162 days x 6 hours). Of these, 864 hours are during the peak period (weekdays) and 344 hours are during the weekend (off-peak).
- Details of the costs of using such an air-conditioning unit for these amounts of time were worked out using the calculator on http://www.energyrating.gov.au for a 3.5 star rated reverse-cycle wall-mounted LG unit. The website allows you to work out the cost of using different air-con units for different hours for heating and cooling use and at different tariff rates.

Cost Calculations for Hypothetical Young Family Household (based on Energy Australia NSW PowerSmart and Standard Domestic Tariff Rate, June 2009)

KWh	Rate	Total
Regulated Domestic tariff		
7000 kWh @ standard tariff rate for first 1,750 kWh per quarter	17.16 cents	1201.2
207 kWh @ balance tariff rate	25.41 cents	52.60
3650 kWh of off-peak hot water	7.37 cents	269
Supply charge of 42.9 cents per day		156.59
Total		1679.39
Time-of-Use Tariff		
2162 kWh @ off-peak rate (30% of consumption)	8.14 cents	175.99
2522 kWh @ peak rate (35% of consumption)	35.64 cents	898.84
2522 kWh @ shoulder rate (35% of consumption)	14.08 cents	355.10
3650 kWh of off-peak hot water		269
Supply charge of 46.2 cents per day		168.63
Total		1867.46

The number of kWh demanded during each time-of-use interval is based on the load profile used in Table 2 for a single mother with two dependent children (NSW). We take this to be a suitable proxy for the load profile of a couple with three dependent children since, although one member of the household will be at work during the daytime, there is also an additional dependent child at home during peak periods.

Appendix B: Supply Capacity Control Concerns

Smart meters have the ability to interrupt the supply of electricity to a household if that household uses over a given quota of electricity during a certain period. The quota limit and timeframe can be remotely programmed by an electricity distributor or retailer and can be varied. When a smart meter is operating in supply capacity control mode, once the given quota of electricity use is reached for the given time interval the meter will open a circuit gate to temporarily suspend the supply of electricity to that household (how long the supply is interrupted for can also be varied, although in Victoria supply will be interrupted for no longer than 60 minutes).

Supply Capacity Control as an Emergency Demand Management Tool

The principal reason for equipping smart meters with supply capacity control functionalities is to enable network businesses to more evenly limit supply to network areas in emergency situations where the network is congested and areas are at risk of blackout. Currently, electricity distributors manage load during emergency situations through the use of rolling blackouts. This is where the supply of electricity is temporarily suspended to entire geographical areas on an alternating basis. The supply capacity control capabilities that smart meters are equipped with, however, will enable distributors to instead load shed in emergency situations by capping the supply of electricity to a wide group of consumers instead of blacking out entire geographical areas. Distributors will therefore be able to continue to provide customers with a continuous supply of electricity during emergency situations, albeit on a limited basis, instead of having to interrupt the supply of electricity altogether to geographical areas. While consumers who exceed their individual capacity limits will lose their supply temporarily, those who have kept their electricity use within capacity limits will still enjoy a continuous supply of electricity.

This ability of smart meters to enable better load management in emergency situations through the instigation of supply capacity control limits has considerable benefits as it offers a way of safeguarding the supply of electricity to people who rely on electricity use for life-support machines and other essential devices. Currently, such individuals are at risk of losing their power along with everybody else when a network area is at peak capacity but this situation could change with the introduction of smart meters, as supply capacity control limits can be instigated to avoid a blackout in the area. As one participant in Adelaide who needs to use electricity to operate essential medical devices commented:

> *The only good thing I can see about these smart meters is that currently if you have a blackout here in Adelaide—and we don't know when a blackout is going to occur or not—you know a 43 degree day, but they blackout particular areas and if you're on a life saving support and you need power, well you get blacked out as well. But with the new smart system they can put that in the computers that that house is not to be blacked out. That's the only thing that I can see good about it.*

Likewise, the use of supply capacity control limits in emergency situations could help in securing the electricity needed to operate common amenities, such as lighting, elevators and escalators in buildings and apartment blocks. As one public housing tenant living in a high rise in Melbourne pointed out:

> *I suppose if they have the ability to control particular items they would ensure that something like lifts would always have their electricity, I would hope*

Her housing block had lost power during the February blackouts in Melbourne and 'it was just pure luck and chance that no one was caught in the lifts.' As she pointed out, 'imagine if you're in 38 to 40 degrees in the lift, no-air-conditioning, no nothing…you would've died in there.' In other focus groups

people commented that it would be much better to only have your power interrupted for an hour or so, rather than risk losing it altogether for much longer, which could have a far more severe effect on your household.

> *If you were going to have a blackout it might be for 12 hours, and what the power company is saying is we'll just turn you off for an hour, so your frozen stuff won't defrost*

People had some reservations, however, about whether or not they would be given sufficient notice that they were being put on a supply capacity control limit and about whether individual households' circumstances would be adequately taken into account (e.g. number of household occupants, health related electricity needs etc.):

> *Is there any warning [that your power will be limited]…It would seem to be a humane kind of thing to do, if nothing else, to provide people with a half hour warning in the area that it was going to be cut from X to Y…If computers suddenly turn off then you lose all your data. So there needs to be some kind of warning. And if this system is such that you can do something and stop power coming to the house, then surely it's possible to send a signal to the house as well in that meter, whether it's a red light or a mechanical voice that says doom is about to strike. (Melbourne participant)*
>
> *They would have to have in place good safeguards. For example, people that are using respirators, who are using kidney dialysis machines at home, and mother medical equipment, that would have to be somehow or other safeguarded. (Melbourne participant)*
>
> *[T]he thing is, what they've got to try and consider too is the amount of electricity that's being used is the amount of people in the house as well…There would certainly have to be some sort of watchdog or something because you know, if like, if you had half a dozen people arrive on your door step, their car's broken down, they've got to stay in your place for three days or something…and they're having extra showers, it would blow it [the capacity limit] to pieces. (Brisbane participant)*

These are important considerations. As with critical peak pricing tariffs, it is crucial that people are given sufficient warning that their household is being put on a supply capacity control limit and that households are treated fairly, with regard to their circumstances. A single person household does not need to use the same amount of electricity as a family with three young children, or even a single person household where the person has MS and is heavily reliant on using the air-conditioner to survive the heat (particularly during emergency situations which typically occur during periods of extreme heat). So different households would need to be placed on different supply capacity control limits, depending on their circumstances. This would not be easy to figure out. But if we are to ensure that supply capacity control limits are used fairly it is crucial that effort be put into arriving at a differentiated approach to supply capacity control limits that takes account of variance in households' electricity needs and individual circumstances.

Similarly, people's needs must be accommodated when informing households that they are being put on a supply capacity control limit. A single method of communication will not do, given the obstacles that some people have to audio communication (the Deaf and those with poor English), that others have to written communication (those with vision impairment), and that others have to sms and email (the elderly). A combination of media will need to be used to ensure that people are adequately aware of the need to curtail their electricity use for a short interval or risk losing supply. This information must also be provided in an *intelligible* way so that people can easily understand the ramifications of what being put on a supply capacity control limit means in terms of their ability to use appliances. Telling people that for the next eight hours they will lose their power if the use more than 10 kWh of electricity, for example, may mean nothing to them. It would be far more helpful to provide information in way

that gives people an indication of the sort of appliances that they can still feasibly run without exceeding their limit. As one pensioner in Melbourne put it,

> *What does that mean [a 10 kWh limit or another such figure]…what does that mean that we can use and like which machines take what? I think they would have to explain to people exactly what you can use within that amount.*

One of the points raised here was the lack of real-time feedback currently available to households on their electricity use. People currently rely on their quarterly bill to tell them how much electricity they have used and how much their household uses on average each day (and as we have seen with people with vision impairment, not everyone is even able to access this sort of consumption data). So, unless people are informed about the sorts of appliances that they can use within given capacity limits, it would be difficult for them to know whether or not they are nearing their capacity limit. But leaving aside these concerns, people in the focus groups could still generally appreciate the benefit of using supply capacity limits *in emergency situations*. What was far more disconcerting to focus group participants was the idea of electricity retailers using the supply capacity control function of the smart meter as a way of managing people's electricity accounts.

Supply capacity control limits as a retail product

In the national cost-benefit analysis and in subsequent reports issued by the Ministerial Council on Energy it has been proposed that the supply capacity control functionality of the smart meter could be used to allow retailers to develop new products based on households' capping their electricity use (much like broadband and mobile phone plans, though instead of having your connection slowed or having to pay extra for usage above your quota limit, your connection would cut out temporarily above an agreed threshold of electricity usage over time). Here, it has been suggested that retailers could offer supply capacity products to low-income customers struggling with the management of their electricity costs 'or as an alternative to disconnection for defaulting customers.'[1] In other words, instead of a defaulting customer being threatened with disconnection, that customer could instead have their electricity supply limited to only a few kilowatts per day until they are no longer in debt to their electricity provider. This idea has been taken up by the Ministerial Council on Energy, which is now looking at developing a base capacity limit that can be applied to households at risk of disconnection because of payment difficulties:

> [The Standing Committee of Officials] will consider minimum terms and conditions for supply capacity control following completion of the [National Stakeholder Steering Committee's] work. The terms and conditions are likely to include a minimum capacity limit that could be applied to any customer's premise. SCO would expect that this limit would not prevent customers from running basic appliances such as fridges, freezers, heaters, cooking appliances and lights. SCO expects that further work will be needed to identify the minimum kilowatt (kW) level required to run basic household appliances.[2]

Alternatively, retailers may offer pricing plans to customers facing financial hardship with discounted rates for limiting their electricity use below a certain threshold as a way of helping these customers to keep their electricity costs down.

[1] NERA Economic Consulting, "Cost Benefit Analysis of Smart Metering and Direct Load Control: Overview Report for the Ministerial Council on Energy Smart Meter Working Group (Phase 1 Overview Report)," 16.
[2] Standing Committee of Officials of the Ministerial Council on Energy, "Smart Meter Customer Protection and Safety Review - Draft Policy Paper One," (2009), 25.

Focus group participants were rightly alarmed that these sorts of supply capacity control products could be used to force or entice poorer households into accepting a sub-standard level of electricity supply, especially if supply capacity control limits were used as debt management tools.

> *"I can't see the point in retailers having access to it. If the idea is to manage load, and one would hope that it is to manage load, not to economically target people or make money or whatever, therefore I can't seen any actual need for the retailers to have that ability [to instigate supply capacity control]."*

As participants in Adelaide commented:

> *We could end up with a definite class distinction, people who can afford power and people who can't afford power*
>
> *It seems to be punishing the people who are the most vulnerable and who, you know, can't afford to, you know, meet their needs compared to the amount of income they are getting…It seems to be punishing people who are already in those situations. It seems to be giving them another hardship to deal with.*

The last comment came from Linda, a young university student from a large refugee family living in public housing in the suburbs of Adelaide. There are eight children living in Linda's home and her mother is a widow trying to survive on a fixed income. They don't have any insulation in their home and they rely exclusively on electricity for all their energy needs:

> *The problem is staying warm in winter…That's our problem, just heating bills and the fact that we have an electric stove. Yeah, that's the thing as well, because it's all electric…Like a lot of refugee families have large families, whether it's immediate or extended family…It would be better for us to have gas, but a lot of the house are electric.*

Because of their large size and reliance on electricity use, Linda's family are substantially in debt to their electricity retailer having recently received a quarterly bill for $1500. A family like hers would be prime candidates for being put onto a supply capacity limit as part of a debt management plan, as would the almost 11,000 households in Victoria and nearly 15,000 households in Queensland who had their electricity supply disconnected in 2008-09 because of payment difficulties.[3] But if time-of-use tariffs are introduced, the number of households at risk of having their electricity supply limited could be even higher as low-income households with 'peaky' loads struggle to cope with spikes in their winter and summer bills from higher heating and cooling costs.

Even if supply capacity control limits are not used as coercive debt management tools but instead offered as *voluntary* retail products there is still a danger that people who are already struggling to afford electricity use could be tempted to cap their electricity use at an absolute minimum because of cost concerns. For instance, a pensioner struggling to live on a fixed income may decide to commit to a low capacity plan with a low tariff rate not because they believe that this limited plan is sufficient to meet their needs, but because they have no money to cope with rising electricity costs and the only way to bring their costs down is to get the low tariff rate for agreeing to cap their electricity use at an absolute minimum. As one participant in Adelaide with a cost-sensitive father–in-law living on a fixed income commented:

> *I'd be worried about some of the elderly saying, 'I'm not going to run the heating, I'm not going to run airconditioning because I can save money.' We've already got that now; they're worried about their*

[3] See Essential Services Commission Victoria, "Energy Retailers Comparative Performance Report 2008-09: Service to Customers," (Melbourne: Essential Services Commission Victoria, 2009), Queensland Competition Authority, "Small Electricity Customer Disconnection and Complaints Data," (Brisbane: 2009).

power bills. But if you're suddenly, if they are put in a situation of signing a contract, they can become so confused in the fact [sic.] of 'oh well, I'll get benefits if I keep it down low', that they will go overboard keeping it down low. You see that with some of the savings on some of the things that they do now…They will go to extraordinary lengths to get their power bill down and it could be very detrimental to their health.

She gave the example of her father-in-law:

I have a father-in-law who won't use the air-conditioner in summer, won't run the heating in winter, he's buying black and gold because he perceives that on the pension he cannot live…If a contract like that was offered to him, he'd say oh right they tell me I can boil the kettle X number of times during the day, I can have my TV on for a coulple of hours. But he may then say, 'oh well, I'll sign on for that but I won't run my air-conditioner ever again'. Because he's got like dementia, it's automatically out the window as far as he is concerned…You will have people who will put their appliances on the shelf and say 'I'm not going to use them'. And they may start, even if you've got an electric stove; it costs too much to run an electric stove. You've got old people and they are eating out of cans, cold food because they don't want to heat it; it costs money to heat…A second class rate of energy use; a second class life.

Similarly, unless the significance that particular capacity limits have for people's actual appliance usage is conveyed to people, they may find themselves locked into contracts at a capacity limit far below what they actually need to operate the appliances in their home that they rely on to meet basic needs.

What you're suggesting would need to be attached to some kind of financial counselling services…and that would need to take account of the average pattern of electricity use of electricity for the whole year. Because, obviously, whoever you are, 30 watts an hour might be fine in the summer, but if you're trying to keep warm in the winter, then you might need 50. So the contract then becomes a very complex one. And once you set up a complex contract that costs the supplier money and I think consumers would need to be reassured that the kind of contracts they were getting into were going to be in the consumer's best interest and not the supplier's. (financial counsellor, Adelaide)

Is there like going to be some sort of financial counselling or some sort of, you know, counselling, to the people affected to tell them that, you know, in real terms if you go over this amount, this is how much money you are going to lose, or this is how much it is going to cost? Practically, what is it going to mean for you and your family. There should be some sort of counselling to, you know, culturally and linguistically diverse people as well… Or if someone is like a carer, or if someone has a diability, so that it's responsible. (Linda, Adelaide)

There would also be issues around accommodating each household's needs in supply capacity retail products. For instance, people didn't think that it would be fair to offer households of different sizes the same supply capacity limit products, with the same discounted tariffs. A high-income couple who both work full-time, don't have any children, and use gas for heating and hot water may do very well on a supply capacity control product that limits their electricity use to 20 kWh per in exchange for a discounted tariff rate because:

- the entire household is at work during the day-time (benefiting from the electricity use of their employer)
- Their access to gas heating and hot water reduces their dependency on electricity use to meet essential needs
- They have an efficient appliance mix that enables them to maximise the value of their electricity use

But a much larger household that is totally dependent on electricity would struggle on such a limit. If each household were offered equivalent products with similarly discounted tariff rates, the higher-income household with no children could find themselves saving on their electricity costs without having to sacrifice any consumption whereas larger households would be forced to heavily curtail their electricity use just to keep within the capacity limit and may then struggle to heat and cool their homes as they would like. Consequently, while the use of supply capacity control limits as a load management tools in emergency situations undoubtedly has many advantages, allowing retailers to access this function of smart meters to develop new retail products or as a debt management tool raises serious concerns about whether households in situations of financial hardship will be able to access the level of electricity use that they need to meet basic and essential needs.

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