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# Changing Demand: Flexibility of energy practices in households with children

Final Report

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Beyond Behaviour Change  
Research Program

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## SUMMARY

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This report summarises the findings and recommendations from a one-year Consumer Advocacy Panel (CAP)-funded Australian study titled *‘Changing Demand: Flexibility of energy practices in households with children’*. The study was conducted in two stages involving in-depth household interviews, tours and observations (Stage 1); and a national survey with households with children (Stage 2). This final report focuses mainly on Stage 2 findings. The project’s Interim Report presents more detail on the Stage 1 research (Nicholls & Strengers 2014).

### WHY STUDY HOUSEHOLDS WITH CHILDREN?

Starting a family is a major change in most people’s lives. It is a time of changing priorities and household routines. Larger households with children face ongoing pressures and competing demands on their time as children go through different stages of development. These ongoing changes have important implications for families’ ability to participate in and adapt to electricity market reforms and demand management initiatives, such as cost-reflective pricing.

Households with children represent 27 per cent of Australian households, experience more difficulty paying energy bills, have reduced family income and higher and less predictable energy use, are more likely to be at home during the day, are more likely to adopt new technologies, and may contain children who are more vulnerable to heat and cold than healthy adults.

### STUDY AIMS

This is the first Australian study conducted on the flexibility of routines in households with children and their changing household practices. The project aimed to:

1. increase the evidence underpinning advocacy intended to reduce the vulnerability of family households to rapid changes in the energy market and pricing structures (despite this significant consumer class often not qualifying for ‘low-income’ assistance); and
2. better understand what changes in energy use larger households have made in recent years and are likely to make in the future, how (in)flexible their household energy practices are at different times of the day, and what protection(s) and assistance is required to benefit this consumer group.

The study engaged with two of CAP’s 2013 research priorities relating to national electricity and gas markets:

1. **Changing demand profiles** — How has household demand changed in recent years? What are the drivers for those changes? Where is demand likely to go in the future?
2. **Tariff design** — What are the likely implications for different classes of consumers of any move toward more cost-reflective network tariffs?

### METHODOLOGY AND CONCEPTUAL APPROACH

The *Changing Demand* project employed mixed methods. Stage 1 involved 44 in-depth interviews and home tours with households in NSW and Victoria (capital city and regional areas) conducted in March – May 2014. Stage 2 involved a national *Family Energy Study* survey informed by the Stage 1 interview findings and conducted in September – October 2014. Data cleaning resulted in a final dataset of 547 survey responses which exceeded the target of 500 responses.

The research adopted a social practice conceptual approach advanced by the researchers in past work. This approach views electricity consumption as an outcome of participating in shared social practices which are routinely carried out. The analysis sought to emphasise the role, flexibility and changing routines in households with children. Focus was placed on four key ‘activity domains’

which contribute to the majority of average and peak energy demand in Australian households (thermal comfort; cleanliness and care; food provisioning; and entertainment, work and study).

Additionally, the research team analysed what parents and guardians thought about electricity usage, bills, tariffs and market choices, and how these considerations intersected with or impacted on their everyday routines. The empirical research was complemented by a short review of web-based, publicly available advice on heating and cooling recommendations for babies and young children (Appendix 6.3).

## **FINDINGS**

### **Priorities and routines at home**

- Parents faced additional or heightened pressures since having children including increased work to be done in less time, reduced focus on personal needs, and extra emotional and financial pressures. Most survey respondents reported being focused on doing what's best for their children (99%) and using time efficiently (73%). Parents' routines were commonly coordinated around the needs and expectations of their children. Family comfort and quality family time were more important than the management of energy use.
- Nine out of ten survey respondents said that 'we rely on routines to make our days manageable'. Many activities were routinised during the mornings and late afternoon/early evening period. During the 'family peak' period, which coincides with the TOU peak tariff period, many practices were bundled together (e.g. homework, cleaning, washing, food preparation and bathing). This reflects parent's need to respond to external activities (e.g. work and school), create a positive bedtime routine for their children, and/or achieve their aim of creating some 'downtime' later in the evening.
- Some household activities were performed in unpredictable 'time gaps' which are coordinated around children's routines (e.g. napping, playing or bathing). Over 80 per cent of survey respondents said 'housework gets done whenever there is a bit of time available'. This made planning and scheduling some activities at specific times of the day difficult (e.g. laundering, house cleaning, preparing dinner).
- Eighty four per cent of survey respondents agreed that 'frequent disruptions to household routines are part of having a family'. These disruptions included illness, school holidays, shift work, visitors or sporting events.

### **Financial insecurity and disadvantage**

- Many households with children were experiencing financial insecurity, including one in five households who are on high incomes. Financial pressures were widespread in low-income and sole parent households, and were also affecting other households with children that may not have access to financial assistance with energy bills.
- Disability and health-related issues including asthma, allergies, skin conditions, Multiple Sclerosis, Asperger's syndrome, epilepsy and mental illness affected the timing and frequency of many activities that use energy in households with children (e.g. bathing, heating). Thermally inefficient housing (including social and rental properties) and inefficient appliances were undermining attempts to save energy.
- Some households with children experienced discomfort when restricting or avoiding use of heating to save money.

### **Tariff uncertainty and disengagement**

- Many parents were uncertain about the details of their electricity tariff including whether they have off-peak electricity, or the times that off-peak rates apply. Over a third of survey respondents said they didn't know their tariff structure and another third of respondents who did were uncertain if they had selected the correct one.
- In couple households, more men than women had sole responsibility for making decisions about retailer and tariff choice. Tariff uncertainty was lower for men and higher for sole parents and respondents from low-income households.
- Engagement with tariff and retailer choice was low in many households with children. Many parents had little time, interest or trust to investigate tariff choice and available energy information. Provision of more information through websites or printed materials is unlikely to resolve this issue.
- Just under half the survey respondents who reported being on a tariff with an off-peak rate (TOU or two part off-peak tariff) did not know what time their off-peak tariff started.

### **Household activities, timing and (in)flexibility**

- Widespread (mis)understandings of 'off-peak' electricity (e.g. cheaper electricity late in the evening) meant that many households were already doing some activities outside peak times. For example, about 40 per cent of households that don't have off-peak rates already ran their dishwasher outside the peak period. The findings suggest that 'easy' options for households with children to respond to TOU tariffs may be less than anticipated.
- Half of the households on a TOU or off-peak tariff did not change their activities to save money. Of the 44 per cent that had responded, the main activities changed were running the dishwasher and/or washing or drying laundry.
- Some households had concerns about safety, noise, impact on clothing (creasing, smell etc.), and/or reduced downtime for parents resulting from running dishwashers, washing machines or dryers late in the evening.
- Clothes dryers were used by many families with children on a regular or occasional basis because of their convenience and time efficiency, the limited availability of drying space, or safety concerns (e.g. not wanting to leave children unattended while hanging washing).
- Most (92%) survey respondents cited 'home-cooked, healthy food' as being a priority for their family. Time efficiency and health considerations meant that some households were shifting cooking activities away from gas cooktops and ovens to electric appliances such as slow cookers, microwaves or the Thermomix. This change is likely to increase the 'peakiness' of electricity use in households that previously used gas as the main energy source for cooking.
- The number and type of ICT devices was increasing in family households and being incorporated into a range of practices related to school, work, entertainment and communication. Two thirds of survey respondents at least somewhat agreed that they felt in 'control of how much time their children spend using ICT devices'; however two thirds were also concerned that their children spent too much time using ICTs.

- There was considerable disagreement in family households about heating and cooling. Children turned heaters on or up themselves in 30 per cent of households, and this figure was higher in households with teenage children (52%). Similarly, children turned the air conditioner on (or up) themselves in 20 per cent of households (42% in households with teenage children).
- Electric heaters were used for cold weather bath time in 40 per cent of 218 households with children. The figures were very similar for use of electric heaters to warm children's bedrooms, which highlight that room heating complements other activities (bathing, sleeping etc.) in a significant proportion of both electric and gas heated households.
- Parents' understandings of the healthiest approach to room temperature and heating for babies were varied. Approximately half (49%) the survey respondents thought that heating the room for a sleeping baby was healthy; 21 per cent thought it was unhealthy. These findings reflect the conflicting range of information available to parents on this topic (see Appendix 6.3).

#### **Flexibility on an occasional basis**

- Acting for the 'common good', for example to prevent an electricity outage and/or be part of a community effort, appealed to most parents.
- Family routines were more amenable to disruption on an *occasional* basis for non-financial reasons — 85 per cent of survey respondents said they would reduce electricity use for a 'peak alert' in hot weather. This finding was unaffected by gender, household type, income status, work status and climate.
- A range of activities considered inflexible for a hypothetical TOU tariff were considered flexible in response to a peak alert by most survey respondents. These included home cooling (air conditioning), TV viewing, ICT activities, and cooking the evening meal. In addition, 40 per cent of survey respondents considered leaving the home to reduce their electricity use for a peak alert scenario.

## **RECOMMENDATIONS**

### **1. Provide optional TOU tariffs**

Given the importance of routine during the peak tariff period and difficulties shifting routines on a regular basis, TOU tariffs may place an unfair burden on households with children. As such, cost-reflective tariffs such as TOU should be optional for households with children, and financial opportunities should not be overstated. Further, households with children should be able to opt-out of TOU tariffs without financial penalty. Ways to financially support some households with children that experience increased costs as a result of cost-reflective tariffs are also recommended.

### **2. Reassess focus on tariff choice and information**

The current emphasis on providing more information and tariff choice to households may be misguided, and is unlikely to achieve positive financial outcomes for households with children or useful demand management outcomes. While clear information is important, more consideration of alternative ways to support households with children to reduce energy demand, lower their bills and shift energy consumption outside peak times is needed. Suggestions include tailoring specific demand management programs towards parents (see Recommendation 5), increasing access to energy efficiency initiatives, and improving the thermal performance of new and existing housing.

### **3. Adopt non-economic understandings of consumption and change**

Economic understandings of consumption are not a good indicator of how or why households with children use energy to carry out their daily activities. Regulators and others seeking to achieve demand shifting in households should adopt other non-economic understandings of consumption and change, such as those used to conduct this research. In particular, understandings of householders' community responsibility towards energy and electricity assets, the important role of gender in family households, and the dynamics of family routines, are needed to inform energy reforms with this and other household groups.

### **4. Further research on changing household practices**

This research identified a number of key areas where households with children are experiencing rapid change (cooking activities, home cooling (and heating) and practices involving ICTs). Some of these have potentially important ramifications for proposed energy reforms and require further in-depth research.

### **5. Demand management programs premised on 'non-financial' understandings of consumption and change**

The research found that *occasional* requests for households with children to disrupt their routines to assist with managing peak demand issues were a more positive proposition than incentivising families to *regularly* shift their weekday routines in response to a TOU tariff. While occasional and non-financial demand management programs, such as a 'peak alert', are unlikely to appeal to all households with children, they may provide a more positive platform to address demand management issues with this group of households. Further trialling the concept of a 'peak alert' with households with children is recommended, alongside alternative demand management programs that build on these findings. These might include:

- Providing better and free access to cool spaces during critical peak demand days, such as extending library and pool opening hours, supporting families to spend time in shopping centres without needing to spend money, or providing free peak period movie tickets.
- Developing programs that assist vulnerable households to stay cool while conserving air conditioning at home, e.g. 'Share the Air' campaigns that encourage households to share their air conditioning with neighbours on very hot days.
- Engaging with the health sector to provide consistent messages about heating and cooling and children's health which are sensitive to peak demand and energy issues.

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## GLOSSARY AND ABBREVIATIONS

<b>ABS</b>	Australian Bureau of Statistics
<b>Air conditioning</b>	Refers to air conditioned <i>cooling</i> .
<b>CAP</b>	Consumer Advocacy Panel
<b>Children</b>	Occupants of households who are living with their parents or another guardian (usually 18 years old or less but sometimes older).
<b>Controlled load tariff</b>	Tariff with off-peak electricity rates for particular appliances, e.g. hot water, floor heating
<b>Households with children/ family households</b>	Households in this study (which included at least one parent and one dependent child 18 years or less, and usually at least three occupants, living in the home on a part- or full-time basis).
<b>Flat rate tariff</b>	Single rate or peak rate or block tariff (may include seasonal variations)
<b>HH/ HHs</b>	Household/ households
<b>ICTs</b>	Information and communications technologies
<b>IHD</b>	In-home display
<b>LPG</b>	Liquid petroleum gas
<b>N/A</b>	Not applicable
<b>Parents</b>	In this report the use of the term ‘parent’ includes all guardians of children living in their home including step-parents, grand-parents, foster-parents and those with overseas students living with them. Parent is also used interchangeably with householder, participant and (survey) respondent.
<b>PV</b>	Photovoltaic (solar PV)
<b>Sole parent household</b>	Household with one parent who is not in a couple relationship with anyone usually resident in the same household, and including at least one dependent child usually resident in the household.
<b>Smart meter</b>	Interval meter
<b>Teenagers</b>	Refers to children approximately 12-18 years old.
<b>TOU tariff</b>	Time-of-Use (3-part) tariff; refers loosely to all 3-part TOU tariff times as advertised in different Australian states or by different Australian retailers.
<b>Two rate / two rate off-peak</b>	Tariff with peak and off-peak rates for electricity use, e.g. off-peak rates for electricity used 11pm – 7am (distinct from controlled load tariffs – above).
<b>TV</b>	Television
<b>Young adults</b>	Refers to children approximately 19-25 years old living in the home.

# 1 INTRODUCTION

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The *Changing Demand: Flexibility of energy practices in households with children* project investigated the practices and priorities households with children juggle during busy times of the day, and how these relate to energy demand concerns and proposed energy reforms. The project aimed to understand:

- what changes in energy use larger households (households with one or more children) have made and are likely to make in the future;
- how (in)flexible larger household energy practices are at different times of the day; and
- what protection(s) and assistance may benefit this consumer group.

The purpose of the project was to increase evidence underpinning advocacy to reduce the vulnerability of households with children to changes in the Australian energy market. Variable (time-of-use (TOU)) pricing was a particular focus of the project.

The project was funded by the Consumer Advocacy Panel (CAP), which facilitates customer advocacy in electricity and national gas markets in Australia. In 2013 CAP identified a number of research priorities relating to national electricity and gas markets. This project addressed two of these:

- **Changing demand profiles** — How has household demand had changed in recent years? What are the drivers for those changes? Where is demand likely to go in the future?
- **Tariff design** — What are the likely implications for different classes of consumers of any move toward more cost-reflective network tariffs?

The project was conducted in two stages during 2014. Stage 1 involved in-depth interviews, tours and observations with 44 Victorian and New South Wales (NSW) households with children. Stage 2 involved a national *Family Energy Study* survey with parents (N=547). The project team produced a mid-year interim report (Nicholls & Strengers 2014) which summarised the findings from Stage 1. This final report draws on data from both stages of research, but focuses mainly on Stage 2 (survey) findings. The reports are intended to be read in tandem; this report frequently refers readers to the Stage 1 report for further information.

This report is organised as follows. Section 1 (Introduction) outlines background to the project scope and aims, describes the conceptual approach and study scope, provides a justification for the project's focus on households with children, and provides advice on how to read the report and data. Section 2 provides an overview of the project methodology, focusing on Stage 2 survey design, recruitment, respondent and household characteristics, and limitations and exclusions. Section 3 discusses the project's key findings. These cover:

- priorities in households with children;
- the important of routine in managing everyday life;
- financial insecurity in households with children;
- uncertainties and misunderstandings about household tariffs and electricity issues;
- the timing of specific household activities and their potential flexibility; and
- potential flexibility of activities in response to a TOU tariff or an occasional 'peak alert'.

Section 4 identifies the project's key recommendations.

## 1.1 CONCEPTUAL APPROACH AND STUDY SCOPE

This research was informed by sociological understandings of routine, everyday practice, disruption and time (Southerton 2003, 2007; Shove et al. 2012; Trentmann 2009). Social practice theories understand consumption as a ‘moment’ or outcome of participating in shared practices, such as laundering, bathing, cooking or home cooling (Warde 2005). This conceptual approach follows the authors’ past research on energy demand (Nicholls & Strengers 2013; Strengers 2013), and other international research investigating energy demand as an outcome of interconnected social practices (Higginson et al. 2013; Powells et al. 2014; Walker 2014). Rather than investigating individuals’ attitudes or behaviours towards energy, the study focused on practices routinely performed in and around the home that consume energy (also referred to as ‘energy practices’, ‘household practices’, ‘routines’ and ‘activities’).

In addressing the first key CAP priority regarding changing demand profiles, this project investigated the practices of households with children across four ‘activity domains’. These domains capture most practices performed in the home which use energy and contribute to peak electricity demand (Petchey 2010). The four activity domains are:

- thermal comfort (heating and cooling);
- cleanliness and care (bathing, showering, grooming, house cleaning, household chores, laundering, dishwashing);
- food provisioning (cooking, snacking, baking, food storage); and
- entertainment, work and study (TV viewing and ICT use for work, study, communication and play).

In addressing the second priority regarding tariff design, the project investigated the timing and coordination of daily routines performed by different people in the home (e.g. children and parents) and their potential ‘flexibility’, meaning the degree to which routines could be disrupted or shifted to other times of the day. The project investigated the flexibility of routines in response to different conditions and events, including TOU tariffs. Findings are intended to inform discussion and decisions about the likely impact and effectiveness of cost-reflective pricing and other time-sensitive energy reforms on the routines performed in households with children.

Additionally, the project investigated a range of energy concepts and understandings, such as family householders’ concept of ‘choice’ in the electricity market, and their reactions to and thoughts on different demand management and tariff options. Not all findings are able to be captured or presented in this final report. For further information on any area of this research, readers are encouraged to contact the research team.

## 1.2 HOUSEHOLDS WITH CHILDREN AND ELECTRICITY MARKET REFORMS

Households with children represent approximately 27 per cent of Australian households<sup>1</sup>. These households face a series of unique vulnerabilities and challenges in light of recent and proposed energy market changes including that they:

- are more likely to be at home during the day<sup>2</sup>;
- have reduced family income<sup>2</sup>;
- experience more difficulty paying energy bills (IPART 2010; Simshauser & Nelson 2012) but often do not qualify for concessions and rebates;
- have more occupants and higher and less predictable consumption; and
- have children who may be more vulnerable to heat and cold (see Appendix 6.3).

<sup>1</sup> Australian Bureau of Statistics (ABS) 2013, 2001.0 - Census of Population and Housing: Basic Community Profile, 2011 Third Release.

<sup>2</sup> ABS 2013, 6523.0 Household income and income distribution, Australia, 2011-12.

In addition, households with children often adopt new technologies (Zpryme 2011) and may be more frequently recruited into new practices which consume energy (such as new technologies for entertainment/ schooling etc.). However, little work has been done to understand changing energy use in families (Fell et al. 2014) or the implications of current and proposed changes to electricity tariffs on this consumer group. As the national electricity market moves towards more cost-reflective network tariffs it is important to understand how households with children might respond or adapt to these changes, and what the possible financial or other wellbeing outcomes for families might be.

Three-part TOU tariffs have been introduced in some Australian states both on choice-based (opt-in) and default bases. Three-part TOU tariffs consist of 'peak', 'shoulder' and 'off-peak' rates which apply at different times of the day (see Figure 6 for an example) with the peak rate applying to weekday afternoons and early evenings.

Energy use profile data from AGL Energy indicate that TOU tariffs are likely to have different outcomes for different groups of Australian consumers (Simshauser & Downer 2014). These data suggest that hardship or concession households are more likely than not to benefit financially from a TOU tariff (without changing the timing of their electricity use). However, more than half of households with children are predicted to be financially worse off on a TOU tariff if they do not shift sufficient energy activities to cheaper periods of the day (Simshauser & Downer 2014). This makes understanding the flexibility of activities in households with children an especially important concern.

### 1.3 READING THIS REPORT

In this report, survey response quotes (from open questions) and interview quotes are represented in italics and are included verbatim. As such, they may contain grammatical or typographical errors. Ellipsis points (...) mark an omission from a quotation. Supplementary text for quotations is provided in square brackets ([ ]) where clarification is required. Quotes included are limited to an illustrative selection. Survey response quotes are distinguished from interview quotes by the survey response number (e.g. S436) or interview number (e.g. Int29).

Percentages in figures and text are rounded to the nearest whole number. Totals may not add to 100 when numbers are rounded or question formats allowed respondents to select multiple responses. Some survey statements have been truncated or summarised for the purpose of graphic representation — see Appendix 6.2 for exact wording of survey statements.

This study investigated change in the practices that use energy in households with children. As such, household activities are usually discussed without reference to energy source (gas, electric or otherwise). For example, hot water use during peak times in households with gas or off-peak electric hot water may have no impact on their peak electricity use. However, the timing and performance of a practice — such as bathing children — is particularly relevant to peak electricity use in households with electric hot water systems that heat on demand (e.g. small storage hot water systems, often found in apartments). Greater attention is given to the source of energy when particularly relevant to peak electricity use.

## 2 METHODOLOGY

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### 2.1 OVERVIEW OF PROJECT METHODOLOGY

The *Changing Demand* project was informed by methodologies which seek to understand lived experience. The project employed mixed methods. Stage 1 involved 44 in-depth interviews and home tours with parents in NSW and Victoria (capital city and regional areas) conducted between March and May 2014. The interviews explored the connections, contradictions and complexities of practices which use energy in households with children, how practices are changing, and the temporal organisation and flexibility of these activities. Details of the Stage 1 qualitative research methodology and findings are presented in detail in *Changing Demand: Flexibility of energy practices in households with children – Stage 1 (Interim) Report* (Nicholls & Strengers 2014).

Stage 2 involved a national *Family Energy Study* survey based on the Stage 1 interview findings. The outcomes of Stage 1 were discussed with consumer advocates at two forums organised by the research team in Sydney and Melbourne. The forums were held in August 2014 and attended by 14 consumer advocates. This process, in combination with the project aims and scope, was used to identify areas of focus for the survey and informed the development of statements which were tested with the larger sample.

The research project was approved by the RMIT University's Human Ethics Committee<sup>3</sup> and all research was conducted in accordance with the University's research ethics guidelines.

The remainder of this section focuses on the Stage 2 (survey) methodology, outlining the survey design; recruitment, response and analysis; respondent and household characteristics; and limitations and exclusions.

### 2.2 SURVEY DESIGN

The *Family Energy Study* survey was designed to test a subset of the Stage 1 qualitative research findings in a broader sample of households and to enable further depth of analysis in key areas. The questions focused on household practices and issues identified in Stage 1 as:

- a) being particularly relevant to households with children (compared with other types of households;
- b) involving changes that may impact energy use and costs; and
- c) being associated with possible vulnerabilities under proposed energy reforms such as cost-reflective pricing.

More specifically the survey questions explored the following areas:

- priorities in households with children;
- practices likely to be performed at different times or frequencies as a result of having children;
- practices commonly carried out at times when TOU peak pricing applies or could apply in the future<sup>4</sup>;
- meanings, competences or technologies associated with certain practices in households with children;
- householder understandings of their current electricity tariff;

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<sup>3</sup> Project Approval Number CHEAN B 0000016372-01/14

<sup>4</sup> The 'peak period' was broadly defined as 2-9pm to accommodate some of the variation in peak pricing periods between states and utilities.

- flexibility of practices in response to peak/off-peak/TOU pricing (experienced or potential); and
- potential flexibility of practices in response to a peak alert.

The survey was conducted online using the Qualtrics web-based survey tool. A combination of online and paper-based survey delivery was considered. A solely online format was selected to allow for the inclusion or exclusion of survey questions depending on earlier responses. In 2012-13, 96 per cent of Australian households with children aged under 15 years reported having access to internet at home<sup>5</sup>. The design and delivery format enabled survey completion on small screen devices such as smart phones; however respondents were advised that they may find the survey easier to complete on a computer.

The survey was tested for clarity of wording, flow, logic, length of time to complete and any other issues. Draft surveys were completed by colleagues, family members and friends of the research team prior to launching the survey. The survey content was limited to enable respondents to complete the survey within approximately 20 minutes. Survey questions are included in Appendix 6.2. Optional open response questions were included throughout the survey to provide respondents with opportunities to provide comments, additional information and clarifications.

## 2.1 SURVEY RECRUITMENT, RESPONSE AND ANALYSIS

The *Family Energy Study* survey was open to all Australian households with a connection to the electricity grid and at least one child (aged under 18 years) living at home on a full- or part-time basis. One adult (parent) from each household was invited to complete the survey. A prize draw with two AU\$500 ColesMyer gift vouchers was offered to incentivise participation. The survey is not representative of any population group, but recruitment methods did aim to capture a broad range of national and demographic characteristics (climate and state variation, income etc.).

The research team distributed the survey weblink and information about the study through the project website (<http://familyenergystudy.net>), a media release, community radio, social media, online forums, newsletters, and emails to individuals and organisations considered likely to have contact with households with children. The range of organisations and groups approached to distribute the survey included consumer advocacy organisations, social service agencies, maternal/child health and childcare centres, play groups, schools and other educational institutions, parents and citizens organisations, community centres, parenting support groups and networks, local councils, low-income energy efficiency program initiatives, rural/regional parents groups, disability support groups, and co-operative housing organisations.

The survey was open for six weeks during September and October 2014. Response rates were monitored over the survey period and further distribution efforts were directed towards sections of the population with initially low response numbers, such as low-income and regional households, and particular states and territories. In addition, a paid advertisement was used to distribute the survey via sole parent networks.

The survey was started 874 times and 684 (78.2%) respondents reached the end of the survey with over 90 per cent of relevant questions answered ('complete' responses). Incomplete responses were discarded. For logistic and equity purposes, sole parent households with one child were not excluded from responding to the survey (or the gift voucher incentive prize draw). However, the research was originally designed to focus on 'larger' households with dependent children — defined as at least three occupants including at least one child less than 18 years old. One hundred and thirty responses from two person households (one parent and one child) were not included in the analysis for this report but may be included in further analyses. Data cleaning resulted in a final dataset of 547

<sup>5</sup> ABS 2014, 8146.0 - Household Use of Information Technology, Australia, 2012-13

responses which exceeded the survey target of 500 responses. Survey data were analysed using the IBM SPSS Statistics software.

In focussing on households with children, this study did not plan to compare subgroups of households within this already defined group. However, given the high proportion of sole parent and low-income households who responded to the survey (see Section 2.2), and feedback from consumer advocates indicating particular interest in these households, comparisons were made in response to selected questions. In addition, the household's location (e.g. state/territory or climate) or respondent gender was included in some analyses where relevant according to other research or qualitative findings from this study.

## 2.2 SURVEY RESPONDENT AND HOUSEHOLD CHARACTERISTICS

The final survey dataset comprised 547 eligible responses. More households living in Victoria participated in the survey than any other state (see Table 1). The overrepresentation of Victorian households (46% of responses) occurred alongside an underrepresentation of households from other states and territories, except South Australia.

*Table 1 State-based comparison of survey numbers with national households with children figures<sup>6</sup>*

State / territory	No. of survey responses	% of survey responses	No. of HHs with children that live in state/territory <sup>7</sup>	% of Australian HHs with children that live in each state/territory
Vic	253	46.3%	536113	24.6%
NSW	124	22.7%	700209	32.1%
Qld	87	15.9%	451832	20.7%
SA	41	7.5%	156704	7.2%
WA	30	5.5%	229291	10.5%
TAS	8	1.5%	50040	2.3%
NT	2	0.4%	21328	1.0%
ACT	2	0.4%	36655	1.7%

HH=household

A summary of survey respondents and their family and household characteristics are provided in Table 2. Specific characteristics of note are discussed below.

**Sole parents:** Sole parent households represent about 21 per cent of Australian households with children<sup>7</sup> but contributed almost 42 per cent of eligible survey responses. The overrepresentation of sole parent households was stronger in non-Victoria locations and had other implications for the survey sample (discussed below).

**Gender:** Consistent with the gender representation in Stage 1 of the project, about 85 per cent of survey respondents were female. This gender bias is likely to be due to a combination of factors including:

- greater exposure of the survey invitation to women (because mothers are more likely to attend child and family services and organisations);

<sup>6</sup> ABS figures are for households with children aged less than 15 years. Survey data include households with children less than 18 years. Therefore these figures are only indicative of the proportion of households with children living in each state or territory.

<sup>7</sup> ABS 2013, 2001.0 - Census of Population and Housing: Basic Community Profile, 2011 Third Release



- the high number of sole parent households headed by women (97% per cent of sole parent respondents were female and 84% of sole parent households with dependents are headed by women<sup>8</sup>); and
- the survey being largely focused on 'housework', domestic and child-care activities, which are more likely to be performed by women in Australian households with children<sup>9</sup>.

Given these points, a gender bias towards female respondents was expected and is appropriate for this study.

The *Family Energy Study* survey sought to take into account whether the respondent was the person who performed particular home activities in question. This is particularly important when discussing the possibility and likelihood of change in the timing and performance of particular practices. Section 2.3 includes further discussion on the implications of low participation of fathers.

**Number and age of children:** The average of 3.9 occupants per surveyed household compares to the Australian average of 2.6 occupants per household in Australia<sup>10</sup> and is in line with the study focus on larger households with children. An average of 2.1 children aged less than 18 years old lived in each surveyed household and the predominant age group of children was 5-11 years (46% of children). Twenty-nine per cent of children were aged less than 5 years and about one quarter were aged 12-17 years. Any children over 18 years old were counted in the numbers of adults living in the home.

**Age of respondents:** Most survey respondents were 25 to 44 years old (78%). This reflects the average age at which women have their first child in Australia (29 years old<sup>11</sup>). The relatively young age of survey respondents is also a likely contributor to some other demographic observations in the survey sample (e.g. housing tenure, see Table 3). However, few very young parents (under 25 years old) participated in the survey and none were under 20 years old. Some parents who had their first child when aged less than 20 (approximately 8% of new mothers; Weston & Qu 2014) are likely to have participated at a later stage of raising their family.

**Cultural and linguistic diversity:** About 21 per cent of survey respondents were born outside Australia which is lower than the average across the Australian population (26%<sup>12</sup>). In addition, just over 50 per cent of migrant respondents were born in predominantly English-speaking countries (United Kingdom, New Zealand and USA) and only 57 respondents (10%) usually spoke a language other than English at home. This figure is not directly comparable to ABS data indicating 23 per cent of Australian households speak another language at home at least some of the time<sup>13</sup>. The highest numbers of migrant respondents from non-English speaking countries were from India (nine respondents) and Malaysia (five respondents). However, it is unlikely that the survey findings adequately represent any differences in culturally and linguistically diverse households in Australia.

**Work and education:** Survey respondents were most commonly working part-time or casually (40%) with the remainder working full-time or not employed in paid work (approx. 30% each). Sole parents were less commonly in full-time paid work (15%) than parents in couple relationships (44%). Eighty per cent of male respondents were employed in full-time paid work compared to 23 per cent of females. It was more common for females to be in part-time paid work (45%) and less common for males to be unemployed or occupied in full-time home duties (8%) compared to females (32%). These findings are generally consistent with trends in Australia for households with children (Baxter

<sup>8</sup> ABS 2013, 6224.0.55.001 - Labour Force, Australia: Labour Force Status and Other Characteristics of Families, Jun 2012.

<sup>9</sup> ABS 2009, 4102.0 - Australian Social Trends, March 2009.

<sup>10</sup> ABS 2013, 4130.0 - Housing Occupancy and Costs, 2011-12.

<sup>11</sup> ABS 2012, 4102.0 - Australian Social Trends, March Quarter 2012.

<sup>12</sup> ABS 2014, 4102.0 - Australian Social Trends, 2014.

<sup>13</sup> ABS 2013, 2011 Census QuickStats.

& Gray 2008). The survey population was more educated than the Australian average with 69 per cent having completed tertiary education compared with approximately 32 per cent of the Australian population<sup>14</sup>.

**Income:** The survey aimed to include at least 150 low-income households. Allowing for the complexity of defining low-income for households with children and the associated additional financial responsibilities for households with children, this target was achieved (see also Section 3.1.3). Two hundred and thirty respondent households (42%) had a low-income concession card (e.g. Healthcare Card), 142 (26%) received government pensions and allowances as their main source of income, and 119 (25%) earned less than AU\$700 per week. Higher income households were also represented with 25 per cent of households earning greater than AU\$2000 per week. Consistent with known higher risk of financial disadvantage in sole parent households, a higher proportion of sole-parent respondents were low-income. For example 57 per cent of sole-parent respondents received government pensions and allowances as their principal source of income. This was higher than the national average of 45 per cent<sup>15</sup>. Other indicators of financial stress for respondent households are discussed in Section 3.1.3.

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<sup>14</sup> ABS 2011, 2011 Census of Population and Housing 2011.

<sup>15</sup> ABS 2010, 1370.0 - Measures of Australia's Progress, 2010.

Table 2 Respondent and household characteristics

<b>Household (HH) type</b>	<b>No.</b>	<b>%</b>	<b>Respondent place of birth</b>	<b>No.</b>	<b>%</b>
Couple with child(ren)	315	57.6%	Australia	429	78.9%
Sole parent with child(ren)	229	41.9%	Other	115	21.1%
Guardian of child(ren)	3	0.5%			
<b>Occupants in home</b>			<b>HHs with low-income concession card</b>		
3	198	36.2%		230	42.0%
4	239	43.7%	<b>Work status</b>		
5	77	14.1%	Full-time paid work	173	32.0%
6+	33	5.1%	Part-time or casual paid work	215	39.7%
Average occupants/HH (ABS=2.6)	3.9		Full-time home duties / No paid work	153	28.3%
<b>Respondent gender</b>			<b>Main source of HH income</b>		
Female	459	84.8%	Wages, salary or own business income	397	72.8%
Male	82	15.2%	Government pension or allowance	142	26.1%
			Investments / Other	6	1.1%
<b>Respondent age</b>			<b>HH gross income/week (AU\$)</b>		
20-24 years	4	0.7%	Less than \$400	20	4.2%
25-34 years	117	21.4%	\$400-\$699	99	20.8%
35-44 years	310	56.8%	\$700-\$999	95	20.0%
45-54 years	104	19.0%	\$1,000-\$1,499	81	17.1%
55-64 years	10	1.8%	\$1,500-\$1,999	63	13.3%
65+ years	1	0.2%	\$2,000-\$2,500	52	10.9%
			More than \$2,500	65	13.7%
			Not provided (72)		
<b>Ages of children in respondent HHs</b>			<b>Respondent education (highest qualification)</b>		
Under 5 years	340	29.4%	Tertiary	376	68.7%
5-11 years	529	45.8%	Vocational	70	12.8%
12-17 years	287	24.8%	Year 12	46	8.4%
Total children under 18	1156	-	Year 10 or below	55	10.0%
Average No. children under 18 / HH	2.1	-			

N=547 (except where demographic questions were not answered by all respondents, e.g. income)

Respondent households' residential location, housing and energy sources are summarised in Table 3. Specific characteristics of note are discussed below.

**Location and climate:** Most respondents lived in capital cities (69%), 17 per cent lived in regional cities and centres, eight per cent in country towns and six per cent in rural and remote areas. Although these categories are not directly comparable to ABS categories, this distribution of household urbanisation is broadly consistent with the Australian population<sup>16</sup>. About one in six households lived in tropical or sub-tropical parts of Australia where it is hot, warm or humid for most of the year. These households are identified in the findings discussed below when discussing weather-dependent activities such as heating, cooling and drying clothing.

**Housing tenure and ownership:** Levels of home ownership were lower than for the national population (57% had a mortgage or owned their home outright compared to the national figure of 67%)<sup>17</sup>. This difference is likely to be associated with the high representation of sole parent households for whom renting private (54%) or public (11%) housing was more common than home ownership. The higher rates of sole parent households living in rental housing are consistent with national figures (63% for private and public housing combined<sup>17</sup>). Low-income concession card households were also more commonly living in rental housing (64%).

**Housing type:** Eighty two per cent of respondent households reported living in a detached home, which is in line the national figure of 76 per cent for Australian households<sup>18</sup> once the higher frequency of young and childless people living in flats and apartments is taken into account<sup>19</sup>. There was very little difference between the dwelling types of couple and sole parent households, or low-income and higher income households. Although the size of detached homes could vary between these groups, these data suggest that financially disadvantaged households participating in the survey were likely to have similar sized spaces to heat, cool etc., compared to other households. Taking into account the predominance of rental housing for sole parent and low-income households (above), and known deficiencies in energy efficiency and energy options in many rental properties (e.g. lack of insulation<sup>20</sup>), many of these families are likely to be exposed to higher energy costs and/or challenges managing their family's energy use and maintaining adequate comfort.

**Solar photovoltaic panels:** The survey only included Australian electricity grid-connected households. Eighteen per cent of households surveyed had solar photovoltaic (PV) panels which is slightly higher than a recent national estimate of 16 per cent of Australian households<sup>21</sup>.

**Energy type:** Sixty-four per cent of surveyed households used mains gas and 10 per cent used bottled gas (five households used both). The mains gas figures are higher than Australian average (48%)<sup>22</sup> and this was likely due in part to the high representation of Victorian households. Similarly, more surveyed households had gas hot water (52%) than electric hot water (35%) compared to national averages (36% and 52%, respectively). Ten per cent of survey households had solar hot water compared to eight per cent of Australian households in 2011<sup>23</sup>. The higher access to gas in the survey sample is a consideration when interpreting findings from this study, as households availability and use of gas may assist or restrict opportunities to change electricity demand (e.g. in association with cooking, heating or use of hot water).

Electricity tariffs and meters in surveyed households are discussed in Section 3.1.3

<sup>16</sup> ABS 2014, 3218.0 - Regional Population Growth, Australia, 2012-13.

<sup>17</sup> ABS 2013, 4130.0 - Housing Occupancy and Costs, 2011-12.

<sup>18</sup> ABS 2012, 2011 Census QuickStats: Dwellings.

<sup>19</sup> ABS 2004, 4130.0.55.001 - Housing Occupancy and Costs, Australia, 2000-01.

<sup>20</sup> ABS 2009, 4602.2 - Household Water, Energy Use and Conservation, 2009.

<sup>21</sup> SunWiz Consulting.

<sup>22</sup> ABS 2011, 4602.0.55.001 - Environmental Issues: Energy Use and Conservation, 2011.

Table 3 Household location, housing and energy characteristics

<b>Residential location</b>	<b>No.</b>	<b>%</b>	<b>Use of gas in home</b>	<b>No.</b>	<b>%</b>
Capital city and surrounding suburbs	375	68.8%	Mains gas	348	63.6%
Regional centre or city	91	16.7%	LPG/Bottled gas	56	10.2%
Country town	46	8.4%	Gas not used	141	25.8%
Semi-rural or rural property	33	6.1%	Don't know	3	0.5%
<b>Climate</b>			<b>Home solar photovoltaics (PV)</b>	99	18.2%
Tropical or sub-tropical	88	16.2%	<b>Hot water system</b>		
Other	455	83.8%	Electric	193	35.3%
<b>Housing tenure</b>			Gas	283	51.7%
Rent privately	191	35.0%	Solar	54	9.9%
Rent public or social housing	25	4.6%	Heat Pump	4	0.7%
Own home with a mortgage	267	49.0%	Other	4	0.7%
Own home outright (no mortgage)	45	8.3%	Don't know	7	1.3%
Living rent-free or low-rent	13	2.4%	No hot water system	2	0.4%
Other	4	0.7%	<b>Interval (smart) meter</b>		
<b>Type of home</b>			Yes	258	47.2%
Detached home (free-standing house)	449	82.1%	No	99	18.1%
Semi-detached home	61	11.2%	Don't know / Unsure	190	34.7%
Apartment, flat or unit	37	6.8%			

N=547 (except where demographic questions were not answered by all respondents)

### 2.2.1 Environmental concerns

Participant recruitment strategies for both stages of research sought to avoid environmental bias. All communications avoided references to the environment and related concepts (e.g. energy saving and conservation). Similarly, environmental organisations were not approached to assist with the distribution of calls for participation and study information (see sections 2.1 and 6.1 and [www.familyenergystudy.net](http://www.familyenergystudy.net)). As part of the strategy to avoid environmental bias, project communications focused on how families *use*, not *save*, electricity as part of their everyday activities. In Stage 1 of the research, a small proportion of interviewees indicated that environmental concerns were part of their understandings of energy consumption in the home. Mostly these concerns were raised by participants in relation to the difficulties (or guilt) they experienced in maintaining what they considered to be environmentally conscious/responsible energy saving activities once they had children.

In Stage 1, participants were not asked about environmental concerns, as it is known that most people express concern for the environment when asked. Hence, allowing this information to be volunteered if relevant gives a more accurate indication of what understandings (environment or otherwise) inform everyday practices that use energy. Given that this strategy is only suitable for interviews, the survey included the statement 'I am concerned about environmental issues' from the American Environmental Values Survey (AEVS), a nationally representative sample of American adults<sup>23</sup>. This statement receives high rates of agreement in the US population: 41 per cent strongly agree; 45 per cent somewhat agree; and 86 per cent are in total agreement. *Family Energy Study* survey respondents' agreement with this statement was similarly high: 47 per cent strongly agreed; 41 per cent somewhat agreed, and 88 per cent were in total agreement. This is also unsurprising given that women generally report more concern than men about environmental issues (Dietz 2007).

In multi-national studies, general questions about interest in environmental issues are similarly high in America and Australia<sup>24</sup> but for most people 'it is neither a personal nor a public policy priority' and competing priorities such as financial issues and personal safety take precedence. While it is difficult to establish beyond doubt that a survey sample does not have an environmental bias, there is nothing to indicate that the *Family Energy Study* survey was biased in this way. As per Stage 1 of the project, a small proportion of surveyed parents indicated in open text responses that they put considerable effort towards reducing home energy use for environmental reasons; however these considerations were often separated from their expectations and 'needs' concerning specific household activities.

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<sup>23</sup> SRI Consulting, 2013. [http://ecoamerica.org/wp-content/uploads/2013/02/AEVS\\_Report.pdf](http://ecoamerica.org/wp-content/uploads/2013/02/AEVS_Report.pdf)

<sup>24</sup> Greendex Index, 2014. <http://environment.nationalgeographic.com.au/environment/greendex/>

## 2.3 SURVEY LIMITATIONS AND EXCLUSIONS

**Self-selection:** As with all research, the validity of the findings may be influenced by some people self-selecting out of or into the project.

**Access to internet:** Households without access to internet at home may be less likely to have participated in the survey. However more households with children do have home internet than households in general. Figures from 2012-13 indicate that approximately four per cent of households with children did not have access to the internet at home during this period, and this limitation is likely to have disproportionately affected disadvantaged low-income households.<sup>25</sup>

**Overrepresentation of sole parent households and representation of households in each state and territory:** See Section 2.2 above. Where state/territory-specific data are included in the analysis, the results presented are limited to states with 40 or more responses (South Australia, Queensland, NSW and Victoria).

**Small households with one parent/guardian and one child:** In accordance with the project focus on 'larger households', households with less than three occupants in total were excluded from this analysis. This criterion excluded sole parent households with only one child living in the home.

**Gender:** While the low number of male respondents in the survey sample was anticipated by the research team and is considered appropriate for this study (see Section 2.2 above), fathers often return home during the peak tariff period and change the household dynamic in important ways that contribute to energy use. Some of these dynamics and the perspective of fathers may be underrepresented in this study.

**Education:** Households with lower levels of education were underrepresented in this study. This outcome is consistent with many surveys and needs to be taken into account when considering the implications of findings. Householders with lower educational attainment and poorer levels of literacy and numeracy are likely to face additional challenges around complexity of tariffs, energy use and electricity information compared with more educated households.

**Culturally diverse households:** The survey sample may not adequately represent the circumstances, experiences and understandings of households born outside Australia (see Section 2.2 above). An additional study with capacity for translation services and targeted engagement with a range of migrant communities is recommended to capture cultural and ethnic diversity. This is especially important when considering the impact of lower levels of English literacy and unfamiliarity with the Australian electricity system on some migrant households' capacity to engage with and understand complexity and change in energy issues.

**Off-grid households:** Households that were not connected to the Australian electricity grid were excluded from the survey due to reduced/lack of relevance to the study's focus on energy reforms and their potential impact on households with children.

**Tropical and desert climate households:** Survey findings were informed by Stage 1 qualitative research findings (interviews and tours) with households living in NSW and Victoria. As such, the survey may not adequately explore issues specific to households with children living in northern parts of Australia or in warmer and tropical climates. Further research with households with children in hotter regions of Australia is recommended to complement this study and address potential climatic differences.

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<sup>25</sup> Australian Bureau of Statistics (2014), 8146.0 - Household Use of Information Technology, Australia, 2012-13.

**Hypothetical responses and access to electricity use data:** Other than observations in homes during Stage 1 of the project, the findings from this study are largely based on self-reported activities, electricity use, and potential change and flexibility. As such, findings are likely to be limited by self-reported action bias common in such studies, where respondents seek to frame their responses in the most positive light (Shipworth 2000). Possible biases are noted at several points throughout this report in relation to specific findings (e.g. see Sections 3.4.1 – 3.4.5). Quantitatively assessing the impact of change and flexibility on energy consumption in households with children would require a longer term study beyond the scope and budget of this research.

**Verification of household electricity tariff:** In Stage 1 of this project some householders were uncertain or could not provide definitive information about their current electricity tariff (e.g. TOU tariff, or other off-peak, flat rate/ block tariff). It is likely that some households incorrectly identified their electricity tariff type. This has important implications for analyses in this and other studies which are based on unverified householder self-reported tariff type. The *Family Energy Study* survey was designed to consider householder uncertainty about their tariff. Future work with households on TOU tariffs would ideally include access to customer tariff information through their electricity provider to confirm actual tariff arrangements.

**Focus on TOU tariff peak period:** Due to the constraints associated with designing a survey that was short and easy to understand, the survey questions predominantly focused on activities being carried out during common peak tariff times (2-9pm weekdays) and their potential to be shifted to other times of the day. As such this study doesn't fully investigate household potential to shift shoulder period activities to off-peak times or peak activities to weekend shoulder periods. However, some of the activity-specific and general issues identified in the study/survey could apply to other tariff times.

**Solar PV and other electricity generation at home:** This study does not address the impact and implications of increasing home-based electricity generation.



### 3 DISCUSSION OF FINDINGS

#### 3.1 PRIORITIES AND ROUTINES IN HOUSEHOLDS WITH CHILDREN

*‘[Having children is] the complete opposite of not having children. There’s no space, there’s no time, there’s heaps more stuff, and everything is all about somebody else, it’s never about you.’ Int41*

Starting a family and raising children represent fundamental life changes which shift a household’s priorities away from adult members (parents), and onto the health and wellbeing of their children and family. This section discusses some of the key changes and shared priorities parents juggle as they go about the everyday practices in their homes. The key changes and priorities for households with children identified in Stage 1 of the project are summarised in Box 1.

*Box 1 Key changes and priorities in households with children (Stage 1 findings)*

KEY CHANGES	PRIORITIES		
<ul style="list-style-type: none"> <li>• Increased time pressure</li> <li>• Reduced focus on personal needs</li> <li>• Increased emotional and financial pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Learning to be a good parent</li> <li>• Providing children’s ‘basic needs</li> <li>• Educating and entertaining children</li> <li>• Discipline and safety of children</li> <li>• Family health issues</li> </ul>	<ul style="list-style-type: none"> <li>• Housework</li> <li>• Managing as a sole parent</li> <li>• Injury, illness, loss and trauma in the family</li> <li>• Getting rest</li> <li>• Mental health</li> <li>• Family social interaction</li> </ul>	<ul style="list-style-type: none"> <li>• Paid work (and study)</li> <li>• Caring for other family members</li> <li>• Multi-tasking and planning</li> <li>• Household administration including finances</li> <li>• Family comfort</li> </ul>

A key change for parents was the emergence of new practices in homes, either performed by or for children, and with their own ‘rhythm’. Parents discussed needing to ‘sync’ their own practices with those of their children as they progressed through different life stages. Parents expressed this constant change as a reduced focus on their own personal needs, and an increased emphasis on the needs of their children.

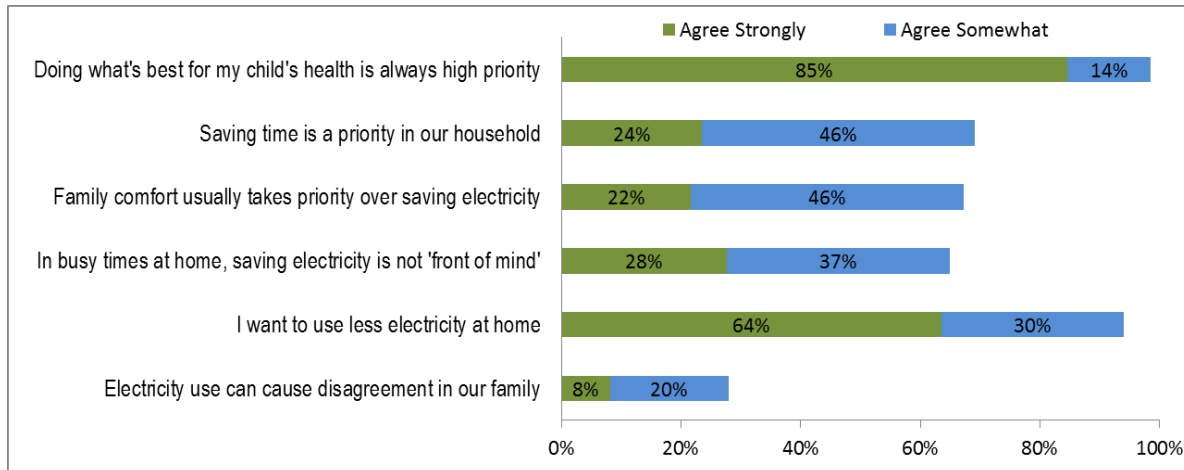
*‘Everything is now linked to what your child needs or wants or what needs to be done...your life rhythm is actually based on your **kid rhythm** rather than the other way around.’ Int8*

The survey followed up on two priorities which underpinned daily life for most parents — doing what’s best for their children (99% of all survey respondents either strongly or somewhat agreed with this statement) and using time efficiently (73% of survey respondents agreed — see Figure 1).

Parents’ focus on children’s needs and the importance of time efficiency to ‘get things done’ had implications for how, when and how much energy is used in the home. Most survey respondents felt they put either ‘a lot’ (20%) or ‘some’ (61%) effort towards saving electricity in the home (17% said not much and 1% said none)<sup>26</sup>. However, most respondents (94%) ‘want to use less electricity at home’. Energy saving concerns were often subsumed by other priorities (above). For example, many parents who conducted the survey agreed that ‘my family’s comfort usually takes priority over saving electricity’ (68%). These findings imply that many parents felt they were doing what they could to manage electricity use, and the ideal of using less seemed beyond their capacity or control at this stage of life.

<sup>26</sup> Figures similar regardless of gender, low-income, sole-parent or work status

Figure 1 Priorities and considerations in households with children



N=527-532. Disagree strongly, 'disagree somewhat' and 'neither' responses not represented in chart.

Survey data presented in Figure 1 demonstrate the complexity of juggling priorities in households with children. Despite parents' efforts to educate children about conserving energy, electricity use could cause family disagreement for 28 per cent of respondents. While most respondents wanted to use less electricity, most said that 'in busy times at home, doing things to save electricity is not front of mind' (65%). Just seven per cent of respondents strongly disagreed with this statement. **These findings raise questions about the likelihood of households with children making electricity use a priority, or even a consideration, during the busiest times of the day.**

In contrast, Stage 1 research revealed that managing electricity use is usually a more intermittent concern in households with (particularly younger) children. Rather than taking energy use into account for each activity in the home, parents interviewed for this research indicated that they attended to energy saving at specific times of the day when they had a 'moment' of free time (e.g. switching things off before leaving the home or after the children were in bed). In addition, exclusion of specific high energy appliances from the home (e.g. clothes dryers), or selection of energy efficient models where affordable (e.g. washing machines), were often discussed as key energy saving efforts in these homes, as illustrated by the following survey participant comment:

*'I cannot afford to run a dryer so I simply do not have one, the temptation to use it when pushed for time is too much.'* S307

Similar findings have been reported in recent UK research conducted on energy use in family households (Fell et al. 2014).

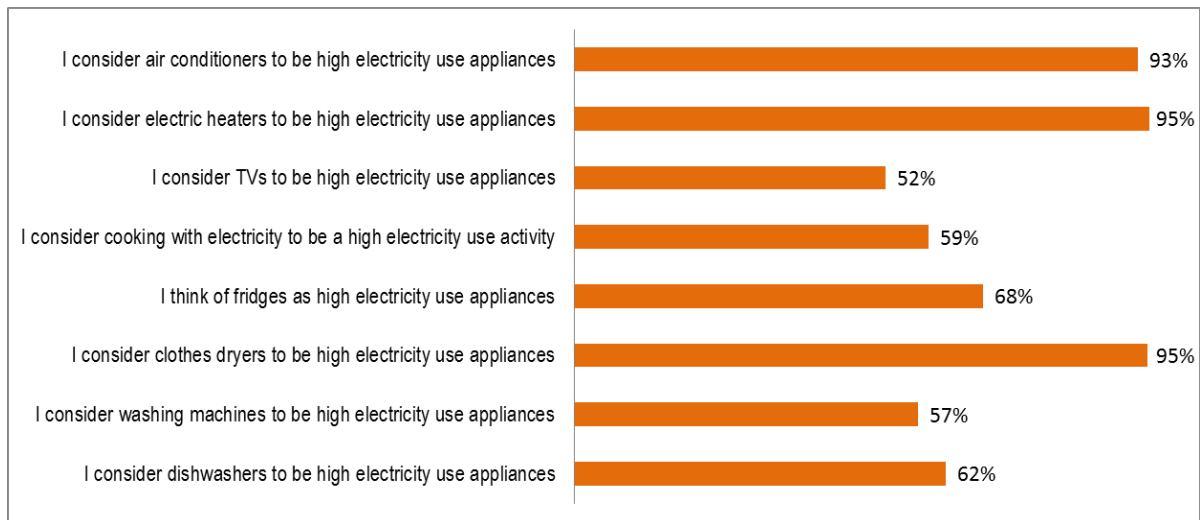
Most survey respondents (93-95 per cent) considered clothes dryers, air conditioners and heaters to be high electricity use appliances by (Figure 2). Fewer respondents considered other appliances high electricity users. While not directly comparable, concern about the electricity use of ICTs appeared to be less than for other appliance types. Eighteen per cent strongly agreed, and 25 per cent agreed, with the statement 'I consider use of electronic devices as high electricity use activities'.

Public policy to reduce energy use and costs to households often focuses on the provision of general information about appliance energy use in 'average' households (e.g. via flyers and websites). It is likely that many householders overestimate or underestimate the impact of ICTs and other appliances on their electricity use (depending on circumstances in their home). Rapid improvements in energy efficiency of some devices and appliances (e.g. ICTs, lighting, reverse cycle heating and cooling, refrigeration) over recent years have contributed to complexity in this area. As such, general information that does not take into account the actual circumstances of individual households (e.g. number, usage and energy inefficiency of each appliance) and their needs and constraints (e.g.

health, financial) can contribute to householder disengagement and/or energy saving efforts being misdirected.

**Further general campaigns that inform householders about the electricity demand of devices and appliances are likely to have negligible impact on energy consumption in relation to other family priorities and the specific timing of routines discussed below. Programs that tailor advice and acknowledge the complexity of circumstances may better engage householders with energy use and its implications in the home (see Section 4).**

Figure 2 Common household appliances and respondent perceptions of their electricity use



N=332-547 (depending whether household had appliance in question)

#### Box 2 Priorities and managing energy use in households with children

*'I am very conscious of what we use and try not to waste electricity where possible, however will put family comfort (e.g. for heating) over worrying...'* S34

*'As a parent you have to spend an enormous amount on electricity keeping your children comfortable and healthy.'* S433

*'My children have been taught about reducing electricity cost, e.g. not opening the fridge door all the time, turning off lights and making sure everything is turned off before we leave the house.'* S491

*'Sometimes I would rather keep the peace then argue over having TVs or lights on.'* S351

*'Our priority is to have fun and enjoy the time we have together, time that is minimised by the fact that both parents work.'* S105

*'I try but it is impossible to get the rest of the family to consider [energy] usage.'* S418

*'Lights are only used when needed. I haven't replaced broken bulbs so the lights won't be used.'* S483

*'Charging of devices and TV would be priority for the children, air conditioning is priority for the grandparents, and saving money is a priority for myself.'* S279

### 3.1.1 Routine and managing everyday life

Stage 1 research demonstrated the integral role of routines in households with children — to manage time and competing activities in order to ‘get things done’.

*‘[We are] consciously creating routines because... it’s just sort of to ensure that everything gets done.’ Int40*

Key Stage 1 findings relating to routine and disruption were tested in the online survey by presenting a range of statements and asking respondents to select ones which applied in their home. These findings are presented in Figure 3 and discussed below.

- **Reliance on routine:** Nine out of ten survey respondents said that ‘we rely on routines to make our days manageable’<sup>27</sup> confirming the importance of routine in family life. Maintaining regular routines, particularly around children’s bedtimes, is widely regarded as important for babies and young children. For example, the Raising Children Network, a scientifically validated information source supported by government and child research organisations such as the Murdoch Children’s Research Institute, advises parents to develop and maintain a ‘positive bedtime routine’ involving a bath and/ or dinner<sup>28</sup>.
- **Managing ‘normal’ disruptions and adaptability:** Eighty four per cent of survey respondents said ‘frequent disruptions to household routines are part of having a family’. This finding supports the Stage 1 research, which found that family household routines were frequently disrupted through a range of events and conditions including: illness, health conditions and injuries; pregnancy, a new baby or other new occupants in the home; relationship and parenting responsibility changes; employment disruptions and responsibilities; children’s sport and other activities; school holidays; heatwaves, bushfires and evacuations (outer urban and regional households); power outages; and weather and seasonal variations. Families were flexible and adaptive in response to these disruptions but routines assisted in managing and coping with them whilst they were occurring, and provided a sense of normality and regularity to which everyday activities could return after the disruption had ended. Similar findings have been reported in UK household research (Higginson et al. 2013).

*‘Routines are constantly being readjusted and changed due [to] Male Adult working shift rosters’ S644*

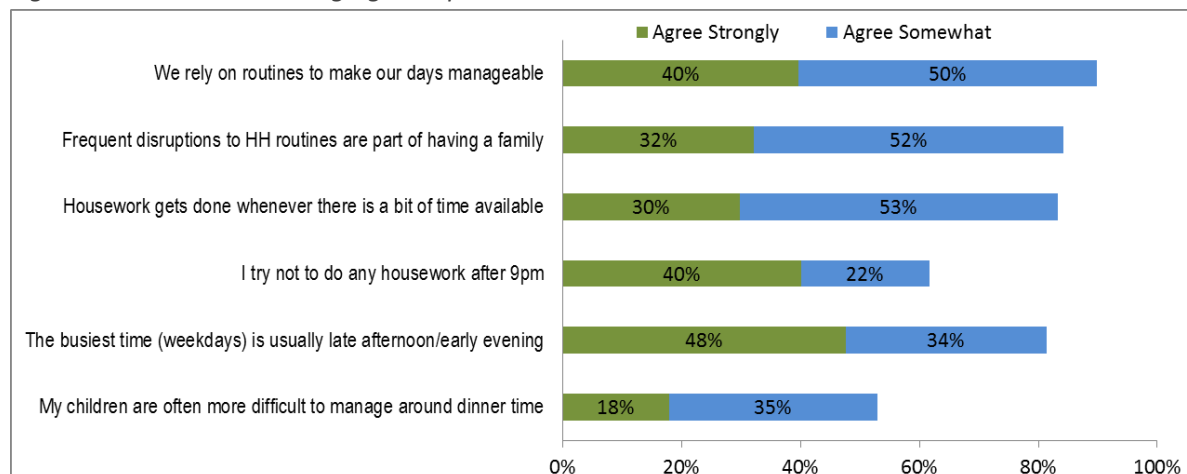
- **Importance of ‘time gaps’:** Confirming Stage 1 findings, the survey found that not all activities were performed at specific or regular times of the day in households with children. Eighty three per cent of survey respondents said ‘housework gets done whenever there is a bit of time available’. These moments of time, or ‘time gaps’, could be found or created when children were napping or self-entertained, and were used for various tasks, particularly cleaning, laundry, and cooking. Multi-tasking and the coordination of different and simultaneous practices were consistently used to try to ‘stay on top of things’ and reduce the possibility of ‘chaos’ in the home (Stage 1 data).

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<sup>27</sup> The main exceptions being some couples with one child and/or particularly helpful and independent older children (Stage 1 data).

<sup>28</sup> See [http://raisingchildren.net.au/articles/positive\\_bedtime\\_routine.html](http://raisingchildren.net.au/articles/positive_bedtime_routine.html)

Figure 3 Routine and managing disruption in households with children



N=529-532. Disagree strongly, 'disagree somewhat' and 'neither' responses not represented in chart.

### 3.1.2 Activity periods throughout the day

During Stage 1 research, four interconnected weekday time periods were identified around and within which most household practices were coordinated. Details of these periods are available in the Stage 1 Report and are summarised in Figure 5. Two time periods were of key interest in understanding the impact of more cost-reflective pricing strategies (e.g. TOU tariffs) on households with children. These were the late afternoon to early evening peak tariff (and peak family) period (approx. 3-9pm) and the late evening (after approx. 9pm).

- Late afternoon to early evening (approx. 3-9pm):** This was experienced as a highly routinised and often complex time of day as family members' returned home and co-ordinated activities such as homework, children's baths, dinner preparation, eating and clean up. Both Stage 1 and 2 findings identified this as the 'family peak period', or the busiest time of day in most households with children.

*'Our family routine is busiest in the late afternoon and evening, through homework, dinner, bath, bed, and then washing and cleaning up. The priority is meeting these needs while saving time, and electricity use is a secondary issue.'* S277

Most survey respondents (82%) said the busiest time in their home on weekdays was usually the late afternoon/early evening period Figure 3. Particularly in households with young children, parents agreed that children 'were often more difficult to manage around dinner time (53% of all survey respondents compared with 62% of 244 respondents with children under 5 years old).

This period was described using colourful language such as 'controlled craziness', 'dinner chaos' and 'witching hour', indicating the hectic nature of this time period. Although time periods are approximate and varied between households, the family peak period occurred mostly within typical TOU tariff 'peak' times (Figure 6).

For some parents, usually those needing to get children to school and/or themselves to work, the morning period was more hectic than the late afternoon/evening period: *'Morning mayhem, very tense'* (S495).

*'Morning is extremely busy for us, rather than evening when we have a bit more time, however both times of the day are very stressful and require planning to go relatively smoothly.'* S684

Survey respondents were asked to use one or two words to describe the busiest time of day in their home and the responses are illustrated in

Figure 4. The words used indicate both the time of day experienced as the busiest period (morning, school, breakfast, dinner, evening) and how parents experience that time of the day (hectic, stressful, chaotic, exhausting, frantic, tiring and rushed). Following past research on how households experience time, these findings support the notion of a 'time squeeze' (Southerton 2003) during busy periods, or the 'compression of practices' (Shove 2009) into a tight sequence coordinated around institutionally-timed events, such as school and work times. They also point to the synchronisation of parents' activities with 'kid rhythms' (see Section 3.1).

For parents with more than one child, one or more very young child, and/or those parenting on their own, these busy periods of the day were especially challenging, as described by one survey respondent: *'Chaos three boys single Dad'* (S271).

Overall, these findings raise questions about the potential flexibility of weekday routines on a regular basis given the complexity and coordination of the activities involved, particularly during the afternoon/ early evening peak period.

Figure 4 'Word cloud' algorithm summary of survey respondents' descriptions of the busiest time of day in their home

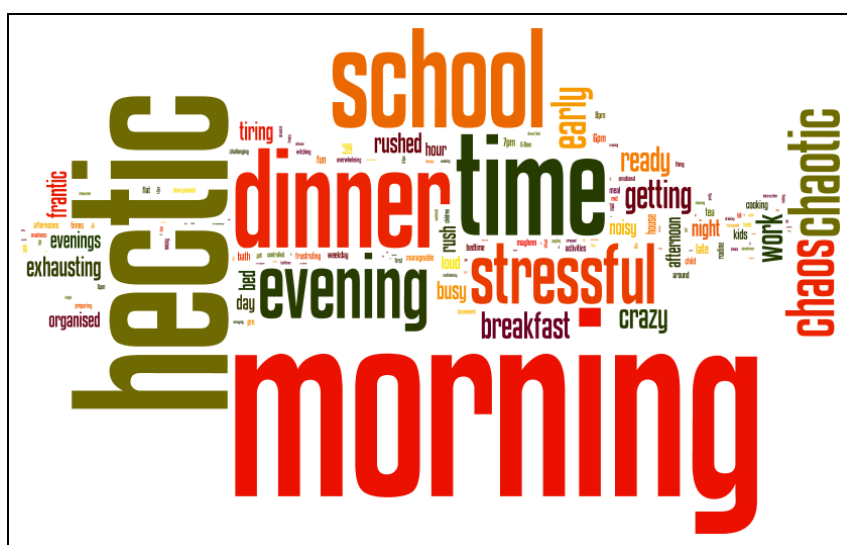


Image created at <http://www.wordle.net/>

- **Late evening (after approx. 9pm):** As found in past research (Leshed & Sengers 2011; Southerton 2003), parents made earlier parts of their day busier in an attempt to achieve a less busy period later in the evening to relax, share time with other adults, or have time to themselves and restore energy for the following day (Stage 1 research). This was not always possible for parents; however, 62 per cent of survey respondents said 'I try not to do any housework after 9pm'. **The importance of 'downtime' in households with children has implications for suggestions to shift energy activities outside the family peak period and into this late evening period.**

Figure 5 Weekday routine activity periods in households with children

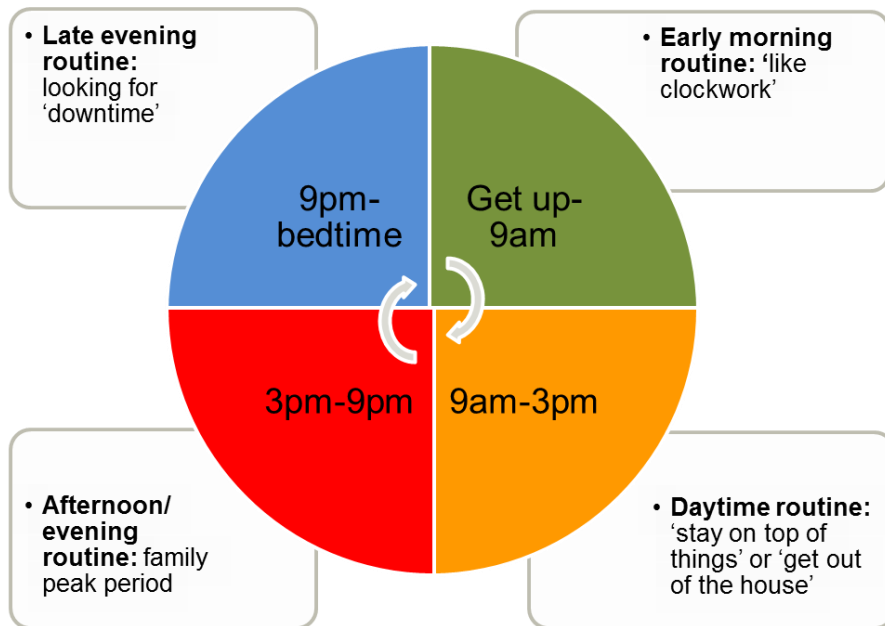
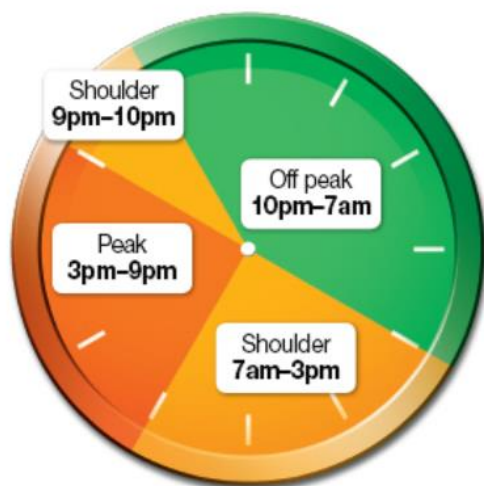


Figure 6 An example of weekday TOU tariff periods in Victoria

### Weekdays



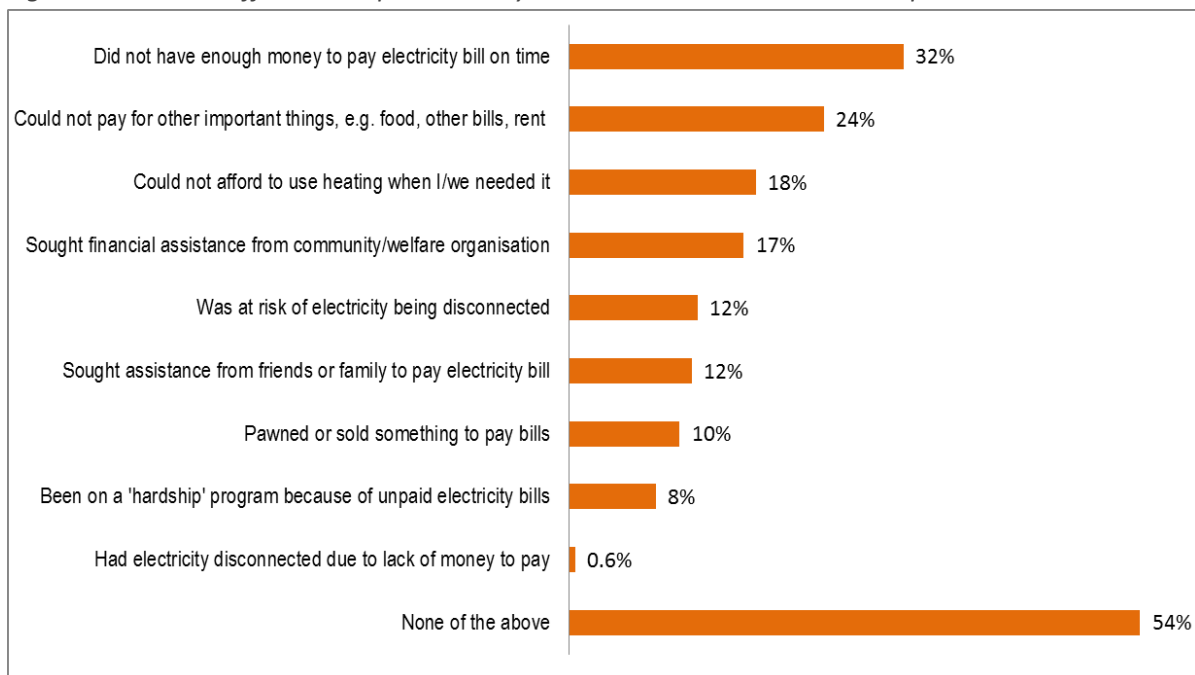
From <https://www.switchon.vic.gov.au/flexible-pricing/how-flexible-pricing-works>

### 3.1.3 Financial insecurity and disadvantage in households with children

Other studies have shown that larger households with dependent children experience more difficulty paying utility bills than smaller or older households (Simshauser & Nelson 2012; IPART 2010). To investigate financial insecurity, survey respondents were asked which of a range of situations had occurred for their household in the last 12 months (see Figure 7). Indicators of financial insecurity ranged from insufficient money to pay the electricity bill on time (32% of 525 HHs) to situations with possible or likely wellbeing implications including: seeking financial assistance from organisations (17%) or friends/family (12%); being at risk of electricity disconnection (12%); and going without heating when needed (18%) (see Chester 2013 for more detailed discussion of the challenges and implications of energy bill-related financial insecurity in households with children).

Three households had recently experienced electricity disconnection due to bill non-payment. These households had incomes of less than AU\$700/week, and were Healthcare card holders and reliant on a government income. These three households lived in privately rented detached homes, suggesting they had restricted opportunity to improve energy efficiency of the home and/or appliances. Eight per cent of survey respondents said they had 'been on a 'hardship' program because of unpaid electricity bills'<sup>29</sup>.

Figure 7 Financial difficulties experienced by households with children in the previous 12 months



N=525. Respondents were able to select multiple statements.

For the purposes of identifying financial insecurity in subgroups of the survey sample, respondents were classified as having experienced financial insecurity if they said they had experienced one or more of the situations identified in Figure 7 — excluding those that only reported difficulty paying the electricity bill on time. Although late bill payment can have financial impacts such as loss of pay-on-time discounts, those more severely impacted are likely to have experienced one or more additional indicator situations which would include them in the financial insecurity classification.

<sup>29</sup>It is possible that misinterpretation/misunderstanding contributed to some respondents selecting this statement without having been on a formal hardship program



With the over-representation of sole parent households in the low-income subgroup in mind, large proportions of sole parent and low-income households had experienced financial insecurity in the past 12 months (65% and 68% respectively, see Table 4). Financial insecurity had also occurred in about one in five higher income households that may not have had access to concessions or other assistance during these times. Open survey responses indicated that housing tenure (renting) and inefficient appliances, utility price increases, insecure employment and unexpected periods of unemployment, parental study, childcare costs, child disability, and health issues were contributing factors in financial insecurity for these households (for examples, see Box 3). These survey data illustrate the potential for increased negative health, wellbeing and social consequences as a result of financial insecurity if electricity pricing reforms lead to additional bill increases for households with children.

Table 4 Financial insecurity in households with children subgroups

HOUSEHOLD SUBGROUP	FINANCIAL INSECURITY		
	No.	%	Total HHs (N) <sup>30</sup>
Low-income status <sup>i</sup>			
Low-Income HH	151	68%	222
Others	57	19%	302
Family type			
Sole parent HH	144	65%	222
Couple HH	64	21%	299
<b>TOTAL households</b>	<b>209</b>	<b>40%</b>	<b>524</b>

<sup>i</sup> Household has low-income (Healthcare) card

### Box 3 Financial insecurity

*'Husband was unemployed for 6 months and it was really tough to pay for everything. Had payment plans with electricity company and in the end sold house to eliminate debt...'* S120

*'Struggling since leaving work 3 months ago to keep on top of bills and put food on the table for my kid's. I don't possibly know what else I could cut out to avoid possibly having to sell my house in the long run.'* S420

*'The price of electricity is becoming difficult to cope with. Renters are in an even more precarious situation, as we can't get solar panels, or have energy-draining things.'* S350

*'I only have electrical oven, stove top to use being public housing. The department are not very electrical friendly. We only have a HUGE hot water service without means to switch off to save electricity.'* S380

*'Electricity bills and childcare are a killer combination.'* S244

*'Have to charge 2 sons including one with disability and the other a student at uni to survive. Otherwise, couldn't afford to keep them at home as lost family allowance for them. I gave up govt job due to child with disability.'* S577

*'One child has a life threatening medical illness requiring devices that need electricity constantly. Also have extra medical expenses so a lot of my income is tied up with keeping my son well.'* S525

*'I am about to get my electricity cut off now, as I am having trouble paying it!'* S328

<sup>30</sup> N figures are lower than total survey responses in each subgroup due to non-response to financial insecurity question (towards end of survey). High representation of sole-parent households in the low-income subgroup (84%) contributes to similarity in figures for low-income and sole parent subgroups. The low-income subgroup included 37 couple households.

### 3.2 TARIFF UNCERTAINTY AND DISENGAGEMENT

During Stage 1 of this project, householder interviews highlighted a range of interconnected issues and misunderstandings relating to electricity tariffs and services which have implications for household response and/or vulnerability to cost-reflective pricing strategies. Low levels of energy literacy and engagement were common, awareness of smart meters and their capabilities (and use of these where available) was limited, and misunderstandings or uncertainties about the household’s own electricity tariff were widespread. Householders often held the general idea that all late night household electricity use is charged at a lower rate. In most cases, further questioning identified parents’ uncertainty about the times for their perceived off-peak rates and whether they currently applied at their home. It was uncommon for households to attempt to verify the details of their (perceived) off-peak tariff. Some householders checked their bill during the interview in Stage 1 and (with guidance from the researcher) were surprised to find that they had a flat rate or block tariff (some had assumed that the ‘peak’ rate on their bill meant that there must also be an off-peak rate). These findings have implications for the analysis and validity of any surveys which rely on householder reports of their own electricity tariff (see Section 2.3).

*Table 5 Electricity tariff structures reported by survey respondents*

TARIFF TYPE <sup>i</sup>	No. (%)
<b>Flat rate:</b> same price for electricity through the day and night (no off-peak rate)	145 (27%)
<b>Controlled load:</b> electricity cheaper late at night for some appliances only (e.g. off-peak hot water)	77 (14%)
<b>Two rate off-peak:</b> electricity is cheaper late at night for all electric appliances (peak and off-peak rates)	83 (15%)
<b>Time-of-Use 3-part tariff:</b> three or more different electricity rates on weekdays (e.g. peak, shoulder and off-peak)	34 (6%)
Other	11 (2%)
<b>Don't know / Unsure</b>	<b>195 (36%)</b>
<b>TOTAL</b>	<b>546<sup>ii</sup></b>

<sup>i</sup> See Appendix 6.2 for exact wording/ description provided to survey participants

<sup>ii</sup> One survey respondent did not answer

Survey respondents were asked to select their household tariff type (e.g. flat rate, controlled load, two rate off-peak or 3-part TOU tariff) based on a brief description designed to accommodate the major state and retailer differences<sup>31</sup>. Over a third (36%) of householders said they didn’t know their tariff structure (Table 5 above). In the following survey question respondents that had selected a tariff type were asked whether the previous household tariff question had prompted them to ‘ask someone else about your electricity tariff’, ‘look for/at an electricity bill’ or ‘feel unsure about having off-peak electricity or the off-peak times’. Responses to this question revealed further tariff uncertainty. Overall, 104 of 335 respondents (31%) ‘felt unsure’ about the tariff type they selected and 148 (44%) reported taking one or more actions that suggested their tariff type selection involved investigation or uncertainty (Table 6).

<sup>31</sup> Thirty-four households reported being on a TOU tariff (15 in Vic, 12 in NSW, 4 in Qld, 2 in SA, 1 in WA). Ten of the TOU tariff households (29%) had solar PV (5 in Vic, 3 in NSW and 2 in Qld).

Table 6 Indicators of possible tariff uncertainty in householders selecting their tariff type

TARIFF TYPE (Table 5 response)	HOUSEHOLDER ACTION (No. / %)				
	'Asked someone else'	'Looked for a bill'	'Felt unsure'	Uncertainty Total <sup>i</sup>	Responses/tariff type
Flat-rate	11 7%	26 18%	34 24%	52 36%	144
Controlled load	1 1%	9 12%	36 47%	41 53%	77
Two rate	10 12%	15 19%	27 38%	40 50%	80
TOU (3-part)	2 6%	8 23%	7 21%	15 44%	34
<b>TOTAL</b>	<b>24</b> <b>7%</b>	<b>58</b> <b>17%</b>	<b>104</b> <b>31%</b>	<b>148</b> <b>44%</b>	<b>335<sup>ii</sup></b>

<sup>i</sup> Respondent selected one or more of 'asked someone else', 'looked for a bill' and 'felt unsure'

<sup>ii</sup> Only respondents that selected a tariff type included in table (i.e. 'Don't know' households not included)

Up to 63 per cent of respondents did not know, or were not confident about, their tariff type (Table 7). The resulting figures may under- or over-estimate tariff uncertainty, for example, if households checked their bill when answering the question despite being reasonably sure of their tariff type. Tariff uncertainty was lower for men (51%), and higher for sole parents (72%)<sup>32</sup> and respondents from low-income households (this does not necessarily indicate differences in tariff accuracy).

Table 7 Tariff uncertainty and demographic differences

RESPONDENT SUBGROUPS	TARIFF UNCERTAINTY? <sup>i</sup>	
	Yes (%)	Total respondents (No.)
<b>Gender</b>		
Female	67%	454
Male	51%	82
<b>Household type</b>		
Sole parent	72%	225
Couple	59%	314
<b>Income status</b>		
Low Income	69%	227
Other	60%	312
<b>Total</b>	<b>64%</b>	<b>546</b>

<sup>i</sup> Selected 'don't know' for tariff type (Qu8.1) or one or more of 'asked someone else', 'looked for a bill' and 'felt unsure' in Qu8.2

In addition to tariff type uncertainty, respondents who thought they had off-peak electricity were often unclear about when their (perceived) off-peak tariff times applied. To allow for tariff/state-based variations, survey respondents were asked to select the time of night that their off-peak (cheapest) rate started from a list ranging from 6pm to midnight. Options of 'other' and 'don't know/unsure' were also available for selection. Forty-one of 83 two rate tariff households (49%) did not know. Similarly, 16 of 34 TOU tariff households (47%) did not know when their off-peak period began. In addition, some of the off-peak tariff start times selected by the remaining TOU tariff households are likely to be incorrect. For example, of the 15 Victorian households reporting being on

<sup>32</sup> High proportion of women in this subgroup

a TOU tariff, only one said that their off-peak tariff started at the standard TOU off-peak time of 10pm<sup>33</sup>; nine said they did not know, and the remaining five householders selected other times ranging from 6pm to 11pm<sup>34</sup>.

These findings align with the authors' previous research on cost-reflective pricing. In interviews conducted with TOU tariff households in Sydney (not just households with children), householders commonly didn't know their tariff times or that they were on a TOU tariff (Strengers & Nicholls 2013).

The survey data did not generally support the assumption that household members involved in electricity tariff choice would be more likely to know their tariff type. Over half the survey respondents (58%) said that they were usually the electricity retailer decision-maker for the household; however, the proportion of respondents who answered 'don't know' to the tariff type question was similar regardless of whether these decisions were usually the respondent's responsibility (35% of 319 respondents), another's responsibility (38% of 50 respondents), or shared (38% of 125 respondents). Similarly, there was no link between indicators of tariff uncertainty and responsibility for electricity bill decision making.

In couple households, 50 per cent of the 74 male respondents had sole responsibility for electricity bill decision making compared to 37% of 235 women. More women (41%) reported sharing electricity bill decisions with others than men (24%). These figures may explain some of the higher tariff confusion indicated by women in this survey. Further, a higher proportion of respondents who had their electricity supplier/ connection arranged by a landlord or agent (9 out of 13 respondents) said they didn't know their electricity tariff type. A lower proportion of respondents who had access to only one electricity retail offer (9 out of 35 respondents) didn't know their tariff. Sole parents, despite predominantly having sole responsibility for electricity bill decisions, were more uncertain about their tariff than those in couple households. This could be the result of sole parents having less time to spend on these matters.

**These findings do not support claims that providing householders with better or more tariff and provider information will necessarily lead to better decision-making and/or more engagement with cost-reflective tariffs.**

### 3.2.1 Understanding tariff uncertainty

The high level of uncertainty and/or misunderstanding illustrated in the survey results above suggest that parents may not be particularly interested in shifting activities to off-peak times to save money on their electricity bill. In conventional terms, electricity tariffs are not 'front of mind' in households with children when negotiating the family peak period or trying to get multiple things done. To some extent this can be attributed to the range of important and competing priorities and lack of time in many households with children (Section 3.1 above and Stage 1 report). However, a range of other considerations are likely to be at play in some households including:

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<sup>33</sup> <http://switchon.vic.gov.au/bills-pricing-and-meters/flexible-pricing#IntNav1>

<sup>34</sup> Victorian TOU tariff households without solar PV systems are of particular concern considering the likelihood that at least some of these 10 households opted into the TOU tariff within the last 12 months (because of the recent introduction of TOU tariffs in this state). None of these householders selected the 10pm off-peak tariff start time as their tariff type. Further investigation of tariff understandings in Victorian households that have opted for TOU tariffs is warranted.

- Low literacy (and/or numeracy) and English as a second language may impede householder understanding. Importantly, participants in this study had higher levels of education than the average Australian population, and migrant households from non-English speaking backgrounds were underrepresented (Section 2.3). These two biases highlight the additional challenges householders with lower levels of education or from migrant backgrounds are likely to face.
- References to ‘peak’ rates on electricity bills and the inferences householders can make from this (see above), alongside other complexities in tariff terminology and charges (Dufty & Johnston 2014), make complete tariffs more difficult and/or time consuming to understand.
- Tariff details are often not stated on bills and therefore verification may require a phone call to the electricity retailer and any associated waiting.
- Recent rapid change in the energy market, increased electricity prices and householder distrust in the energy companies and government (Nicholls & Strengers 2012) have resulted in ‘active disengagement’ (Nicholls & Strengers 2014) from energy-related issues.
- The variation of tariffs between states and retailers means that when householders do seek information and verification about their tariff the range of sources can easily lead to misunderstanding. For example, the fourth source returned in a Google search for ‘time of use tariff’ is the Australian government Department of Industry webpage titled ‘Your Energy Savings’ (see <http://yourenergysavings.gov.au/energy/energy-efficient-living/off-peak-smart-meters-time-use-pricing>). This page states that TOU ‘prices are usually divided between peak (2pm–8pm weekdays), shoulder (7am–2pm and 8pm–10pm on weekends) and off-peak (all other times) with off-peak being the least expensive). Presumably these times apply for NSW but they are likely to be inaccurate for most TOU tariff households in Victoria. Websites that are out of date (or which contain state-specific electricity tariff offers), media articles that refer to tariff times that are locality or retailer specific, and inaccurate information from friends, family and colleagues, all complicate the task of navigating information about tariffs.
- In interviews with parents who had solar PV and a TOU tariff (Stage 1), the TOU tariff was a low priority compared to using electricity at times that may increase the financial outcomes of their feed-in-tariff. Some noted the complexity of working out the most financially beneficial approach to electricity use with two different incentives dependent on the timing of electricity use. Although this issue was not explored in the survey, 10 of the 35 TOU tariff survey households had solar PV systems and some of their uncertainty about off-peak times may be attributed to this issue.

It is unlikely that the extent of misunderstanding and disengagement from the details of electricity tariffs in households with children has been taken into account in current and proposed energy reforms. Where households change their activities in response to misunderstandings about off-peak rates, both the financial outcomes for the household and potential demand response benefits for the network are likely to fall far short of expectations. **Increasing the complexity of tariff choice is likely to add to householder confusion and uncertainty. These issues have not been, nor are they likely to be, adequately addressed by more or better information. Energy reforms need to include realistic expectations of how much time and engagement parents will be prepared to commit to understand increasingly complex electricity tariff issues.**

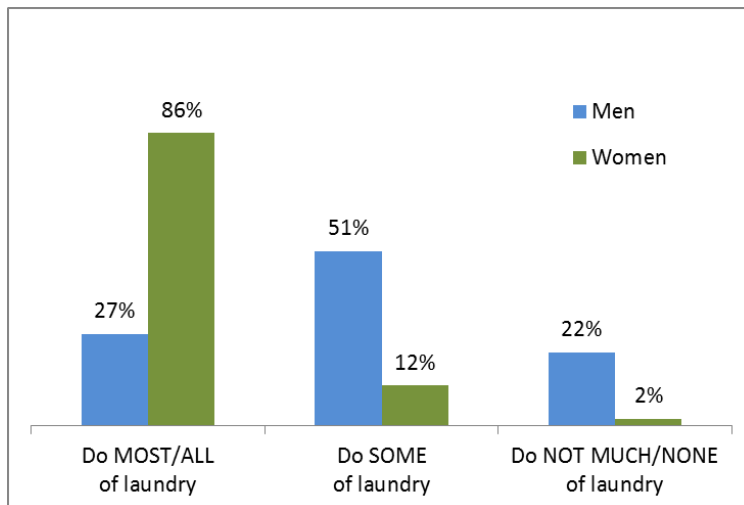
### 3.3 HOUSEHOLD ACTIVITIES, TIMING AND (IN)FLEXIBILITY

This section discusses the flexibility of activities in households with children. Insights are gained from survey responses about actual and hypothetical TOU and/or off-peak electricity tariff scenarios: respondents either indicate what they *actually do* on their current tariff, or what they *would do* if on a cost-reflective tariff. Activities which householders typically perform during the TOU peak tariff period are of particular importance to how households with children may respond to and be affected by more cost-reflective electricity pricing strategies. The section begins by discussing who performs what activities in households with children.

#### 3.3.1 Gender roles and activities which use energy in the home

Survey respondents were asked to identify who performs most of the laundry and cooking activities in households with children to provide an indication of gendered activities. Laundry was predominantly performed by women: 86 per cent of female respondents reported carrying out most or all laundry activities compared to 27 per cent of male respondents (Figure 8). The prevalence of traditional gender roles in these households aligns with work status survey data indicating that, for couple households, men were more commonly working full-time in paid work (84% of men, 31% of women), most women worked part-time (48%) and fewer men were primarily responsible for home duties (4% of men, 20% of women)<sup>35</sup>. As anticipated, sole parents were mostly responsible for laundry activities, regardless of gender or work status.

Figure 8 Gender and responsibility for laundry in couple households with children



N=74 (men)/ 235 (women)

This gender bias was also evident in couple household responsibilities for cooking evening meals, but to a much smaller degree. Eighty-eight per cent of women were mainly responsible for preparing the evening meal (compared to 59% of men) and 40 per cent of women indicated that other adults cooked (some) evening meals.

These findings support the approach taken in this study – which assumes that women predominantly perform activities which use energy in the home. **Demand management strategies and energy reforms need to ensure they consider the gendered nature of activities performed in the home.**

<sup>35</sup> These data do not assume absence of same sex couple households. Survey data do not include the gender of partners in couple households.

### 3.3.2 Overview of activity flexibility in households on a TOU or off-peak tariff

Stage 1 identified that parents often believed that all electricity used late at night is cheaper than during the day regardless of their tariff type, or any doubts about the availability and/or times for off-peak electricity. Even without verifying household tariffs, responses to ideas of off-peak or TOU tariffs provide insights into the potential flexibility of household practices for financial gain.

The survey asked respondents who were on a two rate off-peak or 3-part TOU tariff whether their 'household deliberately do[es] anything differently because of peak and off-peak electricity rates'. There was little difference between two rate off-peak and TOU tariff respondents regarding their household's overall reported flexibility to their tariff (any or no change or time-shift in activities). Combining responses from these two subgroups, 59 of 117 respondents (50%) said their household did not 'deliberately do anything differently because of peak and off-peak electricity rates'. Forty-four per cent of TOU and off-peak households said they did 'do some things differently' (5 households did not know if their household changed its activities). Sole parent and low-income respondents reported slightly lower response rates but there were only 52 respondents in each of these subgroups.

Greater clarity about when the off-peak tariff starts may be associated with higher demand response. Seventy-three per cent of the 56 TOU and two rate off-peak households who said they didn't know their tariff start time reported no demand response compared with 29 per cent of 58 households who said they did know. This suggests that having a clear idea of the off-peak start time may be important to engage householders who are interested and able to shift activities for bill savings. Alternatively, these data may indicate that householders with little flexibility for off-peak tariffs take little interest in the timing of off-peak tariff periods.

Since a low number of respondents reported being on a TOU tariff (34), and only 14 reported a change in activities as a result, only limited insights can be derived from their responses to questions about which activities they 'had changed or moved to reduce electricity use during the peak tariff period'. The main activities TOU tariff respondents reported changing or moving were running the dishwasher and washing machine (see Table 8). Air conditioner (cooling) use and evening meal cooking were changed by one household each and no TOU tariff respondents said they changed computers, ICT, TV or electric heating use or showering/bathing activities. Further details about these findings are presented in combination with insights from questions about household activities in Sections 3.3.3 –3.3.9 below.

Table 8 Summary of household activities changed or moved in TOU tariff households

HOUSEHOLD ACTIVITY	No. of TOU tariff households that changed or moved activity
Running the dishwasher	8/27 HHs with a dishwasher
Running the washing machine	9 HHs
Using the clothes dryer	5/22 HHs with a clothes dryer
Using air conditioning when it's hot	1/28 HHs that use air conditioning
Using electric fans when it's hot	No change
Using electric heating when it's cold	No change <sup>36</sup>
Watching TV	No change
Using computers and other electronic devices	No change
Charging phones and other electronic devices	2 HHs
Taking showers or baths	No change
Cooking the evening meal	1 HH
Running the pool pump/filter	2 HHs (No. of HHs with a pool unknown)
Ironing	2 HHs
Vacuuming	2 HHs

N=34 unless otherwise specified

### 3.3.3 Running dishwashers

Two thirds (65%) of all households surveyed had a dishwasher<sup>37</sup>. Changing the timing of dishwashing was one of the main activity changes reported by TOU tariff households. Eight of the 27 TOU households with a dishwasher (30%) said they had changed this activity. The survey questions about dishwashing provide some insights into flexibility of this activity in households with children.

The percentage of householders who often ran their dishwasher between 2-9pm weekdays was higher for flat rate, controlled load and respondents who didn't know their tariff type (58% of 245 HHs; compared to 26 of 58 (45%) two rate off-peak HHs and 10 of 36 (38%) TOU HHs). These figures imply that, although it is less common for TOU tariff households to run their dishwasher during the peak tariff period, **about 40 per cent of households that don't have off-peak rates already run their dishwasher outside the peak period**. This implication is supported by household interviews and other survey data (e.g. 41% of 99 flat rate HHs with dishwashers indicated they 'usually switch the dishwasher on after 9pm'). Widespread ideas of off-peak electricity are likely contributing to late night dishwashing. For example, nine per cent of 194 respondents that did not know their tariff type said they did some things differently because of perceived peak/off-peak rates.

Once the 182 households that didn't have a dishwasher are taken into account, **33 per cent of surveyed households could shift their dishwasher running times to reduce electricity use in the TOU tariff period**. This is an estimate of 'best-case' dishwashing flexibility across this sample. However, there are other issues associated with dishwashing which affect the timing of this practice, as indicated in Figure 9. Although the noise of dishwashers caused some households to delay running the dishwasher until late at night, it prevented others from leaving this activity until later in the evening. This may be the case in small and non-detached dwellings (particularly apartments), where sleeping and kitchen spaces are closely connected, and/or which have an old or poor quality dishwasher.

<sup>36</sup> Some households would not have electric heating and two households lived in places they identified as not being cold enough to need heating.

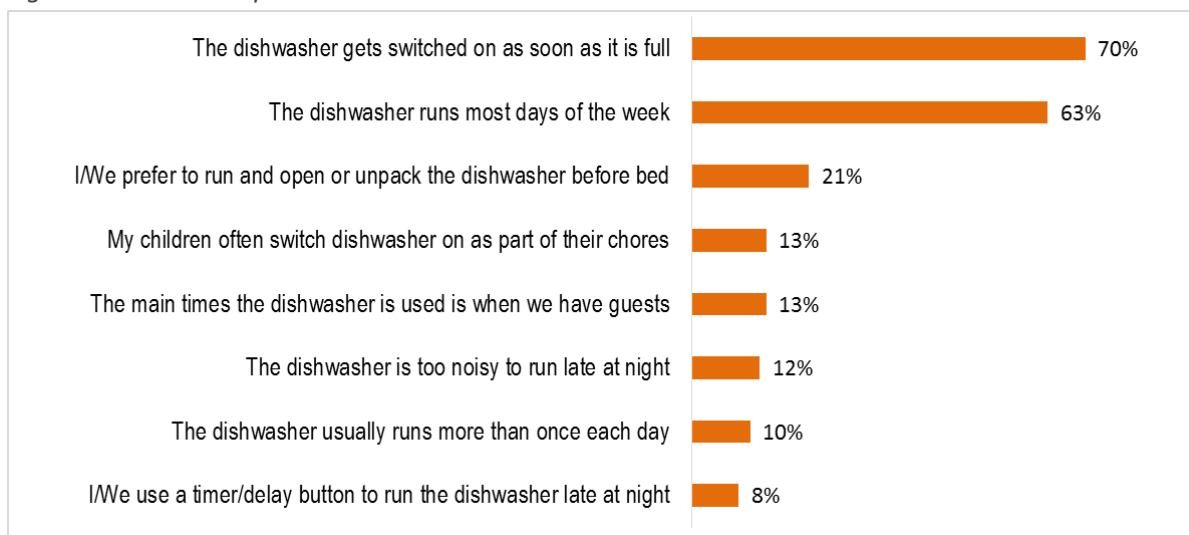
<sup>37</sup> 58% of households in Victoria have a dishwasher; Australian Bureau of Statistics (2012), 4602.2 - Household Water and Energy Use, Victoria, 2011.



Additionally, 21 per cent of households using a dishwasher preferred to run and unpack their dishwasher *before* going to bed, and seventy per cent switched the dishwasher on ‘as soon as its full’. These findings highlight the dishwasher’s role as a convenience appliance in households with children, where it is used to help families ‘stay on top of things’, specifically the dishes (Box 4). They also point to the timing of dishwashing in relation to other household routines, and the coordination of dishwashing routines around ‘kid rhythms’. For example, 13 per cent of survey respondents reported that their ‘children usually switch dishwasher on as part of their chores’. Stage 1 findings also found that dishwashing chores were sometimes done before bedtime to allow children to participate, and/ or to avoid ‘build up’ of dishwashing the following day. Low numbers (8%) of households used a timer or delay button to run the dishwasher late at night. Greater penetration of this technology may make it easier for households to shift dishwasher demand outside peak times; however, this opportunity is likely to be limited by the other dishwashing findings reported above.

These findings are significant because shifting the timing of dishwashing activities is often cited as an easy way for households to respond to TOU tariffs. **This research indicates that calculations of potential savings and demand response from dishwashing in households with children may be overstated.**

Figure 9 Dishwasher practices in households with children



N=346 (households with a dishwasher). Respondents were able to select multiple statements.

#### Box 4 Dishwasher use

*‘We go through a lot of dishes and turn it on as soon as it’s full. I’ve never thought to turn it on at night –off peak?’*

*‘Dishwashers rock. We’d happily put it on overnight if there was an auto start function.’ S33*

*‘I try to turn [the dishwasher] on last thing before I go to bed at night and unpack it first thing in the morning. But sometimes if it’s full I have to turn it on during the day.’ S649*

*‘Our dishwasher is provided by land lord. It is old and too small for us, so we need to run it at least twice most days. We run it normally once around 5.00 pm and then again after dinner.’ S116*

*‘The dishwasher is used once a day immediately after dinner around 7.30pm.’ S277*

*‘I don’t like to run the dishwasher late because of risk of fire.’ S367*

### 3.3.4 Doing laundry

Like dishwashing, laundry activities are commonly considered flexible under TOU tariff conditions. This section discusses washing and clothes drying practices involving electric washing machines and clothes dryers. Other aspects of laundering are not considered (e.g. ironing, hand washing, line drying).

**Washing practices:** Nine of the 34 TOU tariff households (26%) had changed use of their washing machine<sup>38</sup> and five of 22 households (23%) had changed the timing of running a clothes dryer to shift these activities outside peak times. However, the percentage of householders that often used their washing machine between 2-9pm weekdays varied little between households with an off-peak tariff (38% of 111 two rate off-peak and 3-part TOU HHs) and others (41% of 385 HHs). Despite these figures, it was more common for off peak and TOU households to use the washing machine after 9pm (37% of 111 HHs,) than flat rate households (19% of 136 HHs).

These data indicate that the timing of some loads of washing may be flexible in some households. However the high volume of washing to be done (more than six loads of washing each week in 57% of households), and other constraints and timing demands for clean clothes, meant that washing was more widely spread through the day/week than dishwasher use. This finding is derived from Stage 1 and 2 data, which indicate that washing was less routinised and often reactive to opportunity (time gaps, see Section 3.1.1 above) than running the dishwasher. For example, 60 per cent of households do washing ‘when they get a chance’ and 42 per cent often wash when ‘clean items are urgently needed, e.g. uniforms, sheets’. These and other issues affecting the timing and flexibility of washing are presented in Figure 10. In addition, late night noise and concerns about smell and creased clothing (possibly requiring extra time and electricity use in the form of machine drying or ironing), were cited by 34 per cent of respondents as a reason to avoid late night washing.

Figure 10 Washing practices in households with children



N=346 (households with dishwashers.) Respondents were able to select multiple statements.

<sup>38</sup> Assumption that all households had a washing machine based on ABS data (97% of households in Victoria; Australian Bureau of Statistics (2012), 4602.2 - Household Water and Energy Use, Victoria, 2011) and increased likelihood of washing machine in households with children.

Given that around 60 per cent of households do not normally use their washing machine between 2-9pm weekdays, combined with the existing timing dynamics of this activity around ‘opportunistic’ time gaps, the potential for households with children to shift a substantial proportion of their washing in response to a TOU tariff may be limited (see also Box 5). These constraints may be specific to households with children, as other studies have found greater opportunity for shifting laundry practices outside peak times in response to TOU tariffs (Powells et al. 2014). Like dishwashing, **assumptions and calculations based on the likely flexibility of washing in response to TOU tariffs should be reviewed in light of these data.**

#### Box 5 Washing practices

*‘I have so much of it [washing] every week and struggle to keep up with it all. Especially with two working parents.’ S220*

*‘You have to do the washing when you can, I’ve never considered electricity use in this.’ S212*

*‘I half load [the washing machine] because I have a bad back and can manage it better, I wash as soon as I have a half load.’ S550*

*‘As a family of 3 we only need to do the washing once a week (average between 3-5 loads) this is done when it’s convenient.’ S226*

*‘The washing machine is run first thing in the morning...and the weather is good for drying.’ S37*

*‘I wash sometimes in the evening so husband can hang it out while I make the kids lunches.’ S214*

*‘We’re actually not allowed to run washers, driers after 10pm.’ S194*

**Drying practices:** Sixty-one per cent (N=332) of households had an electric clothes dryer<sup>39</sup>. Twenty-one per cent of these households reported using the dryer for most of their washing and 52 per cent reported using it less than once a week (Figure 11). Half of respondents with a clothes dryer said that it was used ‘more than I want it to be’. Most (82%) stated that their household preferred not to use a clothes dryer, and 95 per cent of all respondents said they considered this appliance a high electricity user. Further, there was little difference between the proportion of households with off-peak electricity that ‘often used the dryer between 2pm and 9pm weekdays’ (42% of 76 two rate and TOU households HHs) and other households (37% of 238 HHs). A similarly small difference was found between the proportion of households with off-peak electricity that said they often used the clothes dryer after 9pm (28% of 78 two rate and TOU households compared with 35% of 241 other HHs). Like dishwashing and washing practices, these findings suggest that the timing of clothes drying is contingent on timings and routines which are separate from energy and tariff knowledge and understandings, or environmental motivations to use less energy.

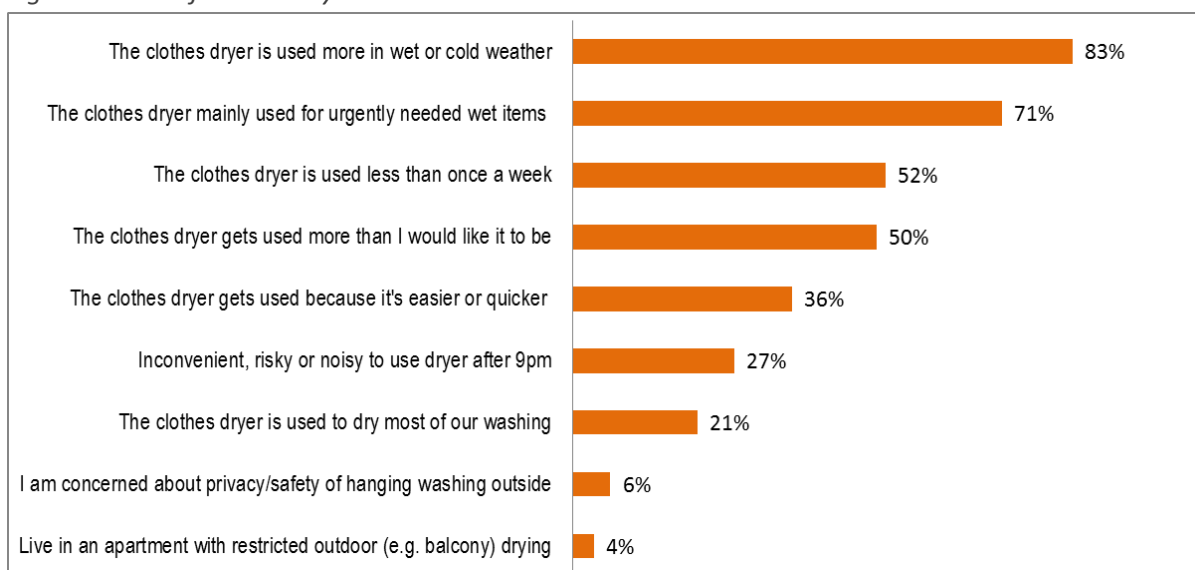
Weather conditions frequently altered how and when householders dried clothes, with 83 per cent of respondents reporting using it more in wet or cold weather. Some comments from respondents also indicated that the weather could modify or ‘ruin’ clothes if they were hung out to dry in harsh conditions such as hot sun (see Box 6). Similarly, the timing of other activities, such as needing a clean uniform for school, or dealing with ‘accidents’, was cited by 71 per cent of respondents as the time when the dryer was mainly used. This suggests that the dryer was often used ‘as needed’ rather than at specific or predictable time points. The reduced time it took to dry clothes in a clothes dryer instead of through other methods was an important consideration, with 36 per cent of respondents stating they used the dryer ‘because it’s quicker and easier’.

<sup>39</sup> 55% of households in Victoria have a clothes dryer; Australian Bureau of Statistics (2012), 4602.2 - Household Water and Energy Use, Victoria, 2011.

The sequencing of clothes drying in conjunction with other household routines was also important in the timing of dryer usage. Twenty-seven per cent of respondents said it was ‘inconvenient, risky or noisy to use dryer after 9pm’, referencing concerns to waking up sleeping children, fire risk, or interfering with the evening’s ‘downtime’.

In addition to the timing of clothes drying, the built environment and neighbourhood shaped a small number of households’ drying practices. Six per cent of respondents were ‘concerned about privacy and safety’ when hanging washing outside, and four per cent said they lived in an apartment ‘which restricts outdoor clothes drying’, an issue noted by Chester (2013). The safety concern raised here may also relate to some parents’ concern with coordinating outside drying with tasks associated with supervising young children indoors, as discussed by several interviewees in the Stage 1 research.

Figure 11 Use of clothes dryers in households with children



N=332 (households with a clothes dryer). Respondents were able to select multiple statements.

#### Box 6 Using the clothes dryer

*'The washing line at our house is too high I cannot reach it and it is bolted to a wall & cannot be moved.'*

S619, renting

*'Damp house and landlord restrictions on where we can dry clothes outside.'* S12

*'I loathe using the dryer but sometimes laziness wins then I loathe myself as well. That's a lot of loathing for some toasty dry clothes.'* S562

*'I hate that we have to use a clothes dryer, but we are not allowed to dry clothes on our balcony. We are a family of three living in a one bedroom apartment so there is not enough space inside to hang the quantity of clothes we go through.'* S4

*'My wife is affected severely from pollen related allergies and that is why we do use the dryer often.'* S241

*'Washing and drying is done often due to MS [Multiple Sclerosis], school and work uniforms. Female adult also has mental illness and avoids going outside.'* S644

*'Have never hung clothes out to dry, they fade or get ruined...always use dryer and cry when I see electricity bill and say I'm not going to use it but I always do...just easy as well.'* S406

*'I use the dryer for kids school clothes so I don't have to use the iron.'* S519

*'Biggest issue probably using the dryer to keep the washing levels manageable.'* S38

### 3.3.5 Cooking

Cooking, including food storage, preparation, and eating, is a complex area of activity which has multiple timing dimensions in households with children. We focus here on afternoon snacking and the preparation of the evening meal, which have important ramifications for the TOU peak tariff period.

**Preparing the evening meal:** Just one TOU household reported changing evening meal preparation in response to the tariff. This supports other research (Powells et al. 2014), which finds that cooking, particularly preparing and eating the evening meal, is generally not a flexible activity. Cooking is likely to be even less flexible in households with children (e.g. compared to elderly retired households) for a range of reasons, some of which are illustrated in Figure 12.

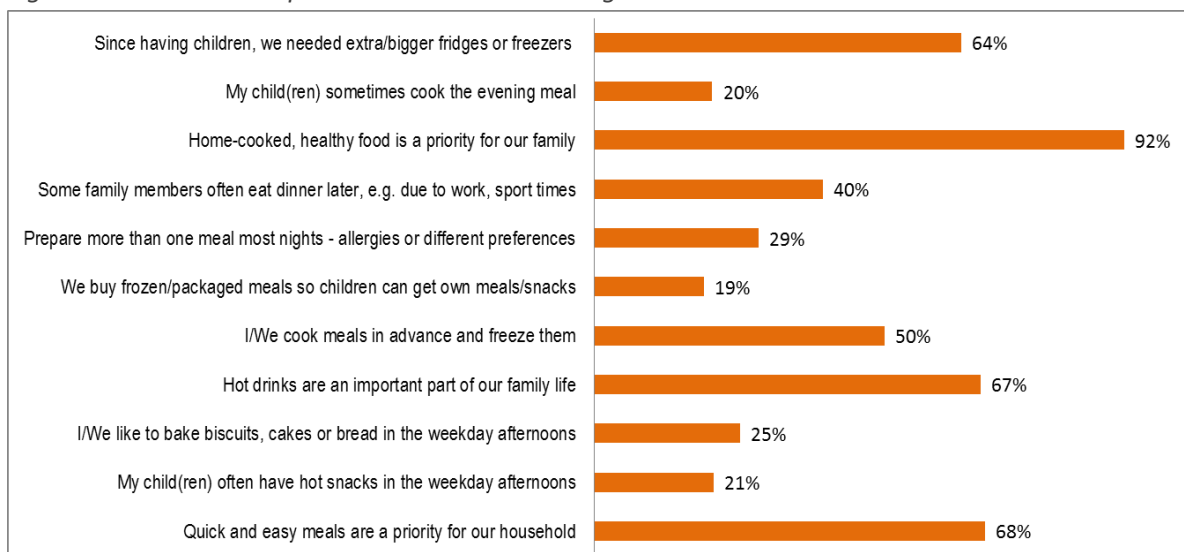
Health and convenience were important priorities when it came to the provision of meals in family households, with some emphasis also placed on life skills and entertainment for children through assistance with food preparation and other food-related activities such as baking.

Overwhelmingly, survey respondents cited ‘home-cooked, healthy food’ as being a priority for their family (92% of respondents). Half of the respondents preferred to ‘cook meals in advance and freeze them’. Convenience foods (and appliances — see below) were important, with 68 per cent of households agreeing that ‘quick and easy meals are a priority’ and 19 per cent reporting to buy frozen or packaged meals ‘so that children can get own meals/ snacks’.

The complexity of scheduling and preparing the evening meal was also noted by surveyed households, with 40 per cent of respondents indicating that some family members ate dinner later than others because of work, sport or meeting times. Twenty-nine per cent of surveyed households reported preparing more than one evening meal to cater for allergies of different preferences within the home.

These findings connect to the important emphasis placed on the coordination of multiple activities around family mealtime (particularly in households with young children) to avoid ‘chaos’ and manage ‘crazy time’ during the family peak period (Section 3.1.2). **They also suggest that families with children have limited flexibility in the timing of dinnertime and snacking routines during the afternoon/ early evening peak tariff period.**

Figure 12 Priorities and practices related to cooking in households with children



N=547. Respondents were able to select multiple statements.

**Gas and electric cooking appliance substitution:** Stage 1 research identified a preference in many family households for convenience cooking appliances/ methods that save time or help the household prepare healthier meals. This meant that some households were substituting traditional stove tops or ovens with electrical appliances to prepare snacks and evening meals. If more widely prevalent, this finding has particular implications for households with gas ovens and/or stovetops. In particular, **assumptions that these households mainly use gas to prepare their evening meal may be incorrect.**

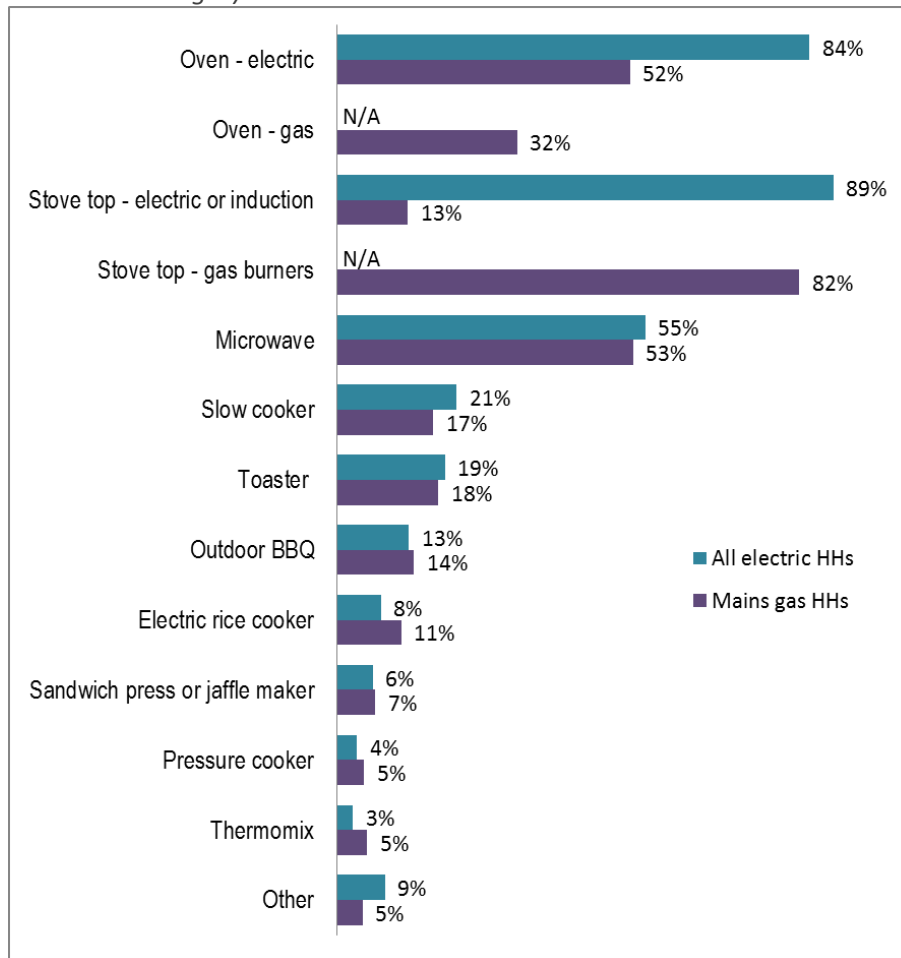
To test these findings, the survey asked parents to select up to three appliances that are most commonly used in their home to prepare evening meals. Many of the 348 households with mains gas selected electric ovens (52%) and stove tops (13%) as one of their three main appliances (Figure 13). Most households did list an oven and/or stove top in their three main cooking appliances; however, when households use appliances such as a slow cooker (19% of all households) or Thermomix<sup>40</sup> (5%), it is likely that most of the energy used to prepare the meal is from running that one electric appliance. For a household with an electric oven and/or stove top the use of alternative appliances may save energy. However, in mains gas households the shift away from gas ovens and/or stovetops to electric cooking appliances would have implications for their electricity use during the TOU peak tariff period.

Microwaves were selected by 54 per cent of households as one of the three main cooking appliances used to prepare evening meals. While use of microwaves for cooking can reduce electricity use if replacing some other electric cooking methods, microwave cooking could increase peak electricity use in household that would previously have used gas appliances for cooking. When electric appliances are solely or partly used to prepare the evening meal in order to save time or provide healthy options for the family, it is unlikely that parents are considering any implications for their peak period electricity use. **These findings suggest that those seeking to encourage shifts towards non- or low-electric meal preparation appliances during peak times should focus on providing convenient, healthy and 'child-friendly' benefits to family households, rather than emphasising the cost and/or electricity demand of electric appliances.**

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<sup>40</sup> <http://www.thermomix.com.au/>

Figure 13 Main appliances used to prepare evening meals (HHs with and without mains gas)



N=348 (mains gas HHs)/ 140 (all electric HHs). Households that didn't know if they had gas and those using bottled gas but no mains gas are not included in chart. 'Other' refers mainly to electric frypans and grills, and air fryers.

### 3.3.6 Watching TV and using computers, other ICTs

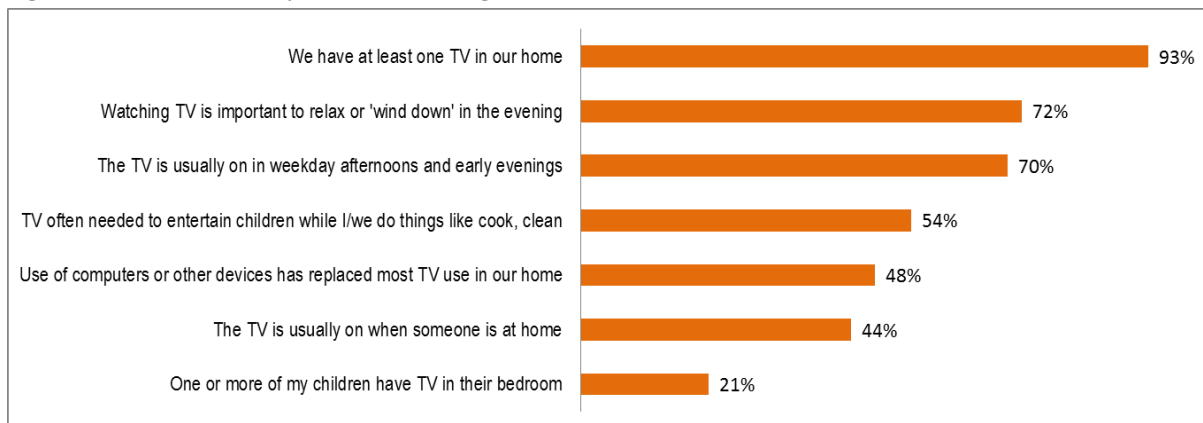
Both Stage 1 and 2 data indicate that entertainment and work related TV and ICT use is considered non-negotiable and largely inflexible in households with children. No surveyed households on a TOU tariff said they had changed their TV or ICT use activities but two had changed ICT charging practices.

Ninety-three per cent of households had one or more TVs and 48 per cent said that the 'use of computers and other ICTs had replaced most TV use in their home' (see Figure 14). Despite this, 75 per cent of householders with a TV said that 'the TV is usually on in weekday afternoons and early evenings'; 78 per cent said that 'watching TV is important for a parent to relax or wind down in the evening'; and 58 per cent agreed that 'TV is often needed to entertain children while I/we do things like cook, clean, or rest'. The likely explanation for this apparent contradiction is that while TVs and traditional TV content are becoming less important compared to computers and ICTs in households with children, one or more TVs are still often running in homes but often in the background or in conjunction with ICT devices (e.g. viewing computer content through a TV screen). Other researchers have also found that ICTs are enabling new forms of multi-tasking, which means that 'more energy can be spent per unit of time' (Røpke & Christensen 2012: 359). While the use of TVs and ICTs appears largely non-negotiable in households with children, the impact on household electricity use (including during peak times) is highly dependent on technology efficiency changes.

Where higher efficiency devices are in use, the efficiencies are likely to offset or outstrip increases in size and number of devices<sup>41</sup>. However, for financially constrained households with older (often secondhand) or cheaper devices the changes in electricity use associated with increasing ICT use may be less favourable.

These findings also highlight the importance of the *timing* of TV (and ICT) usage, which is coordinated around the family peak period (2-9pm) and the later evening period of ‘downtime’. The findings suggest that the emergence of ‘on-demand’ television is unlikely to have a significant impact on the times at which television is watched in family homes.

Figure 14 Priorities and practices relating to TV use in households with children



N=547. Percentages in this figure differ from some quoted in text for households that had a TV (N=508). Respondents were able to select multiple statements.

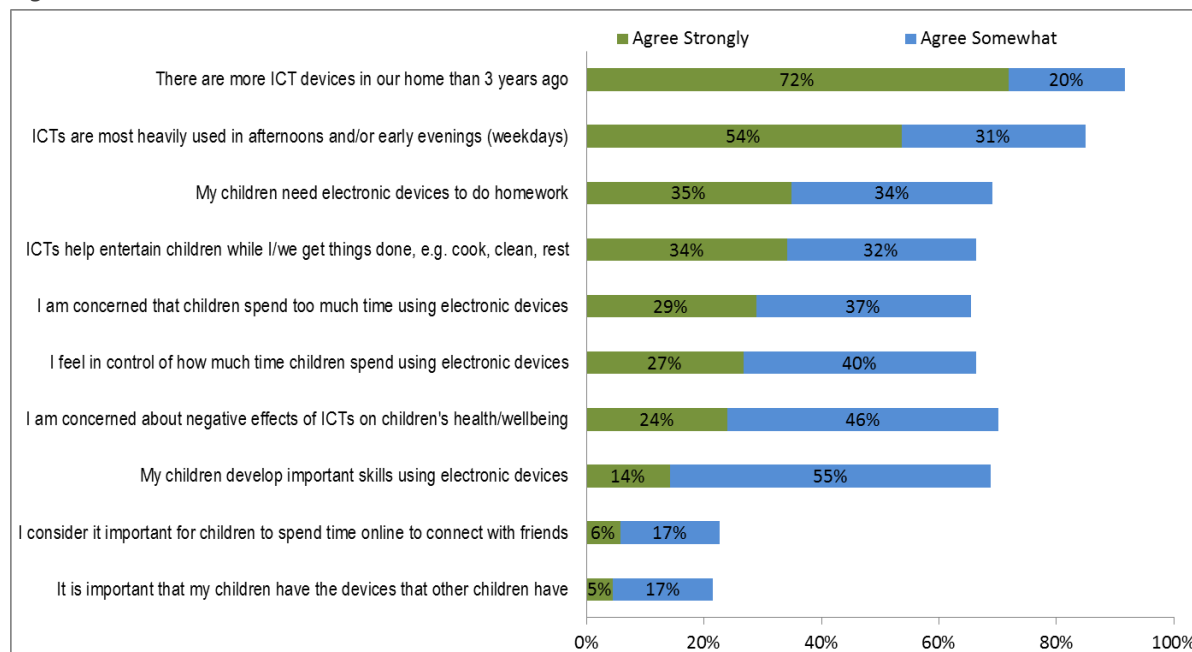
Children’s use of ICT devices was an area of enthusiastic discussion and often concern during Stage 1 interviews with parents. This reflects the recent inclusion of ICTs into school, work and leisure activities. Some of the conflict felt by parents is also clear in the survey data. Children used electronic devices in 81 per cent of households and 92 per cent either strongly or somewhat agreed that there were more ICTs in their home than three years ago (Figure 15). Most (85%) agreed that these devices were most heavily used in the weekday afternoons (TOU peak tariff period). Even though 67 per cent of parents at least somewhat agreed that they felt in ‘control of how much time their children spend using ICT devices’ (24% did not), two thirds were concerned that their children spent too much time using ICTs and were concerned about negative effects on their children’s health from too much ‘screen time’.

Like TV viewing, parents often relied on ICTs or TV to entertain children while they got things done (66% and 54%, respectively). Entertaining children with devices while parents cooked, cleaned, worked or rested was often reluctantly embraced by parents who saw little alternative. The recent incorporation of these devices into home-school-work meant that parents were often unable to refuse children’s access to ICTs. Once children had devices at home it became difficult for their parents to control the integration of these devices into non-school related activities (socialising, entertaining etc.).

<sup>41</sup> Alan Pears, personal communication



Figure 15 ICTs in households with children



N=442-445 (households where children use ICTs only). Disagree strongly, disagree somewhat and neither responses not represented in chart.

### Box 7 Watching TV, using ICTs

*'Computers and internet are a way of life and very important for society and learning at all levels.'* S36

*'In theory our kids are only allowed 30 minutes of computer or iPad time twice a week. I try to enforce this but my partner is much more lenient and lets the time go especially on weekends - so it has the potential to lead to parental conflict!'* S78

*'I let the baby watch 60 mins of TV total per day - 30 mins in the evening when I do laundry and tidy up.'* S242

*'Electronic devices are mainly used after school / early evening as leisure time for the kids and to keep them busy while I prepare dinner. I am a heavy electronic device user too.'* S166

*'Our teenager spends most of his time on his lap top and/or playing games on a tv. He was given the laptop as part of a school program and he got the tv for almost no cost a tip shop. We had little/no control over these things.'* S273

*'Both kids use smart phones and laptops, we rarely watch TV anymore. I try to restrict the amount of time on them for the kids but they are both on them most of the afternoons and evenings.'* S17

*'Two of my children are addicted to their online connection with friends.'* S482

*'So many devices...when [the children] were younger I controlled screen time. Not now.'* S120

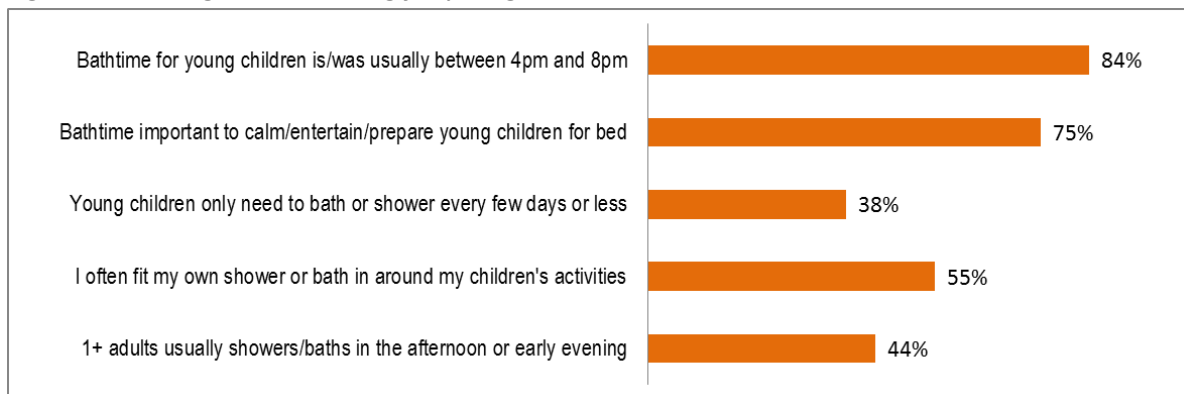
### 3.3.7 Bathing and personal grooming

For many households, hot water system (e.g. gas, solar) and tariff/meter arrangements (e.g. controlled load off-peak) mean that hot water use has no or little impact on electricity use in the afternoon or early evening. Few of the TOU tariff households surveyed had electric hot water systems and none reported changing showering or bathing on a TOU tariff. However, for a portion of households (e.g. with small or instantaneous electric or boosted solar systems), heating of water for showers and baths may contribute to their electricity use during the TOU peak tariff period.

Additionally, many households with children reported using other electronic appliances, such as heaters and hairdryers, when bathing or showering, which may have implications for their TOU peak electricity demand (see Section 3.3.7 below). Insights into the possible impact of variable tariffs for these households can be gained from understanding bathing practices in households with children.

Approximately 60 per cent of households bathe their children every day while others consider daily baths unnecessary. Most parents (84%) said that their young children usually had baths between 4 – 8pm (Figure 16). The specific timing of bathing highlights the important function bathing performs in households with children, where three-quarters of parents agree that bathing is important for calming, entertainment and/or preparing young children for sleep. Parents’ own bathing/showering was less routinised with 55 per cent saying they often fit this activity around their children’s activities (e.g. showering in time gaps—see Section 3.1.1). Just under half (44%) of the adults in these households showered in the afternoon or early evening with likely reasons being lack of time in the morning, preferences for multiple showers per day, preferences/needs for showering after work, and cultural understandings of important times to be clean (Stage 1 findings).

Figure 16 Bathing and showering for young children and adults



N=547. Respondents were able to select multiple statements.

## Teenagers

Figure 17 Showering, bathing and grooming in households with teenagers



N=186 (households with teenagers)

A significant area of concern noted in the Stage 1 research was teenagers’ showering, bathing and personal grooming practices. The different expectations of both parents and children for different stages of life development presented some distinctions between young children’s and teenagers’ bathing and grooming practices. Eighty per cent of parents preferred their teenage children to bath or shower every day; however 71 per cent were concerned that their teenagers bathed too often or

for too long, and 60 per cent found it difficult to limit the length or frequency of their showers or baths (see Figure 17). Almost 30 per cent also felt their teenage children spent too much time drying and styling their hair. In contrast to concerns about teenage children's 'excessive' cleanliness or grooming, 33 per cent of survey respondents found it difficult to get their teenage children to have a bath or shower, highlighting the difficult transition children go through as they become young adults, and the competing expectations they face from parents and peers during this time. Previous research has discussed these different expectations for cleanliness and personal grooming as children age (Gram-Hanssen 2007).

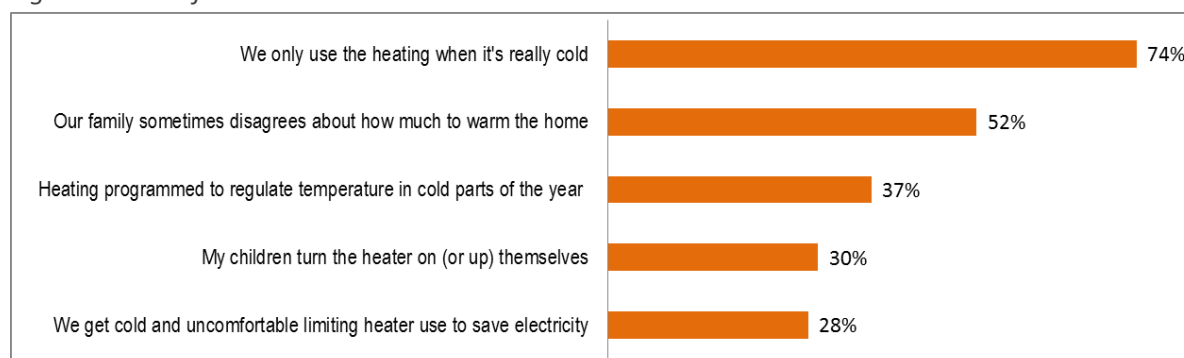
### 3.3.8 Keeping warm or cool

**Keeping warm:** Research participants who reported being on a TOU tariff (stages 1 and 2) did not change their heating practices in response to the tariff. As the survey was conducted in Spring, most or all of the TOU tariff households would have experienced at least one winter on the tariff. The inflexibility of heating for TOU tariffs sits alongside survey findings indicating that some parents are avoiding use of heating for financial reasons — 43 households in Qld, WA, Vic and NSW (8% of all surveyed households) said they did not use heaters due to the energy cost. Of these, 29 (67%) were low-income concession card households and 33 (77%) were sole parent households. Respondents that did not use heating were not asked other heating-related questions but it is likely that at least some of these households are experiencing discomfort. Of the 440 households that did use heating, 28 per cent said they 'get cold and uncomfortable at home because we limit heater use to save electricity' (see Figure 18 below). **These findings indicate that electricity costs led to restricted heating in about one third of households with children.**

Twelve per cent of respondents lived in a tropical or sub-tropical part of Australia; however, some of these households did use heating. The remainder of this heating-related analysis excludes the seven per cent of households who lived in locations where they did not consider it cold enough to need heating, or did not use gas or electric heating for other reasons (energy cost, used a wood fire, concerns about fire risk, lived in a thermally efficient house). Regardless of whether homes have gas heating, the authors' past research indicates that electric heaters (particularly heat lamps) are common in Australian bathrooms. Use of these prior to and during children's baths would represent a mostly TOU peak tariff activity which is specific to households with children. Electric heaters were used for cold weather bath time in 40 per cent of 218 households with children aged less than five years (27% of 313 mains gas HHs, 40% of 122 other HHs). The figures were very similar for use of electric heaters to warm children's bedrooms, which highlight that room heating complements other activities (bathing, sleeping) in a significant proportion of both electric and gas households.

Importantly, parents were not always in control of how or when heaters were used in their homes. Over half of the survey respondents noted that that 'our family sometimes disagrees about how much to warm the home', highlighting both the contested idea of comfort and the costs associated with it (see Figure 18). Children turned heaters on or up themselves in 30 per cent of households, and this figure was higher in households with teenage children (52% of 143 HHs), indicating that teenagers have a higher level of control over heating in the home which may complicate efforts to reduce or shift energy associated with this activity. Thirty-seven per cent of households programmed their heating to regulate indoor temperature throughout cold parts of the year, which may reduce the visibility of heating as an energy use in the home and possibly contribute to the inflexibility of heating for households on TOU tariffs (see Figure 18).

Figure 18 Use of heaters in households with children



N=440 (households that did not use heating and did not answer this question are excluded). These figures include households with access to gas (as most of the heating practices and understandings are likely to be independent of the energy source). Respondents were able to select multiple statements.

**Keeping cool:** Seventy per cent of surveyed households used air conditioning in their home. More households in Western Australia (87% of 30 households), South Australia (81% of 41 households) and Victoria (76% of 253 households) used air conditioning and these figures are broadly reflective of national variations<sup>42</sup>. A high proportion of low-income respondents in NSW and Qld may have contributed to lower rates of air conditioning in these states.

Only one of the 28 households with air conditioning that were on a TOU tariff reported changing their use of air conditioning in response to this tariff. However, understandings of air conditioners as high electricity use appliances were widespread (see Section 3.1). Eighty per cent of households with air conditioning reported limiting their air conditioning use to save electricity and 90 per cent only used it on what they considered to be very hot days, reflecting the 'peaky' nature of air conditioning usage in Australia (Figure 19). Eighty-two per cent also reported using fans on very hot days (see Figure 20). These findings suggest that air conditioning is unlikely to be significantly affected by TOU pricing given that usage is already limited and restricted to very hot days (which are also commonly correlated with afternoon/ early evening peak times). Further, children usually spend more time inside the home on very hot days in 81 per cent of surveyed households (see Figure 20 below), implying that cooling is more likely to be used on these days.

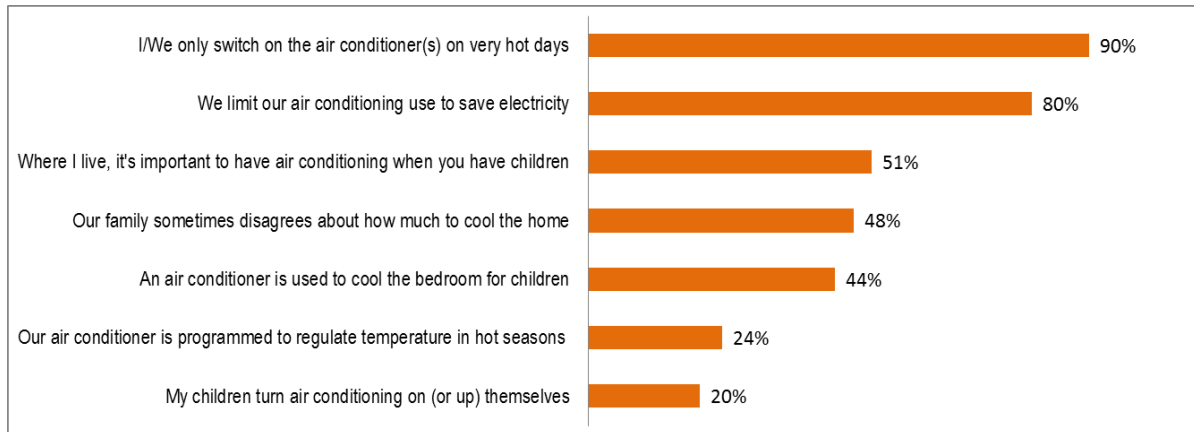
Similar to heating, cooling preferences are contested within family households, with almost half (47%) disagreeing about how much to cool the home (see Figure 19), and 20 per cent reporting that their children turn the air conditioner on (or up) themselves. Control of air conditioning by children was also more common in households with teenagers (42% of 116 households). Some parents highlighted the importance of air conditioning for children, with over half (51%) agreeing that 'it's important to have air conditioning when you have children', and 44 per cent using an air-conditioner to cool the bedroom for children.

These findings are further explained by Figure 20, which shows that children's behaviour is often more difficult on very hot days (58%). However, over half (55%) the survey respondents also reported that their children cope with the heat better than the adult(s) in their home, suggesting that air conditioning is not only about children's expectations or perceived needs. Stage 1 data provide further insight here, where parents reported that air conditioning enabled other things to get done, particularly during the tightly-routinised afternoon/ early evening peak period.

<sup>42</sup> Australian Bureau of Statistics (2014), 4602.0.55.001 - Environmental Issues: Energy Use and Conservation, Mar 2014

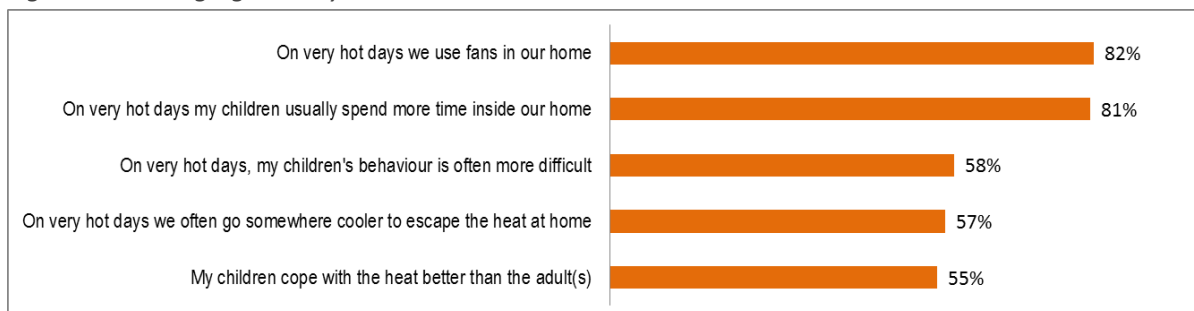
Fifty-seven per cent of parents reported going somewhere cooler to escape the heat at home on very hot days. However, it is unclear whether any cooling technologies are running during this time. In about a quarter of households (24%), the air conditioner is programmed to regulate indoor temperature throughout the hot season, which may restrict flexibility to TOU tariffs or other demand shifting opportunities<sup>43</sup>.

Figure 19 Understandings and use of air conditioners in households with children



N=379 (households with air conditioning and for which heating questions were relevant). Respondents were able to select multiple statements.

Figure 20 Managing hot days in households with children



N=539 (respondents which answered this question). Respondents were able to select multiple statements.

### Box 8 Keeping warm or cool

*'We live in Tasmania and the winters are long and cold... we also have a plug in heater in our son's bedroom so he can study.'* S273

*'We do 15 min exercise when we are too cold.'* S536

*'There are disagreements in the household regarding air-con. Some are more conscious than others and some feel the heat more. We are lucky we do not need to use heating as the apartment is quite warm and we rug up if needed.'* S11

*'My MS [Multiple Sclerosis] symptoms get worse as I get hotter, but I really agonise about the power usage. I also live with MS, so staying cool is important.'* S681

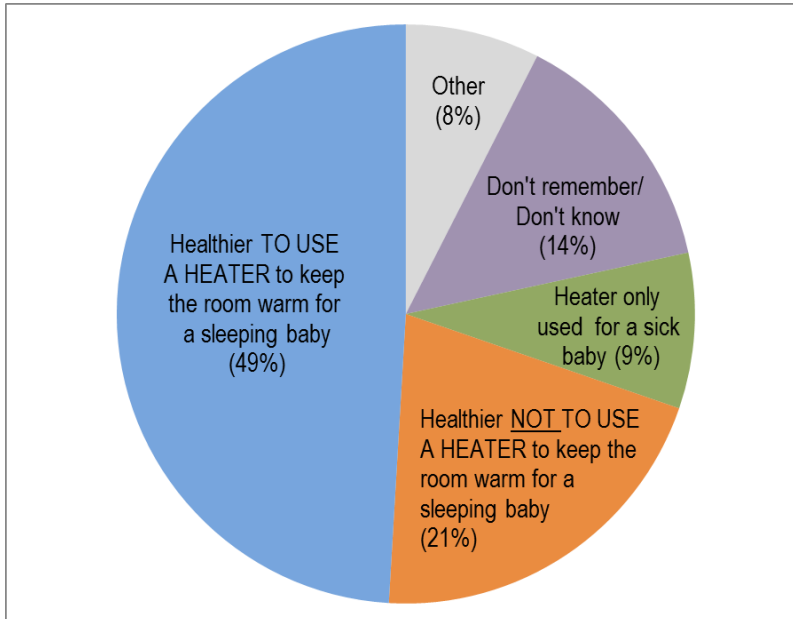
*'My daughter has epilepsy which heat makes worst so aircon is used a lot when she is home and it's hot.'* S331 *'Our house has a flat tin roof. It is very hard to keep cool.'* S380

<sup>43</sup> While the question wasn't asked, it is unlikely that any of these households have 'smart' thermostats that respond to price signals or tariff periods. These findings contradict the earlier finding that 90 per cent of respondents report only using the air conditioner on very hot days.

### 3.3.9 Heating and cooling expectations for babies and young children

Parents' understandings of the healthiest approach to providing heating for babies were varied. State of residence (and therefore climate) had little impact on responses<sup>44</sup>. Contrasting understandings of heating as healthy (49%) or unhealthy (21%) in babies' bedrooms (Figure 21) appear to reflect the conflicting range of information available to parents on this topic (see Appendix 6.3). Box 9 provides indicative quotes of the contrasting understandings around babies' health and heating while sleeping. Some parents made a distinction between 'keeping chill out of a room' and warming or heating a room for babies, the former being understood as more healthy than the latter (see Box 9).

Figure 21 Understandings of baby health and heater use when sleeping



N=426 (excludes households in tropical/ sub-tropical areas and households that don't use heating)

#### Box 9 Using heating for babies and young children

'[We use heating] only once the [children] go to bed. They have a heater in their rooms due to health reasons.' S280, SA

'Babies/ toddlers woke up a coldest point in night, keeping chill out of room is different to keeping a room warm. Generally better not to heat a room where people are sleeping, better to have sufficient warm bedding. S137, VIC

'The baby hardly slept if we didn't turn the heater on.' S12, VIC

'Our babies were kept warm with appropriate clothing and bedding.' S192, VIC

'Our house is centrally-heated, including the room where the baby slept. I didn't make any special arrangements for the baby one way or the other. However when getting up to breastfeed in the middle the night, I didn't want to be cold!' S166, VIC

'When my smallest child was a baby I had to constantly run heating and have a giant debt in the thousands now.' S557, TAS

<sup>44</sup> Some respondents were answering this question retrospectively – for when their children were babies – therefore they may have been living in a different state/climate area to their current address.

### 3.4 FLEXIBILITY ON AN OCCASIONAL BASIS FOR THE ‘COMMON GOOD’

This section discusses the possibility of a ‘peak alert’ to achieve demand management aims including why and how householders would consider responding when no financial incentive or penalty is provided.

#### 3.4.1 Hypothetical peak alert scenario

The findings of this study indicate that juggling multiple activities and achieving family wellbeing are usually more important than small daily financial costs or savings in households with children. As a result, this research found that the peak period demand response to TOU tariffs is likely to be (or is) non-existent or limited in households with children. In contrast, previous research conducted by the authors has found that some households (not specifically households with children) are willing to shift routines on an occasional basis for other reasons discussed below (Nicholls & Strengers 2013; Strengers 2010, 2013). The *Changing Demand* project also explored this opportunity by proposing a hypothetical ‘peak alert’ scenario to households in both stages of research.

The peak alert scenario posed in the survey was as follows:

‘The weather is forecast to be very hot (over 35°C) tomorrow and there may be a shortage of electricity. Everyone is asked to reduce their electricity use where possible between 2pm and 9pm on this hot day. This might happen a few times each year ... would you try to reduce home electricity use between 2pm and 9pm on those occasions?’

Eighty-five per cent of all respondents answered ‘yes’ in response to the peak alert question, mirroring the positive comments from Stage 1 participants (Nicholls & Strengers 2014). The response was high regardless of gender, household type, income status, work status and climate (Table 9).

Table 9 Householder interest in responding to a peak alert

RESPONDENT SUBGROUPS	RESPONSE TO PEAK ALERT REQUEST					
	Yes		No		Don't know	
	No.	%	No.	%	No.	%
Gender						
Female	390	85%	29	6%	39	8%
Male	70	85%	7	8%	5	6%
Household type						
Sole parent	188	82%	17	7%	24	10%
Couple	275	88%	19	6%	20	6%
Income status						
Low Income	187	81%	18	8%	25	11%
Other	276	88%	18	6%	19	6%
Work status						
Full-time	146	85%	12	7%	14	8%
Part-time	188	87%	12	6%	15	7%
Not in paid work	129	84%	11	7%	13	8%
Climate						
Tropical/sub-Tropical	71	81%	10	11%	7	8%
Other	393	87%	25	5%	36	8%
<b>Total</b>	<b>460</b>	<b>85%</b>	<b>36</b>	<b>7%</b>	<b>44</b>	<b>8%</b>

### 3.4.2 Reasons to respond to a peak alert

The survey explored householder reasons for wanting to participate in a peak alert scenario (or not). The 'reason' options presented to respondents (see Figure 22) were based on unprompted responses provided by householders during Stage 1 of the project. Survey respondents were able to select multiple reasons to explain their answer. Few householders indicated they would respond because 'it would be easy' (12%), which suggests that most felt their response would require some effort or impact on their household. This contradicts common assumptions held about energy saving and demand management, which argues that actions should be 'easy' for people to participate (e.g. Loux 2008).

The most popular reasons to respond to a peak alert were 'to help prevent electricity outage (blackout)' (64%), 'to be part of a community effort' (59%) and 'to reduce stress on the electricity grid' (52%). These responses indicate considerable interest in householders working together to co-manage and secure electricity supply on very hot days. They also reflect common or community interest in, and ownership of, the 'electricity grid', which runs counter to current market-based propositions that position householders as 'consumers' or 'customers' of a commodity (energy).

Notably, these reasons were selected more frequently than 'to benefit the environment' (39%). Of the households that selected environmental benefit as a reason, only five selected it as their sole reason, indicating that community responsibility or common ownership of a (sometimes) publicly owned asset is *different* to broader environmental concerns. These findings raise concerns for current intentions to privatise electricity sector assets as noted in the *Energy White Paper – Green Paper*, which may undermine householders' interest in energy reforms.

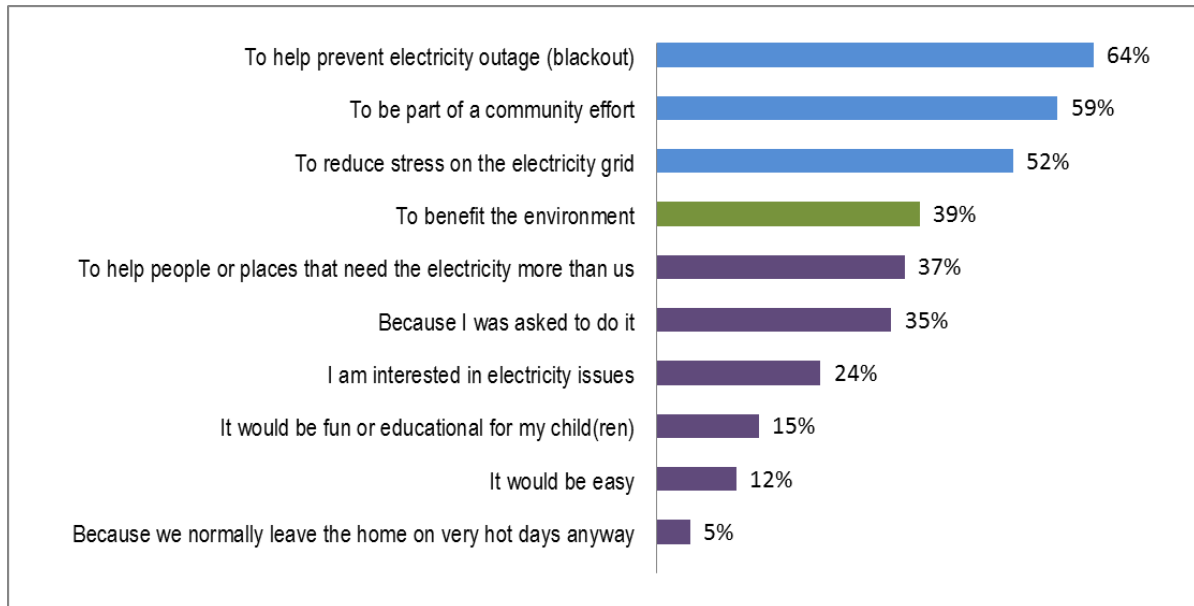
Thirty-seven per cent of respondents selected 'to help other people or places that need the electricity more than us' as a reason to participate in a peak alert. This finding highlights the important health benefits provided by access to reliable electricity, and a sense of community responsibility to provide power to those who 'need the electricity more than us'. It reflects concerns for elderly or sick community members and the greater need for electricity in aged care facilities and hospitals than in their homes during critical peak events. These findings support past research on the varied meanings of electricity (Nicholls & Strengers 2013) and 'communal cooperation' on issues of national significance (Boucher et al. 2012).

Fifteen per cent of survey respondents stated that they would respond to a peak alert because 'it would be fun or educational for my child(ren)', highlighting learning and child development opportunities which are currently overlooked in current energy reform proposals and demand management programs.

Importantly, over a third of households (35%) said they would respond to a peak alert simply because they were asked.



Figure 22 Reasons to reduce household electricity use in response to a peak alert



N=460 (respondents could select multiple reasons)

These survey responses are based on a hypothetical scenario and do not necessarily indicate that 85 per cent of households would reduce their peak demand during every critical peak event they were aware of. However, **the high level of interest in cooperating and assisting with network demand issues found in this research is under-explored in demand management and energy reform discussions.**

It is possible that household responses to peak alerts could diminish over time, particularly if they were delivered too often. Findings from Stage 1 indicate that approximately six times per year is an acceptable figure, although other Australian trials have successfully conducted more frequent events (up to 12 times per year) as part of critical peak pricing and rebate trials (Strengers 2013). With advances in available technology and communications, some peak alerts may not be delivered state or city-wide but rotated or targeted to households depending on where demand response is most needed.

It is also possible that the demand response to peak alerts could increase over time as householders become more familiar with this strategy, becoming one of many 'normal' disruptions in everyday life (see Section 3.1.1). Response may also increase as householders:

- come to understand energy issues such as peak demand and the role they can play in addressing it;
- gain more trust and social investment in the electricity system as a shared resource;
- respond to developing community expectations around peak demand response (e.g. similar to community expectations around water restrictions);
- become familiar with ways to 'disrupt' routines on an occasional basis (e.g. prepare a salad or BBQ instead of electric cooking); and
- incorporate longer term strategies to reduce their household's need for electricity on very hot days (e.g. increase external shading to enable reduced air conditioner use on these days).

Box 10 Responding to a peak alert

'Due to where we live we often get blackouts during summer so would do anything to help lessen the load on the grid.' S133

'I am personally more motivated by helping the community (i.e. being TOLD that the whole community need to reduce electricity) than saving money.' S52

'Happy to adapt for benefit of all.' S528

'I would be more likely to reduce energy usage in peak times if I knew why I was being asked to do so.' S105

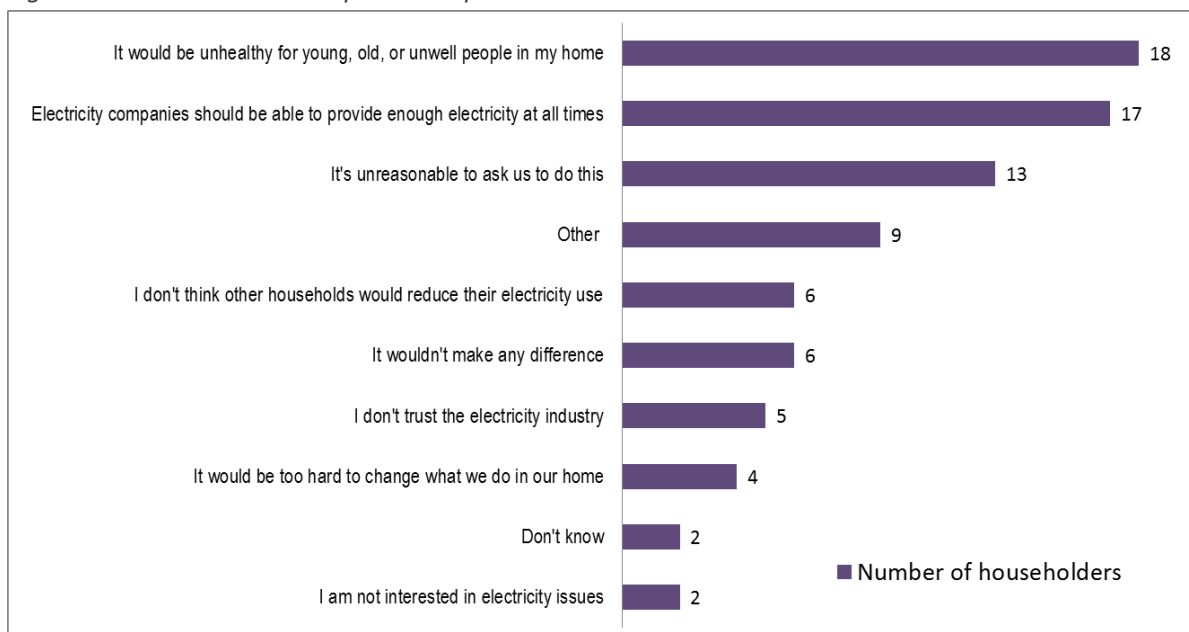
'We've all got to do our bit - and really, it's not that hard!!' S80

### 3.4.3 Reasons *not* to respond to a peak alert

Twenty-six survey respondents said they would not respond to a peak alert, and 44 didn't know if they would respond or not. Those who said they wouldn't respond were asked why. They were provided with a range of statements based on findings from the Stage 1 research (Figure 23). Respondents were able to select more than one answer. The top reasons given were that 'it would be unhealthy for young, old, or unwell people in my home' (18 respondents) and that 'electricity companies should be able to provide enough electricity at all times' (17 households). Thirteen households said it would be 'unreasonable' to ask them to do this. These respondents provided some additional reasons not to respond to a peak alert including: wanting to be comfortable when at home; being a low electricity use household; using renewable energy; and having to work around external commitments (work, school, community).

Past research conducted with households on peak demand revealed that very poor understandings of peak demand and its causes were often related to negative reactions to demand management strategies such as those reported here (Strengers & Nicholls 2013). These responses may therefore change if and when householders have a clearer understanding of current energy demand challenges in Australia.

Figure 23 Reasons *not* to respond to a peak alert



N=36 (respondents could select multiple reasons)

### 3.4.4 TOU tariff respondents' interest in responding to peak alerts

Most of the survey respondents who reported being on a TOU tariff and who said they 'don't change what we do at home because of peak/ off-peak electricity rates' (17 out of 19) also said they would 'try to reduce home electricity use between 2pm and 9pm' in response to a peak alert. In other words, most respondents who indicated they were not currently responding to a TOU tariff or financial incentive indicated they would respond to a non-financial and voluntary peak alert. Similarly, most respondents on a TOU tariff (14 out of 15) who said they 'deliberately do some things differently because of peak/off-peak electricity rates' said they would respond to a peak alert.

Of the 28 households who reported being on a TOU tariff and had an air conditioner, 16 said they would change their air conditioning use in response to a peak alert. Only one of these households reported shifting their air conditioner use outside peak times on a TOU tariff.

These findings point to two important distinctions between TOU tariffs and peak alerts: (i) frequency and regularity; and (ii) financial or non-financial understandings. In regards to the first distinction, TOU tariffs aim to **permanently** move weekday routines to different times of the day/ week whereas peak alerts aim to spontaneously disrupt them on an **occasional** basis. The peak alert therefore mimics similar disruption already happening in homes, without seeking to permanently alter regular and afternoon and early evening peak routines (see Section 3.1.1). Advanced warning of a peak alert is likely to further mimic the planned disruptions already happening in family households as part of everyday life (e.g. school holidays and sporting events). Secondly, TOU tariffs aim to financially incentivise householders to shift their electricity demand to other times of the day, whereas a peak alert positions the problem of peak demand as a community, health and/ or national concern.

### 3.4.5 Activities and household flexibility for TOU tariffs and a peak alert

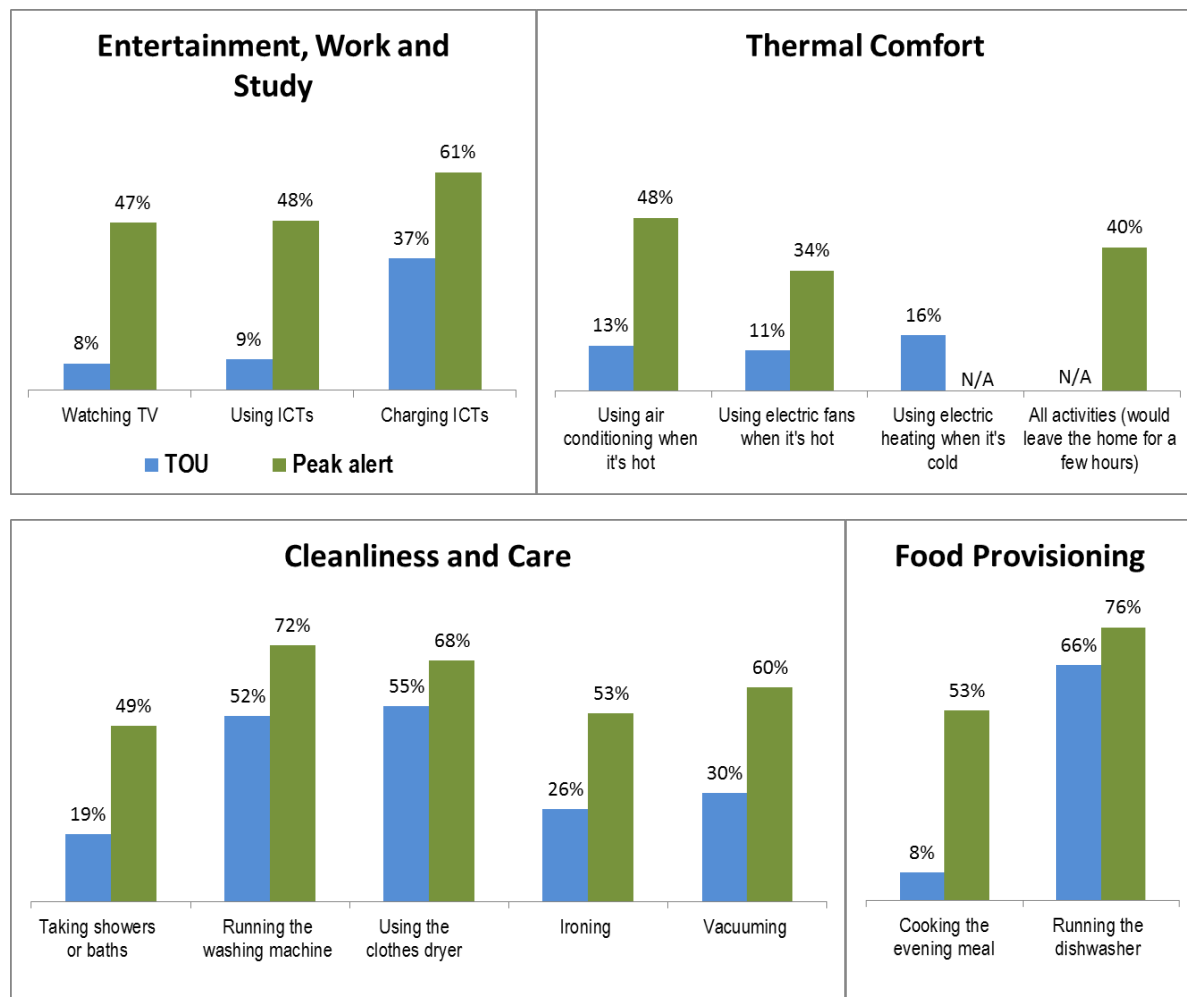
This section compares the activities that householders consider changing in order to participate in two contrasting demand management approaches — TOU tariffs and a critical peak alert. As discussed above, a TOU tariff aims to change when and/or how households perform daily activities and re-establish some of their routines, whereas a peak alert aims to occasionally disrupt household routines. A TOU tariff presents financial incentives to shift routines outside peak times, while the peak alert draws on non-financial meanings associated with electricity systems and human health and wellbeing.

Box 11 Survey descriptions of demand management scenarios

TOU tariff	Peak alert
<i>'Electricity becomes more expensive between 2pm and 9pm on weekdays (Mon-Fri). At the same time, electricity becomes cheaper at other times (mornings, late in the evening and weekends).'</i>	<i>'The weather is forecast to be very hot (over 35°C) tomorrow and there may be a shortage of electricity. Everyone is asked to reduce their electricity use where possible between 2pm and 9pm on this hot day. This might happen a few times each year.'</i>

The comparisons made in this section are based on two scenarios posed in the survey (see Box 11). Respondents<sup>45</sup> were asked ‘which (if any) regular activities would your household change or move to reduce electricity use between 2pm and 9pm’ for each hypothetical scenario and provided with a list of household activities. For each activity, respondents could select ‘No...would not change’ or ‘Yes...would change or move’. In addition, respondents could indicate their uncertainty or that the activity was not relevant to the peak period in their household. These data are presented in Figure 24 according to the four main activity domains which use energy in households (see Section 1.1). For dishwashing, clothes drying and air conditioning practices, only results from households with the relevant appliance were included<sup>46</sup>.

Figure 24 Activities householders considered flexible for a TOU or peak alert scenario



**Entertainment:** TV, N=420 (TOU)/ 380 (peak alert); Using ICTs, N=422 (TOU)/ 384 (peak alert); Charging ICTs, N= 422 (TOU)/ 384 (peak alert). **Thermal comfort:** Air conditioning, N=294 (TOU)/ 270 (peak alert); Fans, N=417 (TOU)/ 379 (peak alert); Heating, N=412 (TOU); All activities, N=348 (peak alert). **Cleanliness and care:** Showers and baths, N=422 (TOU)/ 381 (peak alert); Washing machine, N=421 (TOU)/ 386 (peak alert); Dryer, N=252 (TOU)/ 228 (peak alert); Ironing, N=414 (TOU)/ 378 (peak alert); Vacuuming N=420 (TOU)/ 376 (peak alert). **Food provisioning:** Cooking, N=420 (TOU)/ 382 (peak alert); Dishwasher, N=259 (TOU)/ 235 (peak alert).

<sup>45</sup>**Variable N figures:** The TOU tariff scenario was only posed to respondents not currently on a TOU tariff or a two-rate off-peak tariff. Only households which answered ‘yes’ to the peak alert scenario were asked which activities they would change. The following analyses include respondents which answered ‘no’ to the peak alert scenario but exclude those that answered ‘don’t know’. Respondents were only included in the analyses if they selected a response for that activity.

<sup>46</sup>Pool data excluded due to lack of certainty about which households had a pool

As these scenarios are hypothetical, caution should be taken when interpreting the findings. Section 3.5 provides more specific information on some of the dynamics affecting the flexibility of routines in family households which suggests that TOU responses are likely to be significantly lower than indicated in Figure 24. It is also probable that the responses to an occasional disruption through a peak alert would be lower than the survey data indicate. However, the data demonstrate clear differences in the perceived flexibility of activities for the two scenarios.

Every activity was considered flexible by more householders under the peak alert scenario than the TOU scenario. In particular, activities that most households considered unsuitable to change on a regular basis for a financial incentive were much more flexible on an occasion basis and for non-financial reasons. For example, 48 per cent of respondents with air conditioners thought they could change their use of the air conditioner to reduce energy use for a peak alert compared with 13 per cent for a TOU tariff (see Figure 24). Preparation of the evening meal was considered more flexible on an occasional basis (53%) than for a TOU tariff (8%). Similar increases were seen in the flexibility of typically 'inflexible' activities such as watching TV and using ICTs. Practices that are often considered flexible for a TOU tariff such as running the washing machine (52%) or dishwasher (66%) were flexible in slightly higher numbers of households for a peak alert (72% and 76% respectively). These data indicate the breadth of activity flexibility in households with children when the demand management proposition takes into account: i) importance and strength of routines; ii) adaptability to disruptions; and iii) meaningful reasons to participate in demand management that are not necessarily for an individual and financial benefit.

Very hot days are already a time of disruption for many households (Stage 1 data), and therefore the peak alert scenario can draw on householders' experience of these days to do things differently or in a way that involves less electricity usage. For example, 40 per cent of respondents considered leaving the home for a few hours in response to a peak alert (compared with 57 per cent who 'often go somewhere cooler to escape the heat at home—see Section 3.3.8). Since planning is an integral part of staying on top of things in households with children, advance notice of the request (the day before) is likely to be important.

The data above suggest that a peak alert may be more effective than TOU in reducing peak demand on critical peak days. A peak alert could reduce the need for financial mechanisms and ameliorate the associated risks of disadvantage and hardship for some households and consumer groups. Similar findings are reported in research conducted by the authors with households participating in similar programs and tariff trials (Nicholls & Strengers 2013; Strengers 2010, 2013).

*Box 12 Disrupting routines on a regular or occasional basis in households with children*

<b>Regular disruption (e.g. TOU tariff)</b>	<b>Occasional disruption (e.g. peak alert)</b>
<i>'If we did not have commitments like school and work it would be much easier to change routines around off peak and peak times. but as a busy household things need to be done at times that fit in with other commitments.'</i> S328	<i>'I wouldn't necessarily stop doing those activities 2pm - 9pm but would minimise them.'</i> S52
<i>'Waiting till off peak time to do the activities will disrupt our routine especially with kids.'</i> S199	<i>'Would try to "pre-cool" house before 2pm so air con not working as hard later (house is well insulated), and do clothes/dishes in morning.'</i> S25
<i>'I would only change what I could but children's routines and bedtime cannot change so for us 2-9pm is OUR PEAK TIMES and can't change that.'</i> S313	<i>'We would only cool one room and at a higher temp if asked to minimise electricity use on hot days.'</i> S204
<i>"Changing activities" need to be put into the context of work hours as well. For our household, the biggest dictator of when to do house work is work arrangement/work hours rather than being dictated by peak, off-peak.'</i> S24	<i>'I would go out to the movies or somewhere that is air conditioned to save electricity in my home and to cool down.'</i> S452
	<i>'During the last 40C heat wave, we sought solace in a friend's house who had ac[air conditioning]. What started as a quick visit to cool off became an extended playdate and impromptu dinner. so we shared their electricity- instead of carpool, electricity pool.'</i> S7

## 4 RECOMMENDATIONS

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The *Changing Demand* project's key findings are as follows.

1. Activities in households with children were tightly coordinated and routinised during the late afternoon/ early evening period. These households depended on routines to keep life manageable. **The importance of regular routines made responding to cost-reflective pricing (e.g. TOU tariffs) difficult for this household type.**
2. Alongside routinised practices, parents used opportunistic 'time gaps' to get some household activities done where possible. Time gaps often depended on the unpredictable and irregular timing of children's activities (e.g. napping, playing). **This restricted and synchronised the timing of activities around children.**
3. Households with children were primarily concerned with health, time efficiency, convenience, comfort, and childhood development. **Energy use concerns and considerations were a lower priority, particularly during peak times.**
4. Many households with children were experiencing financial insecurity. Financial pressures were widespread in low-income and sole parent households, but were also affecting other households with children that may have less access to financial assistance. **Tariff reforms that result in increased bills for households with peaky usage profiles may contribute to negative health and wellbeing outcomes.**
5. Many parents did not understand their tariff or its time implications well. (Mis)understandings of cheaper electricity late in the evening had already shifted the timing of activities in some households (e.g. running the dishwasher) outside the afternoon/ early evening peak. **Most 'easy' options for households with children to respond to TOU tariffs were already implemented where deemed possible. Many parents are unlikely to have the time, interest or trust in the sector to take more active interest in investigating the expanding range of tariff choice.**
6. Many households with children found it difficult, or thought it would be difficult, to *regularly* alter their routines for a financial incentive (e.g. TOU tariff). In contrast, **most were interested in disrupting their routines on an *occasional* basis for non-financial reasons (e.g. for a peak alert).** This represents a significant and currently unexplored demand management opportunity that is likely to be more positively received by households with children.

Box 13 provides a case study of a survey respondent who demonstrates many of these findings, and tells the common narrative found throughout this research in their own words.

The *Changing Demand* project has five recommendations which specifically relate to Australian households with children. These recommendations are subject to the project's limitations and exclusions, as outlined in Section 2.3.

### 1. Ensure TOU tariffs are provided on an optional basis

The research confirms previous research conducted by AGL Energy, which finds that households with children are more likely to be financial disadvantaged on a TOU tariff than other household types if they do not shift the timing of their activities (Simshauser and Downer 2014). Given the importance of routine during the peak tariff period and householders' difficulties shifting their routines on a

regular basis, this tariff may place an unfair burden on households with children. As such, **cost-reflective tariffs such as TOU should be optional for households with children, and financial opportunities should not be overstated. Further, households with children should be able to opt-out of TOU tariffs without financial penalty. Ways to financially support some households with children that experience increased costs as a result of cost-reflective tariffs are also recommended.**

## **2. Reassess focus on tariff choice and information campaigns**

The parents who participated in this research often had low understandings of and engagement with the details of their electricity tariff and any timing implications. Time constraints, other priorities, too much or irrelevant information, confusion, and distrust led many householders to actively disengage from retailer and tariff choice. Given that participants in this research were more educated than the average population, this finding is likely to be more widespread amongst households with children. As such, this research finds that **the current emphasis on providing more information and greater tariff choice may be misguided, and is unlikely to achieve positive financial outcomes for households with children or anticipated demand management outcomes.**

More consideration of alternative ways to support households with children to reduce energy demand, lower their bills and shift energy consumption outside peak times is needed. Options might include:

- tailoring independent advice to assist households with children to understand electricity and tariff issues in the context of their everyday lives, e.g. in-home advisory services;
- demand management programs, such as **peak alerts**, which allow households with children to participate in demand management without risk of financial disadvantage (see Recommendation 5 below);
- initiatives to **improve thermal efficiency of new and existing housing** (including social housing and rental properties) to reduce the need for air conditioning and heating; and/or
- strong policy focus on **energy efficiency programs**, such as energy efficiency improvements in the manufacture and sale of new appliances, and programs to encourage and enable households (including those with financial constraints) to access energy efficient systems and appliances and/or appliances with delay or timing capability.

Further research is also needed to investigate the communication strategies and messages being directed at households.

## **3. Adopt non-economic understandings of consumption and change**

Energy reforms and tariff changes are currently premised on an economic understanding of consumption and change. For example, TOU tariffs assume that householders will weigh up the costs and benefits of using electricity during peak times and shift their consumption accordingly. In contrast, this project found that economic understandings of consumption were not a good indicator for how or why households with children use energy to carry out their daily activities.

**Regulators and others seeking to achieve demand shifting in households with children should adopt other non-economic understandings of consumption and change, such as those used to conduct this research.** This requires social science expertise.

Three important non-economic understandings of consumption and change were evident from this research.

- i. Households with children do not only have an economic relationship with energy, but also understand it as a 'common' resource, a shared asset and a community responsibility. These understandings are not currently being considered in energy reforms and may be undermined by intentions to further privatise the sector (Strengers & Nicholls 2014).
- ii. Women may play a more central role in regards to energy demand in households with children, where they are often primarily responsible for domestic and child-raising activities. Rational or cost-benefit equations are unlikely to be a high priority whilst juggling household activities and children's needs. Further understandings of women and their priorities at home are needed to advance demand management programs and understandings.
- iii. Understanding family routines helps explain how and why activities are performed at specific times of the day. Routines are sequenced between different family members (parents, children) and institutionally-timed events (school, work, sport etc.) in households with children. They are also bundled together during particular periods of the day. Regular routine helps keep life manageable and is often inflexible in response to small changes in price. Demand shifting reforms should pay more attention to these dynamics and how to shift them.

#### **4. Further research on changing household practices**

The research identified a number of key areas where households with children are experiencing rapid change. Some of these have potentially important ramifications for the energy sector and tariff change for households with children. Because this change was self-reported at one time point, further social research is required to assess these trends over a longer time frame. In particular, change was found in relation to:

- Cooking activities, particularly trends towards electrical convenience appliances and the importance of 'healthy' meals;
- Expectations and perceived needs for air-conditioning (and heating), particularly for babies and young children;
- Practices involving ICTs for work, school, entertainment and communication, including the changing role of television and other ICTs during the TOU peak tariff period.

**Further in-depth investigation of the demand, financial and social outcomes in households with children experiencing cost-reflective pricing is warranted.**

In addition there is scope to conduct analysis of the rate of change in energy efficiency of appliances, equipment and buildings, and the extent to which policy or measures in these areas (including tailored advice programs) could change the peak demand profiles of households with children.

#### **5. Develop demand management programs premised on 'non-financial' understandings of consumption and change**

The research found that *occasional* requests for households with children to disrupt their routines to assist with managing peak demand issues was a more positive proposition than incentivising families households to *regularly* shift their weekday routines in response to a TOU tariff. This finding reflects the importance of regular family routine, as well as these households' adaptability and resilience to



normal disruptions to routine. It also reflects the importance of non-financial understandings of energy consumption (such as acting for the 'common good' of the community) and demand management issues. While occasional and non-financial demand management programs, such as a peak alert, are unlikely to appeal to all households with children, they may provide a more positive platform to address demand management issues with this group of households. **Further trialling the concept of a peak alert with households with children is recommended, alongside considering alternative demand management programs that build on these findings.**

Such approaches could build on campaigns from other sectors which emphasise community understandings and social values, such as voluntary and compulsory water restrictions, bushfire alert systems, and some public health campaigns.

Additionally, these findings opens up other possibilities for encouraging householders to innovate, adapt and shift their routines outside peak times through a range of incentives or strategies such as:

- Providing better and/or free access to cool spaces during critical peak demand days, such as extending library and pool opening hours, supporting families to spend time in shopping centres without needing to spend money, or providing free peak period movie tickets.
- Developing programs that assist vulnerable households to stay cool while conserving air conditioning at home, e.g. 'Share the Air' campaigns that encourage households to share their air conditioning with neighbours on very hot days.
- Engaging with the health sector to identify consistent messages regarding 'healthy' heating and cooling for young children, which supports peak demand and energy reduction aims. These could inform strategies which emphasise practical and fun ways for families to manage in cold and hot weather while supporting health and energy efficiency outcomes.

**About the respondent/household:** Female in couple household with 4 children (1 aged 0-4 years, 3 aged 12-17 years). The family lived in regional Victoria, had a mortgage and a low-income concession card.

**Respondent description of busiest time of day in their home:** *'chaotic, productive'*

**Respondent comments throughout the survey:**

*'Health issues make maintaining basic household standards and school grades very challenging, so while we reduce electricity use when we can, and when we think of it, we have no option but to prioritise productivity. Alas, this means we often use our tumble dryer instead of line drying as line drying takes ten times as much time and effort as tumble drying, but is less reliable.'*

*'My teenagers are strongly encouraged to do their own laundry, and I have shown them how to use the most environmentally friendly cycles and techniques I know our machine does. I also encourage them to line dry when they can, but as they do their laundry after school, there is seldom time to get it washed, hung and dry before dark in Winter, so machine drying is used a lot. I find it insanely difficult to hang washing while wrangling a toddler at my house (poor layout/home design) so I machine dry most of the time, too. This will change as summer approaches, but machine drying will still be the main way we dry our laundry.'*

*'I run the dishwasher after breakfast, and I open it to assist with drying. Kids unpack it after school, and pack more dishes into it. If there is a backlog and the dishwasher can be filled in the afternoon, we run it again. We don't run appliances at night both because they are noisy, and because there is a small risk of appliance failure/fire which could be catastrophic if the household is asleep.'*

*'School iPad program. Mandatory ownership of an iPad from year 7 makes it difficult for me to feel as though I control the kids' electronic device use. They use them for homework, recreation (games) and socialisation, and it is difficult for me to know when they are doing what.'*

*'We have a couple of people with Asperger's Syndrome living in this household, which impacts our routine and tolerances for noises and temperatures.'*

**Household response to TOU tariff:** The household was on a TOU tariff but the respondent didn't know when the off-peak tariff period started. They didn't do anything differently as a result of the TOU tariff.

**Respondent comments re peak alert:**

*'I would switch everything off at home and go to a shopping centre, then pick kids up (if a school day) then perhaps go do a hot day activity (splash in a stream) then have a picnic dinner, possibly resorting to going to a shopping centre again to fill in time before going home. If we were unable to go out on such a day, I would probably need to use a fan and laptop computer or TV but otherwise confine electricity use as much as possible.'*

**Reasons for responding to peak alert:**

Because I was asked

To prevent a blackout

To be part of a community effort

## 5 REFERENCES

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## 6 APPENDICES

### 6.1 PARTICIPANT RECRUITMENT DOCUMENTS

#### 6.1.1 Sample of interview recruitment flyer



Centre for Urban Research  
College of Design and Social Context  
RMIT University  
GPO Box 2476  
Melbourne VIC 3001  
<http://www.rmit.edu.au/research/urban>

**BE PART OF A NATIONAL STUDY ABOUT  
FAMILIES & ENERGY USE**

***RMIT University is inviting family households to be part of research about:***


- Household activities at busy times of the day/evening
- **'What it's really like' for families at these times of the day**
- How household electricity consumption is changing
- Having the voice of family households heard in decisions about electricity costs, concessions etc

***What would I need to do?***

- **An interview at home (1-2 hours) in the afternoon or evening**
- No special knowledge or preparation (or tidying up!) is needed
- **Each household will receive a \$50 Coles/Myer gift voucher**

***Want to take part or find out more?***

- Go to [www.familyenergystudy.net](http://www.familyenergystudy.net)
- Or contact Larissa:  
Email [larissa.nicholls@rmit.edu.au](mailto:larissa.nicholls@rmit.edu.au)  
Phone (03) 9925 9012



## 6.1.2 Detailed information for interview participants ('Plain Language Statement')

### **INVITATION TO PARTICIPATE IN A RESEARCH PROJECT**



Centre for Urban Research  
College of Design and Social Context  
RMIT University  
GPO Box 2476  
Melbourne VIC 3001  
<http://www.rmit.edu.au/research/urban>

**Project Title:** *Changing Demand: Energy Use in Larger Households with Children*

#### **Investigators:**

Dr Yolande Strengers (*BA, PhD*)  
Senior Research Fellow

Dr Larissa Nicholls (*BA/BSc, PhD*)  
Research Fellow

*Dear Householder,*

You are invited to participate in a research project being conducted by RMIT University. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

#### **Who is involved in this research project? Why is it being conducted?**

- Yolande Strengers and Larissa Nicholls, both RMIT University research staff, are conducting an independent research project approved by the RMIT Human Research Ethics Committee.
- The Consumer Advocacy Panel supports advocacy for consumers in national energy market decisions, policy and regulation. The Panel has provided funding for this project about energy use in larger households with children.

#### **Why have you been approached?**

Your household has been invited to participate in this project because you registered your interest in response to project information distributed through places such as schools, health centres and a webpage. Households with 3 or more occupants and at least one child under 18 years are eligible.

#### **What is the project about? What are the questions being addressed?**

The project is about how larger households use energy in their homes. The project involves interviews with 44 households in NSW and Victoria to understand:

- How has household electricity use has changed in recent years and the reasons for any changes
- Where electricity demand is likely to go in the future
- How changes to electricity pricing may affect households

#### **If I agree to participate, what will I be required to do?**

You are being asked to spend one to two hours with RMIT interviewers in your home (in the afternoon/evening). No specific knowledge is required to participate. You will be asked basic demographic questions followed by some questions about how and when your household does activities which use energy and any challenges your family faces relating to electricity use. The broad household activity topics are: keeping cool or warm, food, washing, cleaning, entertainment, work. We would also like you to show us around your home, to see the appliances you own and use. We will have a voice recording device which will only be used with your signed consent. We may ask your permission to take photos of specific objects/areas (but not people or identifying features) and it is your choice whether you agree to this.

To thank you for your time, we will provide you with a \$50 Coles Myer gift card at the end of the interview and tour. You are welcome to see the interview materials before deciding if you want to participate.

#### **What are the possible risks or benefits associated with participation?**

- There are no perceived risks outside your normal day-to-day activities and the interview will not cover any questions of a sensitive nature.
- There may be no direct benefit to you from participating in the project, however your participation will contribute to findings to assist advocacy for larger household electricity consumers

#### **What will happen to the information I provide?**

- All recorded and written documentation will be treated confidentially and not used for any purpose outside of the research. The only people that will access to your raw or coded interview data will be members of the research team and a professional transcriber (for the voice recording). Any information that you provide can be disclosed only if (1) it is to protect you or others from harm, (2) if specifically required or allowed by law, or (3) you provide the researchers with written permission.
- The data from the study will be aggregated and findings disseminated in research outputs such as project reports, conference presentations, and research articles. No information will be included which could identify yourself or any participants. Non-identifying codes will be used for all information collected. You can request access to your data at any time. A summary of study findings will be made available.
- In publication of an Appropriate Durable Record (ADR) research outputs may be publicly accessible in an online library. A project report will be available on the Consumer Advocacy Panel and Australian Policy Online websites and the findings will be disseminated to consumer advocacy organisations and national electricity market decision-making organisations.
- Your research data will be kept securely at RMIT for 5 years after publication, before being destroyed.
- If any children make comments on the voice recording, we will ask your permission to use this data if it is relevant to the research. If you do not consent, we will remove these comments from the interview data.

#### **What are my rights as a participant?**

- The right to withdraw from participation at any time
- The right to request that any recording cease
- The right to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for the participant
- The right to have any questions answered at any time

#### **Whom should I contact if I have any questions?**

Please feel free to contact Yolande or Larissa team at any time if you have any questions or concerns, or if you would like to discuss any aspects of this research.

Yours sincerely



Dr Yolande Strengers (PhD, BA)  
Senior Research Fellow  
Ph 03 9925 1916  
Email [yolande.strengers@rmit.edu.au](mailto:yolande.strengers@rmit.edu.au)



Dr Larissa Nicholls (BA/BSc, PhD)  
Research Fellow  
Ph 03 9925 9012  
Email [larissa.nicholls@rmit.edu.au](mailto:larissa.nicholls@rmit.edu.au)

#### **If you are experiencing difficulties paying your electricity bill:**

The first step is to contact your energy company to ask about assistance, rebates and programs to help customers with financial difficulties to pay their energy bills. You will find your energy retailer's number on your bill.

If you receive a pension or benefit from Centrelink you may want to arrange a Centrepay option. Call 132594 for information.

In NSW, you can also call the Energy Information Line on 1300 136 888 for advice.

#### **If you have an unresolved issue with an energy company:**

You can contact the Energy Ombudsman in your State or Territory. This is a free service.

*If you have any concerns about your participation in this project, which you do not wish to discuss with the researchers, then you can contact the Ethics Officer, Research Integrity, Governance and Systems, RMIT University, GPO Box 2476V VIC 3001. Tel: (03) 9925 2251 or email [human.ethics@rmit.edu.au](mailto:human.ethics@rmit.edu.au)*

### 6.1.3 Participant interview consent form

Centre for Urban Research  
College of Design and Social Context  
RMIT University  
GPO Box 2476  
Melbourne VIC 3001  
<http://www.rmit.edu.au/research/urban>

#### **PARTICIPANT CONSENT FORM**

**Project Title:** *Changing Demand: Energy Use in Larger Households with Children*

**Investigators:**

Dr Yolande Strengers (BA, PhD)  
Senior Research Fellow  
Ph 03 9925 1916

Dr Larissa Nicholls (BA/BSc, PhD)  
Research Fellow  
Ph 03 9925 9012

1. I have had the project explained to me, and I have read the information sheet
2. I agree to participate in the research project as described
3. I agree:
  - to be interviewed and complete a questionnaire
  - that my voice will be audio recorded
4. I acknowledge that:
  - (a) I understand that my participation is voluntary and that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied
  - (b) The project is for the purpose of research. It may not be of direct benefit to me.
  - (c) The privacy of the personal information I provide will be safeguarded and only disclosed where I have consented to the disclosure or as required by law.
  - (d) The security of the research data will be protected during and after completion of the study. The data collected during the study may be published, and a report of the project outcomes will be provided to the Consumer Advocacy Panel, advocacy organisations and other organisations associated with electricity network decisions. Any information which will identify me will not be used.
  - (e) I understand that the interviewers may ask to take photos of specific objects/areas (not people or identifying features) and that it is my choice whether I agree to this.
  - (f) I understand that any comments made by my dependent children present at the time of the interview may also be captured on the voice recorder. The interviewers may ask to use these comments if they are relevant to the research. It is my choice whether I agree to this.

**Participant's Consent**

Name : \_\_\_\_\_ Signature : \_\_\_\_\_ Date : \_\_\_\_\_

**Where additional participants are under 18 years of age:**

I consent to the participation of \_\_\_\_\_ in the above project.

Signature (1): \_\_\_\_\_ Signature (2): \_\_\_\_\_ Date: \_\_\_\_\_

*(Signatures of parent(s) or guardian(s))*



## 6.2 ONLINE SURVEY

### **Family Energy Study 2014 – Households with Children**

You are invited to be part of this study being conducted by Dr Yolande Strengers and Dr Larissa Nicholls at RMIT University. If you have any questions please contact Larissa on (03) 9925 9012 or [larissa.nicholls@rmit.edu.au](mailto:larissa.nicholls@rmit.edu.au)

The electricity industry is considering a range of changes to address challenges of electricity supply and demand in Australia. This study aims to better understand electricity use in households with children and to help represent the needs and interests of families in decisions about electricity pricing, policy and regulation in Australia.

The study is funded by the Consumer Advocacy Panel ([www.advocacypanel.com.au](http://www.advocacypanel.com.au)) and approved by the RMIT Human Research Ethics Committee.

#### **Important Information:**

- The survey is open to all electricity grid-connected Australian households that have children living at home (at least 1 child under 18 years of age).
- We ask that only one adult (parent or guardian) in the household does the survey.
- **There are two \$500 Coles/Myer gift card prizes.** Two households will be randomly selected to receive one of these gift cards. If you would like to be included in the gift card draw you can provide your contact details for the purpose of the prize draw. Your name and contact details will not be used in the survey analysis or for any other purpose.
- Your confidentiality and anonymity will be protected at all times.
- The survey takes about 20-30 minutes.
- **Note: You might find the survey easier** on a computer than on a smart phone.

**Q1.1** Would you like to read more detailed information about being part of this study?

- No - Please take me to the survey questions [Skip to Q2.1]
- Yes

#### **Extra Information for Participants:**

##### **What is the FAMILY ENERGY STUDY about? What are the questions being addressed?**

The project is about how households with children use energy in their homes. The study aims to:

- Understand specific needs and expectations for electricity use in households with children
- Understand how changes to electricity pricing might affect households with children
- Make recommendations that would benefit households with children

##### **If I agree to participate, what will I be required to do?**

You are being asked to spend 20-30 minutes completing a survey. No specific knowledge is required to participate. You will be asked:

- Some questions about the activities which use energy in your home
- What you think about some electricity issues
- Some demographic questions

Two \$500 Coles Myer gift card prizes are being offered as incentives to participate. Households which opt to complete the survey and choose to include their contact details at the end of the survey will go in the random draw for these prizes. Contact details will only be used for the purposes of random prize draw and will not be included as part of the survey analysis.

##### **What are the possible risks or benefits associated with participation?**

- There are no perceived risks outside your normal day-to-day activities and the survey will not cover any questions of a sensitive nature.
- There may be no direct benefit to you from participating in the project, however your participation will contribute to findings to assist advocacy for larger household electricity consumers.

**What will happen to the information I provide?**

- Any information that you provide can be disclosed only if (1) it is to protect you or others from harm, (2) if specifically required or allowed by law, or (3) you provide the researchers with written permission.
- The data from the study will be aggregated and findings disseminated in research outputs such as project reports, conference presentations, and research articles. No information will be included which could identify yourself or any participants. Non-identifying codes will be used for information collected. A summary of study findings will be made available.
- A project report will be available on the Consumer Advocacy Panel and Australian Policy Online websites and the findings will be disseminated to consumer advocacy organisations and national electricity market decision-making organisations.
- Your research data will be kept securely at RMIT for 5 years after publication, before being destroyed.
- Because of the nature of data collection (a survey), we are not obtaining written informed consent from you. Instead, we assume that you have given consent by completing and submitting the survey.

**Security of the website:** Participants completing the survey online should be aware that the World Wide Web is an insecure public network that gives rise to the potential risk that a user's transactions are being viewed, intercepted or modified by third parties or that data which the user downloads may contain computer viruses or other defects.

**Security of the data:** This project uses an external site to create, collect and analyse data collected in a survey format. The site we are using is Qualtrics. If you agree to participate in this survey, the responses you provide to the survey will be stored on a host server that is used by Qualtrics. At the end of the survey period, personal information (participant contact details) will be deleted from the site and our records and will not be stored as data. Once we have completed our data collection and analysis, we will import the data we collect to the RMIT server where it will be stored securely for five (5) years. The data on the Qualtrics host server will then be deleted and expunged.

**What are my rights as a participant?**

- The right to withdraw from participation at any time
- The right to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for the participant
- The right to have any questions answered at any time

**Who should I contact if I have any questions?**

Please contact Larissa or Yolande at any time if you have any questions or concerns, or if you would like to discuss any aspects of this research.

Dr Larissa Nicholls  
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*If you have any concerns about your participation in this project, which you do not wish to discuss with the researchers, then you can contact the Ethics Officer, Research Integrity, Governance and Systems, RMIT University, GPO Box 2476V VIC 3001. Tel: (03) 9925 2251 or email [human.ethics@rmit.edu.au](mailto:human.ethics@rmit.edu.au)*

**YOUR HOUSEHOLD**

**Q2.1** Which of the following best describes your household?

- Sole parent with child(ren)
- Couple with child(ren)
- Legal guardian of children, e.g. grandparent, carer
- All adult household (no children under 18)

[If 'All adult household' Is Selected, Then Skip To End of Survey (not eligible)]

**Q2.2** Your gender?

- Female
- Male
- Other \_\_\_\_\_

**Q2.3** How many persons in each age group live in your home on a regular basis? Please include yourself, other adults, and any children who live with you all or part of the time.

	None	1 person	2 persons	3 persons	4 persons	5+ persons
Age group: Under 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Age group: 5-11 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Age group: 12-17 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Age group: 18+ years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q2.4** How would you best describe the area in which you live?

- Capital city and surrounding suburbs
- Regional centre or city
- Country town
- Semi-rural
- Isolated farm or property

**Q2.5** In which state or territory do you live?

- New South Wales
- Queensland
- South Australia
- Tasmania
- Victoria
- Western Australia
- Northern Territory
- ACT

**Q2.6** Do you live in a tropical or sub-tropical part of Australia where it is hot, warm or humid for most of the year?

- Yes
- No

**Q2.7 Do you rent or own your home?**

- Rent privately, e.g. with a landlord or real estate agent
- Rent public or social housing
- Own home with a mortgage
- Own home outright (no mortgage)
- Living rent-free or low-rent in someone else's home, e.g. with parents
- Other \_\_\_\_\_

**Q2.8 Do you (or your partner/spouse) have a low-income concession card? E.g. Low-Income Health Care Card or Pensioner Concession Card**

- Yes
- No
- Don't know / Unsure

**Q2.9 Were you born in Australia?**

- Yes
- No

**Q2.10 What type of home do you live in?**

- Detached home (free-standing house)
- Semi-detached home, e.g. town house, terrace or duplex
- Apartment, flat or unit
- Other \_\_\_\_\_

**Q2.11 Do you use gas at your home? You may select more than one answer.**

- Yes - Mains Gas (piped)
- Yes - LPG / Bottled Gas
- No
- Don't know / Unsure

**Q2.12 Do you have solar electricity (solar PV panels) at home?**

- Yes
- No
- Don't know / Unsure

**Q2.13 What type of hot water system do you have? If you have more than one hot water system, please select main one for water used inside the home.**

- Electric Hot Water
- Heat Pump Hot Water
- Gas Hot Water
- Solar Hot Water
- Other \_\_\_\_\_
- Don't know / Unsure

**Q2.14** Does your home have an electricity 'smart meter'?

- Yes
- No
- Don't know / Unsure

**Q2.15** In your household, who usually decides which electricity company or deal you sign up to?

- Me
- Mostly another adult, e.g. partner, wife or husband
- These decisions are usually shared
- Real estate agent, landlord or body corporate arranges electricity supplier / connection
- There is only one electricity company/offer where I live
- Other \_\_\_\_\_

**PRIORITIES AND ROUTINES**

**Q3.1** The following statements apply to some households. Please indicate whether you agree or disagree with the statement (for you / your household).

	Agree Strongly	Agree Somewhat	Neither / NA	Disagree Somewhat	Disagree Strongly
We rely on routines to make our days manageable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Housework gets done whenever there is a bit of time available.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The busiest time in our home on weekdays (Mon-Fri) is usually in the late afternoon/early evening period.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Frequent disruptions to household routines are part of having a family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what's best for my child(ren)'s health is always a high priority.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I want to use less electricity at home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In busy times at home, doing things to save electricity is not 'front of mind' for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electricity use can cause disagreement in our family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child(ren) are often more difficult to manage around dinner time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family's comfort usually takes priority over saving electricity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saving time is a priority in our household.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am concerned about environmental issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try not to do any housework after 9pm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q3.2** In one or two words, how would you describe the busiest time of day in your home?

\_\_\_\_\_

**Q3.3** How much effort does your household put to reducing your home electricity use? You may select more than one answer.

- A lot
- Some
- Not much
- None
- Depends how busy we are at the time
- Other \_\_\_\_\_

**Q3.4** Optional: Comments about FAMILY ROUTINES, PRIORITIES AND ELECTRICITY USE

\_\_\_\_\_

**LAUNDRY**

**Q4.1** How much of your household's washing (clothes, bedsheets, towels etc) do YOU do?

- Not much / None
- Some
- Most / All

**Q4.2** [Question Displayed Only If Q4.1 'Not much / None' Is Not Selected]

Please read each of these statements about washing (clothes, bedsheets, towels etc). Select 'Yes' for each statement which is generally true for your home.

	—	Yes	No
Most washing is done on a regular day or two of the week.		<input type="radio"/>	<input type="radio"/>
Most washing is done when there is a chance to do it (no regular routine).		<input type="radio"/>	<input type="radio"/>
The washing machine runs most days of the week.		<input type="radio"/>	<input type="radio"/>
My child(ren) do some loads of washing themselves.		<input type="radio"/>	<input type="radio"/>
I consider washing machines to be high electricity use appliances.		<input type="radio"/>	<input type="radio"/>
Washing is often done when clean items are urgently needed, e.g. uniforms, sheets.		<input type="radio"/>	<input type="radio"/>
Washing is often done when the weather looks good for getting it dry.		<input type="radio"/>	<input type="radio"/>
The washing machine is often used between 2pm and 9pm on weekdays (Mon-Fri).		<input type="radio"/>	<input type="radio"/>
The washing machine is often used after 9pm.		<input type="radio"/>	<input type="radio"/>
IWe avoid washing late at night due to risk of noise or clothes smelling or creasing.		<input type="radio"/>	<input type="radio"/>
IWe wash often because otherwise it becomes too much work to get the washing done.		<input type="radio"/>	<input type="radio"/>
More than 6 loads of washing each week is usual for my home.		<input type="radio"/>	<input type="radio"/>
Our household does less washing than most families we know.		<input type="radio"/>	<input type="radio"/>

**Q4.3** Do you have an electric clothes dryer at home?

- Yes
- No

**Q4.4** [Question Displayed Only If Q4.3 'No' Is Not Selected]

What is your preferred way to dry clothes?

- Clothes dryer
- Hang washing on clothes rack or clothes line
- Other \_\_\_\_\_

**Q4.5** [Question Displayed Only If Q4.3 'No' Is Not Selected]

Who are the MAIN people that use the clothes dryer in your home? You may select more than one answer.

- Me
- Other adult(s)
- One or more children

**Q4.6** [Question Displayed Only If Q4.3 'No' Is Not Selected]

Please read each of these statements about drying clothes. Select 'Yes' for each statement which is generally true for your home.

	—	Yes	No
The clothes dryer is used to dry most of our washing.		<input type="radio"/>	<input type="radio"/>
The clothes dryer is used less than once a week.		<input type="radio"/>	<input type="radio"/>
The clothes dryer is mainly used when urgently needed items are wet.		<input type="radio"/>	<input type="radio"/>
The clothes dryer gets used more than I would like it to be.		<input type="radio"/>	<input type="radio"/>

The clothes dryer gets used because it's easier or quicker than hanging washing out.	<input type="radio"/>	<input type="radio"/>
The clothes dryer is used more in wet or cold weather.	<input type="radio"/>	<input type="radio"/>
There is enough space to hang washing up to dry at our home.	<input type="radio"/>	<input type="radio"/>
We live in an apartment building which restricts outdoor (e.g. balcony) clothes drying.	<input type="radio"/>	<input type="radio"/>
I am concerned about privacy or safety of hanging washing outside.	<input type="radio"/>	<input type="radio"/>
I consider clothes dryers to be high electricity use appliances.	<input type="radio"/>	<input type="radio"/>
The clothes dryer is often used between 2pm and 9pm on weekdays (Mon-Fri).	<input type="radio"/>	<input type="radio"/>
The clothes dryer is often used after 9pm.	<input type="radio"/>	<input type="radio"/>
It is inconvenient, risky or too noisy to use the clothes dryer after 9pm.	<input type="radio"/>	<input type="radio"/>

**Q4.7 Optional: Comments about WASHING, DRYING AND ELECTRICITY USE**

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**FOOD AND DISHWASHING**

**Q5.1** Who are the MAIN people that cook or prepare evening meals in your home? You may select more than one answer.

- Me
- Other adult(s)
- One or more children
- We don't do much cooking in our home

**Q5.2** Which appliances are MOSTLY USED to prepare evening meals in your home? Please select up to 3 of the MOST USED appliances.

- Oven - electric
- Oven - gas
- Stove top - electric or induction hot plates
- Stove top - gas burners
- Microwave
- Outdoor BBQ
- Thermomix
- Electric rice cooker
- Slow cooker
- Pressure cooker
- Toaster
- Sandwich press or jaffle-maker
- Other \_\_\_\_\_
- Don't know

**Q5.3** Please read each of these statements about food and hot drinks. Select 'Yes' for each statement which is generally true for your home.

	Yes	No
Quick and easy meals are a priority for our household.	<input type="radio"/>	<input type="radio"/>
My child(ren) often have hot snacks in the afternoon on weekdays (Mon-Fri).	<input type="radio"/>	<input type="radio"/>
I/We like to bake biscuits, cakes or bread in the afternoons on weekdays (Mon-Fri).	<input type="radio"/>	<input type="radio"/>
Hot drinks are an important part of our family life.	<input type="radio"/>	<input type="radio"/>
Since having children, extra/bigger fridges or freezers were needed in our home.	<input type="radio"/>	<input type="radio"/>
I/We cook meals in advance and freeze them.	<input type="radio"/>	<input type="radio"/>

I/We buy frozen or packaged meals to make it easier for children to get their own meals or snacks.	<input type="radio"/>	<input type="radio"/>
I think of fridges as high electricity use appliances.	<input type="radio"/>	<input type="radio"/>
Most nights I/we cook or prepare more than one meal due to allergies or different food preferences.	<input type="radio"/>	<input type="radio"/>
Some family members often eat dinner later than others, e.g. because of work, sport or meetings.	<input type="radio"/>	<input type="radio"/>
Home-cooked, healthy food is a priority for our family.	<input type="radio"/>	<input type="radio"/>
I consider cooking with electricity to be a high electricity use activity.	<input type="radio"/>	<input type="radio"/>
My child(ren) sometimes cook the family's evening meal.	<input type="radio"/>	<input type="radio"/>

**Q5.4** Do you have an electric dishwasher at home?

- Yes
- No

**Q5.5** [Question Displayed Only If Q5.4 'No' Is Not Selected]

Please read each of these statements about the dishwasher. Select 'Yes' for each statement which is generally true for your home.

	Yes	No
The dishwasher runs most days of the week.	<input type="radio"/>	<input type="radio"/>
The dishwasher usually runs more than once each day.	<input type="radio"/>	<input type="radio"/>
The <u>main times</u> the dishwasher is used is when we have guests.	<input type="radio"/>	<input type="radio"/>
My child(ren) often switch the dishwasher on as part of their chores.	<input type="radio"/>	<input type="radio"/>
The dishwasher often runs between 2pm and 9pm on weekdays (Mon-Fri).	<input type="radio"/>	<input type="radio"/>
The dishwasher gets switched on as soon as it is full.	<input type="radio"/>	<input type="radio"/>
I/We usually switch the dishwasher on after 9pm.	<input type="radio"/>	<input type="radio"/>
I/We use a timer or delay button to run the dishwasher late at night.	<input type="radio"/>	<input type="radio"/>
I/We prefer to run and open or unpack the dishwasher before we go to bed.	<input type="radio"/>	<input type="radio"/>
The dishwasher is too noisy to run late at night.	<input type="radio"/>	<input type="radio"/>
I consider dishwashers to be high electricity use appliances.	<input type="radio"/>	<input type="radio"/>

**Q5.6** Optional: Comments about WASHING, DISHWASHING AND ELECTRICITY USE

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**TV and COMPUTERS**

**Q6.1** Please read each of the following statements about television (TV). Select 'Yes' for each statement which is generally true for your home.

	Yes	No
We have at least one TV in our home.	<input type="radio"/>	<input type="radio"/>
One or more of my children have a TV in their bedroom.	<input type="radio"/>	<input type="radio"/>
Use of computers or other devices has replaced most TV use in our home.	<input type="radio"/>	<input type="radio"/>
TV is often needed to entertain child(ren) while I/we do things like cook, clean, or rest.	<input type="radio"/>	<input type="radio"/>
Watching TV is important for a parent to relax or 'wind down' in the evening.	<input type="radio"/>	<input type="radio"/>
The TV is usually on in weekday afternoons and early evenings.	<input type="radio"/>	<input type="radio"/>
The TV is usually on when someone is at home.	<input type="radio"/>	<input type="radio"/>
I consider TVs to be high electricity use appliances.	<input type="radio"/>	<input type="radio"/>



**Q6.2** Do any of your children use any electronic devices at home? E.g. Computers, laptops, tablets, iPads, computer games (e.g. Xbox, Wii), music players, smart phones.

- Yes
- No

**Q6.3** [Question Displayed Only If Q6.2 'No' Is Not Selected]

Please read each of the following statements about electronic devices such as computers, laptops, smart phones, computer games (e.g. Xbox, Wii etc.) etc.

Please select whether you agree or disagree with the statement.

	Agree Strongly	Agree Somewhat	Neither / NA	Disagree Somewhat	Disagree Strongly
There are more electronic devices in our home than 3 years ago.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electronic devices are most heavily used in the afternoons and/or early evenings of weekdays.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electronic devices help entertain children while I/we get things done, e.g. cook, clean, rest.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider it important for my child(ren) to spend time online to connect with friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am concerned that my children spend too much time using electronic devices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My children develop important skills using electronic devices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am concerned about negative effects of electronic devices on my child(ren)'s health or wellbeing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important that my children have the electronic devices that other children have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel in control of how much time my child(ren) spend using electronic devices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider use of electronic devices as high electricity use activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child(ren) need electronic devices to do homework.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q6.4** Optional: Comments about TV, COMPUTERS, ELECTRONIC DEVICES AND ELECTRICITY USE

**BATHING, HEATING AND COOLING**

**Q7.1** Please read each of these statements about bathing or showering. Select 'Yes' for each statement which is generally true for your home.

	Yes	No
Bathtime for young children is/was usually between 4pm and 8pm in our home.	<input type="radio"/>	<input type="radio"/>
Bathtime is/was important to calm, entertain or prepare young children for bed.	<input type="radio"/>	<input type="radio"/>
I prefer my child(ren) to bath or shower everyday.	<input type="radio"/>	<input type="radio"/>
Young children only need to bath or shower every few days or less.	<input type="radio"/>	<input type="radio"/>
It can be difficult to get my child(ren) to have a bath or shower.	<input type="radio"/>	<input type="radio"/>
One or more of my children bath or shower too often or for too long.	<input type="radio"/>	<input type="radio"/>
It is difficult to limit the length or frequency of my child(ren)'s showers or baths.	<input type="radio"/>	<input type="radio"/>
Some of my child(ren) spend too much time drying or styling their hair.	<input type="radio"/>	<input type="radio"/>
I often fit my own shower or bath in around my child(ren)'s activities.	<input type="radio"/>	<input type="radio"/>
One or more adults usually showers/baths in the afternoon or early evening.	<input type="radio"/>	<input type="radio"/>

**Q7.2** In cooler parts of the year, do you use any heaters in your home?

- Yes
- No - It's not cold enough to need heaters where I live
- No - We don't use any heaters because energy is expensive
- No - We don't use heaters for other reasons \_\_\_\_\_

**Q7.3** [Question Displayed Only If Q7.2 'No' Is Not Selected]

Please read each of these statements about keeping warm when it's cold. Select 'Yes' for each statement which is generally true for your home.

	Yes	No
Our heating is programmed to regulate indoor temperature throughout cold parts of the year (all or part of the house).	<input type="radio"/>	<input type="radio"/>
An electric heater is used to warm the bedroom for child(ren) when it's cold.	<input type="radio"/>	<input type="radio"/>
An electric heater or heat lamps are used for child(ren)'s bathtime when it's cold.	<input type="radio"/>	<input type="radio"/>
We only use the heating when it's really cold.	<input type="radio"/>	<input type="radio"/>
We get cold and uncomfortable at home because we limit heater use to save electricity.	<input type="radio"/>	<input type="radio"/>
My child(ren) turn heating on (or up) themselves.	<input type="radio"/>	<input type="radio"/>
I consider electric heaters to be high electricity use appliances.	<input type="radio"/>	<input type="radio"/>
Our family sometimes disagrees about how much to warm the home.	<input type="radio"/>	<input type="radio"/>

**Q7.4** [Question Displayed Only If Q7.2 'No - It's not cold enough to need heating where I live' Is Not Selected AND Q2.6 'Yes' Is Not Selected]

Thinking of when you have/had a baby...please select the most relevant answer for where you live:

- It is/was healthier TO USE a heater to keep the room warm for a sleeping baby in cold weather.
- It is/was healthier NOT TO USE a heater to keep the room warm for a sleeping baby in cold weather.
- A heater is/was only used for a sick baby.
- Don't remember / Don't know
- Other \_\_\_\_\_

**Q7.5** Do you ever use air conditioning to cool your current home?

- Yes
- No

**Q7.6** [Question Displayed Only If Q7.5 'No' Is Not Selected]

Please read each of these statements about using air conditioning. Select 'Yes' for each statement which is generally true for your home.

	Yes	No
I/We only switch on the air conditioner(s) on very hot days.	<input type="radio"/>	<input type="radio"/>
Our air conditioner is programmed to regulate indoor temperature throughout hot seasons (all or part of the house).	<input type="radio"/>	<input type="radio"/>
Where I live, it is important to have air conditioning when you have children.	<input type="radio"/>	<input type="radio"/>
My child(ren) turn air conditioning on (or up) themselves.	<input type="radio"/>	<input type="radio"/>
We limit our air conditioning use to save electricity.	<input type="radio"/>	<input type="radio"/>
Our family sometimes disagrees about how much to cool the home.	<input type="radio"/>	<input type="radio"/>
An air conditioner is used to cool the bedroom for child(ren).	<input type="radio"/>	<input type="radio"/>
I consider air conditioners to be high electricity use appliances (e.g. refrigerated/reverse cycle air conditioners).	<input type="radio"/>	<input type="radio"/>

**Q7.7** Please read each of these statements about keeping cool in hot weather. Select 'Yes' for each statement which is generally true for your home.

	Yes	No
On very hot days we use fans in our home.	<input type="radio"/>	<input type="radio"/>
My child(ren) cope with the heat better than the adult(s).	<input type="radio"/>	<input type="radio"/>
On very hot days my children's behaviour is often more difficult.	<input type="radio"/>	<input type="radio"/>
On very hot days my child(ren) usually spend more time inside our home.	<input type="radio"/>	<input type="radio"/>
On very hot days we often go somewhere cooler to escape the heat at home.	<input type="radio"/>	<input type="radio"/>

**Q7.8** Optional: Comments about BATHING, HEATING, COOLING AND ELECTRICITY USE

## TARIFFS AND CHANGE

**Q8.1** Which of the following electricity tariffs is **most like** the one at your home?

- Same price for electricity all through the day and night (Flat-rate, No 'Off-Peak')
- Electricity is cheaper late at night for some appliances only (e.g. Off-Peak Hot Water)
- Electricity is cheaper late at night for all electric appliances (Peak AND Off-Peak)
- Time-of-Use tariff with 3 or more different electricity rates on weekdays (e.g. Peak, Shoulder AND Off-Peak)
- Other \_\_\_\_\_
  
- Don't know / Unsure

**Q8.2** When answering the previous question, did you do any of the following?

	—	Yes	No
Ask someone else about your electricity tariff?		<input type="radio"/>	<input type="radio"/>
Look for/at an electricity bill?		<input type="radio"/>	<input type="radio"/>
Feel unsure about having off-peak electricity or the off-peak times?		<input type="radio"/>	<input type="radio"/>

**Q8.3** [Question Displayed Only If Q8.1 'Same price for electricity all through the day and night' Is Not Selected AND is 'Electricity is cheaper late at night for some appliances only' Is Not Selected]

Does your household deliberately do anything differently because of peak and off-peak electricity rates?

- NO - We don't change what we do at home because of peak/off-peak electricity rates
- NO - We don't have off-peak electricity at our home
- YES - We deliberately do some things differently because of peak/off-peak electricity rates
- Don't know / Unsure

**Q8.4** [Question Displayed Only If Responses to Q8.1 and Q8.3 indicate that the household may have off-peak electricity available]

At night, what time does your off-peak (cheapest) electricity time begin?

- 6pm
- 7pm
- 8pm
- 9pm
- 10pm
- 11pm
- Midnight
- Other \_\_\_\_\_
  
- Don't know / Unsure
- Don't have off-peak electricity

**Q8.5** [Question Displayed Only If Q8.1 'Time-of-Use tariff with 3 or more different electricity rates on weekdays' Is Not Selected]

**Please consider this scenario:** Electricity becomes **more expensive** between 2pm and 9pm on weekdays (Mon-Fri). At the same time, electricity becomes **cheaper** at other times (mornings, late in the evening and weekends).

In the scenario above ... Which (if any) regular activities would your household **change or move to reduce electricity use** between 2pm and 9pm on weekdays (Mon-Fri) **to save money?**

	NO...would still do in peak	YES ...would change or move	Don't know	Not a usual 2pm-9pm activity.
Running the dishwasher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the washing machine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using the clothes dryer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using electric heating when it's cold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using air conditioning when it's hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using electric fans when it's hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watching TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using computers and other electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Charging phones and other electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking showers or baths	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooking the evening meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the pool pump/filter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ironing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vacuuming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q8.6** [Question Displayed Only If Q8.1 'Time-of-Use tariff with 3 or more different electricity rates on weekdays' Is Selected AND Q8.3 'No - We don't change what we do at home because of peak/off-peak electricity rates' Is Not Selected]

In an earlier question you indicated that your home has a Time-of-Use electricity tariff with 3 or more different electricity rates on weekdays (e.g. Peak, Shoulder AND Off-Peak).

Which (if any) regular activities has your household already **changed or moved to reduce electricity use** during the peak tariff period (most expensive) on weekdays **to save money?**

	NO change...still do in peak	YES...changed or moved	Don't know	Not a usual peak activity.
Running the dishwasher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the washing machine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using the clothes dryer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using electric heating when it's cold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using air conditioning when it's hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using electric fans when it's hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watching TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using computers and other electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Charging phones and other electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking showers or baths	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooking the evening meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the pool pump/filter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ironing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vacuuming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q8.7 Please consider this scenario:** The weather is forecast to be very hot (over 35°C) tomorrow and there may be a shortage of electricity. Everyone is asked to reduce their electricity use where possible between 2pm and 9pm on this hot day. This might happen a few times each year.

Considering what you just read about a possible electricity shortage on a very hot day ... would you try to reduce home electricity use between 2pm and 9pm on those occasions?

- No
- Yes
- Don't know / Unsure

**Q8.8** [Question Displayed Only If Q8.7 'Yes' Is Not Selected AND 'Don't know / Unsure' Is Not Selected]

Considering the previous scenario (possible electricity shortage on a very hot day) ... **Why wouldn't** your household reduce electricity use between 2pm and 9pm on those occasions?

You may select more than one answer.

- It's unreasonable to ask us to do this
- It would be too hard to change what we do in our home
- I am not interested in electricity issues
- It wouldn't make any difference
- I don't trust the electricity industry
- Electricity companies should be able to provide enough electricity at all times
- I don't think other households would reduce their electricity use
- It would be unhealthy for young, old, or unwell people in my home
- Other \_\_\_\_\_
- Don't know

**Q8.9** [Question Displayed Only If Q8.7 'No' Is Not Selected AND 'Don't know / Unsure' Is Not Selected]

Considering the previous scenario (possible electricity shortage on a very hot day) ... **WHY would** your household reduce electricity use between 2pm and 9pm on those occasions?

You may select more than one answer.

- Because I was asked to do it
- To be part of a community effort
- I am interested in electricity issues
- To reduce stress on the electricity grid
- To help prevent electricity outage (blackout)
- To help other people or places that need the electricity more than us
- It would be easy
- It would be fun or educational for my child(ren)
- Because we normally leave the home on very hot days anyway
- To benefit the environment
- Other \_\_\_\_\_
- Don't know

**Q8.10** [Question Displayed Only If Q8.7 'No' Is Not Selected AND 'Yes' Is Not Selected]

Is there anything you would like to say to about...

- the previous scenario (possible electricity shortage on a very hot day)?
- reducing home electricity use on those occasions?

**Q8.11** [Question Displayed Only If Q8.7 'No' Is Not Selected AND 'Don't know / Unsure' Is Not Selected]

For the previous scenario (possible electricity shortage on a very hot day) ... Which (if any) regular activities would your household change or move to reduce electricity use between 2pm and 9pm on those occasions?

	NO...would not change	YES ... would change or move	Don't know	Not a usual 2pm-9pm activity.
Running the dishwasher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the washing machine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the clothes dryer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using air conditioning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using electric fans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watching TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using computers and other electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Charging phones and other electronic devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking showers or baths	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooking with electricity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Running the pool pump/filter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ironing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vacuuming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All activities (would leave the home for a few hours)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q8.12** Optional: Comments about PEAK, OFF-PEAK, CHANGING ACTIVITIES or any of the questions you have been asked.

**BILLS AND FINANCES**

**Q9.1** What is the MAIN source of your household income?

- Government pension or allowance, e.g. Centrelink payment
- Wages, salary or own business income
- Investments or superannuation
- Other

**Q9.2** What is your current work status?

- Full-time home duties / Not employed in paid work
- Full-time paid work
- Part-time or casual paid work

**Q9.3** Does anyone else in your home do paid work?

	None	1 person	2+ people
Full-time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Part-time or casual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q9.4** In the last 12 months, did any of the following things happen for you?

You may choose more than one answer.

- Sought financial assistance from community/welfare organisation
- Did not have enough money to pay electricity bill on time
- Sought assistance from friends or family to pay electricity bill
- Could not pay for other important things, e.g. food, other bills, rent or mortgage
- Could not afford to use heating when I/we needed it
- Had electricity disconnected due to lack of money to pay
- Was at risk of electricity being disconnected
- Pawned or sold something to pay bills
- Been on a 'hardship' program because of unpaid electricity bills
- None of the above

**Q9.5** What is your family's TOTAL WEEKLY household income (before any tax is taken out)? Please include the income of all family members who live with you.

- Less than \$400
- \$400-\$699
- \$700-\$999
- \$1,000-\$1,499
- \$1,500-\$1,999
- \$2,000-\$2,500
- More than \$2,500
- Prefer not to say / Don't know

**Q9.6** Optional: Comments about BILLS OR FINANCES

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## **FINAL QUESTIONS**

**Q10.1** How old are you?

- Under 20
- 20-24
- 25-34
- 35-44
- 45-54
- 54-64
- 65+
- Prefer not to say

**Q10.2** [Question Displayed Only If Q2.9 'Yes' Is Not Selected]

In what country were you born?

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**Q10.3** [Question Displayed Only If Q2.9 'No' Is Selected]

How long ago did you move to Australia?

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- Less than 5 years ago
- 5-10 years ago
- 10-20 years ago
- More than 20 years ago
- Not applicable

**Q10.4** Do you usually speak a language other than English at home?

- Yes - please write language below 

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- No

**Q10.5** What is the highest qualification you have completed?

- Left school before finishing Year 10 / High School
- Year 10 / High School
- Year 12
- Trade or TAFE qualification
- Diploma
- Bachelor Degree
- Masters or MBA
- Doctorate / PhD

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**Qu11.1** If you have anything else you would like to mention please write it here:

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## 6.3 REVIEW OF HEATING AND COOLING-RELATED ADVICE FOR PARENTS WITH BABIES OR YOUNG CHILDREN

### The issue

Heating and cooling is the most significant energy cost for households (Petchey 2010). Parents may understand heating and cooling to be necessary for the health of babies or small children. Heating and cooling use for the health of children during peak times of the day may have additional financial impacts for households with children under cost-reflective pricing.

### Scope of review

- Professional advice and advice from other trusted sources relating to the use of home heating and cooling for the health of babies and young children.
- Conflicts in understandings regarding the needs of babies for mechanical heating and cooling.

### Method

The review consulted a range of online sources providing information for parents, including government, professional healthcare, scientific advisory groups, support groups, parenting, and commercial sources and forums. The review primarily reviewed information from Australian sources.

The advice contained in these sources may (or may not) differ from advice parents receive in personal consultations with professionals such as doctors, maternal health nurses etc. The review was restricted to advice specifically relating to caring for babies or young children at home in hot or cold weather.

### Why hot and cold weather are concerns for parents

Hot and cold weather were found to be of concern for parents with babies and/or young children for the following reasons:

- Babies are more quickly affected by cold temperatures and can get dehydrated from small amounts of fluid loss in hot weather due to their low body weight;
- Babies have a limited ability to sweat and have limited ability to regulate their own temperature in hot and cold weather;
- Babies can become sleepy in the heat – they may need to be woken and fed to maintain hydration;
- Breastfeeding can be more difficult in hot or cold conditions<sup>47</sup>;
- Babies/young children can be irritable and cry and/or have more difficulty sleeping in hot and cold weather; and

Overheating can cause Sudden Infant Death Syndrome (SIDS) but evidence mainly relates to overheating caused by excess bedding rather than heat caused by hot weather.

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<sup>47</sup> In addition to advice relating to health of babies and young children in hot and cold weather, there are heating and cooling implications from professional advice to support mothers in breastfeeding.

## Summary of advice available to parents for hot weather

<ul style="list-style-type: none"> <li>• Watch babies and young children carefully during hot weather</li> <li>• <a href="#">Stay indoors on hot days<sup>i</sup></a></li> <li>• <a href="#">Go to cooler places outside the home</a></li> <li>• Allow air to circulate around cot with fan (but not blowing onto baby) or other ventilation/breeze, hang wet towels to help cool the air</li> <li>• <a href="#">Use home air conditioning</a></li> <li>• Air conditioning can cause babies to become dehydrated</li> </ul>	<ul style="list-style-type: none"> <li>• Sleep baby in the coolest room of the house</li> <li>• Babies may need extra breastfeeds</li> <li>• Open places are better for sleeping than enclosed prams</li> <li>• Use lighter clothing/bedding</li> <li>• Encourage older babies/toddlers to eat fruit, ice cubes</li> <li>• If hot to touch, sponge baby with lukewarm water or bathe frequently</li> <li>• Keep baby out of sun (use curtains)</li> </ul>
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<sup>i</sup>Predominant items with direct implications for energy use (in blue)

## Conflicting advice regarding use of air conditioned cooling and fans

Most advice available in Australia is general and not tailored to particular states or climate zones. Online forums frequently contain discussions between parents debating whether the use of air conditioning for their children is necessary or healthy. The topic is an area of concern for parents and there is little consensus.

While many online sources of advice do not preference or assume the availability of air conditioning in homes with children<sup>48</sup>, others do. Green Cross Australia, an organisation ‘empowering a resilient Australia’ prioritises air conditioning in its advice to parents for looking after babies during heatwaves<sup>49</sup>. The Royal Women’s Hospital, Melbourne presents air conditioning as the preferable/superior approach but provides alternatives to maintain baby health during hot weather ‘if you do not have a fan or air-conditioner’<sup>50</sup>. The Western Australia (WA) Department of Health similarly implies a preference of air conditioning<sup>51</sup>. Both information sources warn of the risks of too much cooling with 24-26°C recommended as a minimum temperature for babies by the WA site. The UK National Health Service (NHS) advice differs, saying ‘your baby will sleep most comfortably when their room is between 16°C (61°F) and 20°C (68°F)’<sup>52</sup>.

Some other Australian government sites suggest different approaches, including little or no focus on the use of air conditioning. For example, a State Government health advice website in Victoria does not mention home air conditioning but encourages parents to keep children indoors on hot days and provides suggestions ‘if you must go outside’<sup>53</sup>. Parents are likely to use more electricity through a

<sup>48</sup> Examples: Parenting/baby websites such as [www.kidspot.com.au](http://www.kidspot.com.au), [www.bellybelly.com.au](http://www.bellybelly.com.au), [www.parents.com](http://www.parents.com)

<sup>49</sup> <http://actfirst.org.au/preparation-advice/heatwave/heatwave-babies/prams,-strollers-and-carseats>

<sup>50</sup> <https://www.thewomens.org.au/health-information/pregnancy-and-birth/at-home-with-your-baby/heatwave-precautions-for-babies-young-children/>

<sup>51</sup> <http://www.public.health.wa.gov.au/cproot/2868/2/Heatwave%20-%20Caring%20for%20babies%20and%20young%20children.pdf>

<sup>52</sup> <http://www.nhs.uk/chq/Pages/1955.aspx?CategoryID=62>

<sup>53</sup> [http://www.betterhealth.vic.gov.au/Bhcv2/bhcarticles.nsf/pages/Child\\_safety\\_hot\\_weather?open](http://www.betterhealth.vic.gov.au/Bhcv2/bhcarticles.nsf/pages/Child_safety_hot_weather?open)

variety of activities (possibly including air conditioning) if they adopt the ‘stay home’ approach. Other advice provided by Queensland Health recommends parents ‘keep your home cool or go to cool areas, such as air conditioned buildings or shopping centres’<sup>54</sup>.

Although babies need close monitoring and care to maintain health during hot weather, the National SIDS Council of Australia (SIDS and Kids) says ‘there appears to be no association between SIDS and high external environmental temperatures’<sup>55</sup>. They reference Scheers-Masters et al. (2004).

The reference material (including any existence of commercial or other interests) supporting the claims made by some websites providing advice to parents is often unclear. In some cases commercial interests are clear and draw on common parental fears and unverified or misused information to present air conditioning as the only healthy approach to cooling babies and young children. For example, Crown Power, an air conditioning and electrical business claims that ‘since overheating is linked to Sudden Infant Death Syndrome, young children benefit from air conditioning being set cooler than what most adults generally need’ and that ‘most paediatricians recommend a temperature between 18-21 degrees as optimum’, that use of air conditioning will help prevent heat rash<sup>56</sup>.

Some parents consider fans to be too dangerous when located near children (Nicholls & Strengers 2014). However, a 2008 study found that use of a fan in children’s bedrooms reduced the incidence of Sudden Infant Death Syndrome (Coleman et al. 2008). This does not appear to have affected medical advice. However the Raising Children Network, a scientifically validated information source supported by government and child research organisations such as the Murdoch Children’s Research Institute, advises use of a fan in hot weather and to mask out noises which could wake a baby<sup>57</sup>.

### **Summary of heating-related advice available to parents**

Sources of advice for parents in cold weather often specify ‘ideal’ temperatures for a baby’s bedroom. The advised temperatures vary but generally range from 16-22°C. These recommendations comes from a wide range of sources including a ‘paediatric sleep expert’ on a commercial advice website for parents<sup>58</sup>, the Lullaby Trust (a SIDS support organisation working with the NHS in the UK-based)<sup>59</sup>, and specialist medical sources such as the Royal Women’s Hospital, Melbourne<sup>60</sup>.<sup>61</sup>

However the SIDS and Kids website specifically states that it ‘does not recommend a specific room temperature for healthy babies’. They state that marketing has led parents to think that specific room temperatures are needed and that ‘in Australia with the absence of very extreme temperatures it is usually not necessary to measure room temperature’<sup>62</sup>. SIDS and Kids also advises against extra heating when babies have the common cold. The Raising Children Network also encourages parents to monitor their baby’s temperature directly (through touch) rather than using a

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<sup>54</sup> <http://www.health.qld.gov.au/disaster/heat/prevent-babies.asp>

<sup>55</sup> SIDS and Kids. National Scientific Advisory Group (NSAG). 2007. Information Statement: Room temperature. Melbourne, National SIDS Council of Australia. This information statement was first posted in September, 2007

<sup>56</sup> <http://www.crownpower.com.au/blog/advice-and-tips/nursery-air-conditioning-and-heating>

<sup>57</sup> [http://raisingchildren.net.au/articles/dressing\\_baby\\_for\\_bed.html](http://raisingchildren.net.au/articles/dressing_baby_for_bed.html)

<sup>58</sup> Example: [http://www.babycenter.com/404\\_whats-the-perfect-sleep-environment-for-a-toddler\\_1288072.bc](http://www.babycenter.com/404_whats-the-perfect-sleep-environment-for-a-toddler_1288072.bc)

<sup>59</sup> <http://www.lullabytrust.org.uk/roomtemperature>

<sup>60</sup> <https://www.thewomens.org.au/health-information/pregnancy-and-birth/at-home-with-your-baby/crying-baby/>

<sup>61</sup> <https://www.thewomens.org.au/health-information/pregnancy-and-birth/at-home-with-your-baby/crying-baby/>

<sup>62</sup> SIDS and Kids. National Scientific Advisory Group (NSAG). 2007. Information Statement: Room temperature. Melbourne, National SIDS Council of Australia.

room thermometer and does not refer to using heating in a range of detailed information sheets to assist parents promote healthy sleep for babies and children<sup>63</sup>.

In online forums, parents express a range of concerns about the safety of different type of heating needed for children bedrooms<sup>64</sup>.

### **Specific child health conditions and heating and cooling**

Asthma: Some websites advise parents to use air conditioning to manage childhood asthma, for example: ‘to maintain good air quality inside your home... Run the air conditioning, especially on days with high pollen or mould counts or ozone or pollution warnings’<sup>65</sup>. The Royal Children’s Hospital does not refer to the need to use air conditioning in asthma-related advice<sup>66</sup>.

Eczema is aggravated by heat and dryness so parents are advised to keep children cool and advise against heating in bedrooms and suggest parents use less home heating and more clothing in cool weather. Parents are reminded that concerns about catching a cold from insufficient warmth is an ‘old wives’ tale’ (Royal Children’s Hospital, Melbourne)<sup>67</sup>.

### **Implications of conflicting advice for parents**

The review identified different devices (electric heaters, central heating, air conditioning, fans), and other (non-mechanical) means for regulating temperature. There is no clear and consistent advice or evidence to suggest that babies and young children require additional heating and cooling from appliances such as air conditioners and/or electricity heaters in Australia, except in relation to some specific health conditions. Even then, there is mixed advice on providing additional heating and cooling for sick children, or to prevent conditions such as SIDS.

Discussions about heating and cooling is focused on issues of health, wellbeing (sleeping, feeding) and safety. The approach to heating or cooling (as necessary or unnecessary) adopted may involve greater electricity costs which are not considered by parents in the context of trying to do what’s best for the health of a child. The findings from the *Changing Demand* project do suggest that heaters and air conditioners can assist parents with ensuring babies and young children are manageable when unwell, or on very hot or cold days.

Conflicting advice and the proliferation of unsubstantiated claims that heighten parents’ fears may be exacerbating trends towards providing additional heating and cooling for babies and young children. There is an opportunity to clarify and consolidate this advice in conjunction with future energy reforms or strategies which target peak demand on very hot or cold days.

Note: Websites accessed December 2014

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<sup>63</sup> [http://raisingchildren.net.au/articles/dressing\\_baby\\_for\\_bed.html](http://raisingchildren.net.au/articles/dressing_baby_for_bed.html)

<sup>64</sup> Example: <http://www.babycenter.com.au/thread/837123/heating>

<sup>65</sup> [http://kidshealth.org/parent/medical/asthma/asthma\\_home.html](http://kidshealth.org/parent/medical/asthma/asthma_home.html)

<sup>66</sup> [http://www.rch.org.au/kidsinfo/fact\\_sheets/Asthma/](http://www.rch.org.au/kidsinfo/fact_sheets/Asthma/)

<sup>67</sup> [http://www.rch.org.au/derm/eczema/Knowing\\_Your\\_Childs\\_Eczema/](http://www.rch.org.au/derm/eczema/Knowing_Your_Childs_Eczema/)